

ATHLETIC EQUIPMENT FACILITY OPERATIONS

An Interactive Qualifying Project Report

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By

Jessica Coelho

Antoine Coleman

Janelle Tavares

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Professor Diane Strong, Major Advisor

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3. Facility Operations

Professor Soussan Djamassbi, Co-Advisor

Abstract

This IQP was to optimize WPI's Athletic Equipment Room, particularly its inventory, workers, and physical space management. The IQP group met this goal while considering the health and fitness goals of the WPI community. The group observed WPI's operations and those of other athletic facilities. It researched technical and organizational options to optimize management. The group produced a system to maintain inventory (Microsoft Access database with inventory bar codes) and revised procedures and space organization.

Executive Summary

This Interactive Qualifying Project had two main objectives. The first objective was to optimize the methods by which the WPI Athletic Equipment Room manages its inventory. The second, which is as important as the first, was to continue to meet the health and fitness goals of the WPI community, while making modifications to achieve the first objective. The sponsor of this project, Shawn McAvey, was primarily concerned with being able to accurately track his inventory. In the past, all records were kept on paper. Some discrepancies in these records led to lost or stolen inventory. Other lesser concerns included managing the workers and the overall layout of the equipment room. There was no designated location for all records to be stored. Also, the equipment room's space was not being used as efficiently as possible. The IQP group concluded that a Microsoft Access database coupled with bar coding the inventory would be the optimal method of tracking inventory. Using WPI ID's and the bar codes found on these ID's would not only assist in this tracking, but would also help manage the workers schedules. To make these modifications, the group needed to utilize resources provided to them by WPI and the Athletic Department. The result: a computer-based equipment managing system which tracks inventory as well as workers and their schedules. This new system is complimented by renovations to the equipment room and the closets, which store equipment, to create a more efficient use of space.

A more specific description of this modified system follows. Each item within the equipment room and its closets corresponds to a bar code. These bar codes along with descriptions of the item are stored within the new database. Information about those using the equipment will also be stored within the database; WPI ID's identify each equipment user individually. Such information is added to the database continually, as opposed to having a table of names and ID's formed during system set up; WPI felt that would potentially be a security risk. The database has multiple functions. By using the bar code scanner with the system, the equipment room staff can check out any item and check it back in relatively quickly and securely. The system also manages work study students' schedules and athletes' contracts. Although the primary modifications are technical, other modifications within the room include minor changes to laundry and security procedures.

The final concern of the project sponsor was having an efficient environment. This meant having frequently used items within reach of the main work areas. As a result, less frequently used items were reallocated. A few important tools to help make an efficient space possible included peg board and space-saving vacuum bags. The peg board efficiently used the height of the room to hang certain items. The bags store sports uniforms. These bags, when compressed, use much less space than the large plastic bins that previously held the uniforms.

These modifications could not be possible without the assistance of the WPI faculty and staff, as well as funding from the Athletic Department. The costs for this project totaled approximately \$1500, which was under budget due to some minor adjustments after product trials. These costs included all technical equipment such as a printer and its accessories, bar coding equipment, and some organizational equipment.

Through this project, the group provided the project sponsor with a program that tracks inventory and stores information about work study scheduling. In addition, the group reallocated storage space and reorganized some stored items. The group also provided documentation about the changes to the equipment room and how to set up and maintain the new system. To conclude, the group met all of its project goals, as well as those of the project sponsor.

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1. Introduction

Many colleges and universities around the country face the challenge of maintaining their ever-increasing fitness and sports inventories. Methods of maintaining and organizing these inventories vary among individual facilities. Size is a major factor, but not the only one to consider. Because of this, every facility must develop its own method of management. Ideally, an inventory management system conforms to an individual situation to make running a facility efficient and cost-effective.

This IQP group seeks to analyze the management system of the athletic equipment room at Worcester Polytechnic Institute (WPI). In doing so, the group will assess whether incorporating new methods and technologies could help the equipment room better serve the community. The group will perform assessments through observations of the equipment room, interaction with the staff, and visits to other schools with newer facilities. In assessing current operations, the group will divide observations into three categories – technical, which includes researching and designing a database to manage inventory; procedural, which includes suggestions on security, laundry, and lending procedures; and organizational, which includes researching more efficient ways of storing inventory. Many other college equipment rooms only handle varsity sports; the WPI equipment room handles not only varsity sports, but also club sports, intramural sports, and the equipment for the physical education classes. The large amount of inventory across all these sports and classes must be taken into consideration when designing a more efficient system.

The ultimate goal of the group is to use the available resources to optimize the functionality of the equipment room. Resources include space, equipment room personnel, a budget of approximately \$2000, and other services provided by WPI. While completing this goal, the group intends to preserve the equipment room staff's primary goal, which is to help the WPI community meet its health and fitness goals as those goals change over time.

The equipment room staff includes full-time and part-time personnel. Full-time staff consists of two capable and experienced managers - Shawn McAvey, Athletic Equipment Manager, and Rick Beaulac, Assistant Equipment Manager. In addition, work study students staff the equipment room. One disadvantage of having work study students as part-time workers is that they may only be able to work for one semester. So, the group is providing guides as an efficient method to quickly train new work study students as they replace experienced ones.

This project maintains a social perspective, keeping in mind two groups - the members of the community who take advantage of the services provided by the equipment room as well as the staff who serve the community. In addressing the needs of both groups and in maximizing the efficiency of the

equipment room's management, this IQP hopes to enhance the contributions of the equipment room to the wellness and fitness of the WPI community.

2. Fitness and Equipment Management Background

The word gymnasium has evolved from a meeting place for the youths in Ancient Greece, in which they would converse (*Gymnasium.*), to the modern definition of gymnasium as “a building or room designed and equipped for indoor sports, exercise, or physical education.” (Random House, 2007). Physical education is a product of the recent past. In the U.S. in the 1970s, Americans went through a fitness revolution. The obesity rates were at an all time high due, in the most part, to a shift to urban culture (*New study tracks American fitness revolution.* 2006). Most Americans no longer lived in rural farm communities. In those communities, farm work was the only exercise and was sufficient for keeping one in good health. With the rise of cities, however, daily work did not always require manual labor or physical exertion. Exercise became a choice, not a way of life. Therefore, in the 1970s and 1980s, the United States Government funded programs to make Americans aware of fitness; collectively, these programs were referred to as “Fitness Across America.” These programs included physical education, after-school programs, public gyms, Boys and Girls clubs and YMCAs (*Fitness revolution.* 2002). This fitness revolution fueled the development of new gymnasium facilities and fitness equipment, in addition to increasing the number of facilities across the country. As fitness became more popular, interest in sports also increased, reflected in the number of televised professional sporting events and the increasing size of sports arenas. Soon, collegiate sports became just as popular, mostly Division I sporting events. Some of these sports teams played in arenas comparable to those of professional athletes. With increasing attention on sports as entertainment, athletes strived to improve their performances. This equates to more weight training and cardiovascular exercise. In turn, the fitness industry again responded with more technology. Likewise, the general public sought to emulate these new American heroes.

In addition, the success of mass media and popular culture contributed to the self-consciousness of America. Health and certain physical characteristics were part of the new ideal instilled by media. The general public sought to be like these “beautiful people.” Whether or not this became an obsession, it moved the culture toward being more health conscious.

At WPI, history is a source of pride, so records of the past are available to current students. Herbert Taylor recounts WPI’s attitude towards sports and fitness in the past. He writes:

“Not only was there little time for organized social or athletic activities, but there was little inclination toward them. Teachers and parents were agreed that work was a cardinal virtue, and that if boys were allowed to fritter away the moments in relaxation, they would be lacking in appreciation and would be jeopardizing their future success. Professor Thompson saw no need for outside activities. In his inaugural address he explained that ‘since courses of intellectual discipline and of mechanical training are carried on simultaneously, it is but fair to suppose that the two will supplement each other, so that, since the shop work will furnish the requisite amount of physical exercise it is expected that at least eight hours a day will be devoted to the work of the Institute by each pupil. Probably more than this

will be found practically necessary.’ But he added that ‘physical training will not be neglected, and all manly sports will be encouraged.’ It was to be many a long year before faculty encouragement in this direction was to be detected.” (Taylor, 1937)

In this, one can see that the founders of WPI focused on academics, not on encouraging physical fitness among its student body. Today, though the attitude is better, one can still see remnants of it - students spending all day on work and classes, not caring about eating habits. In the last 15 years WPI has placed a focus on physical fitness to encourage students and faculty to be more active. There are now programs for faculty that include yoga and self-defense classes. In addition, they are also welcome to many of the other physical education classes, which range from volleyball to basketball to tennis to different forms of dance. Also, the athletic department has added more cardio machines to the Fitness Center to encourage students to exercise. In many of the dining areas around campus, the Healthy Alternatives Office has posted flyers and provided pamphlets on the importance that eating, sleeping and exercising means for achieving overall wellness.

WPI’s first gymnasium was actually a makeshift facility just north of the Washburn shops created by the students. It consisted of a horizontal bar, parallel bars, ladders, and flying rings that were suspended from a crossbar in the trees. These were installed at minimal expense, and the gym was in constant use during students' free time. Due to the incessant demands from students for sports and recreation facilities, WPI built Alumni Gymnasium in 1916. Currently, Alumni holds all offices for varsity coaches, three locker rooms, the equipment room, three equipment room storage closets and a full size basketball court. With the growth of the university, WPI added Harrington Auditorium in 1968, which has a basketball court, three-thousand-person capacity seating, three locker rooms, two squash courts, three ROTC workout rooms and a room for wrestling practice. With the current scope of athletic teams and facilities, WPI utilizes its equipment room staff to coordinate many aspects of athletics. They manage all the equipment and the lockers, coordinate staffing, and provide services to encourage students, faculty and staff to be active and well. Through this IQP, the group seeks to maximize the positive impact of the equipment room on the community through efficient and effective management.

3. Requirements Analysis

The first phase of this IQP is analysis of the athletic equipment room management. This phase involves observing the current situation, assessing what could benefit from changes, and assessing how available resources could be used to make improvements. Throughout this process, the group will keep in mind what changes would be reasonable with given resources – personnel, space, money and services already available to WPI.

3.1. Observations of Athletic Equipment Rooms

To better understand how equipment rooms are run, the IQP group observed other facilities, as well as WPI's equipment room, as an integral part of the research. Witnessing other equipment room procedures and interviewing staff has been very informative and relevant, as they have already been through cycles of improvement. The group purposely contacted a variety of fitness facilities. It wanted to observe facilities that served communities of different sizes, as well as different athletic divisions. The general goal was to find a number of facilities that differed from WPI's in their day-to-day procedures, their inventory methods, and their organization of stored items, but whose procedures could apply to WPI. Not only did the group seek out a variety of collegiate facilities, the group considered observing commercial facilities to gain insight on how they perform similar functions in a different setting.

3.1.1. Commercial

Through observing commercial gyms, the group gathered information to compare a large-scale facility, which services a broad community, to smaller facilities, which only service college communities. One group member visited four commercial gyms: Bally's Total Fitness, Gold's Gym, Mass Health & Fitness, and Family Fitness. The managers of these facilities were very willing to assist the group. Unfortunately, the information they provided was not entirely useful.

Dale, the manager of Bally's Total Fitness, explained that equipment is never lent out; generally, the only equipment in their inventory system are fitness machines. Inventory is done once a year and is handled in the following manner. Every machine has a bar coded sticker on it. A maintenance worker gathers a list of serial numbers found on these stickers, which he then compares to lists from previous years. This maintenance worker adds new equipment to the master list when purchased.

At Gold's Gym, Todd is one of two managers. He explained that Gold's Gym does not lend out equipment either. Due to a theft problem, he does, however, keep track of his dumbbells. He set up a simple Excel worksheet consisting of the quantity of different sized dumbbells. He checks the inventory once every few weeks.

Both Shawn Gilbert, the manager of Family Fitness, and John Snyder, the owner of Mass Health & Fitness, only check inventory once a year, similar to Bally's procedure. Overall, the gyms have no need for any complex inventory systems, nor do they have any organizational advice for the group.

The group next observed collegiate facilities, the greater focus of research. All except the College of William & Mary were observed directly. The group inquired about this facility over the phone. The information from this conversation is relayed first, followed by all schools that the group observed directly.

3.1.2. College of William & Mary

WPI's equipment manager, Shawn, participates in a discussion group about equipment management. He posted a question about what software other managers were using, and how well it was meeting their needs. Through this channel, the group made contact with Jerry Fife, the Head Equipment Manager at the College of William and Mary. He responded to the inquiry with his situation and willingness to communicate. Of note, he uses an Access database to maintain his inventory.

Upon calling him, a group member gained further information about his entire system. Jerry keeps track of equipment and uniforms for the football team only, but has incorporated quite a bit of technology to do so. He taught himself enough Access to create a database for inventory. Using a WASP thermal printer and bar code software, he has bar coded equipment such as helmets and shoulder pads, but not uniforms. Though he has a heat transfer machine for pressing bar codes onto uniforms, he has not incorporated that into his system yet. He utilizes a scanner and a magnetic strip reader to input data directly into his database. All in all, Jerry's system cost about \$3,000.

In speaking to this school, the group gained knowledge of what worked for them and what did not. In terms of printing bar codes, Jerry personally eliminated the direct thermal and laser printing options, as the quality of the printed materials they produce does not last. He recommends using SQL Server for a database, as it is very secure, though he has not implemented this. On one hand, it is quite valuable to gain this knowledge. On the other, the size of their inventory and system is small, so this does not give much insight into the feasibility of implementing such a system on a larger scale, like the scale of WPI's equipment room.

3.1.3. Clark University

Upon visiting Clark University to assess their equipment management facilities, it was obvious that their system was not comparable. Evan Davis, the manager, only keeps track of uniforms and their laundering. Unlike WPI, he is not involved with equipment management for varsity sports or intramural

sports; coaches handle that individually. Clark University does not have a Physical Education department at all. The Proctor's desk, which is located next to the Equipment Room, controls lending to the general student body and facility sign ups. Their lending inventory only consists of a few items, namely balls for a few different sports, which is not comparable to WPI's system.

As his inventory consists only of uniforms, keeping track of these on Excel spreadsheets has been sufficient. Numbers (either on the uniforms themselves or permanently written on their tag) are the means by which he uniquely identifies an article. He is considering moving to an Access database, but this is not necessary because the current system is sufficient. This system easily allows him to know exactly what is in his inventory, and what has not been returned. The penalty for not returning something is a bill directly to the student.

Upon asking about the shortcoming of their system, Don regrets that he does not have more space. Space is a concern for pretty much every facility, but they are satisfied with their system despite this shortcoming. He keeps all uniforms in large plastic storage bins in one storage room. He feels this prevents environmental damage while in storage. A great strength of the system is proximity. The uniforms are stored across the hall from the laundry room. Student athletes drop off their laundry directly into the laundry room. Game bags are coded with colored tags, indicating different sports. Athletes pick up their bags of laundry with all their items already inside.

In terms of what can be learned from the equipment management system at Clark University, they make the best of their small scale. In keeping an athlete's articles together for pick up, the whole process of retrieval is very efficient. Currently at WPI, the system for picking up laundry requires the person working in the equipment room to retrieve individual items for a student athlete. When there is a line of people waiting to pick up uniforms, this can become inefficient. A case to consider is when an athlete does not always need to pick up all items (either none or just warm-ups), in the case of an injury or for a very large team in which not everyone dresses for each game. Record keeping must reflect this; as well, the person assembling items for a student must know not to look for items that had not been returned.

3.1.4. Worcester State College

The equipment management system at Worcester State College maintains all varsity sport equipment, but usually no physical education or intramural equipment. Its inventory and record of lending is solely on paper. Storage is spread across three rooms. Uniforms stay in the main storage room, or the office. Equipment mostly stays in the other two rooms. Within the office, in-season uniforms stay on mobile racks or hung up on stationary poles along the walls. Jimmy, the manager, keeps off-season uniforms folded on shelves and secured with hinged flaps which are secured with pad locks. When students arrive

to pick up uniforms, he allows one student to approach the counter at a time. Every week (sometimes more or less often) he keeps track of who checks out what uniforms and equipment, so that he can order replacements immediately for damaged or lost items.

This school also benefits from the proximity of their locker rooms and equipment room to the laundry facilities; they are all on one floor, in one hallway. Athletes drop off their laundry bags in a designated locker, which is then locked until a work-study student is available to do the laundry. After the laundry has been completed, the bags are returned to the locker and secured until a student athlete needs to retrieve his laundry. He prefers not to use heat drying, but rather air drying, to preserve the quality of some of the new synthetic materials in some uniforms.

Jimmy says his biggest challenge for maintaining his inventory is stealing. When it comes to students forgetting to return items or attempting to keep them, he says he has been pretty successful by coordinating with the Registrar's Office to put a hold on the students account so that the student cannot enroll until items has been returned or debts paid. If a student has graduated, the college has ties with the State of Massachusetts and can put other holds in place, e.g., vehicle registration. Regarding traveling teams, he has a unique system. For the night of a game, he has the away locker room doors re-cored, such that the away team's coach would be the only person with a key to that part of the facility. In general, he prefers to limit access to locker rooms, the laundry room, and all storage closets to prevent any person from committing theft - on-campus students, faculty, or staff and off-campus persons. His system works well, especially with cooperation from coaches, students and security guards. The major changes he would like to make concern security.

Through inquiring at Worcester State College, the ideas of efficiency and security are further enforced. Jimmy fits many jerseys in his office, and accessing them was quite easy with hangars and racks. Notably, these were the only types of items stored in his office. He addresses security along several steps of his process. Security is a concern that the group will have to address, but not necessarily with the same measures implemented at Worcester State College.

3.1.5. Providence College

Providence College (PC) is a Division I school that serves a larger community than WPI (approximately 1,000 more undergraduate students, according to their website). Despite this fact, the procedures are not any more advanced than those at WPI. Because the Varsity Equipment Manager was not available, a group member met with Kevin Broome, the director of Facilities and Club Sports. PC, like WPI, lends out equipment to students. This equipment includes balls, racquets, jump ropes, safety goggles, stopwatches, padlocks, and more. The staff checks equipment in and out via a printed table on a

clipboard. PC does do something that WPI does not, numbering each item, e.g., “PC Rec Ball #2.” Mr. Broome also handles club sports. We did not discuss how he handles that inventory. He did discuss his laundering procedures briefly. He arranges for the Varsity Equipment Manager to wash the practice gear and towels.

The organization of the room is fairly simple. It consists of six cabinets, each labeled according to its contents such as first aid, flag football, etc. Because varsity sports are kept separate from this equipment room, it is easier to handle the inventory for each sport. In keeping each individual varsity sport separate from each other and from intramural general student use equipment, Mr. Broome can easily manage his equipment using a simple Excel spreadsheet.

3.1.6. Bridgewater State College

The equipment room at Bridgewater State College is one of the newest facilities in the northeast. The equipment manager, Ken Duarte, keeps his facility organized and efficient. Regarding equipment, Ken stores some items in the main equipment room using some organizational equipment. He keeps balls in a vertical ball rack, which is mounted on the wall. This allows the balls to be removed and replaced easily, and also keeps the balls out of the way. Ken also succeeds in utilizing vertical space well with his wall of pegboard. Sundry items hang on the wall, mostly tools. These items are highly visible and easily retrieved, a very efficient use of space. Notably, a room dedicated to hanging off-season jerseys is another example of well-managed space. This room consisted of custom rods and hooks to keep off-season jerseys out of the way and out of harm’s way. Jerseys did not clutter precious shelf space. The group was rather impressed with how the Bridgewater State equipment room stored in-season jerseys. Towards the front of the room, a rotating rack holds up to three hundred jerseys, which can be sorted by sport and by number. This neat and organized method of storing jerseys occupies a relatively small amount of space, but retrieving an item remains easy and efficient.

In terms of records, Ken uses an Excel spreadsheet to keep records of what was lent and when it was returned. He posted the inventory of off-season jerseys on the wall of that room. Also, they keep records of contracts signed by athletes, which state that the athlete agrees to return the equipment received, or a penalty will be served. To ensure that not only sports equipment is returned, the equipment room requires that a student surrender ID upon borrowing a ball or towel. For faculty members, Ken created towel cards, which they substitute for ID cards in that situation.

Their system of doing the laundry is unique in that they use a product called laundry loops. This product is an improvement upon laundry bags. Using laundry loops eliminates the fire hazards of laundry bags in that there is no metal, which gets hot, marks the inside of machines, and creates sparks.

Furthermore, laundry loops ensures even drying. During this visit to Bridgewater State College, the group recognized some practices which utilized new technology, helped the equipment room keep organized, and used the available space very efficiently.

To summarize the group's observation of other equipment rooms, some aspects compared to the size and scope of WPI's equipment room, and some did not. Notably, no other school lent as much equipment to the general community, the student body, faculty, and staff. In terms of inventory management in a database, the College of William and Mary is the most advanced, using an Access database. Regarding organizational efforts, Bridgewater State College was the most successful in using the space available to them. In retrospect, the space in their main room is quite comparable to what WPI has. This IQP group seeks to keep the best aspects of these colleges in mind for comparison when assessing the WPI athletic room.

3.2. Worcester Polytechnic Institute

In spending time observing the athletic equipment room in process, the group noted how the equipment managers run this part of the athletic facilities. To communicate their operation, the group divided observations into three categories - use of technology, organizational methods, and procedures. The group was then better able to analyze the current system and compare it to what the group observed at other facilities. As a result, the group acknowledged practices which served the community well, and some areas which would benefit from some improvements.

3.2.1. Technical

Technology exists in the equipment room currently in two forms, computer software and computer hardware. Collectively, the managers use these resources for basic communication, submitting work orders, some inventory tasks, keeping track of locker usage, and scheduling work study students. These tasks contribute to not only maintaining the equipment room, but also managing other aspects of WPI athletics.

In terms of hardware, both Shawn and Rick have computer workstations. Shawn's desktop computer is a fairly recent Dell model, whereas Rick's desktop computer is an older Dell model. Both are on the WPI network. Until recently, there was no printer in the athletic equipment room; they connected to a networked printer in the athletic office. Continuing Education reallocated two used printers, both HP Deskjet 640C, from Waltham to the equipment room. One is now working and connected to Shawn's workstation, but it does not have a network card, so it can only be accessed from Shawn's computer. The

other may be further shuffled around. Currently, Rick's best printing option through his current connections is a printer in the athletic office.

Regarding software, the managers use spreadsheets for a few tasks. In terms of inventory, Rick keeps spreadsheets which contain roster information for most sports on his computer. Before a game, he prints a spreadsheet so that the managers or work study students can make a manual record of a student picking up the pieces of a uniform (jersey, shorts, pants, belt, warm ups, etc.). No one enters the information about inventory into the computer after records of uniform pick-up have been made on the printouts. Also, to keep track of inventory, they compare the items on this list with laundered items.

In addition to inventory maintenance, the equipment managers created an Excel spreadsheet of locker information that stores which lockers are available, which lockers are in use, to whom those lockers have been assigned, and any comments about deposits or assignment expiration. This information remains in the computer. Rick keeps blank tables on his computer, which he prints for scheduling work study students to assist with running athletic events. Like uniform pick-up, the information about scheduling does not return to the computer after students fill in these tables. Rick stores these schedules in a binder. These procedures concerning inventory maintenance, lending, and locker assignment are further explained below.

Notably, Rick's workstation is slow, often impeding his progress with his tasks. Also of note, both Shawn and Rick are conscientious with computer security; they consistently lock their desktops when leaving their workstations. Students must ask to gain access to a computer for equipment room related tasks.

3.2.2. Procedural

Some aspects of procedures performed in the WPI equipment room require direct contact with the WPI community, and some do not. The equipment room services four categories of people: the general WPI community, varsity and intramural athletes, the Physical Education students, and summer program attendees. The general WPI community, which includes faculty, staff and students alike, is welcome to borrow equipment, such as balls or racquets, to be used within the campus. The varsity and intramural athletes use the equipment room to store and launder uniforms and practice gear, as well as store all equipment needed for practice and games. Physical Education and summer program activities require equipment, which is stored within the equipment room. All of these groups are welcome to borrow towels, also.

These services provided by the equipment room require tracking inventory, laundry and other procedures associated with maintenance. Lending of items and returning athlete's laundered items are an

exchange involving interaction with members of the WPI community, whereas most of inventory, laundry and maintenance are “behind the scenes” procedures.

To maximize the equipment room’s contributions to the health and fitness of the WPI community, the group analyzed the efficiency and effectiveness of the procedures and determined procedures which could benefit from changes. This analysis begins with defining all current procedures of the WPI equipment room. Although the categories may overlap, procedures will be discussed in separate categories for clarity.

Table 1: Categories of Procedures

Categories	Procedures
General WPI Community	<ul style="list-style-type: none"> • Lending equipment • Lockers • Laundry • Inventory • Equipment Storage • Purchasing
Athletes	<ul style="list-style-type: none"> • Laundry • Inventory • Equipment Storage • Contracts • Uniform distribution
Physical Educations Students	<ul style="list-style-type: none"> • Inventory • Equipment Storage • Purchasing
Summer Programs	<ul style="list-style-type: none"> • Inventory • Equipment Storage

The entire WPI community is privy to a number of services that the equipment room has to offer. The equipment room stores athletic equipment specifically for lending to students or faculty members. From 9am to 4:30pm, workers in the equipment room lend to students, faculty and staff. Where and how equipment is stored will be described in more detail later. The most popular items that are borrowed include balls, racquets and towels. The current method of tracking this equipment is a sign-out sheet attached to a clipboard at the front desk. When one borrows an item, one writes one’s name and checks from a list of options the item one is taking. Once the item is returned, the staff crosses off the borrower’s name.

Members of the community may also choose to rent a locker. To do this, one must be entered into a master Excel spreadsheet containing names, contact information and locker information. The lockers

must be locked with the combination lock provided by WPI. One must give a deposit of ten dollars, which will be returned when the person no longer needs the locker and returns the lock. Also, to ensure the lockers are being used, emails are sent periodically.

The laundering services are not intended for the personal use of the WPI community. The equipment room, however, handles the towels used by the community. The towel is a frequently borrowed item. Towels are borrowed and returned with no record. During the lunch hour especially, faculty and staff commonly take advantage of this service. A patron will usually take a towel before his workout, return it by tossing it in the laundry barrel, and grab another so that he can shower. This service results in the high turnover of towels.

Currently, the maintaining inventory procedure consists of completely manual recording. One of the major tasks in keeping track of inventory is accounting for the equipment and towels the general community uses. These two services alone are the cause of many misplaced, stolen and otherwise unreturned item. The equipment room also handles purchasing to replace these items. After the comprehensive annual inventory, the equipment manager has an idea of what he needs to purchase for the next year. Currently, the system of record keeping is not consistent, in that records of inventory and purchases are not always filed in the same place.

The equipment room is very important to the athletes; it is a hub of athletic resources. It handles all of the uniforms and equipment for varsity and intramural sports. For varsity, the room is the storage location for current and some off-season uniforms and equipment. Two procedures contribute to maintaining inventory for varsity athletic equipment and uniforms – contracts and lending records. Each athlete signs a contract before the season's games begin. The contract gathers information about the athlete, as well as specific information about which items were lent to the athlete for his or her respective sport. Also, in signing this contract, the athlete agrees to return all items (generally laundry bag, towel, practice gear, uniform, warm up suit, equipment, and travel bag) at the completion of the season.

Lending is another important procedure for maintaining inventory. From season to season, the managers keep different teams' uniforms hanging on numbered racks. Numbering helps to keep the uniforms organized for distribution to athletes playing in upcoming games. These racks reside in the center of the main equipment room, leaving little space to move between the racks and the shelves. Generally the work study student on duty handles the distribution process. Each team has its own checkout sheet that consists of the team's roster (name and number for each student). When an athlete picks up his uniform, he states his team and number. Once he receives his uniform, the worker checks a column by his name to indicate which items he took. He returns his uniform by dropping it down a chute near the equipment room. After laundering, the uniforms are cross-referenced to this checkout sheet. They cross-reference with this sheet and not the master inventory for that sport. Not all items and

equipment are frequently laundered (for example, travel bags) and not all items may have been returned, for reasons such as athlete injury or forgetfulness among other reasons, though it is encouraged that uniforms be returned for laundering soon after every game. Regarding the laundering of practice gear, the equipment room encourages students to drop off a laundry bag more often so that the bag contains fewer items. These items are laundered but not cross-referenced to a list as they do not keep a checkout sheet for practice gear. At the end of the season, the managers and work study students complete a general inventory of all the items for the sports of that season.

The laundering process for athletes is different from the other WPI member categories. As mentioned above, athletes receive a laundry bag. Currently, students walk in and out of the room to drop off and collect their laundry bags. The various colors of laundry bags indicate the sport of the athlete using it. There is no checkout system for this. Athletes drop laundry bags down a chute leading to a side section of the equipment room or place them into barrels in the main part of the equipment room inside the side door. Athletes drop uniforms, as well, in this chute. It is their responsibility to leave the laundry bag as necessary with the towel and practice gear inside; more often is better for the equipment room as densely packed laundry bags yield less favorable results.

A final procedure that affects the athletes is storage. The equipment room is responsible for the storage of uniforms, pads, and other forms of attire for the athletes, as well as all equipment. This includes balls, nets, racquets, chairs, and anything that is used at a game or practice. Along with the storage of the items, the equipment room performs maintenance to keep items in good condition.

Unlike many colleges, WPI has a physical education requirement. The physical education department is part of WPI's efforts to encourage health and fitness throughout the community. Physical education classes also take advantage of the equipment room's services. The classes often require equipment, which the equipment room stores for those instructors. This equipment also has to be purchased, inventoried and occasionally fixed. The equipment room managers perform inventory for physical education equipment once a year.

The equipment room's involvement in summer programs and the Fitness Center is much like its involvement with physical education. Maintenance of both programs and the Fitness Center require storage of some items and some collaborated efforts with the Athletic Office for purchasing. In taking the responsibility of storage, the equipment room also inventories and performs any necessary maintenance on these items.

The group has also taken the staffing procedures into account. Currently, the equipment room staff consists of the head equipment manager, Shawn, the assistant equipment manager, Rick, and work study students. Shawn and Rick have mostly consistent hours, whereas work study work schedules are more flexible. All work study paperwork (including time cards and contact information) are kept in a filing

cabinet. Also, work study students include those who work in the equipment room, as well as those who assist at sporting functions, work as lifeguards, etc.

The efficiency of procedures correlates to the organization of records and storage. For example, lending may take more or less time depending on how easy it is for a worker to locate items. Also, quickly locating inventory records that are accurate speeds up the whole inventory process, which is a particularly major undertaking for the comprehensive annual inventory.

3.2.3. Organizational

The group's organizational observations encompass all items in the inventory. The group uses the term "organization" to refer to what the equipment room stores, how it is stored, and where it is stored. Discussion of organization will be divided by location, items in the main equipment room and attached side room and items in the storage closets.

There is a unique aspect of the main room, as compared to the attached side room and the storage closets; the main room is not only storage, but also dynamic working space. Different items move through the same space; for instance, the shelves with towels usually empty completely over the course of a day; laundry bags rotate daily through the shelves by the side door; several teams' uniforms rotate through the racks weekly during a season. Items in other storage areas are less frequently moved, typically a few times a term to a few times a year.

The equipment main room and side room store varsity and intramural uniforms and equipment, physical education equipment, equipment for general loan, inventory records, maintenance and purchase records, general maintenance items (tools and cleaners) along with some miscellaneous items. Generally, these are the items used most frequently or rotated most frequently due to changing sports seasons. Towards the front of the room, nearest the checkout window, there are shelves with folded items, towels and practice apparel mostly. Also, above the counter is a ball rack and an area for items that are stored on pegs. The ball rack has three rungs, and balls are overflowing on the rack onto the counter. The items hung on the pegs consist mostly of racquets and swimming accessories (goggles and water joggers). Beside Rick's desk is another area of hanging storage, mostly football belts. In addition, the front of the room contains much space for files – desks, two filing cabinets, and a holder of folders behind the side door. These files are records of lending, inventory, records of maintenance and purchasing, work study schedules, and correspondence, mostly. Several of the filing cabinet drawers do not contain files, but boxes of golf balls, ping-pong balls, and racquetballs.

Toward the back of the main room and the side room is space, which is divided by much shelving; these units have adjustable shelves. Boxes further divide some of this space. The set of shelves behind the side door goes through the most rotation. At any given time, they contain a printer, a television,

laundry bags, folded uniforms, shoulder pads, lost and found items, a vacuum hose, a step ladder, and cleaning supplies. The group has observed that even when these shelves are used; there is often free space as the items do not fill the height of those shelves. The closets in the back of the room contain track uniforms and warm up suits. Some inventories are posted inside the doors of these closets. Along the bottom of the table in the middle of the space and the shelves along the wall closest to the side room are folded uniforms. Currently these are items for the football teams. At other times, these are items for the wrestling team.

Above these items on the wall and in the corner between this apparel and the track uniforms are a variety of items. They range from first aid to athletic equipment to athletic equipment maintenance supplies to general maintenance supplies to tools. Some of these items are grouped in categories or put in labeled bins or boxes, so stand freely on the shelves. In the corner, many nails, screws, nuts and bolts are stored in both bins and small drawers. Tools in this corner can be found hanging, laying on the counter, or collected in a large box under the counter. Along with hanging tools, the equipment room stores laundry pins and combination locks on pegboard. Within the last few years, rods have been attached to the vent, which runs along the ceiling in the middle of the room. These rods store helmets. Not all of the items stored in the main room are used frequently, if at all.

In the side room, there are several closets, several filing cabinets, and four groups of shelves. These contain sports equipment for varsity sports, intramural sports, and physical education classes. The shelves hold equipment for varsity sports in boxes and uniforms for varsity sports in bins. These bins take up the space equivalent to two shelving units. While the closets contain mostly practice apparel, the filing cabinets contain sundry items. In addition, the equipment room has a unit, which houses a sewing machine. As with the boxes in the main room, these boxes are mostly cardboard. Some of these boxes are not the original boxes for the items that they now store. In this way, they have words on the outside that do not accurately state the contents. For example, "Dell" is the most prominent word on a box, which contains football equipment. Also, boxes have been used for more than one type of item, and have both labels on them, and a piece of paper attached to the side so as to write the name of the new item stored. Furthermore, some of these boxes have lost their shape and have ripping seams or torn sides. The state of storage boxes is similar in the storage closets.

Three other storage locations for the equipment room are scattered throughout Alumni Gym. Two are on the first floor, in a hallway and attached to the coaches' office. One of the closets can be accessed by a door in the corner of the gym. All closets contain a variety of items on shelves pushed against the walls, from paper records to equipment for summer programs to bleachers. Some space is not divided by any shelving. Methods of grouping vary from hooks for helmets to boxes for files to bins of equipment to no method (some items are ungrouped).

One aspect for consideration is retrieval. For common items and items in plain sight, retrieval is efficient. For seldom-used items, retrieval is usually time-consuming. Neither Shawn nor Rick is often certain of the location of an item, and cannot locate it without rummaging. The faster a worker can locate an item, the more efficient the system and the better the equipment room is able to serve the community directly.

3.3. Research Overview

The previous observations were management systems in use. The pros and cons of those systems were manifest. In this next section, the group further analyzes options to improve the technical, procedural, and organizational aspects of the tasks that the athletic equipment room performs for the community, based on additional options beyond those observed by the group. Therefore, some analysis is required to assess how relevant these options are for the equipment room's purposes.

3.3.1. Technical

Through our observations, the group has acknowledged technical areas that would benefit from changes. For example, the system for inventory could benefit from incorporating several different types of technology to aid in the maintenance of inventory, which will increase efficiency and accuracy; ideally, the system will be precise, user-friendly and will make students, faculty, and staff accountable for borrowed items. A database will keep a permanent and specific record of equipment room transactions. A means to uniquely identify all items in inventory will prevent confusion as to who has which item. The following section explores options for databases and identification of items.

3.3.1.1. Database Software

One of the most important aspects of information management to consider was a database for the equipment room. A simple, modern definition of database is an electronic collection of information. The purpose of a database in the equipment room is to keep track of inventory (purchases as well as borrowing), locker lending, and the work study schedule. While these tasks are all related to the functionality of the equipment room, the types of data in each situation are different – equipment and uniforms versus lockers versus scheduled events. Three options exist for implementing a database – purchase a pre-configured database, hire a group to design a database, or design a database on-site. As stated earlier, the budget for this project is limited, so hiring an outside group to design a database was unlikely; indeed, that was the task of this group. The next portion of this section explores existing

database software and options for creating a custom database. Flexibility is a main criterion for the feasibility of these options.

Software already exists for a situation similar to the athletic equipment room. These programs can be found as freeware - free, downloadable software - and complete software packages. The source used to locate freeware is CNET Download.com. One can search this site and sort by operating system, as well as by whether or not the software is free, or often free to try. The freeware results from this site proved to not suit the needs of the equipment room. Some inventory maintenance programs are too broad. For example, Everything I Own is a database program for any and all items which one might keep residentially. This is an extensive database program, but not suited for the transaction environment of the equipment room. Other general programs have the same disadvantages. No specific freeware programs existed through this search engine that are relevant for the equipment room. For example, just by the name, Coinpro and WineLibrary are clearly unrelated to the tasks that this project seeks to accomplish for the athletic equipment room. For these reasons, it was decided that freeware programs were not applicable to help with the equipment room's inventory maintenance and other record keeping issues.

On the other hand, several commercial database software packages are applicable to the needs of the equipment room. Some of these packages include a pre-configured database along with inventory identification systems. The following paragraphs evaluate the potential effectiveness of these programs.

SportSoft has a package called Equipment Manager Pro (includes scanning hardware, a bar code printer, all necessary software, and labels) which they claim is ideal for a single, large equipment room. It supports up to twenty sports, each with up to sixty pieces of equipment. The number of sports is similar to what WPI would need, though there are almost twenty varsity sports, without considering club and intramural sports, Physical Education classes, and summer camp activities. The equipment room has some records of inventory that may not be up-to-date or complete, but indicate at least one thousand items under the category of sports uniforms alone, not including equipment. At the cost of \$2,195, this package may have been somewhat helpful, but it would not have encompassed the needs of the equipment room.

Another program considered was Pensport Equipment Database. This database has no limits on capacity, is transaction oriented, and holds information for players, staff, clothing, and equipment. It also allows for ID tags on items in the inventory. This program is about \$250. Unfortunately, Equipment Database would be too specific to help the equipment room keep track of lockers or the work-study schedule. Other software packages exist that have similar features to the former two, in addition to invoicing and scouting, which are relevant for coaches dealing with a single sport. In general, these commercial equipment management databases and inventory systems are expensive, and do not fit the unique needs of the athletic equipment room at WPI. WPI would experience a greater benefit from a program customized for its operations.

Several means to create databases are available; some are particularly relevant because WPI already has the necessary resources. WPI has purchased licenses for MS Access and MS SQL Server; Access is part of MS Office, a portion of the Windows operating system, whereas SQL Server is a special database application. Currently, George C. Gordon library has implemented an Oracle database to keep track of its inventory, so this was an option. Lastly, MySQL is an open source program to create databases; there is no built-in client with MySQL.

Generally, SQL Server, Oracle, and MySQL are suited to handle very large amounts of data; all these programs claim great scalability. In addition, Oracle is highly available, manageable, and secure. One group member spoke with Don Richardson, the Assistant Director, Library Systems, about the use of Oracle in the library. The library chose an outside source to create a database system to suit its needs. The database has gone through several iterations and upgrades, and has served its purpose quite well. This system incorporates bar code scanning, including bar codes located on WPI ID cards. The interface with this database is a program called Voyager Integrated Library System, designed by Endeavor Information Systems. All of this is run on Sun Servers. One disadvantage of this set up is the extensive training required to operate the system, which does not include the creation of a functional and populated database.

SQL Server is a database platform that supports relational and structured data. Through the Microsoft suites, which are compatible with SQL Server, database users have tools to analyze, report, integrate data, and create notifications. This platform is best suited for an enterprise-scale situation and has a great reputation for security (“Microsoft SQL Server Home: What is SQL Server 2005?”).

MySQL can be run on any platform. Notably, a MySQL database can handle terabytes of information and provides much transaction support, preventing lost data in multi-access situations. These features are available from the previously mentioned database options, as well. One drawback to storing data with MySQL is that the client Graphical User Interface (GUI) must be configured separately from configuring and managing the database set up and management (“MySQL AB:: Top Ten Reasons to Use MySQL”). Free options also exist for this program, such as MySQL Client by EngInSite.

The last consideration is Access, a database program that incorporates both data management and a user interface. It is not particularly scalable, reaching some functional limits around several gigabytes (GB) of storage. It has the capabilities of linking and importing data. One major advantage of this type of database is familiarity; several group members are comfortable enough with Access to start to build a database. This would be more efficient during proposal implementation, as less time is required throughout the process to research how to go about setting up a database and manipulating its features, as with an unfamiliar method.

All database options have features that link data, which is essential for keeping track of related pieces of information, particularly when involving transactions. Now, the technical research focuses on the information that would be part of a database and its relationships.

3.3.1.2. Inventory Tracking

The next concern is the data, which will be stored in the database. In terms of inventory, the information should consist of identifiers; such that the equipment managers can track some of the items in inventory very rigorously. Completely unique, permanent identifiers would facilitate this end. Currently, the type of item and the number already on the item identifies it in lending records and inventory. This manual system is prone to error and can easily result in confusion from duplicated numbers on items. In the past, duplicate numbers have been accidentally written on items. This limits one's ability to uniquely identify an item. Two categories of identification exist – manual and automated. Current manual systems incorporate color coding and numbering. Warm-up suits and other varsity clothing, which do not already display a number, have been given a number on the tag. Given the state of hand-written records in the athletic equipment room, this has not been sufficient. One form of manual identification that is effective is color coding found in use with the laundry bags. For the scale of the inventory, these methods are not sufficient for the extent of WPI inventory and cannot be altered to handle the needs of the athletic equipment room. A new system must be developed.

A very common method to automate inventory maintenance is implementing bar codes. This encoding can be used to discriminate among a very large number of items. The group has observed that the inventory in the equipment room exceeds several thousand items. Therefore, this system is applicable. Bar codes are found in the commercial industry in areas such as warehouses, retail sites, and shipping systems. This attests to the scalability of implementing bar codes to track inventory. Scanning and decoding technologies accompany such a system. In addition, this technology complements an electronic database, as these technologies can be incorporated into a single workstation.

“Bar code” is a general term for a collection of lines or dots to represent some data. Different types of bar codes, called symbologies, exist which encode numeric or alphanumeric information. According to SoftBars, Inc., there are eleven types of common bar coding symbologies – UPC-A, UPC-E, Code 39, Code 93, Code 128, UCC/EAN-128, United States Postal Service (USPS) Zip, Interleaved 2 of 5, EAN-13, PDF 417 and RSS-114. These symbologies fall into two categories, linear and two-dimensional. PDF 417 is two-dimensional, appearing as dots scattered across the bar code. This encoding can store a great amount of information and requires very specific technology to decode.

The other symbologies are linear. They encode a variable number of digits and/or characters through the spacing and width of lines. Notably, Code 39, Code 93 and Code 128 are specifically alphanumeric,

whereas the other linear symbologies are only numeric. UPC-E is a shorter version of UPC-A, which stored 12 digits, whereas EAN-13 is an extension of UPC-A. USPS Zip and UCC/EAN-128 are designed for shipping systems. RSS-14 is compatible with a specific type of scan technology, known as OmniDirectional scanning.

In terms of what would be necessary for the athletic equipment room, the inventory is not extensive enough to require relatively long numbers to be stored in bar codes. It would be beneficial if the bar codes could store characters, as words and abbreviations in the code would help the managers and database users to identify what type of item is associated with a given bar code without having to cross reference it with a master list. For this reason, Code 39, Code 93 and Code 128 are the most favorable symbologies at this stage in the group's options research. As several of these symbologies have been eliminated, the research shifts focus to generating and scanning technologies for bar codes.

3.3.1.2.1. Generating and Scanning Barcodes

Many options exist to generate bar codes; as with database software, bar code generation software exists as freeware and as commercial software packages. Through CNET Download.com, several software packages are available which are either completely free, free to try for a trial period of time, or free to try with limited program capacity. One program in particular fits the needs of the new management system. ID Automation Free Barcode Label Design Application 2006 R2 has all features that could make barcodes simple and free to produce. It supports alphanumeric symbologies (Code 39 and Extended Code 39), has a flexible print layout, and has features to easily create an integrated array of barcodes. Other software options, such as Bar code Label Generator Plus, were rejected because they did not support one of the desirable bar code symbologies or because of a lack of flexibility in print layout. Commercial software packages, in comparison, generate a greater range of bar code symbologies and provide extensive graphical manipulation. These features would not enhance the inventory systems accuracy or effectiveness. One example of such a program is TekLynx Labelview from POSGuys.com. This program can "print bar codes, text, graphic images, or pull information from databases" at a cost of about \$2500.

According to Bar Code Planet, there are six types of current scanner technologies - Laser, CCD, 2D, OmniDirectional, PDF 417 and Imager. Two of these technologies, 2D and PDF 417, are capable of decoding both 2D and 1D symbologies. OmniDirectional scanners emit several linear laser scans, so as to read bar codes at any orientation. Imager scanners take a picture, in essence, of what is scanned and then interprets it; the information need not be in the form of a bar code. Laser and CCD are more entry level technologies. Laser is the most common; it is ideal in many situations, particularly warehouses, as these scanners must not be in proximity to a bar code to read it. Charge Coupled Device, or CCD, take a

picture like Imager scanners. Unlike Laser scanners, these devices must be close to the bar code and cannot read any bar code wider than the reader. A major feature of this technology is that it does not contain moving parts, such that motion does not affect its performance.

Cost, durability, and performance are other factors to consider. The environment of the equipment room would not demand much in terms of bar code width or scanning distance from the bar code. On the other hand, a moderate level of durability is necessary as the scanner may be damaged during the exchanges through the check out window. These features are all available from CCD, which happens to be the most cost effective technology as well. Different vendors exist for this technology; POSGuys.com is a good resource as it carries several entry-level models which are rated well for durability, performance, and customer satisfaction. These models, which all cost under \$100 and rate comparably, are POSX Xi1000, V-Line Shooter, IDTECH EconoScan, CipherLAB 1000, and Unitech MS180. A separate consideration from durability and performance is hardware compatibility. Several connection types are available for scanners, including USB and PS2/keyboard wedge. Both are compatible with any personal computer, PS2/keyboard wedge connections are generally cheaper.

Software to decode the symbologies and relay the information to the PC is generally part of the scanner package. In the rare case that the final choice for the new system did not include software, options exist all across the Internet. Another freeware search produced the program BC-Wedge, which directs the information that the scanner decodes to any maximized program window. This is ideal for inputting bar code information into a database.

The WPI ID's hold information in the form of a bar code and in a magnetic strip. Upon speaking with Andrew Stone in the CCC, the group learned that the symbology of this bar code is Code 39. This symbology is compatible with all scanners considered. Using the bar codes on WPI ID's will complement the electronic database, expediting the process of inserting information into the database. At this point, how to generate and scan bar codes has been considered. Next, the research turns to media.

3.3.1.2.2. Labels

To implement a bar code system, one must consider two implementation steps— set up and maintenance. Several options for producing bar codes were considered next, with those steps in mind. It is possible to order bar codes labels from companies which select values from a random range or values from a specified range for a selected symbology. Barcode Direct is one company that offers this service. They offer 2500 durable labels for \$425. In consideration of the two steps, this system does not efficiently serve small maintenance tasks – replacing a damaged bar code, adding a few new items to inventory. Control, flexibility, and ease of maintenance are aspects of a proposed system which contribute to the success of implementing and perpetuating a bar code system. Therefore, it is preferable

to create and control bar codes completely within the equipment room. One of the practical aspects of this potential system should be analyzed – materials. Bar codes would be applied to helmets, racquets, and washable items (jerseys and towels) in this new system. The method of application should withstand somewhat harsh situations, such as friction, heat, cold, and moisture, and should be compatible with different surfaces – smooth, rough, plastic. In particular, cloth application is much different from application on hard surfaces. In addition, the printing needs for a washable item versus the rest are quite different. These two situations have been explored separately in the next sections.

3.3.1.2.2.1. Producing Labels Suitable for Cloth

The following is research regarding bar coding printing options on cloth. For the needs of the equipment room, this technology should be crisp and permanent. Typically, these options are silk screening, heat transfer, hot stamping, and sublimation. First, silk screening and heat transfer are similar processes in the materials and chemicals required, and the necessity of heat. Silk screening is used in industry to quickly apply a single image to many items; heat treatment makes these images permanent. As bar codes will not be repeated, this process is not applicable to the equipment room. Next, heat transfer, also known as iron-on transfer, uses specially coated paper and heat to transfer ink and a coating to fabric, generally cotton. On a small scale these processes do not require much equipment. To continue, hot stamping is a process which forces ink into a piece of cloth using force and a layer of foil, which contains pigment. The equipment is quite large for this process; attempting to implement hot stamping would defeat the group's efforts in organization and consolidation, to some degree. Lastly, sublimation is a technology, which takes advantage of the porous nature of some synthetic fabrics. Natural fibers do not accept sublimation ink as well as synthetic fabrics when heated. This process begins with printing an image. Upon heating the image laid face down, the ink sublimates, or vaporizes without becoming a liquid, and the fabric becomes more receptive of the pigment. Moreover, the pigment becomes part of the fabric. This process requires a specific printer, ink and paper; the paper it is coated so that it does not absorb any ink, transferring all ink during heat treatment. All of these options are resistant to wear from washing ("Sublimation for Custom Printing T-Shirts, Mugs, Metals and More"). Notably, the sublimation process is most wear-resistant as the pigment becomes part of the fabric. On average, the equipment managers keep uniforms for five years and wash them at least 15 times during the season, so this is a major concern.

Commercial equipment for this process ranges from a \$15,000 machine to print directly to and heat treat the fabric to \$300 for a t-shirt heat press. For the scale of the equipment room, most equipment is unnecessary. The most labor-intensive part of implementing this process is initial set up, with maintenance being new bar codes for perhaps a couple teams a year. New materials for uniforms are

often engineered to move water and air well. These materials are often synthetic and heat-sensitive. Therefore, these bar codes could not be applied directly to uniforms; a solution to that issue could be applying bar codes to pieces of polyester and sewing them into uniforms. At least thirty bar codes can fit on one standard-size page, and a pack of one hundred sheets of sublimation paper is about \$15. For the scale of the equipment room's inventory, a commercial grade printer is not necessary. Two brands of desktop printers exist that can be converted to print sublimation ink, Seiko and Epson. Seiko uses thermal wax, and some of their products have recently been discontinued. In favor of the maintainability of the system, Epson is the better alternative. The Piezo print head in all Epson printers works well with sublimation ink. These inks are the solid sublimation pigments in suspension. The size of the particles does not inhibit movement through this print head, whereas the size of these particles clog other brands' print heads ("Sublimation Information, Sublimation Definition, Define Sublimation."). One model of Epson printer suitable for sublimation printing and the needs of the equipment room is about \$80. Black sublimation ink cartridges are about \$75, for printing at least one hundred and fifty pages. As a bonus, this printer can also serve basic office needs when using a regular inkjet cartridge.

As bar codes are relatively small, heat treatment does not require large equipment for even heating, which produces the best results. A professional grade clothing iron may be sufficient, as long as it heats from 375-400°F. These can be found in the vicinity of \$40. With bar codes for clothing considered, the research now turns to the other type of label necessary for this inventory management system – labels on equipment and hard surfaces.

3.3.1.2.2.2. Producing Labels Suitable for Hard Surfaces

While labels for hard surfaces are the next major consideration, there is one small side consideration. The inventory system could benefit from using a set of generic bar codes, which refer to only a type of item, and not one item in particular. Some items need not be tracked individually, but rather the total number of that kind of item is important –for example, towels. In this way, the bar code would not be placed on the item, but rather saved in a library of generic bar codes. The library could be a binder with sheets of bar codes printed with regular ink or toner on regular paper.

The main consideration in this section is the type of bar code label applied to sports equipment - helmets, sticks and racquets, to name a few. The bar codes and labels must withstand water, heat, cold, dirt and friction. Normal paper and natural fibers wear away in these situations. Synthetic materials designed to be tough and resistant to these elements are much more applicable. Also, regular ink would not withstand these conditions, particularly as it is highly water-soluble.

Thermal printing is a very common method for creating crisp bar codes. It is used in warehouses and shipping quite commonly. Two divisions of this printing technology exist, direct thermal and thermal

transfer. With direct thermal technology, the printer paper is treated such that when the hot print head touches the paper, the coating turns black. The paper that has not been printed still remains reactive. With thermal transfer, a ribbon exists between the print head and the paper; the ribbon melts under the heat and leaves a permanent mark on the paper, both the paper and the mark being inert. Direct thermal is currently used for short-term shipping labels, whereas thermal transfer printing can last for years (Bar Coding tutorial). If the items to be bar coded in the equipment room's inventory wear out before the printing on the labels, that would be ideal for inventory recording. Thermal transfer's endurance comes at a price. Printers of normal desktop size can be in excess of \$1,000. Smaller and more economical alternatives exist. The Zebra TLP 2824 monochrome thermal transfer label printer from either Zeeno.com or Superwarehouse.com is under \$300. It supports almost all symbologies. While this format may slow down bar coding initially, the small size of this printer will make storage more efficient while it is not in use.

Inkjet can be a viable option for this type of application. It must be able to survive the factors that tend to diminish inkjet quality – moisture, friction and light. Regarding the print quality, Epson has a relatively new technology that extends the life of its inks up to eighty times that of other brands. This ink, DURAbrite, scores very well in PC World's assessment of popular inks.

Table 2: Ink Comparison

Source: http://www.epson.com/pdf/PCWorld_CheapInkProbed.pdf

TEST REPORT

THIRD-PARTY INKS SAVE MONEY BUT GIVE UP PERMANENCE

THE QUALITY OF PRINTS made with third-party inks sometimes equals that of prints made with printer vendors' products; yield (the number of prints) can vary considerably. For additional yield and print-quality results, see find.pcworld.com/36944.

PRINTER	Ink	Cartridge street price	Yield (average number of prints) ¹	Ink cost per page (cents) ¹	Print quality relative to brand-name ink ²	Display Permanence Rating (years) ³
Canon S900 (uses six cartridges)	Amazon Imaging	\$11 black, \$10 color	680	6.7	Comparable	5
	Carrot Ink	\$8	667	5.1	Somewhat worse	4
	OA100	\$5	687	3.2	Significantly worse	4
	Canon	\$12	653	7.8		27
Epson Stylus C82 (uses four cartridges)	G&G	\$17 black, \$9 color	953	5.8	Comparable	0.5
	OA100	\$10 black, \$8 color	1053	4.9	Somewhat worse	0.5
	Rainbow logo ⁴	\$17 black, \$9 color	940	5.8	Somewhat worse	1
	Epson	\$33 black, \$12 color	1113	7.1		92
HP DeskJet 3820 (uses two cartridges)	Carrot Ink	\$21 black, \$24 color	760	4.4	Comparable	1
	Ink.Tec (refill kit)	\$10 black, \$14 color	n/a ⁵	n/a ⁵	Comparable	*
	Printek	\$20	700	5.2	Somewhat worse	1.7
	Hewlett-Packard	\$30 black, \$35 color ⁷	380	15.5		15

FOOTNOTES: ¹ Calculations based on 5 percent coverage per color per page. For the Canon printer, our test prints used only four of the six ink tanks. ² Prints made with printer manufacturers' longest-lasting photo paper. ³ Tests conducted by Wilhelm Imaging Research (www.wilhelm-research.com); results provided to PC World. Wilhelm Imaging Research tests prints as follows: Prints are carefully prepared and dried for two weeks in a controlled environment, and then exposed to high-intensity fluorescent light at a constant 75 degrees Fahrenheit and 60 percent relative humidity. Data from these accelerated tests is extrapolated to a real-world display condition of fairly bright room illumination (45 lux) for 12 hours per day, with prints framed under glass. For additional details on test methodology, see find.pcworld.com/31136. ⁴ This ink came in a white box with nothing on it except for a rainbow logo. ⁵ Not applicable. Cartridge refill kits hold more than three times as much ink as HP's black and 19ml color cartridges do. ⁶ Wilhelm Imaging Research was unable to produce prints suitable for testing. ⁷ Price is for a 19ml color cartridge. HP's 38ml cartridge is \$50 (street).

The materials and adhesives for the labels are just as important as the printing itself. Synthetic labels have a great reputation for being durable and surviving the elements. They are often used in laboratory settings in which they will be subject to extreme temperatures and chemicals, and must continue to adhere and not lose any of the information. Vinyl and polyester are two varieties that are common for outdoor application. Synthetic labels are more costly than regular paper labels. Sometimes, these labels must be bought in bulk. One source, techniCODE Inc., allows a customer to order a case of 8 rolls of synthetic labels at about \$140. This roll is compatible with a small printer, such as the Zebra TLP 2824. Sheets of a similar material meant for desktop printers can be found for about \$12 for 10 sheets. In addition, laminates protect the print quality and overall life of labels. These laminates are available pre-cut, in sheets, and as a spray. Barcode Direct quotes includes laminates in their quote for pre-printed labels. Hemmi Papilio Supplies sells sheets of UV resistant laminate for inkjet applications for about \$15 per 20 sheets. They also sell aerosol UV laminate for \$13 per 12-ounce can.

Finally, in terms of workstations, the ones now in the equipment room are insufficient for the current needs of the equipment managers, and would not support the transition to a new system. The group thought it ideal to replace Rick's workstation with something faster. Also, concerning the potential equipment room management database, another workstation dedicated to those tasks would be very efficient. In this way, any maintenance of the system and lending could occur at a workstation at the front window, and this would not interfere with the tasks Shawn and Rick may need to perform at their workstations. Generally, any new equipment purchased for part of WPI should be coordinated with the Academic Technology Center (ATC). The equipment discussed thus far does not need to be networked, so it is unnecessary to coordinate purchasing and set up with the ATC. A workstation needs to be networked, so it must comply with any standards that WPI has. Fortunately, the ATC reallocates computers campus-wide. One group member spoke with Mary Beth Harrity, the director of the ATC, about the process of obtaining a used computer that has been replaced elsewhere on campus. The equipment room has been on their list of possible reallocation to receive another computer for several months. She has added the equipment room to the list for a second computer for the inventory workstation. Given the time restraints of this project, she estimates that one computer could be reallocated by the end of B Term. This would not cancel the request for another computer for Rick.

3.3.2. Procedural

The observations also reveal procedures that could be changed for the betterment of the equipment room staff, and the WPI community. Some of the procedural changes have been covered within the technical research, such as replacing check in/check-out lists with an Access database. The procedures

that involve transporting the laundry to the laundry room need to be researched to generate a conclusion as to whether or not more efficient ways to transport the laundry are available.

The group's first idea was to install a commercial dumbwaiter. A group member called a number of companies, and the group's intentions were explained to each of them. The first company, Bay State Elevator, Co., was kind enough to give an estimate based on the information given. The information provided to the company for an estimate included the type of institution in which the dumbwaiter would operate, the weight and size of the material going into the elevator, and the number of floors (one) that it would be lifted. The company gave a possible estimate of \$25,000. Before deciding that this was prohibitively expensive, more research was necessary. Another company the group contacted, Source Equipment, was also explained the situation. In the opinion of the group's contact person with WPI, a dumbwaiter was not suited for our application. One reason is that dumbwaiters require compliance with elevator codes. This company explained that a vertical reciprocating conveyor was more suited for the group's purpose. This machine does not require any codes to be met, as a dumbwaiter would. Also, this device would cost less than an elevator but is still expensive at approximately \$15,000. Unfortunately the company assured the group that construction would have to be done, and these costs could be as much as \$10,000.

To be sure to cover all possibilities before analyzing feasibility, the group researched other options. Another idea was to construct a lift. By designing a system that would include a motorized winch, a pulley system, and a crate of some sort to hold the laundry, the group hoped to cut costs. The best winch dealer found was Winch Depot, because it contained an immense variety of winches. These winches ranged in price from \$500 to nearly \$2000. The remainder of the system could be purchased at a local hardware store. All of these possible changes will be further analyzed with consideration for available resources, such as time and the current budget of about \$2,000 for all aspects of the project.

The other laundry procedure observed was the use of mesh bags and large metal safety pins. When the group visited Bridgewater State College, the manager Ken Duarte suggested a conversion to "Laundry Loops." He had recently replaced mesh laundry bags with these loops. Only one company makes these loops; it is owned by a former equipment manager of over twenty years. The loops are a sensible way to save space and ensure clean, dry clothes. Their website explains the loops as "The highest quality heavyweight polypropylene webbing. The cord lock on the Sock Snare contains a stainless steel spring, made to hold up to years of daily use" (Laundry Loops, 2005). The loops are designed to slip through clothes, such as through the neck and sleeve of a shirt, or the leg of shorts so that the clothes are not condensed into a bag. In a dryer, the clothes tumble more freely than they would in a mesh bag. The heat resistant buckle clasps the ends of a loop together. A loop has the option of coming with a sock snare or sock bag attached to it. The sock snare is a drawstring. Socks are to be placed within the loops of the

string, then the drawstring is tightened, keeping the socks with the rest of the clothing. The sock bag is a small mesh bag where socks and/or undergarments can be placed. This is often used for women because they sometimes need to wash undergarments and feel better having them within a bag, rather than hanging off a loop. Although the loop with a sock bag attached costs more than \$1.50 more (\$4.95 vs. \$3.25), the owner of Laundry Loops insists that the sock snare works just as well, if tightened properly. The loops can be purchased in an assortment of ten colors.

3.3.3. Organizational

In making organizational suggestions, the group seeks to find ways to use the available space most efficiently. One of the options the group has considered to enhance the organization of the equipment room is a new desk for Rick, one of the equipment managers. Rick currently has a very small desk in which many important files are kept piled, making them harder to find. A larger desk provides more space, with different compartments and shelves, to keep his documents and records well organized. A new cork mesh-board for posting messages can be hung to further save desk space and keep tasks and reminders organized.

In terms of equipment organization, the current ball rack design does not encompass the needs of the equipment room for ball storage. These balls often sit on the counter next to the ball rack, as there is no room. The corner in which the balls are stored is a rather deep space. In making a larger ball storage structure, the equipment room can fully utilize that space. For nonspecific equipment, bins may help to group similar items and replace some cardboard boxes, which are falling apart. Other organizational options include a new holder for shoulder pads that would cost \$75 a piece and hold 25 shoulder pads (Wengercorp). This will keep them in a smaller space and hold more pads. Also, another option would be sliding shelves for the helmets which would cost \$50 and can hold up to 20 helmets (Wengercorp). This will keep the helmets high up to save space on the racks and slide on and off the rack for easy retrieval. A helmet hanger, which would hold 10 helmets and cost \$35, would allow helmets to be hung on a standing rack out of the way (Wengercorp).

In terms of efficient storage and availability of in-season items, team carts, costing \$2,456, would provide teams with a sport-specific, miniature form of the equipment room (Wengercorp.). This structure can be stored in a closet or a shed to hold equipment and uniforms closer to the team's athletic venue. By using team carts, less of a varsity team's inventory will have to be held in the equipment room. If this were not implemented, a motorized rack, (costing an estimated \$800 by the equipment room manager at Bridgewater State) would be helpful for storing the in-season uniforms and would save space and allow for easy retrieval. Finally space saving bags, costing \$327.60 for ten boxes containing 9 bag,. would be a very efficient way to store the off-season jerseys and would minimize the space required for off-season

storage. With the conclusion of management research, the group turns to how to develop and analyze ideas to eventually create a recommendation for the equipment room.

4. Overview of Methodology

With observations and research completed, the group shifted focus to the rest of the project. From this point, the group moved toward analyzing options and creating a set of recommendations, along with a plan to implement those recommendations. A standard methodology, systems development life cycle, helped the group consider how to proceed. Methodology refers to the organized steps of project development and the schedule by which these are accomplished. In the systems development life cycle (SDLC), three phases exist which organize progress as the project proceeds (Dennis *et al.*, 2006).

The initial set of tasks is the definition phase. In this phase, the project team gathers information about the current state of the system under review and researches other applicable systems. From assessing the current system and gathering information from the operators of the current system, the team produces system requirements for a revised system, if one is necessary. The system requirements take into consideration what data is involved, who is involved, how these two interact and what functions the system must perform. Then, the project team analyzes what aspects of researched systems could be implemented to improve the current system's fulfillment of requirements. Considerations for the practicality of these aspects of researched systems must pass feasibility analysis - the technical, the organizational, the operational, and the economic feasibility. From this step, the project moves into the next phase to define a new system that complies with system requirements and passes feasibility analysis.

The construction phase follows the definition phase. In this stage, the team produces written details of the proposed system. The team designs the proposed system to make improvements on the existing system to increase performance and move toward completely fulfilling system requirements. Once the detailed design is complete, the team moves toward building whatever aspects of the proposed system are new, often being a database and client given the business context of the SDLC. In addition, the group obtains any new items that it cannot produce during this step. Before this system can be implemented, it must be tested for functionality and user acceptance.

The last phase is implementation. This involves installation of the new system, with special consideration for transitioning from the old system to the operation with the new system. Several scheduling options for implementation exist – parallel, pilot, phasing, and cutover. First, the parallel strategy refers to installing the new system while maintaining the old system until the new system is completely functional. Next, the pilot strategy uses one branch of the organization in which the system is to be installed as a “guinea pig.” Once the system installation is deemed successful, the implementation is extended to the rest of the organization. Phasing refers to installing aspects of the new system in succession until the whole new system is in place and functional. Lastly, the cutover strategy completely removes the old system from operation in favor of a complete installation of the new system, which is

completely functional immediately. After installation in any of its forms, the project enters an operation sub-phase in which the project group uses training and documentation to make the installation operational for the organization. In addition, the implementation phase includes the process of system maintenance, providing any support necessary to keep the newly installed system in operation and providing any changes necessary, as the organization may change system requirements.

Another contemporary methodology is prototyping. This methodology is somewhat similar to the SDLC model with one major adjustment; it allows for dynamic changes in system requirements throughout the course of project development. This methodology does not put as much emphasis on creating thorough system requirements, but rather goes through a number of iterations of prototypes with the customer. Upon the team submitting a prototype to the customer, the customer gives reactions and suggestions for improvements for the next prototype. In this way, the project team adjusts to the dynamic changes in customer requirements, new requirements compiling onto those initially gathered. When the customer finally approves a prototype, the project team begins installation and operation. Along the way, if requirements change, another prototype may be proposed before proceeding to installation and operation again.

In addition, the Rapid Application development methodology takes aspects from both the SDLC and prototyping methodologies. A major consideration for this methodology is time; the goal of a project team using this methodology is to complete the project cycle in under a year. Once requirements have been established, the project team involves multiple system users and experts in one or more intense sessions over a relatively short period of time to develop the new system application. The project team often utilizes software tools to aid the process of application development. Finally, the new system is implemented using the cutover strategy (Martin, 2005).

Its project objectives will lead the group to use aspects of both the SDLC and prototyping methodologies. The group has completed steps to create detailed system requirements. Making this step and feasibility analysis thorough before proceeding is a characteristic of the SDLC. On the other hand, the group foresees incorporating user feedback from installation assessment into the system during implementation. This is more characteristic of prototyping. Aspects of the current athletic equipment room management system that could benefit from improvement are interrelated in that successful procedures use technology and require accuracy from organization; therefore, the proposals for technical, procedural, and organizational change will go through the installation phase in parallel. This is opposed to the waterfall development method, which requires one phase to be complete before initializing another. The installation of procedural and organizational proposals will be more process-centered, concentrating on users actions. The installation of technological proposals is more data-centered, considering mostly the information necessary for inventory tracking (Dennis *et al.*, 2006). Furthermore, implementation

strategies will vary among the categories of proposals. Procedural and organizational implementation will resemble the phasing strategy, completing tasks to move towards full operation in incremented steps. Technological implementation will resemble cutover, with much testing and iterations from user feedback before moving the new system to operation and discontinuing all use of the old system. In any case, the group foresees being thorough with training and documentation for transitions into the fully operational phase.

5. Detailed System Requirements

The group gathered information about the current management system in the WPI athletic equipment room, management systems at other athletic facilities, and research about other relevant systems. Then, the group recognized areas that would benefit from changes and decided what the goals of those changes should be. The group kept in mind the scope of this project, as well as the reasonable potential for change in the current management system. The group then made an outline of the new system that will enhance the current management system, and thus the contribution of the equipment room to the health and fitness objectives of WPI. Below is a summary of general requirements that the group gathered from the managers (explicit) and through observation (implicit). The following sections elaborate on these general requirements.

Table 3: Summary of General Requirements

<i>Technical</i>	<i>Organization</i>	<i>Procedures</i>
Implicit		
<ul style="list-style-type: none"> • Accurate • Reliable 	<ul style="list-style-type: none"> • Easy to locate items • Not physically difficult to retrieve anything • Preserve inventory/prevent damage 	<ul style="list-style-type: none"> • Not difficult to implement • Efficient (close to proximity to main room/location of task)
Explicit		
<ul style="list-style-type: none"> • Easy to learn • Maintains inventory • Accesses information on students, faculty and staff • Tracks purchasing • Tracks maintenance • Stores locker assignments • Holds work study schedules • Tracks Lending/returning 	<ul style="list-style-type: none"> • Prefers some numbering • Transfer color coding to any new laundry system 	<ul style="list-style-type: none"> • Minimal paper usage (just for contracts) • Enforcement to prevent late returns • Security

5.1. Technical

Generally speaking, the introduction of technology into the management of the athletic equipment room would improve the method of inventory maintenance. From this system, the equipment room requires that it be more accurate than the former system, to justify the switch. Also, this system needs to have the capabilities of the current system (manual records) and be capable of holding several thousand items that are currently in inventory. In addition, the system needs to be capable of rigorously keeping track of inventory transactions and allowing users to easily retrieve data. Incorporating locker transactions, tracking work-study schedules, supporting weekly and annual inventories, and assisting with student contracts are also attractive features. In these transactions, persons and items should be identified uniquely, though a few items can be identified generally. Furthermore, any changes to the inventory maintenance methods should not increase the length of time it takes to complete inventory-related tasks or impede the completion of any other tasks. Finally, any changes should not be prohibitively difficult to maintain.

5.2. Procedural

Based on the observations of the equipment room procedures, the IQP group concludes that the current methods of data keeping and inventory could be improved for the betterment of the equipment room staff. Most of the improvements are related to inventory. Items in inventory need to be accurately labeled, categorized, and stored. An improved system must help to prevent the loss and theft of items and increase efficiency when retrieving and managing items. Also, a safe and convenient method of transporting the laundry to the laundry room is required. Laundry must be organized by sport, coded in a way that maintains the current system of colors. The room and its closets must be organized so the procedures can be completed, and completed efficiently. To ensure security, valuables must be locked away and access to the items in the room must be limited to a trusted staff.

5.3. Organizational

In proposing organizational changes to the equipment room, some guidelines are to be followed in order to meet the requirements of the equipment manager. First, all records and equipment must be easily located. In other words, once changes have been made, the managers and staff need to be able to easily and quickly find items. Second, preserving the inventory and protecting the jerseys from moisture and abuse while in storage are necessary. Other requirements include ensuring the equipment is stable and organized wherever it is placed. Also, a system of numbering is necessary for inventory and locating

purposes. A more organized room, although of least importance to the fundamental requirement at hand (inventory management), is required as it complements an inventory management database.

6. Feasibility Analysis

Before deciding on our detailed design, the group analyzed the options available to decide how feasible they are to implement. This includes feasibility in terms of time, sustainability and resources. Regarding sustainability, an option for improvement must not be prohibitively difficult to initiate or maintain. Resources not only include money, but also include what outside help may be required.

6.1. Technical

This section reviews the options presented in Research Overview, Technical, and assesses the likelihood that those options would improve the current management of the athletic equipment room and that those options are reasonable to implement. This section covers database software options, generating and scanning bar codes, and all options for labels.

As presented in the section about database software, any changes made to the inventory maintenance system of the equipment room could sufficiently be fulfilled by an Access database. The database needs to be able to hold a couple thousand records; Access can handle this amount of data. The amount of data that needed to be stored locally is minimized by linking to the Directory Services database; the equipment room does not need to store data for all persons taking a recreational ball or towel, only information for athletes and work study students in the Athletic Department. It is also capable of the data manipulation and relationships that will help to keep the managers informed about how many items have been lent, to whom, when they are due, what lockers are available, what games need staffing and so forth. In addition, all students in this IQP group have a background with this program, so this background was an advantage when selecting Access as the choice. Keeping the database manipulation separate from other equipment room computer tasks and keeping the database stored in a file share are two methods to ensure that the data is secure and accurate, so that these changes would improve upon the current system. These specifications required assistance from the ATC, to obtain computers for the equipment room, the CCC, to set up file share and links to Directory Services, and Network Operations, concerning networking another workstation; all offices have been very helpful in assisting the group to meet its goals.

The group proposed using a scanning and bar code system along with the Access Database. The ID Tech EconoScan from POSGuys.com has the same favorable features as the other models mentioned, in addition to an optional stand for hands-free scanning.

It is best to print bar codes, rather than order pre-printed labels. Paper labels would need to be replaced very often due to not being resistant to moisture and friction, among other factors; therefore, synthetic labels would pay for themselves.

6.2. Procedural

To meet the requirements, the group had to sift through all of its procedural options, and through analysis of these ideas, decided what was best. The main procedural focuses of the group were inventory and data management, laundry, and equipment storage. All data, with the exception of the locker lists, were kept on paper. To make this more efficient, more accurate and safer to store, the group suggested a computerized database. This database would help expedite the multitude of the equipment room's procedures. By entering all of the information into a computer system, it is safely stored where it is much less likely to be misplaced. Also, it is readily available to the staff for reference, year to year. Locker lists, athlete uniform contracts, check-in lists for uniforms, and check-out lists for equipment will all be stored within this database. To optimize the process of checking in and out and keeping track of all items, the group looked into different types of bar coding systems. This was also at Shawn's request. First, the group looked into bar coding each individual item with its own unique code. After realizing that this was not feasible due to the lack of need for everything to be uniquely coded, the group concluded that a unique bar coding system for certain items, such as individual uniforms, is best. The other items would be accounted for by using a generic code. For example, if a student wanted to borrow a basketball, the equipment room staff would scan the generic basketball code that would be found on a bar code list, among other codes for other sport's balls. This would appear in the database as one less basketball available for generic lending.

The group suggested some laundering changes. The bustle caused by students retrieving laundry bags can be solved with a closed door and setting up a new exchange station. Because this cannot be physically accomplished by the IQP group with the resources or time allotted, the managers have agreed to take the suggestion and take on the door construction themselves as they have more resources. The bar coding will help keep track of the towels, practice gear, and uniforms. The group also suggested converting to laundry loops. These loops will make the laundering procedure more efficient. Finally, to make the process of taking the laundry downstairs to the laundry room safer and more efficient the group had a few suggestions. Both processes would involve giving special access to the fire door located in the back of Alumni gym beside the entrance to Gompei's Gutters to the staff of the equipment room. If the staff exited through this door, a shorter and straighter path would be available for moving from the equipment room to the laundry room via the outdoor entrance of the basement. To add to the efficiency to laundry procedures, the group suggested using the window located right outside of this door. Installing a chute would eliminate carrying laundry down stairs. Other possible ideas include a dumbwaiter, manual or motorized, or a winch connected to a crate and pulley system.

Analyses of these ideas for laundry are as follows. The laundry loops are a suiting solution to the problems of the mesh bag. The mesh bags do not allow laundry to dry fully because students sometimes

pack their clothes inside the bag, therefore not allowing for even drying. This can provide the appropriate situations for bacterial growth. With the laundry loop, this would not be possible. In addition, the metal pins on the mesh bags are unsafe because they get hot in the dryer and they can scrape on the inside of the machine, potentially causing sparks. The laundry loops do not have any metal. The equipment room staff already uses the laundry loops for the wrestling team, so the transition would not be difficult.

The method of transportation of the laundry will not be changed. Using the Emergency Exit was an easy way to reach the laundry room. One idea to help with the transport of laundry was a chute leading from the outside of Alumni straight down into the laundry room. The problem with this is that a chute only allows for one-way transportation. The clothes could easily get downstairs, but taking laundry up the stairs would still be an inconvenience. A manual dumbwaiter may be an insufficient choice, also. According to the equipment room staff, the laundry carts can weigh as much as 200 lbs. This, plus the weight of the elevator, would be too much weight to move even with a pulley. Another option is a motorized dumbwaiter. Available in commercial and residential sizes, the motorized dumbwaiter is a common method of transport between floors. This could have been an efficient procedural change; other factors, however, needed to be considered. Factors to consider with this are elevator codes, possible constructional changes of the building, and high costs of approximately \$25,000. One company suggested a vertical reciprocating conveyer, which is more suited for the job. This would still have high costs of approximately \$18,000, plus possible construction. This choice does, however, exclude the elevator code necessity. Another possible choice that may have been feasible was using a winch. The group would have needed to build a sort of crate and pulley system using a winch and box device for the load. The only option left was to simply change the route, and nothing else. This could have been feasible, but after discussing the idea with the managers, it was eliminated as an option as it did not yield enough benefit. The managers do still plan to find another way, on their own time. One idea discussed so far has been moving the laundry drop off point to directly outside of the laundry room.

Finally, the group was concerned with the storage of equipment. The equipment room needed be reorganized to optimize the space. Because of this, better organizing of the room and more efficient use of space will in turn assist the staff by allowing procedures to run more smoothly.

6.3. Organizational

Though all the ideas above could have possibly helped the equipment room greatly, not all of them were feasible considering our budget and time constraints. Some of the options the group proposed for improving organization are plastic bins for storage of various items, space saving vacuum bags for off-season jerseys to create more space on shelves, building a ball rack to store an assortment of sports balls and be able to easily retrieve them, and laundry loops that would make the laundry safer and also easier to

hang when dry for athletes to retrieve them easier. Purchasing bins was appropriate as the bins are cheap enough to fit in the budget and provide much help in sorting inventory. The space saving bags help with the space issue as they greatly reduce the volume of items stored, and they also fit well within the budget. The ball rack, after some deliberation on design, does not require additional materials and costs nothing. Also, a manager agreed to do the construction, thereby making this idea completely a feasible modification. The use of pegboards to hang various items was one of the group's ideas. The room can easily be rearranged slightly to make room for pegboard. Also, there would be no need to purchase the pegboard because WPI's wood shop was willing to donate some of its spare board. For these reasons, this idea is completely feasible. The team carts, helmet and shoulder pad racks have all been determined to be unfeasible. All three require more than the space allotted. These ideas are not spatially feasible.

6.4. Economic

Most of the money that the equipment room spends is for purchasing equipment. In one year, thousands of dollars were spent on physical education equipment alone. Because proper records of lost equipment have not been kept, it was impossible to determine how much of the money could have been saved had the equipment been tracked differently. Making significant changes to the procedures of the equipment room, along with changes in the organizational set up, the equipment room staff could not only save time and trouble, but also money.

Technical costs were the first to be analyzed because these changes are the most beneficial to the equipment room staff. The inventory database itself did not cost anything, as the most likely options, Access and MySQL, are free. Along with this database, however, the group desired to implement a bar coding system. This part of the system would be more costly. To begin, this system required a scanner, a means to generate bar codes, a means to print bar codes, and the media on which to print. As the ID Tech Scanner from POSGuys.com was the only scanner with the convenience of a stand, it was the best choice, as well as an economical choice at \$104 with the stand. Regarding bar codes for clothing, the preferred method was sublimation for its durability and endurance. The other viable option was heat transfer, which was somewhat cheaper as it did not require a special printer or cartridges. Regardless, using sublimation technology is still feasible as the estimated start up cost is about \$225. For printing on hard surfaces, the group chose not to consider pre-printed bar codes. The two other options were thermal transfer printing and inkjet printing. Thermal transfer printing required a printer and special labels, in the least \$450. Inkjet printing required ink, paper, and laminates. This consideration assumed that an Epson printer is already available for the purposes of sublimation printing. Also, while spray laminate is the cheapest option, it also required special attention during application, which could result in compromised quality if performed incorrectly. Therefore, laminate sheets provided the necessary protection, while still

being relatively simple to apply. These inkjet costs totaled about \$150. Cost breakdowns are available in Appendix E. It is unclear as of yet whether or not the quality and lifespan of thermal transfer printing is worth the additional costs. A trial will be performed to decide on the best method. The other considerations for technology were workstations and networking. The ATC is the source for workstations and this is a service provided gratis by WPI. On the other hand, networking that workstation required a service from NetOps, for which they usually charge. In this particular situation, Shawn was able to eliminate the fee for the port activation of the new equipment room work station.

The majority of the suggested procedural changes overlap with technical and organizational changes. There is one procedure, however, that needs a separate economic analysis. This is laundry. The two main focuses of laundry are changing over to loops and changing the method of transporting the laundry.

The transportation of the laundry is the most expensive suggestion presented by the IQP group. The lift systems suggested will cost at least \$15,000 more than the allotted budget for this project, which is approximately \$2000. By that figure alone, the group decided these methods are not feasible at this time. The group had another suggestion - assembling a lift. A winch varies in cost from approximately \$500 to \$1500. Although the essential costs may have fit into the budget, the long term costs would not. By building a system, the maintenance and upkeep is an inefficient use of money at this time. Also, this would be an unfeasible use of the group's allotted time. The final option is to simply use the rear exit as mentioned before. Although, rather than using a chute or machine, one can use the basement door to manually transport the laundry to the laundry room.

The laundry loops will cost \$3.25 each. The group will only need to purchase enough to cover the largest sport season because the loops will only be distributed to athletes who are playing for an in-season team. At this price, purchasing 200 loops is a feasible option.

The organizational costs add up as well. The space saving bags cost \$32.76 for 9 bags. This includes five extra large dual valve bags and four jumbo-sized bags. These bags can fit an entire team's jerseys. The efficiency of this product, along with the affordable price, makes it a feasible choice. Plastic bins, in replacement of the cardboard boxes now used to store various items, is an option. After the assessment of inventory and current availability of plastic bins, the group may decide to purchase more bins. The cost will be no more than \$300. The group will know a more exact price once the equipment room and the closets have been better organized, and therefore a more accurate count of necessary bins is known. The ball rack would have cost the price of materials with a former design; the new design requires no new materials.

Some of the options, which due to economic feasibility could not be implemented, are new shoulder pad stackers. While these would help the equipment room, at \$300 for the four racks that would be needed, the money is not available and this is not the greatest priority; the ones that the equipment room

currently have work properly with little inefficiency, though one is slightly damaged. Also, the shelves for helmets are too costly considering its unimportance compared to other more necessary items. These shelves would total approximately \$150. The final idea was team carts. These carts would hold a whole team's set of equipment in the team's own designated closets. While the carts may have been effective, all the teams do not have closets near their practice field and also they do not fit into the budget at nearly \$2,500.

The group has been given an estimated budget of approximately \$2000 in order to provide Shawn and Rick with an improved system. The estimated costs thus far are as follows. The proposed technical costs are approximately \$800. The procedural and organizational costs are \$650 and \$500, respectively. At these prices, the group's suggestions total about the estimated budget. With a trial yet to complete, these are mostly firm numbers for projected costs. Despite this, all ideas confirmed above are feasible.

7. Design

The following section describes the IQP group's collaborative ideas of what changes could benefit the athletic equipment room. This plan reflects the group's research and feasibility analysis of possible technological, procedural and organizational options. Sponsor approval determines those ideas that are implemented.

7.1. Technical

The technical changes pertain to inventory maintenance and work study scheduling. The parts of this design include equipment room database, inventory workstation, and bar code labels for both cloth and hard surfaces. To begin, an Access database will meet the needs of the athletic equipment room for information storage. The group created a GUI so that all workers can easily access information. The database holds information related to student athletes, locker usage, work study scheduling and, most importantly, inventory. Inventory includes not only item description and item quantity, but also fields related to equipment maintenance. The group prefers to use WPI's database to obtain up-to-date directory information; unfortunately, the Family Educational Rights and Privacy Act (FERPA) Officer for WPI, Ron Fontaine, found the group's method of storing this information to be too insecure. The equipment room will have to obtain this information from individual members of the WPI community; the equipment room, however, will share work study information with the Athletic Department office via the file share through their spreadsheet of work study students. The file share has been set up by Jon Bartelson in the CCC. Table 4 explains all tables in the database which hold information about borrowers, lockers, work study scheduling, and inventory.

Table 4: Description of Database Tables

Master Inventory: Contains an entry for every item in inventory and contains descriptions for inventory, maintenance, and laundry purposes.

Bar Code ID:	The alphanumeric codes printed on labels applied directly to "specific" inventory and found in a directory for "generic" inventory. This code is input into the database via a scanner.
Generic vs Specific:	This field is a dropdown menu. The user can choose "Generic" for items such as sport balls or towels. "Specific" will be chosen for all other items such as uniforms or racquets, mostly for varsity sports.
Description:	Here the user describes the item. For example, the user would type "jersey" or "thigh pad."

Type:	This is a dropdown menu containing “Varsity,” “Intramural,” “Club,” “Summer Camp,” and “General.” These options specify how the inventory is used, and helps to differentiate between sports that exist in more than one category. For example, basketball is a varsity sport, as well as an Intramural sport.
Sport:	This is another dropdown menu containing WPI sports of all types that the equipment room supports with equipment storage and/or uniform maintenance.
Date Purchased:	The user will enter the date purchased. This will assist in inventory management and purchasing in the future.
Date Refurbished:	Some items are refurbished, but not all. This field may be blank if an item in the inventory has not been refurbished.
Storage Location:	This is also a dropdown menu of places an item may be stored. The locations include the Main Room, the Back Room, or one of three closets.
Washable:	This is a checkbox. Some items do not need to be returned for laundering on a regular basis, whereas others do. Items, such as sport uniforms, must be returned after games for washing. This checkbox allows for better monitoring of items that need routine laundering.
Comments:	This field is simply an area for any extra comments the user may feel necessary to add.

Generic Inventory: Contains an entry and additional information for the part of the inventory without unique bar codes.

Generic ID:	An automatic number that appears next to every new entry into the table.
Total Number:	This is the number of items in the inventory altogether, whether lent, returned, or never lent.
Last Updated:	This date signifies the last time the total number of that generic inventory item was verified. The user updates this number after taking inventory.
Bar Code ID:	Field for an alphanumeric value that links this extra information to an item in the Master Inventory table, as well as any time this item is used.

Specific Inventory: Contains an entry and additional information for the rest of inventory, those items with individual bar codes.

Specific ID:	Similar to the Generic ID, it is an automatic number that will appear next to every new record.
Uniform Number:	This field will not always be filled. This only applied to the athlete’s number, which appears on a jersey or pair of shorts.

Size:	The size of the uniform.
Combination:	This field will not always be filled. This only applies to the lending of a lock when assigning a locker. This field will store the lock's combination for easy retrieval by staff.
Bar Code ID:	Field for an alphanumeric value that links this extra information to an item in the Master Inventory table, as well as any time this item is used.

Lockers: Complete list of lockers and their location.

Locker ID:	An automatic number that will appear next to every new record.
Locker Number:	Number physically on the locker.
Location:	Lockers can be located in different areas of the building, in general or varsity locker rooms.

Sports: List of sports at WPI that the equipment room supports, uniquely identified with a number.

Sports ID:	This automatic number uniquely identifies each sport.
Sport:	The equipment room supports these sports at WPI; this list appears as a dropdown menu in various forms.
Type:	Refers to for what variety of sport the item is used (i.e. varsity sport, club sport, intramural sport, general item for lending, physical education item)

Directory: Directory information for each borrower, obtained in the equipment room from each borrower individually. This information relates tables.

Borrower ID:	The bar code found on a WPI ID card.
First Name:	First name matching the WPI ID card.
Last Name:	Last name matching the WPI ID card.
Email Address:	The email address of the person.

Athletes: Contains information to relate students to a sport and the information for a student contract.

Athlete ID:	An automatic number.
Student Athlete ID:	The ID number from the athlete's student ID card.
Sport ID:	Corresponds to the sport table.
WPI Box:	The number of the athlete's WPI mailbox.
Address fields:	Contact information: mailing address, email address, and phone number(s).

Insurance Company: The equipment room requests the name of the athlete's insurance company for liability purposes.

Personal Stats: At least one field is used for each athlete - age, height, and weight.

Work Study Student: Contains complete list of work study students and their respective departments.

Work Study ID: Similar to Borrower ID, the number found on the work study student's ID card. Must be filled in by the equipment room staff.

Full Name: Full name of work study student in the format Last, First. This is the unique part of the information taken from the Athletic Department Office.

Supervisor: Person who supervises student, i.e., Shawn, Swim Coach. This may be filled in by the Athletic Department Office.

Contact Number: Phone number that is best to contact this student. This may be filled in by the Athletic Department Office.

Graduation Year: Graduation year of the worker. This must be filled in by the equipment room staff.

Lending: Contains the data related to lending and returning equipment and assigning lockers.

Lending ID: This automatic number appears with each record.

Date Lent: Automatically appears as the current date.

Borrower ID: Every member of the WPI community is given an ID with a bar code and magnetic strip on it. This relates to information in the directory table. The user will input the ID into this field with a bar code scanner.

Bar Code ID: The bar code found on the item being lent or the bar code corresponding to that generic item.

Date Due: The date on which the item should be returned to the room. For varsity equipment, this should be the last day of the sports season.

Date Returned: Once checked in, the current date will automatically appear.

Deposit: This is a checkbox. If checked, the locker borrower has paid the deposit. This reminds the staff to return the deposit upon return of the locker.

Locker Number: The Locker ID corresponding to a specific locker. This will be blank when this particular transaction does not involve lending a locker.

Email: The email address of the borrower, this automatically appears from the Directory table after the user scans the Borrower ID.

Initials: This field is for the initials of the worker who makes a change to the database by lending an item or checking one in.

Game Schedule: Contains information about events that must be staffed by work study students.

Game ID: An automatic number that uniquely identifies each game or athletic event.

Time: Time of game or event, in the short date format – MM/DD/YYYY.

Date: Date of game or event.

Hours: The number of hours each game or event lasts.

Locations: Location of game; the field appears on the forms as a drop down menu containing Harrington Auditorium, Alumni Gymnasium, the Fitness Center, Football Field, Softball Field, Baseball Field, the Pool and the Equipment Room.

Sport ID: Corresponds to the Sport table.

Number of Students: Number of workers needed for the game or event.

Work Study Schedule: Contains information to assign work hours to work study students.

Schedule ID: An automatic number, unique to each record.

Date: Date in which the worker is scheduled to work

Hours: The number of hours the worker is scheduled to work for that date, whether a game or event, hours in the equipment room, or lifeguarding.

Location: Where the worker will be working.

Game ID: If the worker is working a sporting event, this field is for the automatic number relating to the sporting event.

Work Study ID: The number found on the work study student's ID card.

The ability to manipulate data is another aspect of the design. While the user actively adds information to the database, the data should always remain accurate. The checks and balances in the database ensure accurate data; one of these methods is establishing table relationships. In linking tables, information is essentially double-checked. As a result, data relationships allow for tracking inventory and locker usage (based on lending transactions) and tracking work study scheduling (based on events to be staffed). The graph below shows relationships between the different types of data in different tables.

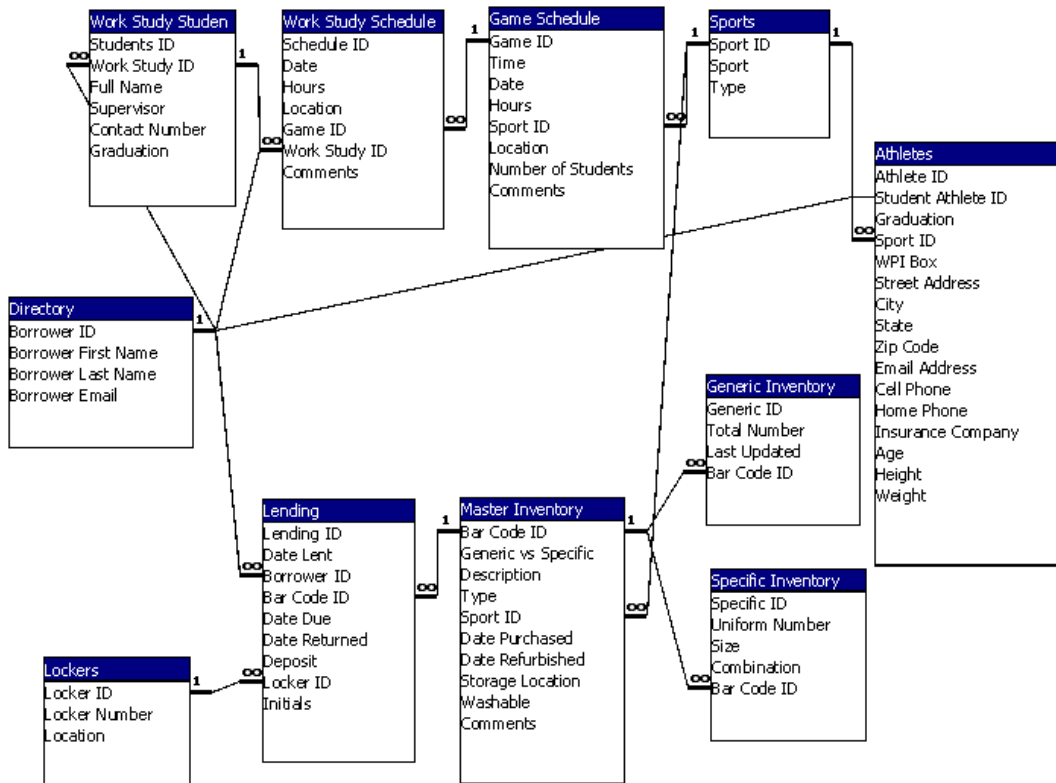


Figure 1: Database Relationships

Tables and relationships are the “behind the scenes” structure of the database. The user interacts with the interface, so as to be able to view, sort, and modify data. Viewing data occurs through queries (a means to locate a subset, or dynaset, of data in the database) and reports (formal display of a subset of data in the database). Modifying data occurs mostly through forms. Forms are the main mode of the GUI. A welcome screen and input screens are the two types of forms in this database. The forms show pertinent information and allow for data input into the database. Also, forms are a filter for producing specific records. Furthermore, the customized menu bar provides for navigation through these interfaces. One can move from the welcome screen to any form, query, or report, as well as perform basic functions such as saving, printing and exiting the program via the navigation menu bar.

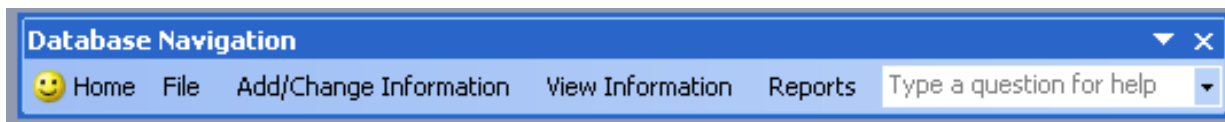


Figure 2: Database Navigation Menu Bar

Table 5 lists forms, queries, and reports with accompanying descriptions that are necessary for viewing and modifying data. With these as part of the user environment, equipment room workers can more readily access the needed information.

Table 5: Lists of Forms, Queries and Reports with Descriptions

Forms	Description
Check Out	Used to lend general inventory and athletic equipment.
Check In	Used to update the database when an item is returned.
Locker Assignment	Used to assign a locker, includes lending a lock and displaying lock and locker information.
New Borrower	Used to add directory information about a first-time borrower.
Athlete	Used to gather for new or update existing athletes' information.
New Work Study Student	Used to add information about work study students from the information retrieved from the Athletic Department Office.
Add to Work Study Schedule	Used to add a game or event to the schedule of games or events which should be staffed by work study students.
Assign Work Study Student	Used to assign a work study student to an event or record regular hours.
New Inventory	Used to add a new item to the inventory, either generic or specific.
Delete Student Records	Used to remove students records, because of graduation or otherwise.
Queries	Description
Checked Out	Used to determine what has been lent out and who has it.
Overdue (Type, Sport)	Used to determine who has not yet returned an item.
Available Inventory	Used to view available inventory.
Available Lockers	Used to determine how many lockers are available for assignment.
Used Lockers	Used to determine information on lent lockers.
Update	Used to update inventory information, particularly the Last Updated field.
Delete	Used to remove items from inventory, as a group and individually.
Verify	Used to view directory information, if it exists.
Reports	Description
Athlete Contracts	Contains athlete information so as to create an agreement for liability and lending returns.
Laundry Inventory	Contains info about the items that should have been returned for laundry.
Last Pay Period	Contains work study students and hours worked over the past two weeks.
Full Inventory (and only Varsity)	Contains sorted information on inventory by Type and Sport for viewing and verifying purposes. Also can be limited to one varsity sport.
Overdue Items (Varsity)	Contains information on items not yet returned by athletes.
Work Study Schedule	Contains information about all scheduled events and work student hours.

To continue, technical design includes bar coding, i.e., the generation, printing, and applying of bar codes. First, all bar codes will be generated with a freeware program, ID Automation Bar Code Label Design Application. This piece of software can generate Code 39 bar codes; this technology is sufficient for the needs of the equipment room, as this symbology holds alphanumeric data. Also, label layouts can be saved for repeated use, which ensures the bar codes generated for either hard or cloth surfaces have the same formatting. Next, the processes for printing and applying bar codes must be compatible, so they are described jointly. Sublimation was the best process for applying bar codes to clothing for the equipment room. As this process fuses pigments to the material, it is resistant to wear due to harsh environments and frequent washing. This process requires an Epson printer, sublimation ink, sublimation paper, polyester fabric and a heat press. The Epson print head is compatible with sublimation inks. A Shark Professional clothes iron proved to be insufficient source of heat, so the equipment room managers conducted research to find a better option and purchased a heat press. Due to the failure of the trials to produce a combination of materials that the bar code scanner can read, the equipment room cannot use the sublimation process. Heat transfer is the second best process. Trials with this process were successful. Heat transfer requires cotton, heat transfer paper, regular ink and a heat press. Once bar code labels have been heat-treated, the bar codes can be cut and sewn on the inside of uniforms, just as intended with the sublimation process.

As a result of the first bar code trial, the group decided upon the best choice for printing and applying bar codes to hard surfaces. Using the current inkjet technology in the equipment room, the Epson C88 printer, regular paper, and polyester laminates, the group successfully applied bar codes to a tennis racquet. Success means the bar codes are securely adhered and the bar code scanner can read the labels. For permanent bar codes, the equipment room workers will print the labels with long lasting Epson DuraBrite ink. As none of the label is exposed, water resistant media is unnecessary. In addition, thermal transfer printing is unnecessary as the bar code trial was successful for hard surfaces.

Lastly, this portion of the technical design describes hardware. The design accounts for the often hectic environment in the equipment room. A workstation should support database maintenance by incorporating the bar code software, database, and printer, in addition to the bar code scanner. Lending will involve not only the bar codes on uniforms and equipment, but also the bar codes already on WPI IDs; this symbology is also Code 39. In keeping database maintenance on a separate workstation, there will be no bottleneck on a multi-purpose workstation. That is, equipment room database maintenance will not interfere with the other responsibilities of either Shawn or Rick.

7.2. Procedural

After deciding what options are feasible, the group designed procedural changes. Changes have been made regarding inventory and storage, which will affect the staff's daily procedures. One change to the staff's normal routine is to use a computer to perform most procedures. Using Microsoft Access, the group created a database in which information for all of the current equipment can be entered. This database is stored on a dedicated workstation near the front window. As explained in greater detail in the technical design section, all of the equipment will be bar coded. The bar coding is either specific code assigned to an individual piece of equipment, or a generic code dedicated to a particular type of equipment. When lending such items as jerseys, shorts, practice gear, helmets, shoulder pads, and game bags, the lender must locate the bar code directly on the items. When lending an item that is generic; such as basketballs, racquetballs, towels, thigh pads; the lender will have to locate the corresponding bar code on a list of generic bar codes near the database workstation.

Tracking lent items and purchasing equipment fall under the inventory category. The Access database will replace the paper check in/check out lists for each sport for the beginning of the season or for game days, and it will also replace the lists for general community lending. It supplants the functions of almost all forms of paper tracking within the equipment room. The bar codes replace the current system of labeling equipment and uniforms, which consists of numbers written in permanent marker that sometimes have duplicates. Also, with a few clicks to maneuver through the database forms and queries, it will be much clearer to the staff which pieces of equipment are gone and who has them. As the database will keep track of each borrower using the WPI ID bar code, the managers will have an easier time contacting borrowers and tracking down overdue items based on precise and complete records. The database will not only help with lending, but also it will assist with purchasing equipment. By performing periodic inventory checks and updating the database, the managers will be able to keep accurate records of the number of each type of item in inventory and, thus, will be able to easily determine what items need to be purchased.

An important addition to the procedures will be the use of a secure server. The managers will share this resource with the Athletic Department Office to store information related to the equipment room database and work study students. In having a file share on a secure server, the managers can control access to the equipment room's database to maintain data security and, therefore, data integrity.

Previously, student contracts were pieces of card stock with generic fields so that all athletes could fill out the same cards. In the new system, each athlete will have a personalized contract generated by the athlete contract report. The format of the contract will change to a standard size page, but it will still have all the necessary fields - student athlete contact information, equipment specifics, and the same disclaimers about personal safety and about personal responsibility to return borrowed items.

Laundry Loops will be phased in as an improvement upon the mesh bags. As these loops cannot hold as much laundry as a bag they encourage students to return their laundry more frequently. As a result, the amount of laundry returned for washing is more evenly distributed over time. Laundry Loops can be hung, so using them saves storage space for clean laundry in the pick up area, which is now the closet past the front window. The method for returning uniforms to be washed has a couple changes; laundry will be dropped off by the laundry room instead of the equipment room, and some of the laundered items (mostly uniforms) will need to be checked back into the database. The loops are still color coded, like the mesh bags are, according to teams.

In the feasibility analyses, the ideas for a dumbwaiter, conveyor, and self-built winch, crate and pulley system were all discarded due to a lack in finances. Also, the managers decided against the group's suggestion to change the route of laundry transport.

Security is also an issue for the staff. Record security was discussed earlier with inventory procedures. Some changes in routine procedures would help prevent theft. The staff, as mentioned before, is consistent in keeping the front window closed during breaks when the managers are not present. They are also consistently locking their computers when they are away from them. The group suggested that valuables be kept in locked drawers. Keeping the side door closed would prevent students and faculty from having access to the room and removing something without proper documentation. With procedural changes now fully described, the next section elaborates organizational suggestions.

7.3. Organizational

After deciding which options were feasible, the group proposed some organizational changes. First, modifications were made in the equipment room and the outside closets to reorganize the inventory in both places to provide more space. Next, the group assessed the condition of the storage containers in order to decide what should be purchased. Then, the group assessed the method of storing off-season uniforms. Previously, off-season uniforms were stored among in-season uniforms and other equipment. The group decided to implement a more efficient method of organization of these items to make the use of this space more efficient so that frequently used items can be stored in a main room. Two methods used to accomplish this were using vacuum storage bags and reorganizing bins, which involved purchasing more bins. Also, the group decided to store the sport balls more efficiently. The group contributed to the design of a more convenient storage rack that also has a greater capacity.

8. Implementation

This section will explain in greater detail how the group intends to make all of its proposed ideas work. The explanation will include some specific details of set up and use of the new technology, procedures and organizational equipment. In addition, this explanation will include projected tasks for long term maintenance.

8.1. Implementing Technology

This section describes how to incorporate technology changes into the management system of the athletic equipment room. As described in the methodology section, these tasks are data-centered. Also, implementing the database can occur as either a cutover process or phasing. Database development has included designing and programming the database with updates based upon feedback from testing. Once the database is complete and populated, using only the database is favorable over keeping most manual records. Population could occur in a relatively short period of time in an intense effort, or could occur in stages, such as when the equipment room takes seasonal inventory. As the technology changes required some new items and more accurate inventory information, the database development began first. After items arrived and information was gathered, implementing hardware and bar codes followed.

8.1.1. Database

Implementing the database began with design. The design has been explained in the previous section; this is a result of iterations with improvements and input from the group's advisors. The progression of improvements started with discussing the necessary information and how that data should be divided into tables. Then, the relationships among those tables were successfully defined and implemented. Next, the welcome screen, forms, queries, reports and the menu bar (all part of the GUI) were assembled with effectiveness and usability in mind. The GUI and the back end of the database are collectively referred to as the Equipment Manager program. This has been evaluated by the equipment room workers. Allowing the workers in the equipment room to test the program and provide feedback has helped the group decide what needs to be improved and what features needs to be added. Using test data has helped the group verify the functionality of forms, queries, and reports. The group's main concerns are succeeding in keeping the data accurate while keeping track of lending, locker assignments, and work study scheduling. Also, the group desired to make it easy for users to retrieve relevant data and navigate the program. While the group has not been able to procure directory information from WPI, it has been able to share information about work study students and their hours with the Athletic Department Office through the file share. The group has provided to the equipment room staff at the conclusion of the project a guide to

the Equipment Room Manager that describes how to use the program, how to maintain inventory, and how to make special changes that may not be common enough so that a form should be created.

Some usable data has been entered into the database from the equipment room's Excel spreadsheets of current locker assignments; this information populates the Lockers table and will be used to put all locks into the Master and Specific Inventory tables. With the help of work study students, many items could be bar coded and the database could be functionally-populated before the beginning of the new academic year. If all sport items are in the database by the beginning of that sport's season, then the program can function during that season. It is recommended that the bar coding and populating of the database begin with general lending items, then proceed to fall sports, winter sports, spring sports and finally any summer activities.

In terms of maintenance, the database should require little upkeep. As items are purchased, refurbished, reallocated, or discarded, they would have to be updated in the database. Athlete, work study, and borrower information would have to be updated each year. In addition, as the workers see fit, a new report or query may be necessary. If this occurs after the IQP is complete, those workers could reference the guide that the group provided at the completion of the project.

8.1.2. Hardware

Hardware implementation has the fewest steps as compared to other technology implementation tasks. As both of the workstations have been delivered to the equipment room, the group has been able to verify their functionality. Both workstations are adequate; Rick's workstation has an image of his last computer, so he has lost no data. Shawn has been able to get NetOps to activate a port for the database workstation, so that workstation is completely functional. The workstation has Microsoft Access and has the bar code generation software. As all workstations are networked, they all have access to the equipment room file share, which the CCC has set up.

All orders have been submitted and all items have arrived. Both the Epson printer and the bar code scanner have been tested and verified. The heat press has arrived and the group verified that it can reach the appropriate temperature (375° – 400°) with acceptable evenness and adjustable pressure.

8.1.3. Bar Codes

Implementing bar codes into the management system of the equipment room is the most time consuming task under technology implementation. The group does not anticipate this will be complete by the end of the IQP, although the group has outlined the system, conducted a trial, and has provided a guide to creating bar codes. To begin, the group decided on the bar code scheme. This includes relating bar code values with specific groups in the inventory. To elaborate, an item related to a sport will begin

with a few letters to indicate the sport – FOOT for football, TENN for tennis, etc. As these labels are not specific to types, they transcend those categories. This is important as items may move from the varsity inventory to general lending inventory as they become worn. The numbers after the prefix of the bar code will not necessarily have a scheme, as items will be added to the inventory relatively frequently. Table 6 elaborates the final bar code scheme.

Table 6: Table of Bar Code Scheme

Sport	Label
Locks	4 digit number
Baseball	BASE + 4 digits
Basketball	BASKET + 4 digits
Crew	CREW + 4 digits
Cross Country	XC + 4 digits
Field Hockey	FDHOCK + 4 digits
Flag Football	FLAGFT + 4 digits
Floor Hockey	FLHOCK + 4 digits
Football	FOOT + 4 digits
Indoor Soccer	INDSOC + 4 digits
Lacrosse	LACR + 4 digits
Rugby	RUGB + 4 digits
Soccer	SOCC + 4 digits
Softball	SOFT + 4 digits
Swimming & Diving	SWIM + 4 digits
Table Tennis	TBLTEN + 4 digits
Tennis	TENN + 4 digits
Track & Field	TRACK + 4 digits
Volleyball	VOLL + 4 digits
Wrestling	WREST + 4 digits

With the bar code generation guide provided to the equipment room, a work study student can begin to create the for sheets of bar codes, only creating enough with a specific prefix for those items for a certain sport. The bar code generation program has built in layouts relating to standard label sizes. The group decided against precut labels, however, so custom print layouts have been made for both hard and cloth surface labels. These layouts account for spaces around all the bar codes, which improve their readability to the scanner. This works in conjunction with the bar code scheme prefixes that have been deliberately kept short and the number following the prefixes, which will never exceed four digits. One exception to this rule is labeling the locks; as these will be put on a curved surface, they will have only numbers so the bar code scanner can still easily read these bar codes. These are the only items allowed to have no prefix, so there should be no confusion. When the equipment room is prepared to begin applying these bar codes, a worker can print them using specified paper and ink. If these bar codes are for

clothing, sheets of cotton must be cut into the size of a standard sheet of paper, approximately. They can then be transferred through heat treatment, which should occur soon after printing. The printouts must be the reverse image to transfer appropriately. Once they have set, these sheets can be cut into individual bar code labels, to be sewn into uniforms. Care should be taken in this step to keep the bar code lines parallel.

Regarding the labels for hard surfaces, the bar code sheets can also be designed prior to printing. To separate the bar codes, one should use a paper cutter, taking care to leave enough space on the left and right on the bar codes, called the quiet zone. In addition, one should cut the laminates so that they cover and extend beyond the edge of the bar code label. The placement of these bar codes will affect their longevity. Preferably, they will be placed where they will receive the least amount of wear from friction and light. In addition, these inkjet labels will be covered with laminate, and that should also be given the appropriate amount of time to cure, ideally overnight. Maintenance for this aspect is not nearly as time-consuming as set up will be, as over one thousand items will require bar codes for varsity sports alone. As new items are purchased, reallocated from varsity, or items are removed from inventory, the applied bar codes will need no updates as new bar codes should just increment in number. This requires several dozen bar codes to be generated, printed, and applied at a time. This and replacing any worn bar codes are the only maintenance procedures for bar coding. The next section will describe implementation of any procedural changes.

8.2. Procedural

Many procedures had to change due to the software and hardware implementations. These have been developed, written into a database guide, and training has been provided as necessary. The database guide is a complete description of the program. It describes every option, drop-down menu, and button from startup to close. This is followed by a “How To” guide for easy reference for common procedures, which will be most useful to work study students once the program is fully populated and functioning.

The next major procedural modification is the switch from laundry bags to laundry loops. The loops have been purchased by the vendor in color, with color codes matching the previous codes used with the mesh bags. These loops are already in use for one sport, wrestling, so no training is necessary for the staff. Training will be needed, however, for the students. The students will need to be briefed on the usage of the loops. This will not be a major change, because the staff normally briefs the students on the usage of mesh bags. The loops will be put into effect in the following sport season, so that all bags will be returned and loops can be issued to replace them. This, again, is only a trial run for Shawn to determine which method he prefers. As far as the other laundry procedures, the drop-off and pick-up

locations have changed; drop-off is now a chute by the laundry room, and pick-up is the old drop-off location, the closet just past the front window.

The security modifications have nearly all been implemented. The managers close the door when they leave the room. Valuables are now locked in a drawer. Safety measures used before, such as locking the computer and closing the main window, are still in place. The final modification still waiting to be completed is based upon a suggestion from the group. The IQP group suggested converting the door into a horizontally hinged two piece door (similar to a barn door) so that items can be retrieved by students without the door being opened. This remains as a suggestion by the group, as the managers will be implementing this project on their own.

8.3. Organizational

Organizational changes began immediately as they did not require any new equipment. The group began implementing the organizational changes by sifting unused items from the equipment room and back closet. To be more specific, the group has been sifting through these areas determining what can be either replaced or relocated. In addition, the group assessed what types exist so that equipment can be organized by type and task. In the process, the group compiled a new, accurate inventory. Also, based on the volume of items in different types, the group adjusted the shelving to optimize available space.

In the main room, the managers implemented the group's suggestions for a new ball rack, and they bought and installed a new pegboard structure. For the ball rack, the old rack was relocated so as to free that space for the new workstation. Next to the new location, a second, smaller ball rack that was in storage was mounted beside the old one. They are in a good location for easy access and together hold more items than the old one. Before pegboard was installed, the main room was rearranged. About half the shelving was removed. Rick's desk was moved across the room next to the side door. The workbench was moved to its old location. Next to Rick's desk and above the work bench, pegboard was installed and existing pegs used. In addition, a set of bins for pegboard were installed above the work bench; these bins help to organize small items like bolts and screws.

With Shawn and Rick's approval, the group discarded or relocated items around the main and side rooms that were not used, or not used frequently enough to be stored in their current locations. This freed space and allowed the group to store frequently used items in the main room. After clearing space, the group began organizing off-season uniforms. Basically, this consisted of placing off-season varsity uniforms in space saving bags. Sealing home and away uniforms, as well as warm up suits, removes air and compacts the amount of space it takes to store these items as much as possible. This also protects the uniforms from potential damage. This method of storage is simple and keeps all uniforms in the same

modular shape. Some shelves in the side room were adjusted to accommodate this shape. Shelves can easily be labeled to organize these uniforms by sport, creating a system for easy retrieval.

The group decided that the bins left over from placing the off season jersey in space bags along with the extra bins already owned by the equipment room were more than enough to handle the rest of inventory that is or will be stored in the side room; therefore, no other bins were purchased. Turning to the rest of the inventory, the group began to assess which cardboard boxes needed to be replaced due to age. Newly emptied bins can hold the items in those boxes and will help to organize them into related groups by type or by task. Since bins are easily labeled, this facilitates efficient grouping.

Furthermore, the group constructed maps, inventory lists, and directories for items that have been organized. Organization is by type (PE, club, intramural, varsity, etc.), by sport, by season, and by task (cleaning, refurbishing, etc.). After storing organized items in existing storage bins, the group decided if and how they should be rotated by season. This rotation schedule has been documented on the inventory map, which is located in Appendix M, along with the other organizational documentation. The completion of many of these organizational changes is the result of Rick's efforts and enthusiasm. These organizational changes not only create a more spacious and neat environment, but also compliment the procedural changes well.

9. Conclusion

In conclusion, the IQP group has assessed the management of WPI's athletic equipment room. The group has observed the equipment room to identify the services that it provides to the community and the tasks it completes within the department. The group commends the equipment room in its many and varied services to the community, and the group identified some areas, with change, that could be enhanced to further contribute to health and fitness at WPI. The group then formulated suggestions for these changes, based on research and analysis, in the areas of technology, procedures, and organization. These suggestions, upon approval by the sponsor and those who would be immediately affected by them, were either approved or disapproved. From here, the IQP team revised their design and began implementation. Rick and Shawn were very patient and helpful during changes; discussion even inspired their own modifications to the management of the equipment room – new laundry drop-off and pick-up locations. The final design included a Microsoft Access database to store all inventory, work study information, athlete information and borrower information. The main purpose of this database is to more efficiently manage inventory. To assist with this purpose, the group implemented a bar coding system for the inventory as well as a way to take advantage of the unique bar code found on all WPI IDs. Changes to the organization of the room and common procedures were also made to compliment the new method of tracking information. Guides were provided at the end of the project to support to staff in maintaining the changes and setting up the new inventory maintenance program.

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11. Appendix

Appendix A. Meeting Agendas

Date: 9/7/2006
Time: 1:00PM
Location: WL 220

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor),
Jessica Coelho, Janelle Tavares

1) Last Week/Current Tasks

- a) Observations of equipment room/Discussions with Shawn and Rick
- b) IQP's / MQP's
 - i) Equipment Room MQP from 2002
- c) Conversation with Athletic Direction (AD)
- d) Visiting other Equipment Facilities
 - i) Commercial – Successful Communications
 - (1) Bally's
 - (2) Gold's Gym
 - ii) Collegiate – Successful Communications
 - (1) Bridgewater State
 - (2) Assumption

2) Short Term Goals

- a) Another discussion with the AD
 - i) Potential for funding, available resources
 - ii) Blueprints
 - (1) Possible computer
 - (2) Possible printer
 - (3) Software/hardware package
 - (4) New building?
 - iii) Blueprints
- b) Equipment Facility Visits
- c) Demo Access GUI for Shawn
- d) Research software/technology packages available
 - i) Order some demos to show Shawn
- e) Research inventory database options already available (MS, freeware)
- f) Equipment Management Periodicals and References

3) Questions

- a) Social aspect of project/service community

Last meeting's minutes:

- Overview of project structure
- Advisors addressed introductory questions

To be delivered by next meeting:

- Agenda for meeting and minutes from this meeting
- Schedule for A-term

Date: 9/14/2006
Time: 1:00PM
Location: WL 220

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djasmasbi (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

1) Accomplished since last meeting

- a. Created a term timeline
- b. Researched relevant MQPs and IQPs
- c. Observed Outside Equipment Room
 - i. Commercial
 1. Bally's Total Fitness
 2. Gold's Gym
 3. Mass Health & Fitness
 4. Family Fitness
 - ii. Collegiate
 1. Assumption College
 2. Clark U
 3. Worcester State
 4. Providence College
 5. Anna Maria
 6. Bridgewater State
- d. Continued Observation of WPI Equipment Room
- e. Appointment(s) made with Athletic Director
- f. Discussed scanning/bar coding systems with librarian
- g. Research via periodicals
- h. Began database research
- i. Polling of database use of the Equipment Manager's Association via Shawn
- j. Quick demo of Access to Shawn

2) To be completed by next meeting

- a. Continue database research
- b. Speak with Athletic Director
- c. Begin writing of the first draft
- d. Order more demos for Shawn to view
- e. Visit Holy Cross

Minutes

- Reviewed Completed tasks
- Reviewed Current tasks to be completed by today
- Professor Djasmasbi addressed students' question
- Suggestions from Professor Djasmasbi
 - Explicit emails

- Agenda content and format
- Organize group with complete timeline
- Lit Review suggestions

To be delivered by next meeting:

- Agenda for meeting and minutes from last meeting
- Gantt Chart (last updated 9/12)

Date: 9/21/2006
Time: 1:00PM
Location: WL 220

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

1) Team Accomplishments

- a) Continued software/hardware research
- b) Composed a preliminary first draft
- c) Spoke with
 - i) Parts of something
 - ii) Parts of something
- d) something

2) To be completed by next meeting

- a) Something
- b) Something
 - i) Parts of something
 - ii) Parts of something
- c) Something

3) Questions

- a) Is it necessary to include agenda/minutes within the appendix?

Last meeting's minutes:

- Discussed agenda
- Suggestions for group
 - Put pictures of nice equipment rooms in Appendix
 - Also include pictures of our room (before and after)
 - Break down observations (procedures, software, organization)
 - Create sample screens
- Post drafts on myWPI and send reminder email or send directly to inbox, either way

To be delivered by next meeting:

- Agenda for meeting and minutes from this meeting
- Updated Gantt chart
- First Draft
- Preliminary requirements (included in first draft)

Date: 9/28/2006
Time: 1:00PM
Location: WL 220

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djasabi (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

1) Accomplishments since last meeting

- a) Re-writing/writing for the Second Draft
- b) Organizational observations and research
- c) Pictures to document current state of the equipment room
- d) Cost research for current management system
- e) Meeting with the Athletic Director
- f) Database research
- g) Barcode printing research
- h) Meeting with Jon Bartleson and Chris O'Connor in the CCC

2) Goals for the upcoming week

- a) Meeting with ATC Director
- b) Complete 99% of the research
- c) Finish Second Draft

3) Questions

- a) Presentation Date/Lunch
- b) B-Term meeting times

Last meeting's minutes:

- Advisor addressed question about agenda/minutes being in Appendix
- Advisor gave critique of paper
 - Table of Contents in same document
 - Overview sentences and introductions
 - Assertive words
 - Sections re-organized
 - Start broad
 - Budget in problem statement
 - Procedures – add table
 - Technical – put programs first, then scanning
 - More analysis
 - WPI standards

To be delivered by next meeting:

- Agenda for meeting, minutes from this meeting, updated Gantt chart
- Second Draft
- Gantt chart for B-Term tasks

Date: 10/05/2006
Time: 1:00PM
Location: WL 220

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djamasi (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

- 1) **Accomplished since last meeting**
 - a) Completed the second draft
 - b) Finished technical research
 - c) Finished organizational research
 - d) Started vendor communication
 - e) Created B term agenda (Gantt)

- 2) **To be completed by next meeting**
 - a) Complete vendor communication
 - b) Complete proposal
 - c) Finish presentation content
 - d) Talk to workers in the wood shop (ball rack, other org. changes)

Last meeting's minutes:

- Suggested changes in format of the proposal
- Decided on a proposal date (10/23/06 @ 12pm)
- Decided on B term meeting time (Thursdays at 3pm)

To be delivered by next meeting:

- Slide show for critique by 10/12
- Final proposal by 10/12

Questions:

- What day do you want the draft by? Do you want it before 10/12 for discussion?
- Should the final proposal be a hardcopy?

Date: 10/12/2006
Time: 1:00PM
Location: WL 220

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djamasbi (Faculty Advisor)
Jessica Coelho, Janelle Tavares, Antoine Coleman

1) Accomplished since last meeting

- a) Revised Draft
- b) Continued Vendor Communication
- c) Revised B term Gantt chart
 - i) Eliminated Bar codes

2) To be completed by next meeting

- a) Complete proposal
- b) Complete Presentation
- c) Presentation: Monday, Oct 23rd @ 12pm in the Equipment Room

Last meeting's minutes:

- Recommendations given for writing the proposal
- Discussed slide show for presentation
- Suggested forming a priority list to ensure what is needed to be done gets done

To be delivered by next meeting:

- Proposal
- Presentation
- Lunch ☺

Questions:

- When are you expecting to see the final proposal?
- What do you think of this draft?

Date: 10/26/2006
Time: 3:00PM
Location: WL 220

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djamasbi (Faculty Advisor)
Jessica Coelho, Janelle Tavares

1) Tasks since last meeting

- a) Final Draft of Proposal
- b) Proposal Presentation
- c) Began Order Forms
- d) Access Research

2) Tasks before next meeting

- a) Complete Order Forms
- b) Further Access Research
- c) Continue Designing and Programming Database
- d) Begin Scheduling and Delegating Organizational Tasks

Last meeting's minutes:

- Reviewed Completed tasks (draft revision, vendor communication, B Term schedule change)
- Advisors provided draft criticisms and Powerpoint presentation feedback
- Advisors established deadline
- Confirmed logistics of presentation

To be delivered by next meeting:

- Agenda for meeting and minutes from this meeting

Questions:

- Comments on the final draft of the proposal?
- Comments on the presentation?
- Feedback on database design?

Date: 11/2/2006
Time: 3:00PM
Location: WL 220

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djasabi (Faculty Advisor)
Jessica Coelho, Janelle Tavares, Antoine Coleman

1) Accomplished since last meeting

- a) Completed order forms
- b) Continued Access research
- c) Database design continued
 - i) Revised Tables
 - ii) Began Queries
- d) Began reorganizing equipment room/closets
 - i) Assigned tasks for work studies
- e) In communication with Writing Center for an appt.
- f) In communication regarding
 - i) Port activation
 - ii) Computer delivery
 - iii) Directory services linking
 - iv) Server access
- g) Security changes made
- h) Revised Gantt Chart

2) To be completed by next meeting

- a) Continue database testing/designing
- b) Continue organizing equipment room
- c) Make an appointment with the Writing Center

Last meeting's minutes:

- Recommendations given for writing the proposal
- Discussed presentation
- Suggested changes for database design

To be delivered by next meeting:

- Revised Gantt Chart
- More database changes

Questions:

- How is the database looking now?

Date: 11/09/2006
Time: 3:00PM
Location: WL 206

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djamasbi (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

1) Accomplished since last meeting

- a) Continued preparing equipment room.
- b) Revised tables in database.
- c) Created test situation list.
- d) Made appointment with writing center (11/10/06 @ 1pm)
- e) Continued Access Research
- f) Computers arrived and are now in place
- g) Tested iron (needs to be returned).

2) To be completed by next meeting

- a) Database modifications
- b) GUI testing
- c) Hardware testing (printer and scanner)
- d) Continue organizing closets and reallocating shelves
- e) Paper revisions based on Writing Center recommendations.

Last meeting's minutes:

- Suggested table changes
- Reviewed Current tasks to be completed by today
- Suggested creating a list of test procedures

Deliverables:

- Updated Gantt
 - *Note that an updated Gantt chart was not delivered today because changes were not significant enough.
- Updated Design

Date: 11/16/2006
Time: 3:00PM
Location: WL 206

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djamasbi (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

1) Tasks since last meeting

- a) Finished revisions with the Writing Center
- b) Continued database modifications
 - i) Table relationships
 - ii) Forms
 - iii) Queries
 - iv) Reports
- c) Hardware testing (printer, bar code scanner)
- d) Heat treatment research
- e) Continued equipment room and closet reorganization
- f) Contacted Archives

2) Tasks before next meeting

- a) Database modifications
- b) Linking to Directory Services
- c) Database functionality testing (population)
- d) GUI testing
- e) Revisions of Design and Implementation
- f) Continued reorganization
- g) Begin trial of bar codes on equipment
- h) Decisions about heat treatment process
- i) Begin documentation (database guide, inventory)

Last meeting's minutes:

- Reviewed database
- Advisors suggested relationship changes, one-to-many for Inventory

To be delivered by next meeting (two weeks):

- Agenda for meeting and minutes from this meeting
- Revised drafts of Design and Implementation

Date: 12/14/2006
Time: 3:00PM
Location: WL 206

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djamasbi (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

1) Tasks since last meeting

- a) Confirmed C term meeting time
 - i) Fridays at 11 AM
- b) C term schedule
- c) Database quiz
- d) Updated database submitted
- e) Revised paper submitted

2) Tasks before next meeting

- a) Collect feedback about database
- b) Continue communication about directory information
- c) Some organization tasks
- d) Continue with documentation
 - i) Database guide
 - ii) Procedures guide
 - iii) Organizational documentation
- e) Continue with database iterations
- f) Check status of remaining orders

Last meeting's minutes:

- Reviewed accomplishments
- Advisors made suggestions for the database
 - Table relationships adjustments
 - Parameterized queries in forms for reports
 - Database quiz
- Discussed exchanging information to set meeting time for C term

To be delivered by next meeting:

- Agenda for meeting and minutes from this meeting

Date: 1/12/2007
Time: 11:00AM
Location: WL 206

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djamasi (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

1) Tasks since last meeting

- a) Collected feedback from Shawn regarding the database
- b) Continued communication with FERPA. *Changes to project must be made*
- c) Equipment room continued to undergo remodeling
- d) Checked status of remaining orders
- e) Continued database iterations
- f) Turned in paper. Awaiting feedback.
- g) Continued with documentation
 - i) Database guide
 - ii) Procedure guide
 - iii) Organizational documentation

2) Tasks before next meeting

- a) Work on building a directory table
- b) Continue equipment room and closet organizational changes
- c) Continue with documentation
 - i) Database guide
 - ii) Procedure guide
 - iii) Organizational documentation
- d) Order a heat press
- e) Continue database iterations
 - i) Accommodate Shawn's requests

Last meeting's minutes:

- Reviewed accomplishments
- Reviewed what needed to be accomplished over vacation
- Advisors made suggestions for the database

To be delivered by next meeting:

- Agenda for meeting and minutes from this meeting
- Revised database
- Updated Gantt chart

*Do you want the final paper handed in electronically?

Date: 1/19/2007
Time: 11:00AM
Location: WL 206

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djamasbi (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

1) Accomplished since last meeting

- a) Orders completed as of 1/12/07
- b) Looked at MQP's for formatting tips and figured out how to format table of contents
- c) Modified the file share
 - i) Janelle, two secretaries and Dana (in the AD Office) have access
 - ii) Allows for access to the Work Study information
- d) Populating lock and locker table- on going
- e) Created new borrower form
- f) Continued organization of off season jerseys
- g) Looked into binding and submitting for the IQP
- h) Set up an account with RefWorks

2) To be completed by next meeting

- a) Taking Pictures for the procedure guide
- b) Modify database
- c) Changes to the paper based on advisors comments

Last meeting's minutes:

- Discussed necessary directory changes
- Briefly discussed C term goals

To be delivered by next meeting:

- Agenda for meeting and minutes from this meeting
- Revised Database
- Updated Gantt chart

Date: 1/26/2007
Time: 11:00 AM
Location: WL 220

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djasasbi (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

1) Accomplished since last meeting

- a) Pictures for the Procedures Guide
 - i) Bar code portion has screen shots
- b) "After" pictures
- c) Database guide outline
- d) Mapped lockers
- e) Working with AD Office about file share
- f) Looked at formatting of one of Prof. Strong's MQP's
- g) Communication with Project Center about final project specifics
- h) Started bar code trials
 - i) Hard surface labels successful so far
 - ii) Cloth labels not working with scanner – fabric? paper?
- i) Incorporated paper editing feedback
- j) Fix database relationships and other modifications

2) To be completed by next meeting

- a) Updated Procedures Guide
- b) Organizational Guide
- c) Incorporate Section 8 feedback
- d) Pursue alternatives for cloth bar codes
- e) Database iterations
 - i) Locks
 - ii) Lockers
 - iii) Work Study linking

3) Questions

- a) One inch margins?
 - b) Number of copies?
 - c) First draft of final paper submitted Wednesday?
-

Last meeting's minutes:

- Reviewed Completed tasks
- Reviewed Current tasks to be completed by today
- Professor Strong gave input about directory table relationships
- Professor Strong gave feedback about Intro, Section 7, and TOC
- Reassessed draft deadlines

To be delivered by next meeting:

- Agenda for meeting and minutes from this meeting
- Updated C Term Gantt chart
- Full updated procedures guide
- Rough draft of organizational guide

Date: 2/2/2007
Time: 11:00AM
Location: WL 206

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djamasbi (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

1) Accomplished since last meeting

- a) Continued database changes suggested by Shawn
- b) First draft of the term completed
- c) Documentation continued
 - i) Bar code guide draft completed
 - ii) Procedural guide draft completed
 - iii) Organizational documentation continued
 - iv) Formed a list of generic bar codes
- d) Attended RefWorks workshop
- e) Communication with Dana regarding letter of acknowledgement
 - i) Will cosign, Shawn will write it (see question at end of agenda)

2) To be completed by next meeting

- a) Appendix changes
 - b) Continue database modifications
 - c) Continue documentation
 - d) Presentation draft
 - e) Another bar code trial
 - i) Communication with vendors regarding problem with cloth bar codes
-

Last meeting's minutes:

- Reviewed Completed tasks
- Reviewed Current tasks to be completed by today
- Presentation practice
- Suggestions from Professors
 - Paper details
 - Presenting tips

To be delivered by next meeting:

- Agenda for meeting and minutes from this meeting
- Updated Gantt Chart
- Organizational documentation- drafts/outlines
- Presentation draft/outline

Questions:

- How should the letter of acknowledgement be formatted? Do you have an example of one?

Date: 2/9/2007
Time: 11:00AM
Location: WL 220

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djamasi (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

1) Accomplished since last meeting

- a) Organization documentation
 - i) AutoCAD drawing of main room and back room
- b) Database Modifications
 - i) Populated locker tables
 - ii) Created new form, added button
- c) Presentation draft
- d) After Pictures
- e) Bar code trial- heat transfer
 - i) Reorder ink
- f) Signed up for RefWorks accounts

2) To be completed by next meeting

- a) Draft #2
- b) Organization Guide Draft
- c) Presentations redrafted

Last meeting's minutes:

- Professors made suggestions regarding presentation
- Discussed presentations date

To be delivered by next meeting:

- Agenda for meeting and minutes from this meeting
- C-term Gantt
- Draft modifications
- Presentation draft
- Organization AutoCAD drawings

Date: 2/16/2007
Time: 11:00AM
Location: WL 220

Equipment Room IQP Meeting Agenda

In Attendance: Prof. Strong (Faculty Advisor), Prof. Djamasbi (Faculty Advisor)
Jessica Coelho, Antoine Coleman, Janelle Tavares

1) Tasks since last meeting

- a) Submitted second draft
- b) Finished “after” pictures
- c) Two orders last week
 - i) One arrived yesterday
 - (1) Finish clothing bar code trial this afternoon
 - ii) Finished cost tables
- d) Incorporate feedback
 - i) Paper
 - ii) Bar code guide
 - iii) Procedures guide
- e) Most of organizational guide complete
- f) Letter of Acknowledgement written
 - i) Secretaries editing it
- g) Invited secretaries to the presentation
- h) Reserved projector and screen
- i) Updated presentation
 - i) Practiced delivery

2) Tasks before next meeting

- a) Finish Everything!
 - i) Final Draft
 - ii) Final Presentation
 - iii) Printing and binding
 - iv) Continued training

3) Questions

- i) Verify procedure for handing in final draft
 - (1) Paper copy, printed front and back. Color? Bound?
 - (2) Disk copy of everything
 - (3) Is it OK to have guides and database as a CD in the Appendix?
- ii) Feedback for Section 7.3, 8, procedures guide and any from second draft

Last meeting’s minutes:

- Reviewed accomplishments
- Prof. Strong supplied edits of the paper
- Prof. Djamasbi provided criticism for the bar code guide
 - What and why!
- Advisors made suggestions on the content and delivery of final presentation

To be delivered by next meeting:

- Final Draft (disk and paper copy)
- Final Presentation

Appendix B. Pictures of Bridgewater State College



Figure B.1: Ball Rack

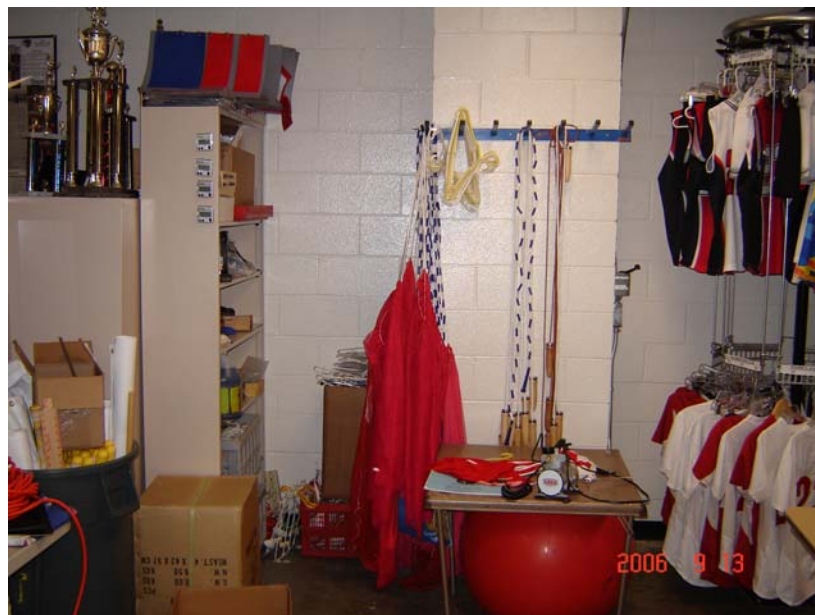


Figure B.2: Main Room Shelves and Hanger



Figure B.3: Main Room Shelves, Left



Figure B.4: Main Room Shelve, Right



Figure B.5: Off-Season Jersey Room



Figure B.6: Off-Season Room Ball Rack



Figure B.7: In-Season Uniform Rotating Rack



Figure B.8: Pegboard Wall

Appendix C. Pictures of WPI's Facilities



Figure C.1: Equipment Room Closet #1 - Before



Figure C.2: Equipment Room Closet #1 - Before



Figure C.3: Equipment Room Closet #1 - Before



Figure C.4: Equipment room Closet #1 - Before



Figure C.5: Equipment room Closet #1 - Before



Figure C.6: Equipment room Closet #1 - After



Figure C.7: Equipment Room Closet #1 – After



Figure C.8: Equipment Room Closet #2 – Before



Figure C.9: Equipment Room Closet #2- After



Figure C.10: Equipment Room Closet #3- Before



Figure C.11: Main Equipment Room Shelves - Before



Figure C.12: Main Equipment Room - Before



Figure C.13: Back Equipment Room - Before



Figure C.14: Back Equipment Room - Before



Figure C.15: Main Equipment Room Shelves - After



Figure C.16: Main Equipment Room - After

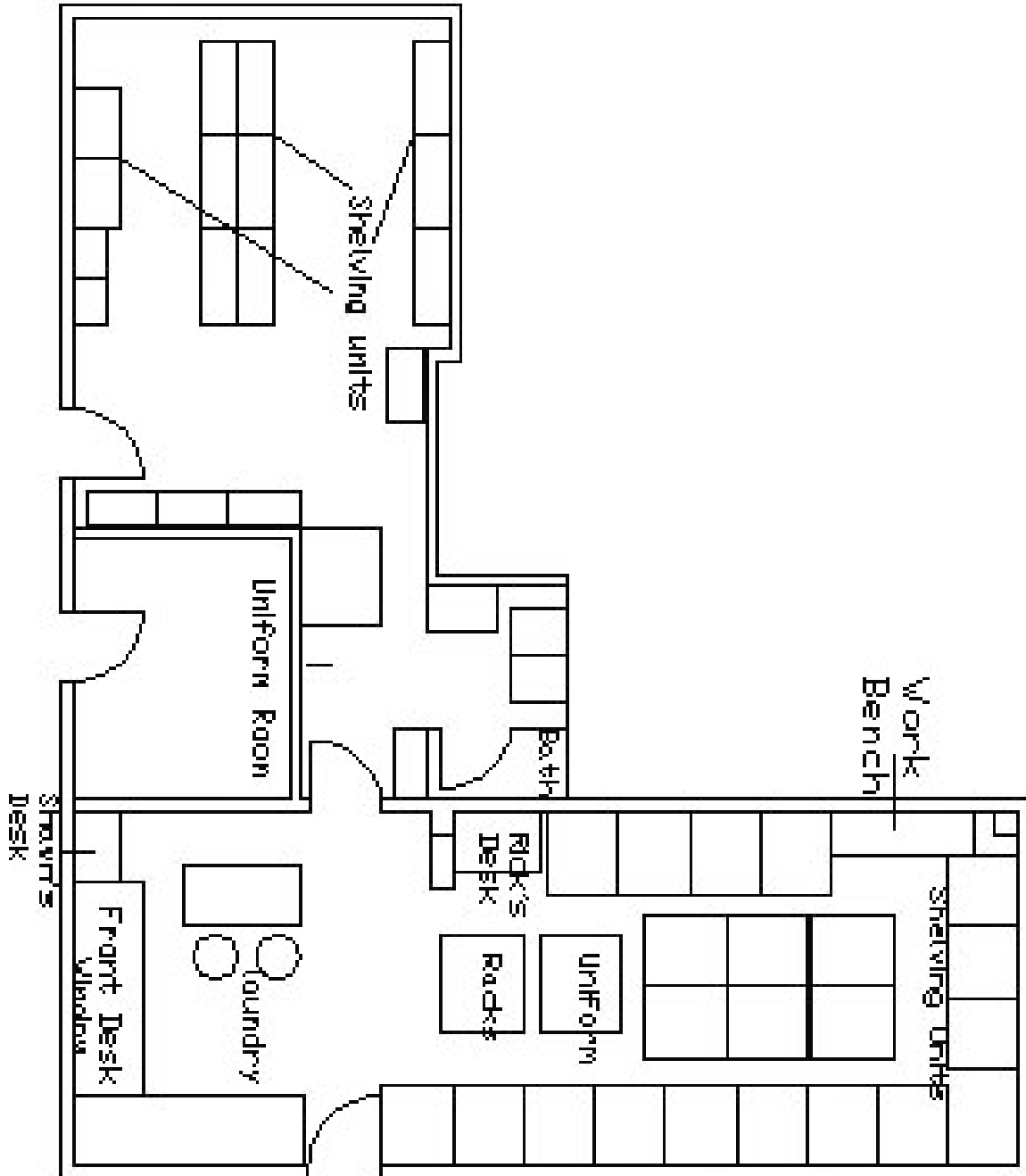


Figure C.17: Back Equipment Room - After

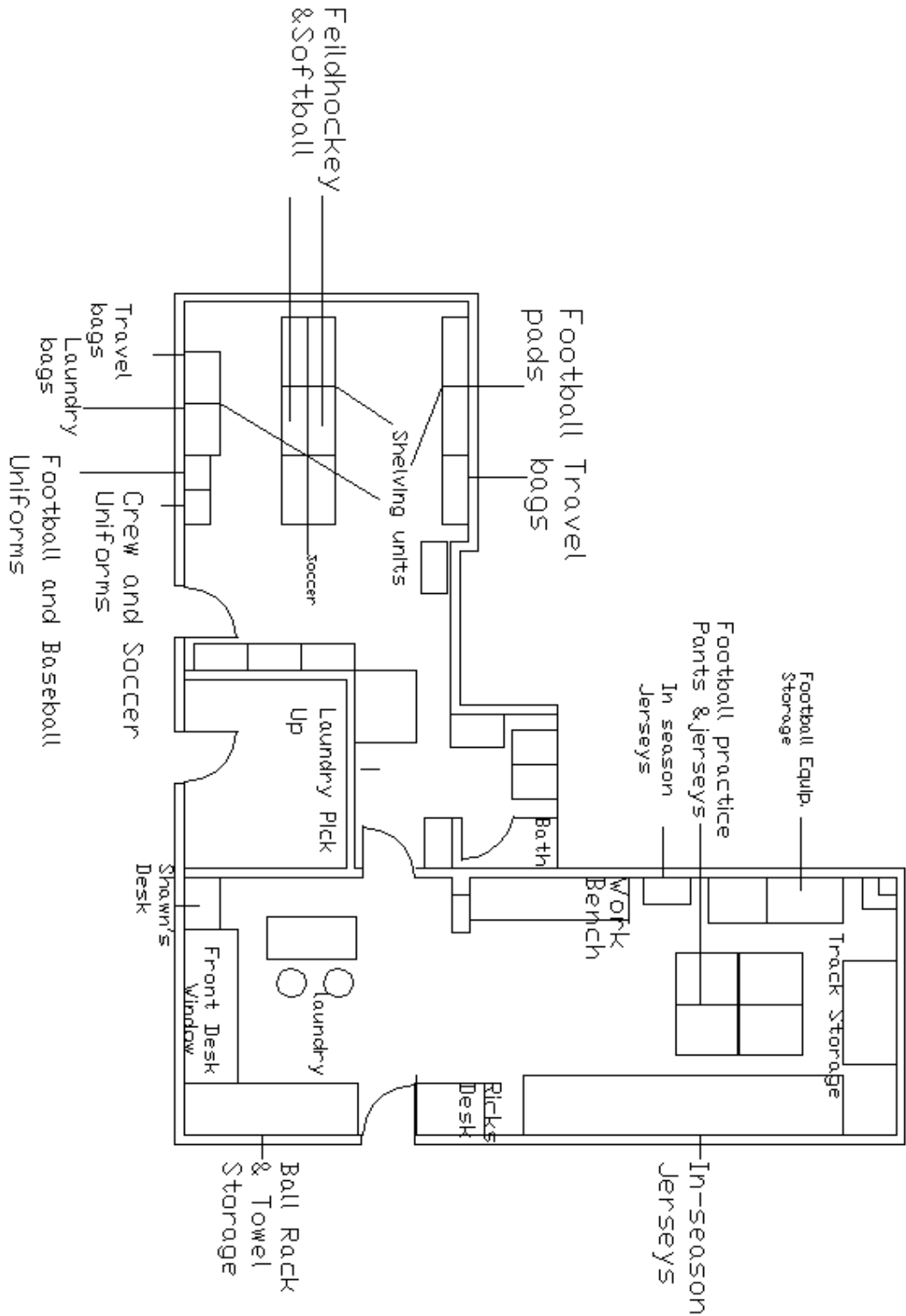


Figure C.18: Back Equipment Room - After

Appendix D. AutoCAD Drawing of Equipment Room Before



Appendix E. AutoCAD Drawing of Equipment Room After



Appendix F. Projected Costs

Table 7: Projected Costs

Item	Vendor	Price
<i>Technical</i>		
Scanner - IDTech EconoScan	POSGuys.com	\$104.00 (with stand)
Printer (sublimation)	Staples	79.99
Sublimation paper	Imprints USA	15.00
Sublimation cartridge	Texas Original Graphics	52.00
Professional iron	Overstock.com	40.00
Regular cartridges(all colors)	2for1imaging.com	15.00
DURAbrite black ink cartridge	bluedogink.com	6.95
Synthetic labels – inkjet sheets	Texascraft.com	80.00
Laminate sheets	Texascraft.com	60.00
Printer (direct thermal)	Keenzo.com	282.99
Ribbon(maintenance)	Keenzo.com	30.00
Synthetic labels – thermal rolls	Online labels	136.00
<i>Subtotal</i>		<i>453.00 – 755.00</i>
<i>Procedural</i>		
Laundry loops	Laundryloops.com	325.00
<i>Organizational</i>		
Space-saving vacuum bags	QVC.com	270.00
Bins	www.lnt.com	140.00
Materials for construction	Homedepot.com	70.00
<i>Subtotal</i>		<i>480.00</i>

Appendix G. Actual Costs

Table 8: Actual Costs

Item	Vendor	Price
<i>Technical</i>		
Scanner - IDTech EconoScan	POSGuys.com	\$104.00 (with stand)
Printer (sublimation)	Staples	79.99
Sublimation paper	Imprints USA	21.12
Sublimation Cartridge	Imprints USA	81.58
Sublimation cartridge	Texas Original Graphics	62.00
Heat Press	EBay	400.00
Regular cartridges(all colors)	Computer Supplies, Inc	16.71
DURAbrite black ink cartridge	Bluedogink.com	12.90
Laminate sheets	Hemmi Papilio Supplies	24.71
<i>Subtotal</i>		<i>803.01</i>
<i>Procedural</i>		
Laundry loops	Laundryloops.com	403.23
<i>Organizational</i>		
Space-saving vacuum bags	QVC.com	297.67
Materials for construction	Home Depot	59.56
Bins (pegboard)	Woodcraft	43.30
<i>Subtotal</i>		<i>357.23</i>
GRAND TOTAL		<i>1563.47</i>

Appendix H. A Term Schedule

Task Name	Duration	Start	Finish
<input type="checkbox"/> Academic Tasks	30 days	Fr 9/1/06	Mon 10/9/06
1 Schedule - Original	1 day	Fr 9/8/06	Fr 9/8/06
2 Read Writing Format packet	4 days	Fr 9/8/06	Tue 9/12/06
3 <input type="checkbox"/> Jessy's Tasks	6 days	Mon 9/4/06	Sat 9/9/06
4 Research MGF's	6 days	Mon 9/4/06	Sat 9/9/06
5 <input type="checkbox"/> Equipment Facility Visits	5 days	Tue 9/5/06	Sat 9/9/06
6 Bally's	3 days	Tue 9/5/06	Thu 9/7/06
7 Gold's Gym	3 days	Tue 9/5/06	Thu 9/7/06
8 Family Fitness	3 days	Tue 9/5/06	Thu 9/7/06
9 Mass Health and Fitness	3 days	Tue 9/5/06	Thu 9/7/06
10 Providence College	4 days	Wed 9/6/06	Sat 9/9/06
11 <input type="checkbox"/> Antoine's Tasks	10 days	Mon 9/4/06	Thu 9/14/06
12 Research IQPs	7 days	Mon 9/4/06	Mon 9/11/06
13 Discussion with Athletic Directo	9 days	Tue 9/5/06	Thu 9/14/06
14 <input type="checkbox"/> Equipment Facility Visits	8 days	Tue 9/5/06	Wed 9/13/06
15 Bridgewater	8 days	Tue 9/5/06	Wed 9/13/06
16 <input type="checkbox"/> Janelle's Tasks	21 days	Fr 9/1/06	Tue 9/26/06
17 Research Databases	21 days	Fr 9/1/06	Tue 9/26/06
18 Research Software	21 days	Fr 9/1/06	Tue 9/26/06
19 <input type="checkbox"/> Equipment Facility Visits	3 days	Fr 9/8/06	Mon 9/11/06
20 Clark	3 days	Fr 9/8/06	Mon 9/11/06
21 Worcester State	3 days	Fr 9/8/06	Mon 9/11/06
22 First Draft	6 days	Tue 9/12/06	Tue 9/19/06
23 Second Draft	9 days	Thu 9/21/06	Mon 10/2/06
24 Final Draft	3 days	Thu 10/5/06	Mon 10/9/06
25 Proposal Presentation	6 days	Mon 10/2/06	Mon 10/9/06
26 <input type="checkbox"/> Technical Tasks	32 days	Fr 9/1/06	Wed 10/11/06
27 Observations	28 days	Fr 9/1/06	Thu 10/5/06
28 Establish Management System Rel	12 days	Fr 9/15/06	Fr 9/29/06
29 Research Organizational Options	11 days	Tue 9/19/06	Mon 10/2/06
30 Compile All Projected Costs	10 days	Sun 9/24/06	Thu 10/5/06
31 <input type="checkbox"/> Jessy's Tasks	8 days	Fr 9/1/06	Sat 9/9/06
32 Access Tutorials	8 days	Fr 9/1/06	Sat 9/9/06
33 <input type="checkbox"/> Antoine's Tasks	32 days	Fr 9/1/06	Wed 10/11/06
34 Access Tutorials	32 days	Fr 9/1/06	Wed 10/11/06
35 <input type="checkbox"/> Janelle's Tasks	21 days	Tue 9/5/06	Fr 9/29/06
36 Demo Access	6 days	Tue 9/5/06	Mon 9/11/06
37 Library Scan System Discussio	3 days	Mon 9/11/06	Wed 9/13/06
38 Obtain Other Demos	10 days	Mon 9/18/06	Thu 9/28/06
39 Test Demos with Shawn	9 days	Wed 9/20/06	Fr 9/29/06

Appendix I. B Term Schedule

ID	Task Name	Duration	Start	Finish	Sep	Sep	Oct	Oct	Oct	Oct	Nov	Nov	Nov	Nov	Dec	Dec
1	Proposal Presentation	1 day	Mon 10/23/06	Mon 10/23/06												
2	Submitting orders to Shwin	4 days	Tue 10/24/06	Fri 10/27/06												
3	Reuse Design	10 days	Sat 11/18/06	Thu 11/30/06												
4	Reuse Implementation	10 days	Sat 11/18/06	Thu 11/30/06												
5	Writing Center Proofread	7 days	Fri 12/1/06	Mon 12/11/06												
6	Technology	8 days	Tue 10/24/06	Thu 12/14/06												
7	Pre-Delivery Change	8 days	Tue 10/24/06	Fri 12/11/06												
8	Port Activation	4 days	Tue 10/24/06	Fri 10/27/06												
9	ATC Deliveries	29 days	Wed 10/25/06	Fri 12/1/06												
10	Designing and Making Database	29 days	Wed 10/25/06	Fri 12/1/06												
11	Test GUI	21 days	Mon 11/6/06	Fri 12/1/06												
12	Test Situations (Tables, Reports, Forms)	21 days	Mon 11/6/06	Fri 12/1/06												
13	Linking to Directory Services	4 days	Fri 10/27/06	Wed 11/1/06												
14	Server Access and File Share	4 days	Fri 10/27/06	Wed 11/1/06												
15	Pre-Delivery Change	24 days	Tue 11/14/06	Thu 12/14/06												
16	Testing Hardware	20 days	Tue 11/14/06	Fri 12/8/06												
17	Testing Integrated System	19 days	Mon 11/20/06	Thu 12/14/06												
18	Database Guide	8 days	Mon 12/4/06	Wed 12/13/06												
19	Initial Training	8 days	Mon 12/4/06	Wed 12/13/06												
20	Procedures	8 days	Tue 10/24/06	Thu 12/14/06												
21	Pre-Delivery Procedures Change	8 days	Tue 10/24/06	Fri 12/8/06												
22	Security Changes (Door Modification, Mentry)	9 days	Tue 10/24/06	Fri 11/3/06												
23	Rotation Schedule	34 days	Wed 10/25/06	Fri 12/8/06												
24	Back Door Access	9 days	Tue 10/24/06	Fri 11/3/06												
25	Pre-Delivery Procedures Change	24 days	Tue 11/14/06	Thu 12/14/06												
26	Laundry Changes	15 days	Tue 11/14/06	Fri 12/1/06												
27	Procedure Changes	20 days	Tue 11/14/06	Fri 12/8/06												
28	Procedures Documentation	24 days	Tue 11/14/06	Thu 12/14/06												
29	Initial Training	3 days	Mon 12/4/06	Wed 12/6/06												
30	Organization	8 days	Tue 10/24/06	Thu 12/14/06												
31	Pre-Delivery Organizational Change	8 days	Tue 10/24/06	Fri 12/8/06												
32	Inventory/Storage/Grouping	34 days	Wed 10/25/06	Fri 12/8/06												
33	Inventory Documentation (Items, Lists)	34 days	Wed 10/25/06	Fri 12/8/06												
34	Construction of Hanging Structure	9 days	Tue 10/24/06	Fri 11/3/06												
35	Construction of Ball Rack	9 days	Tue 10/24/06	Fri 11/3/06												
36	Pre-Delivery Organizational Change	24 days	Tue 11/14/06	Thu 12/14/06												
37	Grouping (By Types, By Location)	24 days	Tue 11/14/06	Thu 12/14/06												
38	Bar Codes Trial(Uniforms, Equipment)	24 days	Tue 11/14/06	Thu 12/14/06												
39	Barcode Labeling Bar Codes	24 days	Tue 11/14/06	Thu 12/14/06												

Appendix J. C Term Schedule

Task Name	Duration	Start	Finish
1 Draft 1	9 days	Fr 1/19/07	Wed 1/31/07
2 Draft 2	10 days	Thu 2/1/07	Wed 2/14/07
3 Draft 3	5 days	Thu 2/15/07	Wed 2/21/07
4 Final Paper Due	1 day	Fr 2/23/07	Fr 2/23/07
5 Presentation Practice	21 days	Fr 1/26/07	Fr 2/23/07
6 Presentation	1 day	Thu 3/1/07	Thu 3/1/07
7 Documentation (Continued)	30 days	Thu 1/11/07	Wed 2/21/07
8 Database Guide	30 days	Thu 1/11/07	Wed 2/21/07
9 Procedures Guides	12 days	Wed 1/24/07	Thu 2/8/07
10 Pictures	12 days	Wed 1/24/07	Thu 2/8/07
11 Organization Guides	30 days	Thu 1/11/07	Wed 2/21/07
12 Maps	30 days	Thu 1/11/07	Wed 2/21/07
13 Alphabetized Inventory	30 days	Thu 1/11/07	Wed 2/21/07
14 Directory	30 days	Thu 1/11/07	Wed 2/21/07
15 Technical	35 days	Thu 1/11/07	Wed 2/28/07
16 Finish Orders	7 days	Thu 1/11/07	Fr 1/19/07
17 Database Iterations	20 days	Thu 1/11/07	Wed 2/7/07
18 Bar Code Trial (Equipment)	20 days	Thu 1/11/07	Wed 2/7/07
19 Bar Code Trial (Clothing)	20 days	Thu 1/11/07	Wed 2/7/07
20 Start Bar Code Printing(Optional)	23 days	Mon 1/29/07	Wed 2/28/07
21 Start Bar Code Application (Optic)	23 days	Mon 1/29/07	Wed 2/28/07
22 Testing with Workers	23 days	Mon 1/29/07	Wed 2/28/07
23 Data Entry (Optional)	23 days	Mon 1/29/07	Wed 2/28/07
24 Continue Training	35 days	Thu 1/11/07	Wed 2/28/07
25 Organizational	30 days	Thu 1/11/07	Wed 2/21/07
26 Inventory/Sitting	30 days	Thu 1/11/07	Wed 2/21/07

**Guide to the
Equipment Room Manager
Program**

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A. Introduction

The Equipment Room Manager is a program to streamline the management of equipment room, in terms of inventory, locker assignment, work study scheduling, and generating athlete contracts. Through this guide, one will learn how to complete any necessary task relating to the Equipment Room Manager program. This first section is an introduction to the types of data in this program, as well as how to navigate through it. Later, this guide will explain how to use each form, query and report, as well as other miscellaneous tasks. Some of the examples may not resemble the actual tasks, as the database had most test data when this guide was created.

Tables

Information is held in the database portion of the Equipment Room Manager in the form of records in tables. A record in a table general has several fields. The following is a table of tables, a listing of all tables in the Equipment Room Manager database and a description of each table's fields. For clarification, fields with unique identifiers generally have names that end with "ID."

Table and Field Descriptions

Master Inventory: Contains an entry for every item in inventory and contains descriptions for inventory, maintenance, and laundry purposes.

Bar Code ID:	The alphanumeric codes printed on labels applied directly to "specific" inventory and found in a directory for "generic" inventory. This code is input into the database via a scanner.
Generic vs Specific:	This field is a dropdown menu. The user can choose "Generic" for items such as sport balls or towels. "Specific" will be chosen for all other items such as uniforms or racquets, mostly for varsity sports.
Description:	Here the user describes the item. For example, the user would type "jersey" or "thigh pad."
Type:	This is a dropdown menu containing "Varsity," "Intramural," "Club," "Summer Camp," and "General." These options specify how the inventory is used, and helps to differentiate between sports that exist in more than one category. For example, basketball is a varsity sport, as well as an Intramural sport.

Sport:	This is another dropdown menu containing WPI sports of all types that the equipment room supports with equipment storage and/or uniform maintenance.
Date Purchased:	The user will enter the date purchased. This will assist in inventory management and purchasing in the future.
Date Refurbished:	Some items are refurbished, but not all. This field may be blank if an item in the inventory has not been refurbished.
Storage Location:	This is also a dropdown menu of places an item may be stored. The locations include the Main Room, the Back Room, or one of three closets.
Washable:	This is a checkbox. Some items do not need to be returned for laundering on a regular basis, whereas others do. Items, such as sport uniforms, must be returned after games for washing. This checkbox allows for better monitoring of items that need routine laundering.
Comments:	This field is simply an area for any extra comments the user may feel necessary to add.

Generic Inventory: Contains an entry and additional information for the part of the inventory without unique bar codes.

Generic ID:	An automatic number that appears next to every new entry into the table.
Total Number:	This is the number of items in the inventory altogether, whether lent, returned, or never lent.
Last Updated:	This date signifies the last time the total number of that generic inventory item was verified. The user updates this number after taking inventory.
Bar Code ID:	Field for an alphanumeric value that links this extra information to an item in the Master Inventory table, as well as any time this item is used.

Specific Inventory: Contains an entry and additional information for the rest of inventory, those items with individual bar codes.

Specific ID:	Similar to the Generic ID, it is an automatic number that will appear next to every new record.
Uniform Number:	This field will not always be filled. This only applies to the athlete's number, which appears on a jersey or pair of shorts.
Size:	The size of the uniform.
Combination:	This field will not always be filled. This only applies to the lending of a lock when assigning a locker. This field will store the lock's combination for easy retrieval by staff.

Bar Code ID: Field for an alphanumeric value that links this extra information to an item in the Master Inventory table, as well as any time this item is used.

Lockers: Complete list of lockers and their location.

Locker ID: An automatic number that will appear next to every new record.

Locker Number: Number physically on the locker.

Location: Lockers can be located in different areas of the building, in general or varsity locker rooms.

Sports: List of sports at WPI that the equipment room supports, uniquely identified with a number.

Sports ID: This automatic number uniquely identifies each sport.

Sport: The equipment room supports these sports at WPI; this list appears as a dropdown menu in various forms.

Type: Refers to for what variety of sport the item is used (i.e. varsity sport, club sport, intramural sport, general item for lending, physical education item)

Directory: Directory information for each borrower, obtained in the equipment room from each borrower individually. This information relates tables.

Borrower ID: The bar code found on a WPI ID card.

First Name: First name matching the WPI ID card.

Last Name: Last name matching the WPI ID card.

Email Address: The email address of the person.

Athletes: Contains information to relate students to a sport and the information for a student contract.

Athlete ID: An automatic number.

Student Athlete ID: The ID number from the athlete's student ID card.

Sport ID: Corresponds to the sport table.

WPI Box: The number of the athlete's WPI mailbox.

Address fields: Contact information: mailing address, email address, and phone number(s).

Insurance Company: The equipment room requests the name of the athlete's insurance company for liability purposes.

Personal Stats: At least one field is used for each athlete - age, height, and weight.

Work Study Student: Contains complete list of work study students and their respective departments.

Work Study ID:	Similar to Borrower ID, the number found on the work study student's ID card. Must be filled in by the equipment room staff.
Full Name:	Full name of work study student in the format Last, First. This is the unique part of the information taken from the Athletic Department Office.
Supervisor:	Person who supervises student, i.e., Shawn, Swim Coach. This may be filled in by the Athletic Department Office.
Contact Number:	Phone number that is best to contact this student. This may be filled in by the Athletic Department Office.
Graduation Year:	Graduation year of the worker. This must be filled in by the equipment room staff.

Lending: Contains the data related to lending and returning equipment and assigning lockers.

Lending ID:	This automatic number appears with each record.
Date Lent:	Automatically appears as the current date.
Borrower ID:	Every member of the WPI community is given an ID with a bar code and magnetic strip on it. This relates to information in the directory table. The user will input the ID into this field with a bar code scanner.
Bar Code ID:	The bar code found on the item being lent or the bar code corresponding to that generic item.
Date Due:	The date on which the item should be returned to the room. For varsity equipment, this should be the last day of the sports season.
Date Returned:	Once checked in, the current date will automatically appear.
Deposit:	This is a checkbox. If checked, the locker borrower has paid the deposit. This reminds the staff to return the deposit upon return of the locker.
Locker Number:	The Locker ID corresponding to a specific locker. This will be blank when this particular transaction does not involve lending a locker.
Email:	The email address of the borrower, this automatically appears from the Directory table after the user scans the Borrower ID.
Initials:	This field is for the initials of the worker who makes a change to the database by lending an item or checking one in.

Game Schedule: Contains information about events that must be staffed by work study students.

Game ID:	An automatic number that uniquely identifies each game or athletic event.
Time:	Time of game or event, in the short date format – MM/DD/YYYY.
Date:	Date of game or event.
Hours:	The number of hours each game or event lasts.
Locations:	Location of game; the field appears on the forms as a drop down menu containing Harrington Auditorium, Alumni Gymnasium, the Fitness Center, Football Field, Softball Field, Baseball Field, the Pool and the Equipment Room.
Sport ID:	Corresponds to the Sport table.
Number of Students:	Number of workers needed for the game or event.

Work Study Schedule: Contains information to assign work hours to work study students.

Schedule ID:	An automatic number, unique to each record.
Date:	Date in which the worker is scheduled to work
Hours:	The number of hours the worker is scheduled to work for that date, whether a game or event, hours in the equipment room, or lifeguarding.
Location:	Where the worker will be working.
Game ID:	If the worker is working a sporting event, this field is for the automatic number relating to the sporting event.
Work Study ID:	The number found on the work study student's ID card.

Forms, Queries and Reports

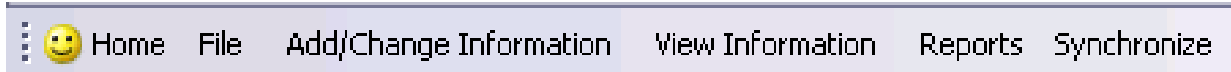
Access to the information in tables is generally limited to forms, queries and reports. Forms are graphical interface for program users to add and change information in the tables. Queries allow one to find a specific set of data based on criteria, such as overdue varsity equipment and uniforms. Reports are a formal way to display a specific subset of data. The following table is a brief overview of what forms, queries and reports are available to a program user.

Lists of Forms, Queries and Reports with Descriptions

Forms	Description
Check Out	Used to lend general inventory and athletic equipment.
Check In	Used to update the database when an item is returned.
Locker Assignment	Used to assign a locker, includes lending a lock and displaying lock and locker information.
New Borrower	Used to add directory information about a first-time borrower.
Athlete	Used to gather for new or update existing athletes' information.
New Work Study Student	Used to add information about work study students from the information retrieved from the Athletic Department Office.
Add to Work Study Schedule	Used to add a game or event to the schedule of games or events which should be staffed by work study students.
Assign Work Study Student	Used to assign a work study student to an event or record regular hours.
New Inventory	Used to add a new item to the inventory, either generic or specific.
Delete Student Records	Used to remove students records, because of graduation or otherwise.
Queries	Description
Checked Out	Used to determine what has been lent out and who has it.
Overdue (Type, Sport)	Used to determine who has not yet returned an item.
Available Inventory	Used to view available inventory.
Available Lockers	Used to determine how many lockers are available for assignment.
Used Lockers	Used to determine information on lent lockers.
Update	Used to update inventory information, particularly the Last Updated field.
Delete	Used to remove items from inventory, as a group and individually.
Verify	Used to view directory information, if it exists.
Reports	Description
Athlete Contracts	Contains athlete information so as to create an agreement for liability and lending returns.
Laundry Inventory	Contains info about the items that should have been returned for laundry.
Last Pay Period	Contains work study students and hours worked over the past two weeks.
Full Inventory (and only Varsity)	Contains sorted information on inventory by Type and Sport for viewing and verifying purposes. Also can be limited to one varsity sport.
Overdue Items (Varsity)	Contains information on items not yet returned by athletes.
Work Study Schedule	Contains information about all scheduled events and work student hours.

Program Navigation

This program would not be of much help to the equipment room staff if it was difficult to use. To ease the navigation of this program, a navigation menu bar appears at the top of the program window at all times. This allows one to easily move among forms, queries and reports while using the Equipment Room Manager. Below is a figure of this menu bar. The guide will instruct one to refer to this menu bar many times throughout the rest of the guide.



Navigation Menu Bar

B. Using Forms

Within the Equipment Room Manager, forms are the main method to access information in the tables to make additions, updates, or deletions. The uses of all of the forms in this program are described below.

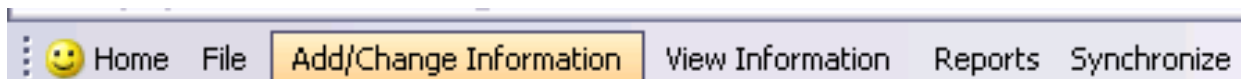
New Inventory Item

One must enter all items in inventory into the database using the Equipment Room Manager. This will occur during the set up of the Equipment Room Manager and when new items are purchased and added to the inventory.

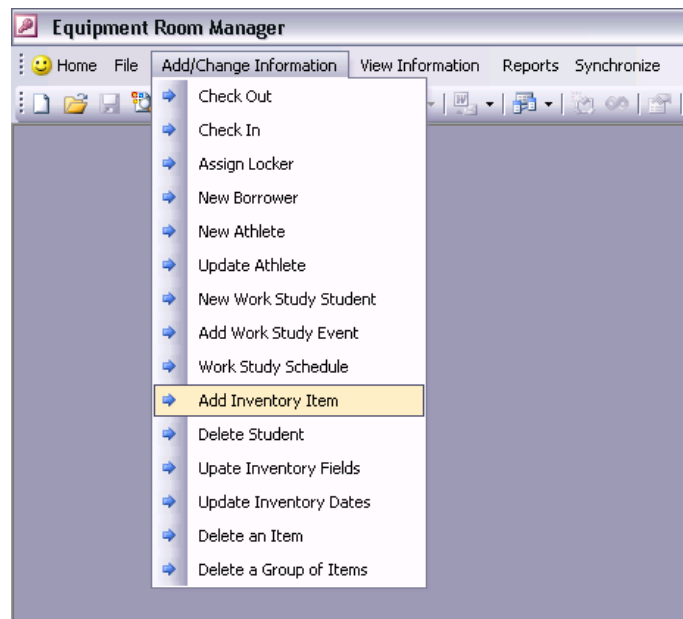
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



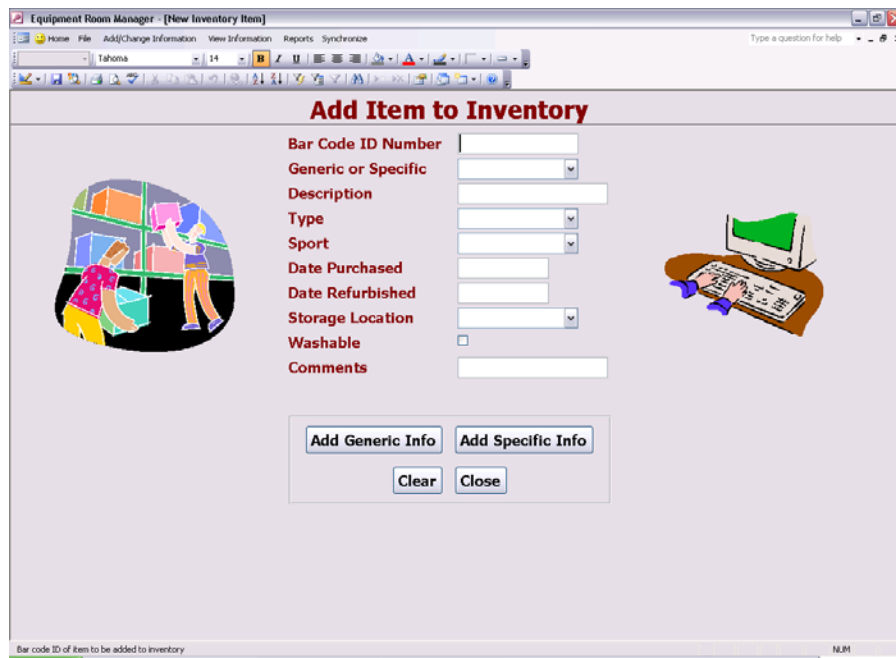
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** on the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, choose the **Add Inventory Item** option.

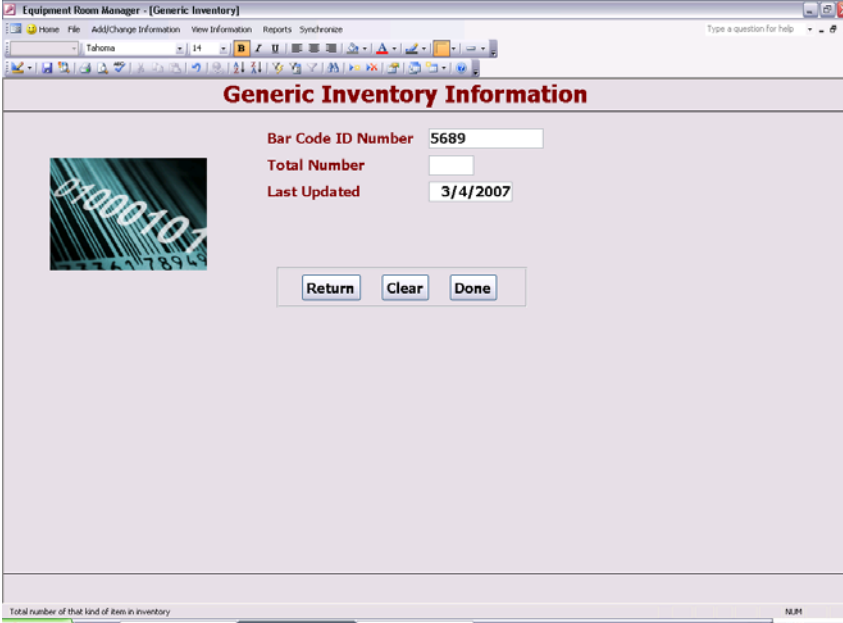


5. The Add Item to Inventory form will open.



6. The cursor is blinking in the Bar Code Id Number field. Scan the bar code corresponding to the item.

7. Fill in the remaining fields accurately. If one needs assistance with a particular field, put the cursor in that field. A helpful description will appear in the bottom left corner. For new items, it is not necessary to fill in the Date Refurbished field. When adding items to the inventory during initial set up, the Date Purchased and the Date Refurbished fields may be left blank if this information is unavailable.
8. If the item is generic (a bar code is not on the item directly), click the **Add Generic Info** button. The Generic Inventory Information form will open. Skip to step 10 if this item is specific.



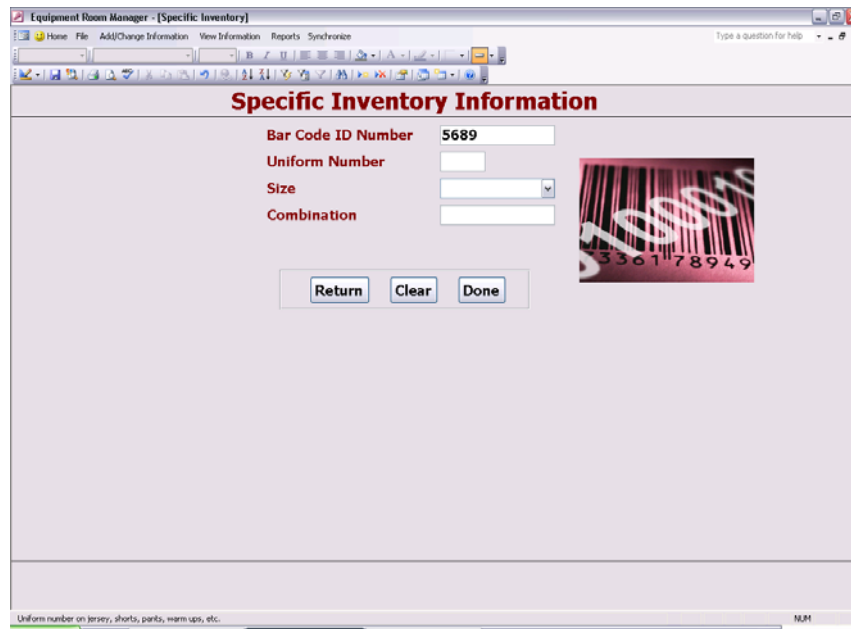
The screenshot shows a web browser window titled "Equipment Room Manager - [Generic Inventory]". The browser's address bar shows "Tahona" and the page title is "Generic Inventory Information". The form contains the following fields and values:

Bar Code ID Number	5689
Total Number	
Last Updated	3/4/2007

At the bottom of the form, there are three buttons: "Return", "Clear", and "Done". A small image of a barcode is visible on the left side of the form.

9. The Bar Code ID field will be filled in automatically. Fill in the remaining field. Click the **Return** field to return to the original form. Click the **Clear** button to start over. Click the **Done** button to save the information and close the form.

10. If the item is specific (a bar code is on the item directly), click the **Add Specific Information** button. The Specific Inventory Information form will open.



11. The Bar Code ID field will be filled in automatically. Fill in the remaining fields. Click the **Return** button to return to the original form. Click the **Clear** button to start over. Click the **Done** button to save the information and close the form.

New Borrower

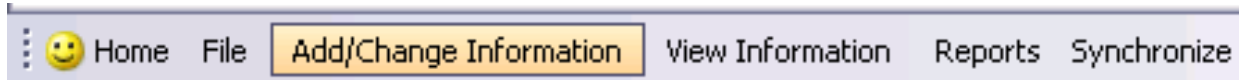
To borrow an item, use a locker, or be entered into the database as a work study student or athlete, a person must have an entry in the Directory. One will use the following steps to enter a new borrower into the Directory, which need only be completed once for each person.

1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.

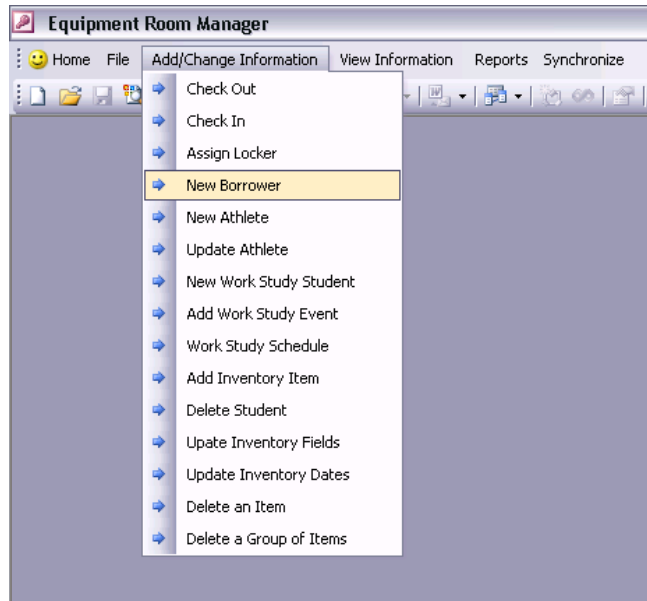


2. The Welcome Screen will appear. Click the **Close** button.

3. Select **Add/Change Information** on the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **New Borrower** option.



5. The **Add First-Time Borrower to Directory** form will open.

A screenshot of the 'Add First-Time Borrower to Directory' form within the Equipment Room Manager application. The form has a title bar that reads 'Equipment Room Manager - [New Borrower]'. Below the title bar is a navigation menu with 'Add/Change Information' selected. The main content area features a title 'Add First-Time Borrower to Directory' in red. On the left is a silhouette of a person in a crouching pose on a green background. On the right is a silhouette of a person on a stationary bike on a purple background. In the center, there are four input fields labeled 'WPI ID Number', 'First Name', 'Last Name', and 'Email Address'. Below these fields are three buttons: 'Save', 'Clear', and 'Close'. At the bottom of the window, there is a small status bar with the text 'WPI ID number of first-time borrower. Be sure WPI ID card is valid' and 'NLM'.

6. The cursor will be in the **WPI ID Number** field. Scan the bar code found on the back of the borrower's WPI ID card. The ID number will appear in this field.

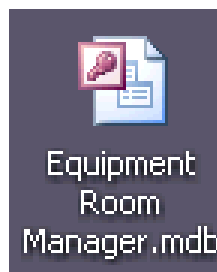


7. Enter the borrower's first name and last name.
8. Enter the borrower's email address.
9. Click the **Save** button to save the record. If a mistake has been made during this process, click the **Clear** button to start over. Click the **Close** button after the record has been saved to exit the form.

New Athlete

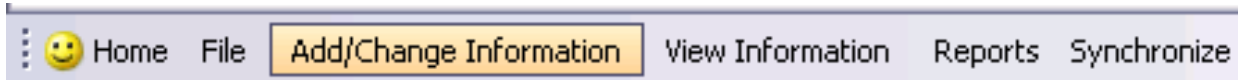
All athletes on WPI sports teams who borrow equipment from the equipment room must agree to certain terms. A contract is a binding document to those terms and allows the equipment room to take action if these terms are violated. The following procedure takes one through how to add an athlete to the database, thus gathering the appropriate information for an athlete contract. The procedure for generating an athlete contract appears later in this guide under **Using Reports**.

1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.

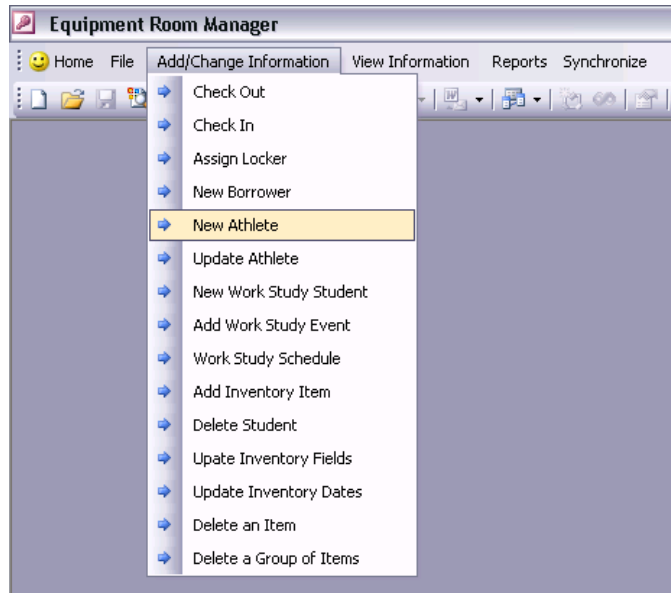


2. The Welcome Screen will appear. Click the **Close** button.

3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **New Athlete** option.



5. The **Add New Athlete** form will open.

A screenshot of the 'Add New Athlete' form in the Equipment Room Manager application. The form is titled 'Add New Athlete' and features several input fields and sections. The 'Address Information' section includes fields for 'WPI Box Number', 'Street Address', 'City', 'State', and 'Zip Code'. The 'Contact Information' section includes fields for 'Email Address', 'Cell Phone', and 'Home Phone'. The 'Additional Information' section includes fields for 'Age', 'Height', and 'Weight'. There are also fields for 'WPI ID of Athlete', 'Sport', and 'Graduation Date'. The form is decorated with icons of athletes in various sports. At the bottom, there are 'Save', 'Clear', and 'Close' buttons. The footer of the form contains the text 'WPI ID number of student athlete' and 'N.M.'.

6. The cursor is blinking in the **WPI ID of Athlete** field. Scan the bar code found on the back of the student's WPI ID card. The ID number will appear in this field.



7. Fill in the remaining fields as necessary. For help with any field, put the cursor in the field and a helpful description will appear in the bottom left corner. If one fills in the WPI Box Number field, one does not need to fill in the rest of the Address Information. It is not required to fill in Additional Information for most sports.
8. Click the **Save** button to save the record. If a mistake has been made during this process, click the **Clear** button to start over. Click the **Close** button after the record has been saved to exit the form.

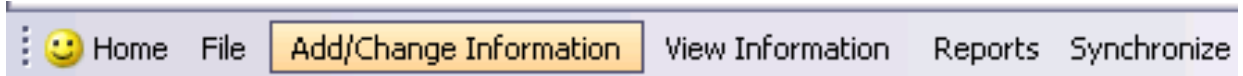
Update Athlete

As the staff adds athlete information, the listing of athletes will increase. As contracts must be made every season, this information will remain in the database from year to year. In this way, it may only be necessary to update information about an athlete, and not to add the athlete to the database every season. The following procedure shows one how to verify a returning athlete's information.

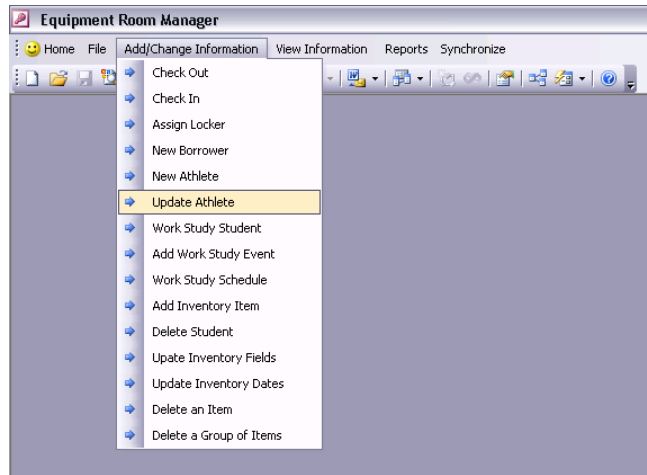
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



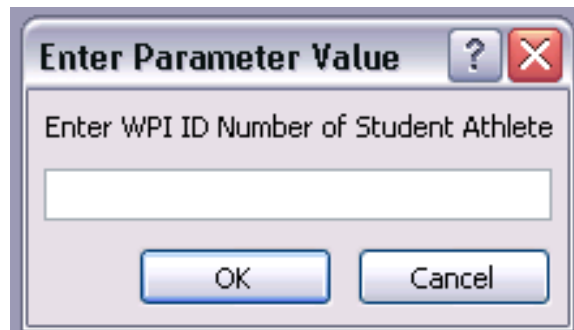
- The Welcome Screen will appear. Click the **Close** button.
- Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



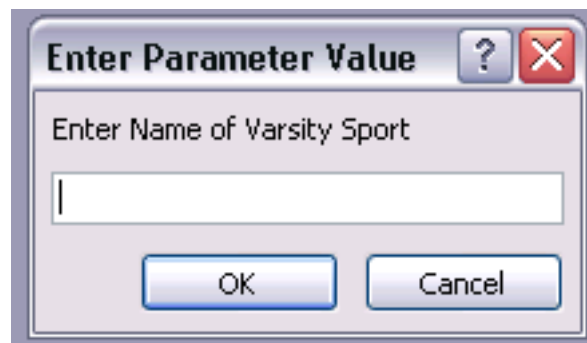
- Within this menu, select the **Update Athlete** option.



- A prompt will appear. Follow the instructions and Scan the bar code found on the back of the student's WPI ID card. The ID number will appear in the white box. Click the **OK** button.



- Another prompt will appear. Follow the instructions and type the sport. Choose from one in the following table and input it exactly. Then, click the **OK** button.



Sports
Baseball
Basketball - Men's
Basketball - Women's
Crew - Men's
Crew - Women's
Cross Country - Men's
Cross Country - Women's
Field Hockey
Football
Soccer - Men's
Soccer - Women's
Softball
Swimming & Diving - Men's
Swimming & Diving - Women's
Track & Field - Men's
Track & Field - Women's
Volleyball
Wrestling

7. The Update Athlete Information form will open.

Equipment Room Manager - [Update Athlete]

Update Athlete Information

WPI ID of Athlete: 264861088

Sport: Soccer - Women's

Graduation Date: 5/1/2008

Address Information

WPI Box Number: 2988

OR

Street Address: _____

City: _____

State: _____

Zip Code: _____

Insurance Company: Blue Cross

Contact Information

Email Address: nellelee

Cell Phone: (222) 222-2222

Home Phone: _____

Additional Information

Age: 21

Height: _____

Weight: _____

Save Close

WPI ID number of student athlete

8. Verify information or change fields as necessary.

9. To save this information, click the **Save** button. Click the **Close** button to close this form.

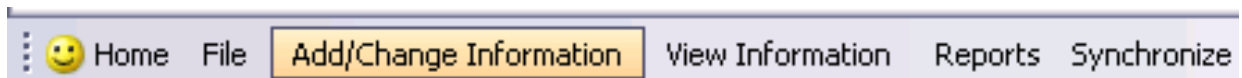
Work Study Student

When a work study student arrives at the equipment room for work, this student should have already filled out a form and submitted it to the Athletic Department office. As the equipment room staff and the Athletic Department office have a file share together, some information about the work study student should already be in the database. The next procedure takes that information and adds some fields so that the Equipment Room Manager can keep a list of all work study student, use this information for work study scheduling and provide a summary of work study hours to the Athletic Department office. This procedure can be used for adding new work study students to list used by the equipment room and for updated work study student information from year to year.

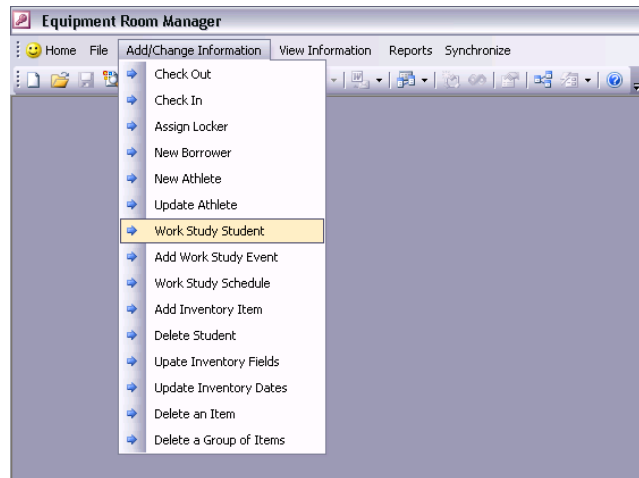
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



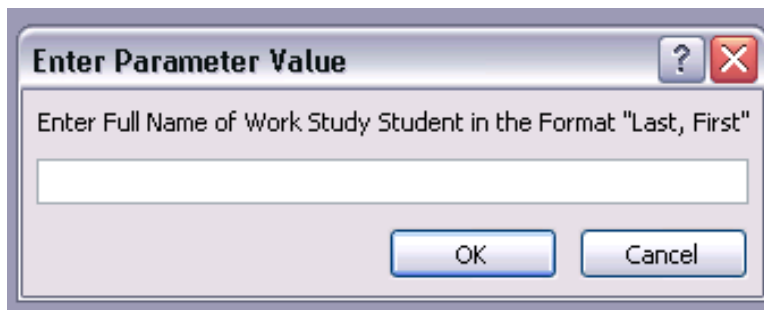
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



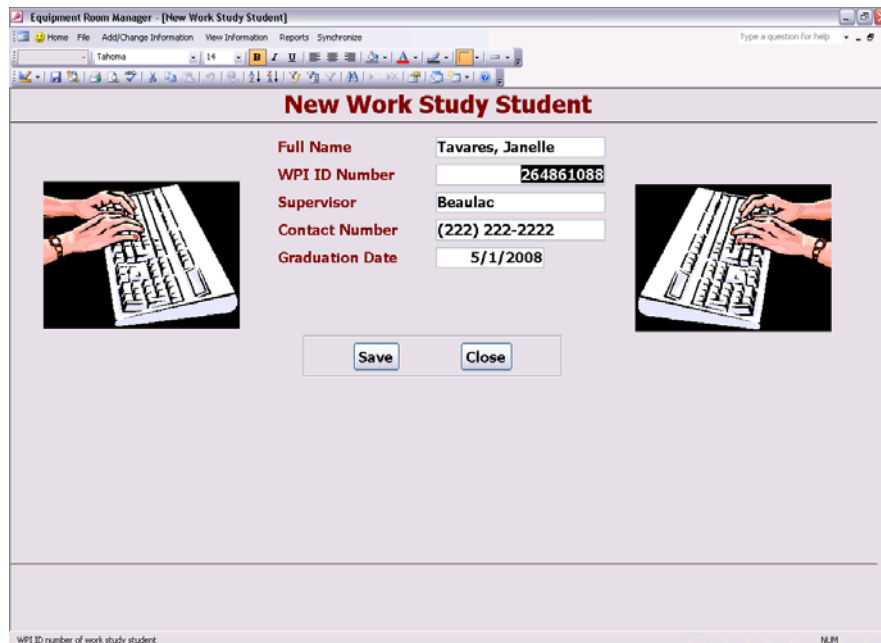
4. Within this menu, select the **Work Study Student** option.



5. A prompt will appear. Follow the direction, entering the full name of the work study student in the format "Last, First."



6. The **New Work Study Student** form will appear.



7. If one is updating a student's information, verify the information in the fields is accurate or change as necessary. Skip to step 10. The next steps are for gathering information about new work study students.
8. The cursor will be blinking in the **WPI ID Number** field. Scan the bar code found on the back of the borrower's WPI ID card. The ID number will appear within this field. Tab to the next field.



9. One or both of the **Supervisor** and **Contact Number** fields may be filled in. If either or both of those are not, fill it in along with the **Graduation Date** field.
10. Once all fields have been filled in, click the **Save** button to save this information. Click the **Close** button to close this form.

Check Out

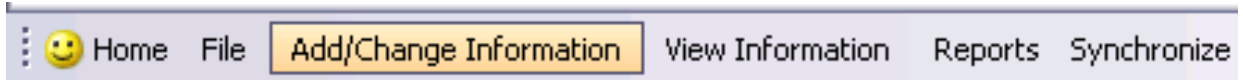
When a member of the WPI community requests to lend an item from the equipment room, one must use the following procedure to check out this item. Be sure that the borrower has a valid WPI ID.

1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.

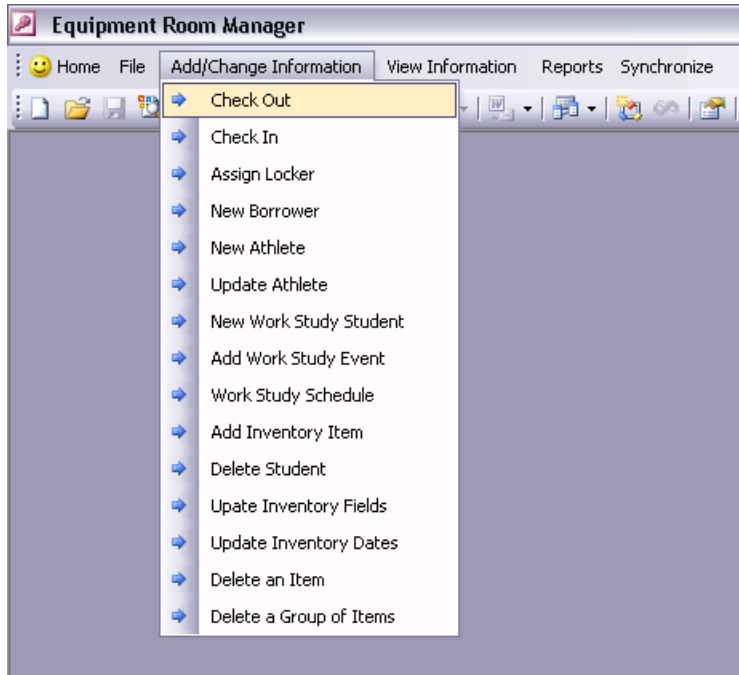


2. The Welcome Screen will appear. Click the **Close** button.

3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **Check Out** option.



5. The Check Out form will open.

The screenshot shows the 'Check Out' form in the 'Equipment Room Manager' application. The form includes the following fields and controls:

- Date Lent:** 3/4/2007
- WPI ID Number:** [Empty field]
- Bar Code ID Number:** [Empty field]
- Date Due:** [Empty field]
- Initials:** [Empty field]
- Buttons:** Save, Clear, Close
- Has Checked Out:** A table with the following data:

Date Lent	Bar Code ID	Type	Description	Deposit	Date Due	Initials
2/28/2007	5555	Varsity	metal bat	<input type="checkbox"/>	2/25/2007	JLT
2/28/2007	11111	General	lock	<input checked="" type="checkbox"/>	3/25/2007	JLT
3/3/2007	2222	Varsity	jersey	<input type="checkbox"/>	3/10/2007	JLT

At the bottom of the form, there is a small text label: 'WPI ID number of the person borrowing the item'.

6. The cursor is blinking in the **WPI ID Number** field. Scan the bar code found on the back of the borrower's WPI ID card. The ID number will appear within this field. Tab to the next field.



7. If the borrower's name appears before **Has Checked Out**, then this person has information in the directory. If it does not appear, the borrower must be added to the directory before continuing. See **Adding New Borrower**. If the name appears, continue.
8. If the borrower has lent an item that he/she has not returned yet, the items will appear in the box at the bottom of the form.
9. The cursor is blinking in the **Bar Code ID Number** field. Scan the bar code corresponding to the item being lent, which can be found on the item itself or on the list of generic inventory bar codes.
10. For varsity items, the due date should be the end of the season. For other items, judgment is necessary. Fill in the **Due Date** field with an appropriate date, in the format MM/DD/YYYY.
11. Type one's initials in the **Initials** field.
12. Click the **Save** button to save the record. Click the **Clear** button to clear the fields and start over. Click the **Close** button to close the form after saving.

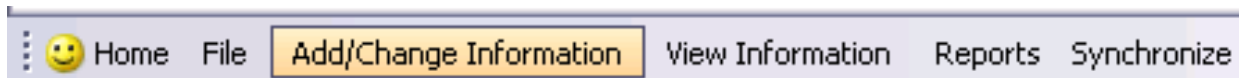
Check In

When a member of the WPI community returns a borrowed item, keep track of this using the following procedure. In addition, this procedure will be used when a person returns a combination lock and no longer needs his/her locker.

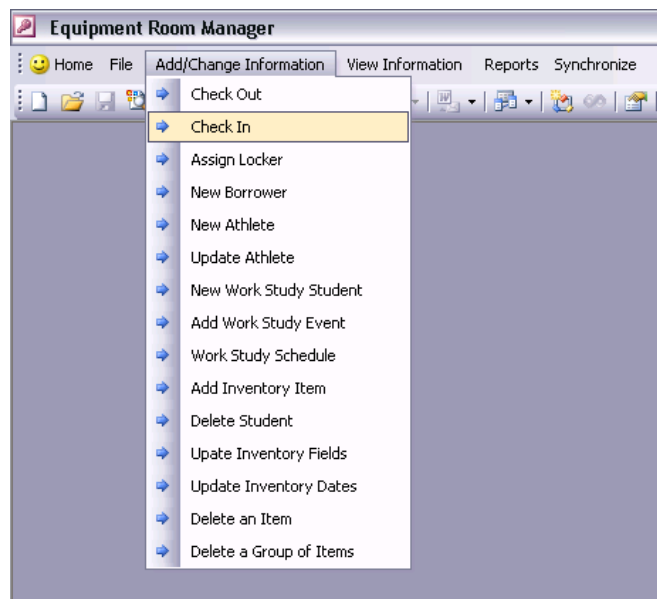
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



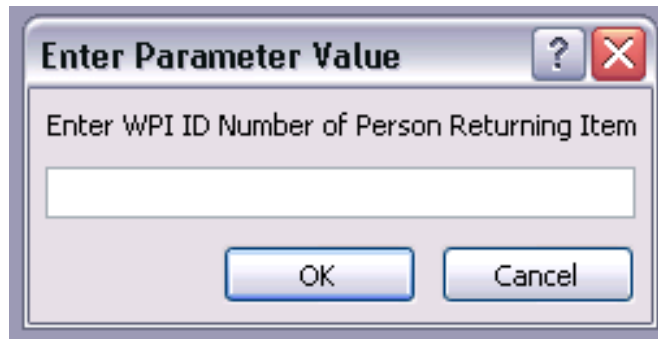
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



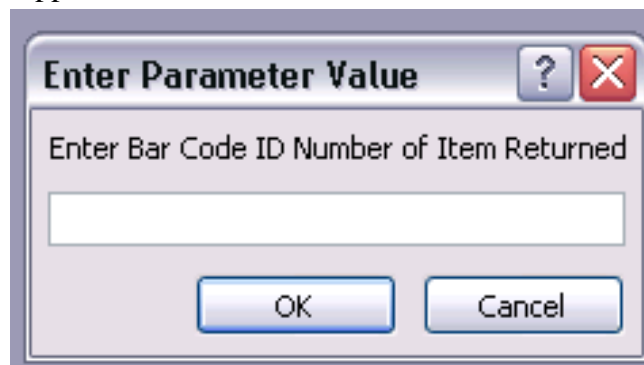
4. Within this menu, select the **Check In** option.



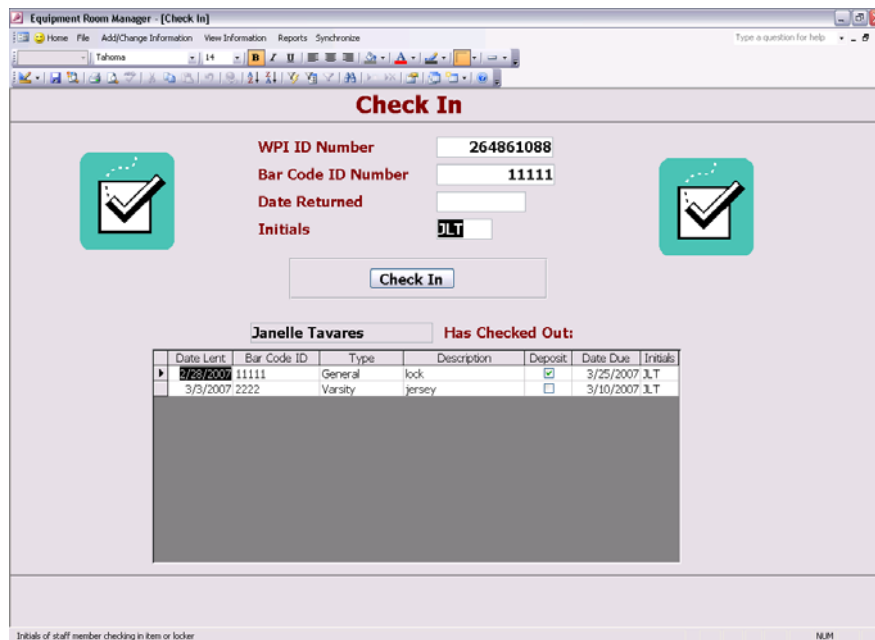
- Two prompts will appear. In the first prompt, follow the direction and scan the bar code found on the back of the borrower's WPI ID card. The ID number will appear within the white box on this prompt. Click the **OK** button. The second prompt will appear.



- In the second prompt, follow the direction and scan the corresponding bar code ID number for the item being returned. It may be on the item or it may on the list of generic bar codes. The ID number will appear within the white box on the form. Click the **OK** button.



- The Check In form will open.



8. Verify that today's date appears in the **Date Returned** field. The cursor is blinking in the Initials field. Type the initials of the current staff member returning the item. At the bottom of the form is a listing of all the items that this person has borrowed and not returned. If this person is returning a combination lock and a locker, check below to see if this person paid a deposit; this is indicated by the Deposit check box. If so, that deposit should be returned at this time. Otherwise, the procedure is the same.
9. Click the **Check In** button to complete this procedure and check in the item. The Check In form will close automatically.

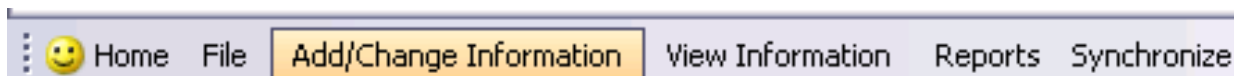
Locker Assignment

The equipment room staff controls the use of all lockers in all athletic facilities. Currently, the equipment room maintains 1065 lockers in total. A common procedure for the equipment room staff is assigning a locker to a member of the WPI community. The following procedure explains how to assign a locker.

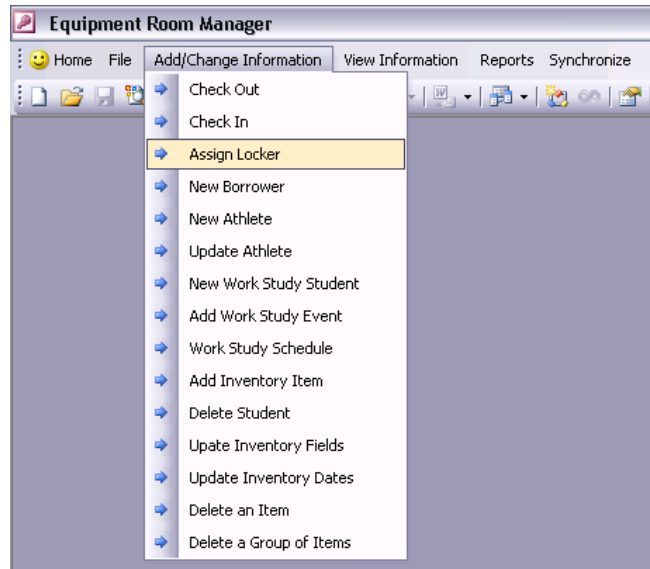
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



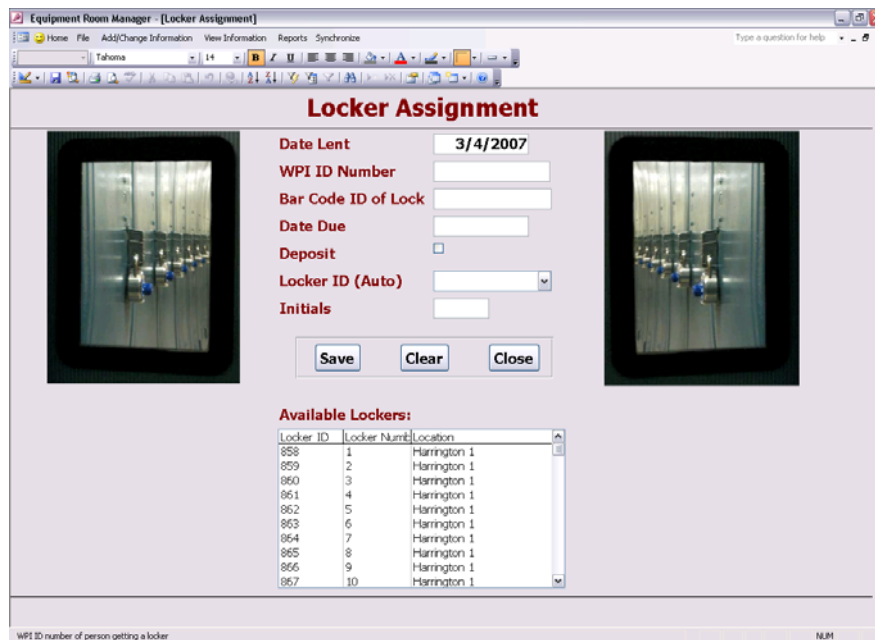
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **Assign Locker** option.



5. The **Locker Assignment** form will open.



6. The cursor is blinking in the **WPI ID Number** field. Scan the bar code found on the back of the borrower's WPI ID card. The ID number will appear within this field. Tab to the next field.



7. Scan the bar code on the bottom of the combination lock to be lent to this person. The ID number will appear within this field. Tab to the next field.
8. Fill in the Date Due field. For athletes, this date may be the end of the sports season. For other students, this may be the graduation date. Otherwise, use judgment.
9. If this person is paying the deposit, click in the **Deposit** check box to select this option.
10. The list at the bottom of the form shows all available lockers, organized by location alphabetically. Scroll down the list and click on a locker in an appropriate locker room. This will put the corresponding value in the Locker ID field automatically.
11. Finish by typing the initials of the lending staff member in the Initials field.
12. Click the **Save** button to save this information. Click the **Clear** button to clear all fields and start over. Click the **Close** button to close this form.

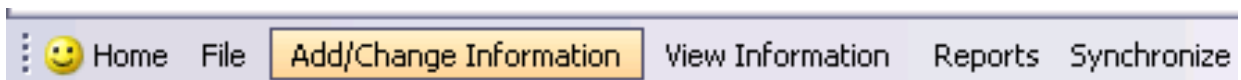
Game Schedule

One of the means by which work study students assist the Athletic Department is by performing certain tasks so that sporting events can be held. So that students can be assigned to these sporting events, these should be put into the database with the Equipment Room Manager. The following procedure describes how to add sporting events to the games schedule.

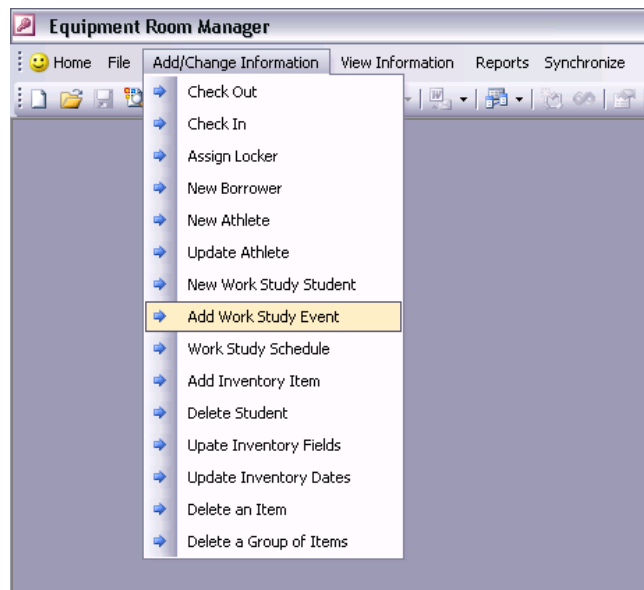
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



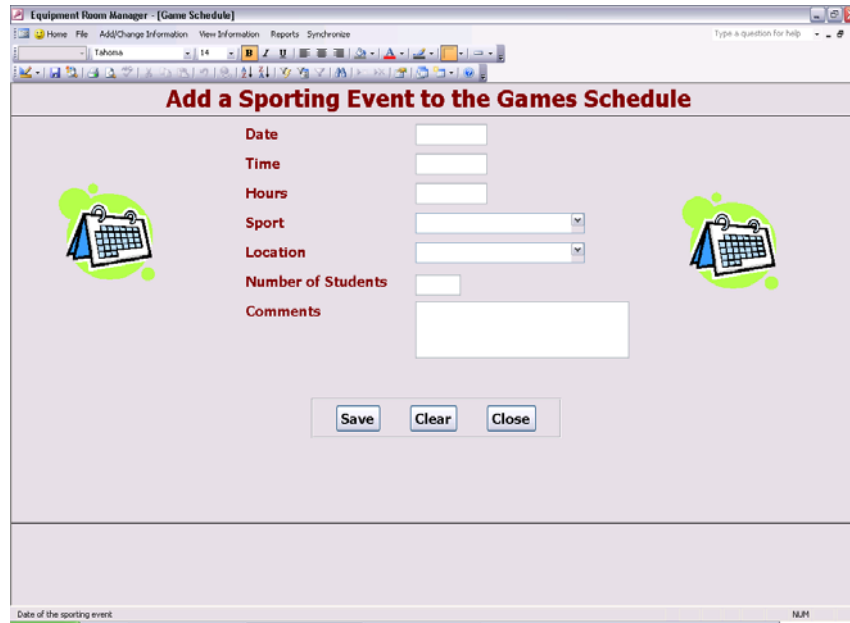
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **Add Work Study Event** option.



5. The **Add a Sporting Event to the Games Schedule** form will open.



The screenshot shows a web browser window titled "Equipment Room Manager - [Game Schedule]". The browser's address bar shows "Tabona". The page content is a form titled "Add a Sporting Event to the Games Schedule". The form fields are: "Date" (text input), "Time" (text input), "Hours" (text input), "Sport" (dropdown menu), "Location" (dropdown menu), "Number of Students" (text input), and "Comments" (text area). There are two calendar icons on either side of the form. At the bottom of the form are three buttons: "Save", "Clear", and "Close". The status bar at the bottom of the browser shows "Date of the sporting event" and "NUM".

6. Fill in the fields on this form. All fields are necessary except the Comments field. For assistance with any field, put the cursor in the field and a helpful description will appear in the bottom left corner.
7. When finished filling in the field, click the **Save** button to save this information and add this event to the games schedule. Click the **Clear** button to clear all fields and start over. Click the **Close** button to close this form.

Work Study Schedule

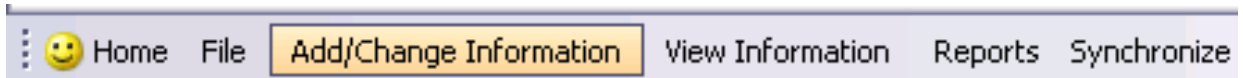
All work study students within the Athletic Department should record their hours worked with the Equipment Room Manager. These hours can be worked during normal operation or during sporting events. The following procedure describes how to record both type of hours.

1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.

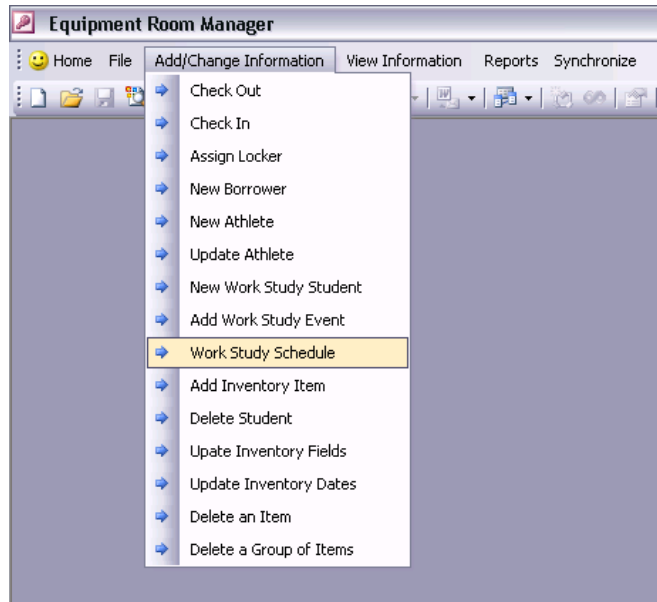


2. The Welcome Screen will appear. Click the **Close** button.

3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **Work Study Schedule** option.



5. The **Assigning Work Study Hours** form will open.

Assigning Work Study Hours

If assigning a student to a sporting event, copy the Date, Hours and Location values from the desired event below.

WPI ID Number:

Date:

Hours:

Location:

Game ID (Automatic):

Comments:

Remaining Work Study Slots:

Game	Time	Date	Hours	Sport	Location	Wanted	Assigned	Comments
14	1:00:00 PM	4/1/2007	5	Swimming & Diving - Women's	Pool - Swim Meet	1	0	
17	7:00:00 PM	3/28/2007	4	Basketball - Men's	Harrington	2	1	books
16	2:00:00 PM	3/8/2007	3	Baseball	Baseball Field	4	2	

Picture Courtesy of WPI
<http://www.wpi.edu/Images/CMS/PE/field.jpg>

WPI ID number of student staffing event or recording normal hours

6. The cursor is blinking in the **WPI ID Number** field. Scan the bar code found on the back of the borrower's WPI ID card. The ID number will appear in this field.



7. If assigning a work study student to a game, click on that game in the **Remaining Work Study Slots** list. This will automatically fill in Game ID. Whether or not this work study student is working a game, one must manually fill in the **Date**, **Hours** and **Location** fields.
8. When finished filling in the necessary field, click the **Save** button to this work study student's assignment. Click the **Clear** button to clear all fields and start over. Click the **Close** button to close this form.

Delete Student Records

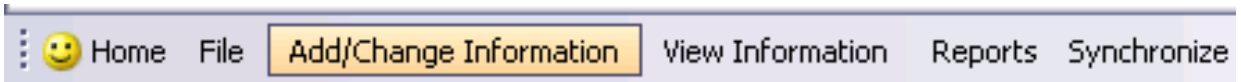
It may be necessary to remove a student or a group of students from the database, to keep the information up-to-date. During a sports season, an athlete may be injured and can no longer play or an athlete may quit. In this situation, the student should be removed from the database as an athlete. In addition, it may be necessary to remove graduated athletes or graduated work study students to keep the records accurate and without useless information. The following describes how to perform these tasks.

1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.

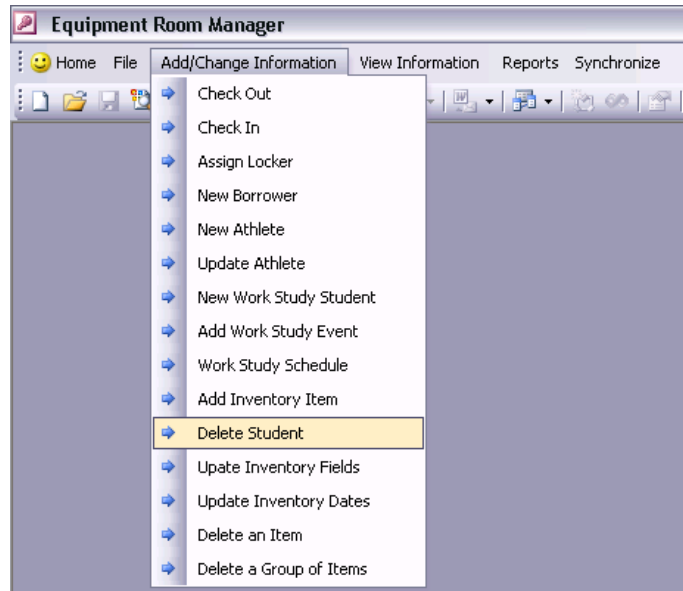


2. The Welcome Screen will appear. Click the **Close** button.

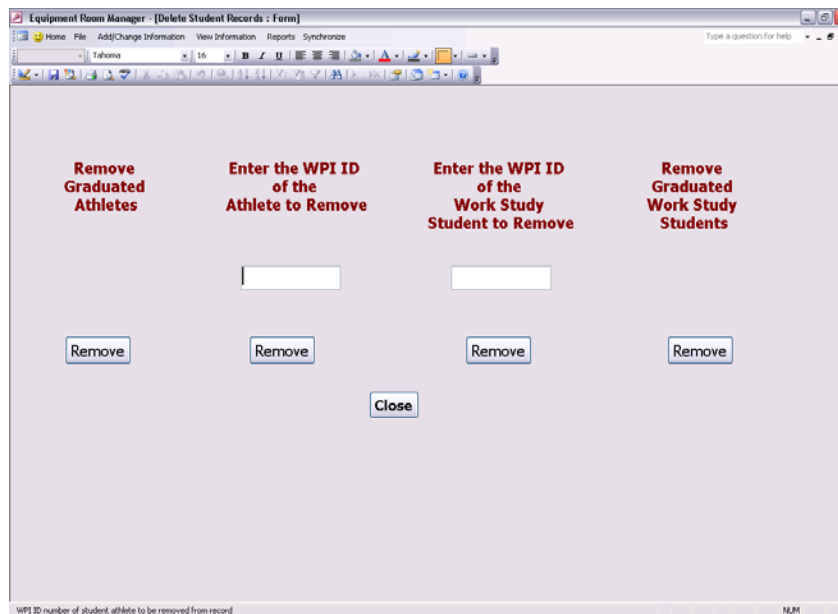
3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **Delete Student** option.



5. The **Delete Student Records** form will open.



6. To remove graduated students from the database, click either the **Remove** button under “Remove Graduated Athletes” or under “Remove Graduated Work Study Students.” To remove a specific athlete or work study student, type in the ID number or scan the bar code on the back of the WPI ID card. Upon the ID numbers, click the corresponding **Remove** button. In all cases, a warning will appear about the number of records that will be deleted and how this cannot be reversed. Click the **Yes** button in these warning prompts.
7. When finished deleting student records, click the **Close** button to close this form.

C. Using Queries

Queries are a means to view a specific set of data. At different times, it may be necessary to view available lockers, used lockers, overdue item, etc. All of the queries under the View Information menu are for viewing only; none of the data presented can be modified. The following describes how to use all queries in this menu.

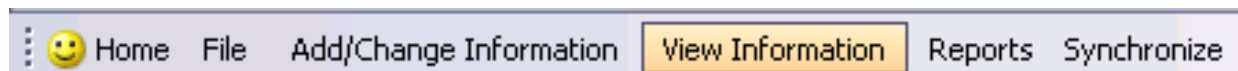
Verify

Before a person can borrow an item, borrow a locker, or be entered into the database as a work study student or an athlete, this person must be entered into the directory. If there is doubt at any point, one can verify if a person is in the directory with the following procedure.

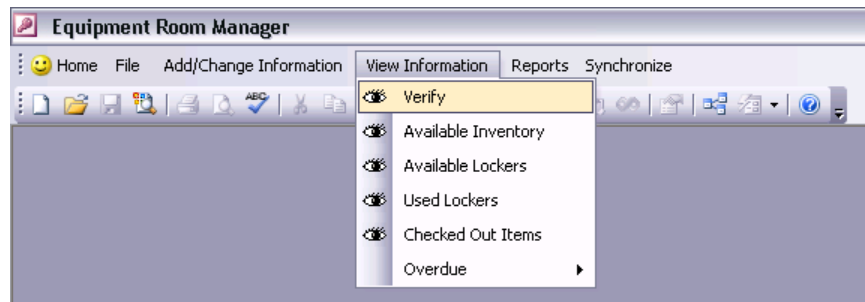
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



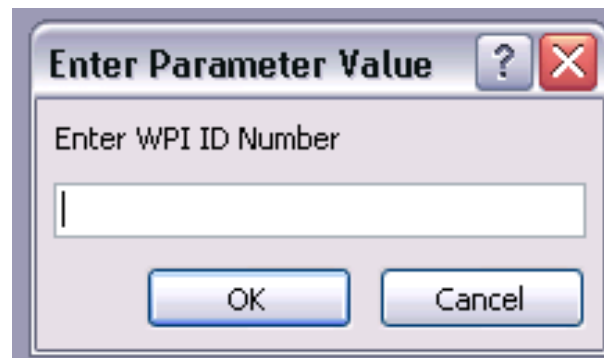
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **View Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



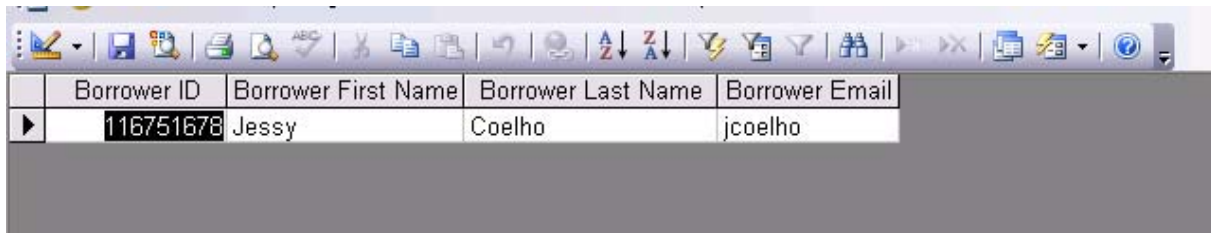
4. Within this menu, choose the **Verify** option.



5. A prompt will appear. Scan the bar code located on the back of the WPI ID card.



6. The results of the verify query will open in a window. If the person is in the directory, the result will look like the following.



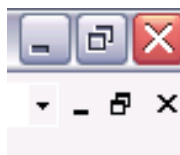
Borrower ID	Borrower First Name	Borrower Last Name	Borrower Email
116751678	Jessy	Coelho	jcoelho

If the person is not in the directory, it will be blank like the following.



Borrower ID	Borrower First Name	Borrower Last Name	Borrower Email
-------------	---------------------	--------------------	----------------

7. Click the small **X** in the top right corner to close this listing.



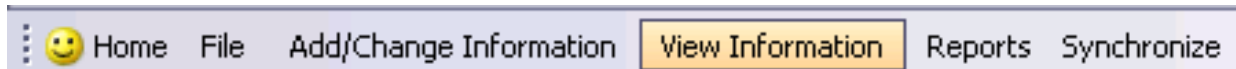
Available Inventory

At some point, it may be necessary to view available inventory. A query exists to display this data. One cannot modify the information that appears during this procedure. To change information, refer to various procedures in **Using Forms**.

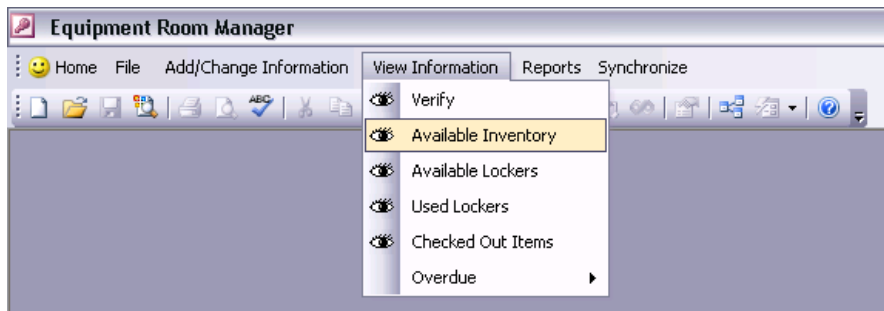
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



2. The Welcome Screen will appear. Click the **Close** button.
3. Select **View Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, choose the **Available Inventory** option.

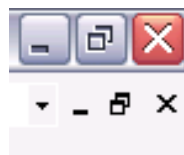


5. A window will open with a listing of all available items. This information is sorted first by whether it is a generic item or a specific item, then by type, then by sport.



Bar Code ID	Generic vs Spec	Type	Description	Sport	Uniform Number	Size	Combination	Total Number
▶ 5555	Generic	Varsity	metal bat	Baseball				7

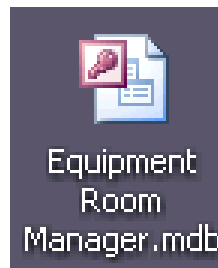
6. Click the small **X** in the top right corner to close this listing.



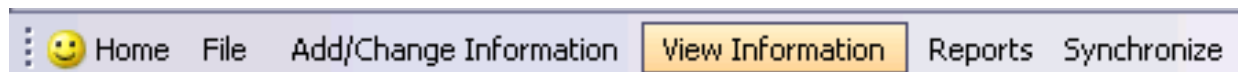
Available Lockers

At some point, it may be necessary to view a list of available lockers. During this procedure, nothing can be modified about the data that appears; it is for viewing only. To assign or return a locker, refer to procedures in **Using Forms**.

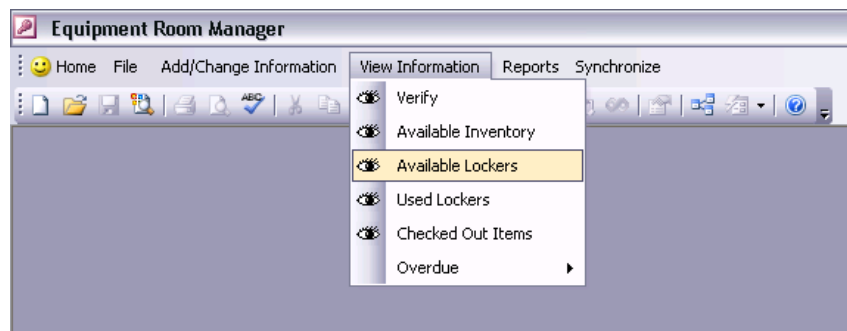
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



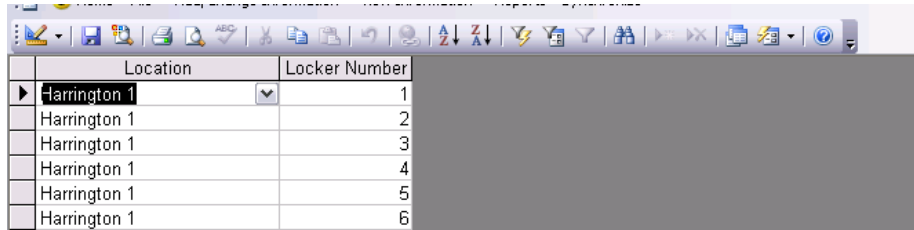
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **View Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, choose the **Available Lockers** option.

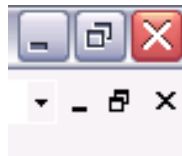


5. A window will open with a listing of all available lockers. This information is alphabetized by locker room, and then sorted by locker number



Location	Locker Number
Harrington 1	1
Harrington 1	2
Harrington 1	3
Harrington 1	4
Harrington 1	5
Harrington 1	6

6. Click the small **X** in the top right corner to close this listing.



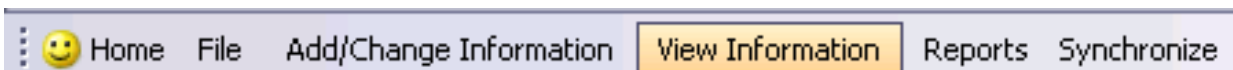
Used Lockers

At some point, it may be necessary to view a list of lockers in use. During this procedure, nothing can be modified about the data that appears; it is for viewing only. To assign or return a locker, refer to procedures in **Using Forms**.

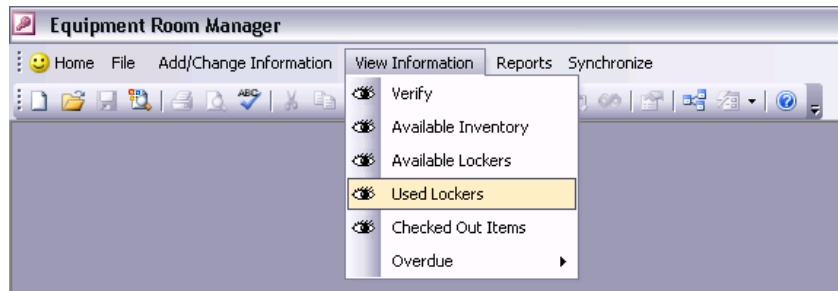
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



2. The Welcome Screen will appear. Click the **Close** button.
3. Select **View Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, choose the **Used Lockers** option.

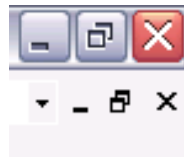


5. A window will open with a listing of all lockers in use and to whom they have been assigned. This information is alphabetized by locker room, and then sorted by locker number.



Location	Locker Number	Name
Women's Alumni 1 - Small	443	Janelle Tavares

6. Click the small **X** in the top right corner to close this listing.



Checked Out Items

It may be necessary for a staff member to view a list of items that have been lent to members of the WPI community. At no point during this procedure can information presented by this query be modified. To change information, refer to the procedures in **Using Forms**.

1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.

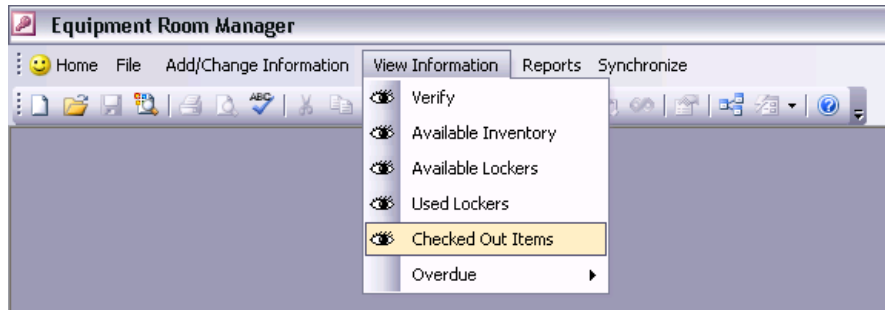


2. The Welcome Screen will appear. Click the **Close** button.

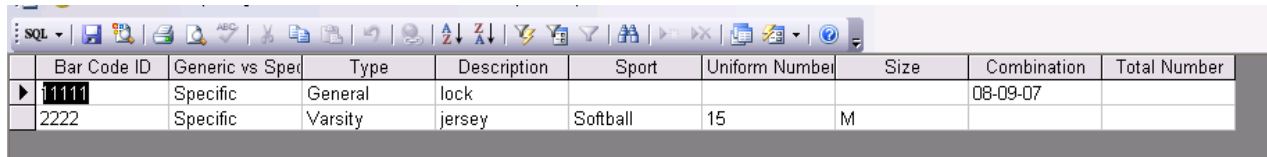
3. Select **View Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, choose the **Checked Out** option.



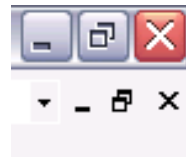
5. A window will open with a listing of items that have been checked out from the equipment room. This includes all specific inventory items and only those generic items that have all been borrowed. If several towels remain in the equipment room, for instance, its inventory information will not appear in the results of this query. This information is sorted by whether the item is generic or specific, its type, and its associated sport, if any.



The screenshot shows a data table with the following columns: Bar Code ID, Generic vs Sped, Type, Description, Sport, Uniform Number, Size, Combination, and Total Number. The table contains two rows of data.

Bar Code ID	Generic vs Sped	Type	Description	Sport	Uniform Number	Size	Combination	Total Number
1111	Specific	General	lock				08-09-07	
2222	Specific	Varsity	jersey	Softball	15	M		

6. Click the small **X** in the top right corner to close this listing.



Overdue

During this procedure, one will be able to view various lists of overdue items. These items can be organized or excluded based on type and sport. At no point during these procedures can information be modified; this information can only be viewed. To check out or return items, refer to the procedures in **Using Forms**.

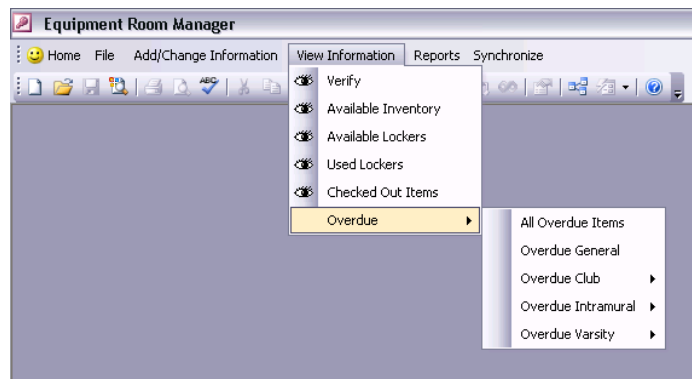
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



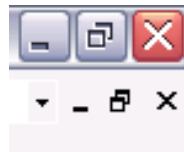
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **View Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, choose the **Overdue** option. A submenu will expand.



5. One has several options within this submenu. Depending on what information is desired, one can view all overdue items, those related to only one type of item, or those associated with a specific sport, sorted by club, intramural and varsity.
6. Click the small **X** in the top right corner to close this listing that one chose.



D. Using Reports

Reports are a means to formally view a specific set of data. These can be printed and kept as records, a periodic view of the entire equipment room. The inventory reports may be helpful to verify what is currently in the equipment room and what needs to be returned. This may help track down items before they become lost or stolen. The work study schedule report may help students choose games which he/she may want to work. All reports are described below.

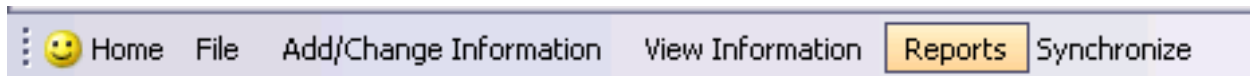
Athlete Contract

The former method of completing athlete contracts included cards that allowed one to fill out information manually and to check off items taken for a particular sport. Using this report, one can put all information about an athlete into the database. This information can be saved until the athlete graduates and used repeatedly. When the athlete has been given all items, the athlete can sign his/her contract to ensure that these items will be returning to the equipment room at the end of the season. The process of using this report is described below.

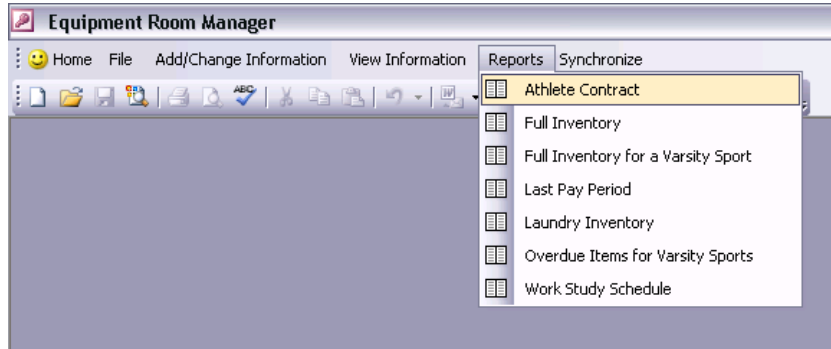
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



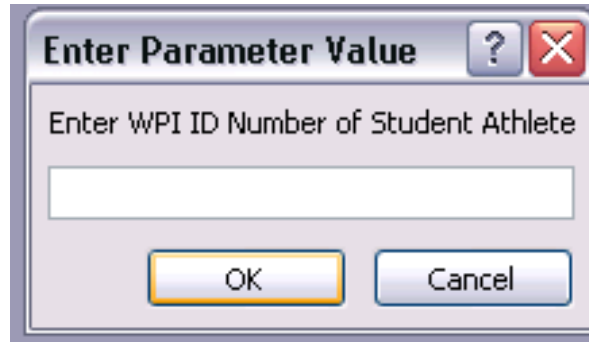
2. The Welcome Screen will appear. Click the **Close** button.
3. Refer to **Check Out** under **Using Forms** to give an athlete all of his equipment for the season. Refer to **Locker Assignment** under **Using Forms** to assign a locker to this athlete, if it is appropriate.
4. Once all items have been checked out, one can generate this student's athlete contract. Select **Reports** from the navigation menu bar at the top of the window to expand this drop-down menu.



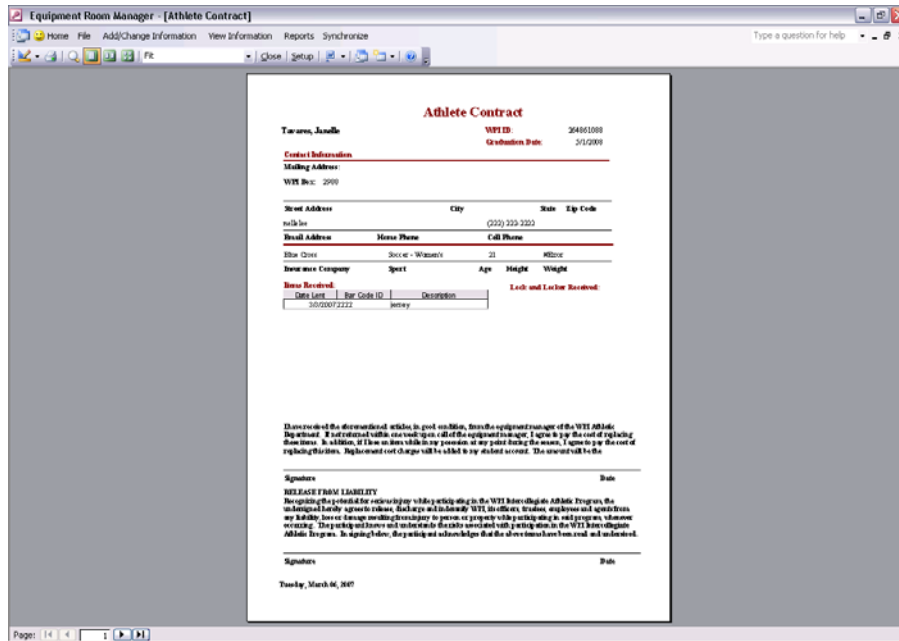
5. Within this menu, choose the **Athlete Contract** option.



6. A prompt will appear. Scan the bar code found on the back of the athlete's WPI ID card to enter this number. The ID number will appear in the white box in this prompt. Click the **OK** button.



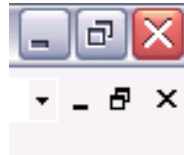
7. The Athlete Contract report will open.



8. If everything appears in order, print it and have the athlete sign. To print, click the printer icon on the toolbar. The report will print automatically.



9. Click the small **X** in the top right corner to close this report.



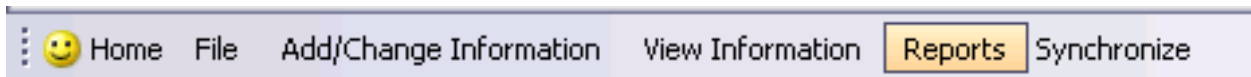
Full Inventory

At one or more times during the year, it may be necessary to perform an inventory check. This report aids in that process. The information in this report is a full listing of all items that have been entered into the database. This report is organized by storage location and by the type of the item. One can verify the items located in all locations with this report, in order to perform inventory.

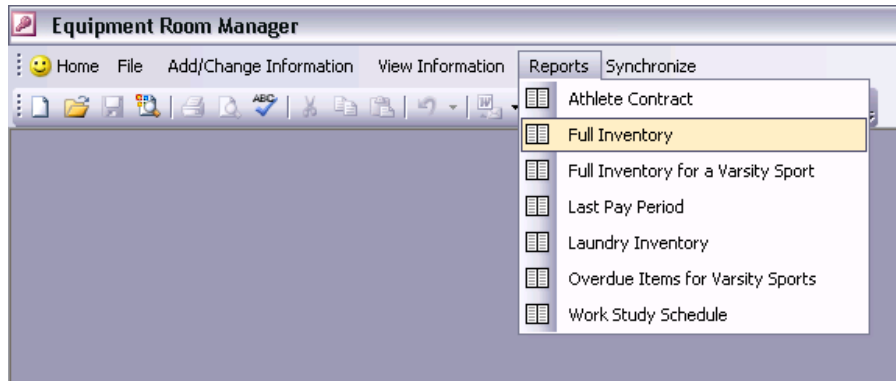
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



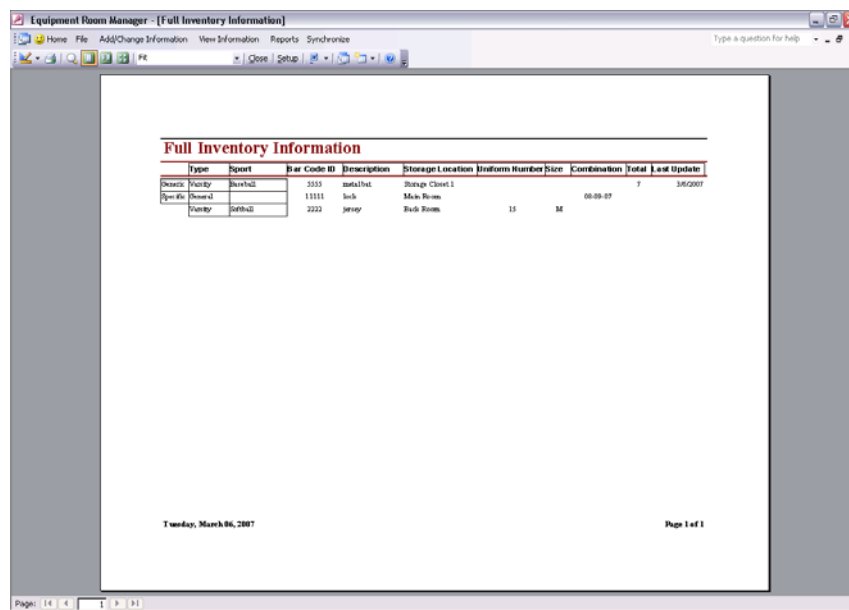
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Reports** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, choose the **Full Inventory** option.



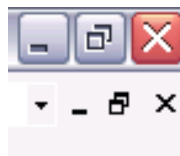
5. The Full Inventory report will open.



6. To perform inventory, print this report. To print, click the printer icon on the toolbar. The report will print automatically.



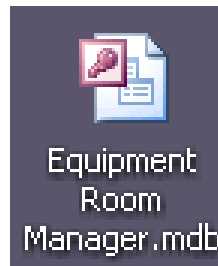
7. Click the small X in the top right corner to close this report.



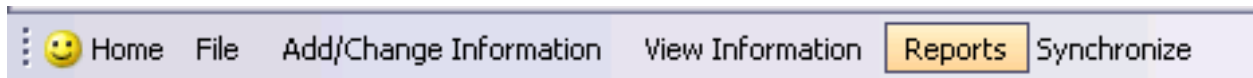
Full Inventory for a Varsity Sport

At the end of a sports season, it may be helpful to perform inventory for the varsity sports of that season. With this report, one can extract information from the set of data about the full inventory that only relates to a certain sport. To use this report, perform the following steps.

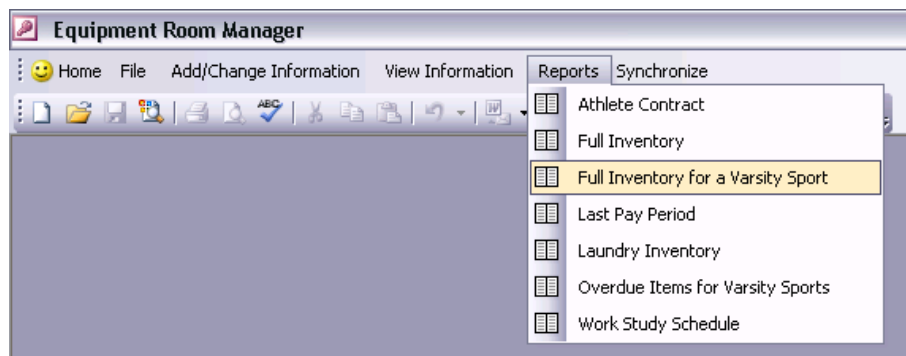
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



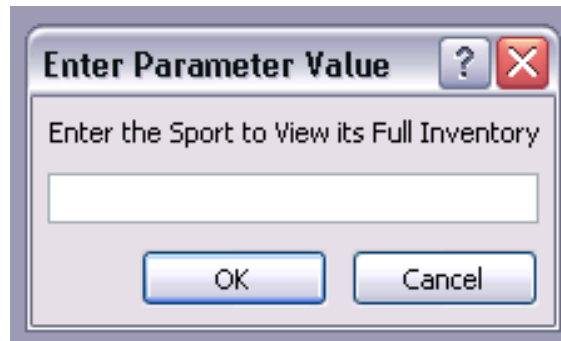
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Reports** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, choose the **Full Inventory for a Varsity Sport** option.

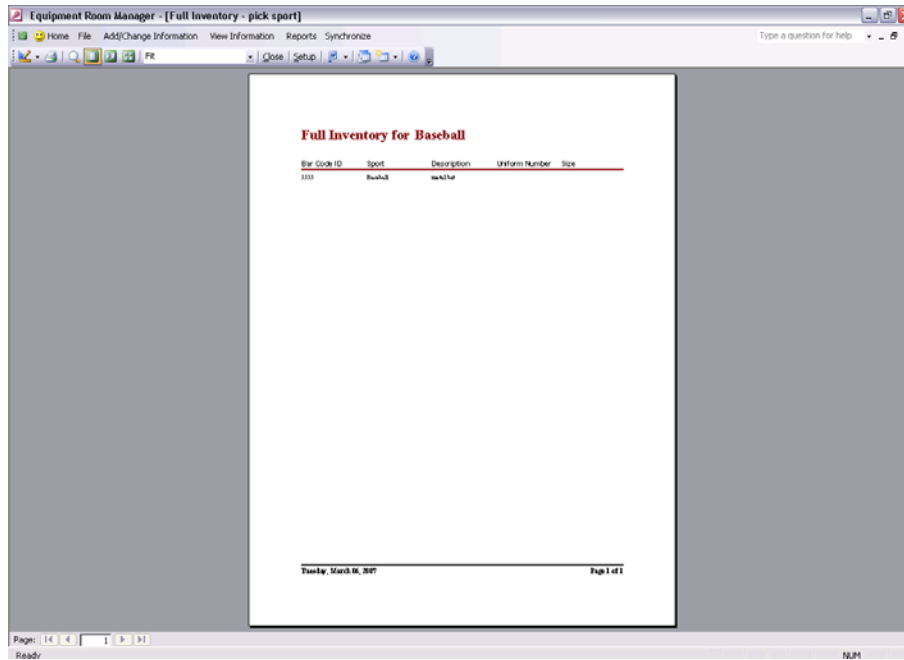


5. A prompt will appear. Follow the instructions by entering one of the sports below exactly how it appears.



Sports
Baseball
Basketball - Men's
Basketball - Women's
Crew - Men's
Crew - Women's
Cross Country - Men's
Cross Country - Women's
Field Hockey
Football
Soccer - Men's
Soccer - Women's
Softball
Swimming & Diving - Men's
Swimming & Diving - Women's
Track & Field - Men's
Track & Field - Women's
Volleyball
Wrestling

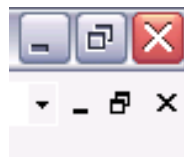
- The **Full Inventory for a Varsity Sport** will open with the entered sport in the title of the report.



- To print this report, click the printer icon on the tool bar. The report will print automatically.



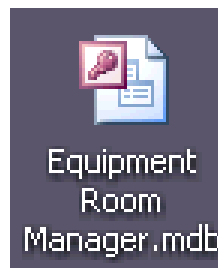
- Click the small **X** in the top right corner to close this report.



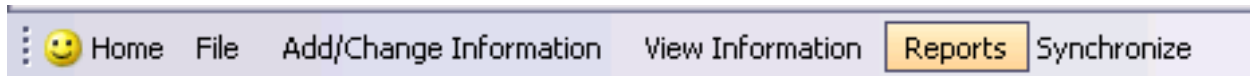
Last Pay Period

For the purpose of keeping track of work study students hours, it may be necessary to summarize the hours worked over the last pay period. This is accomplished through a report. For all hours that have been entered into the work study schedule in the database, this report will generate a summary, organized by work study students' names. To generate this report, follow the steps below.

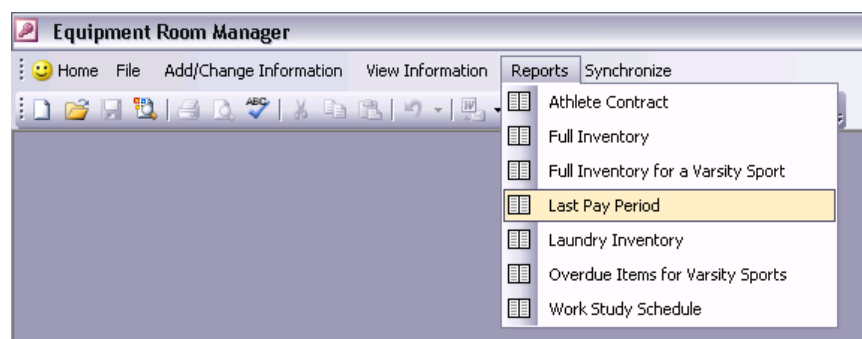
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



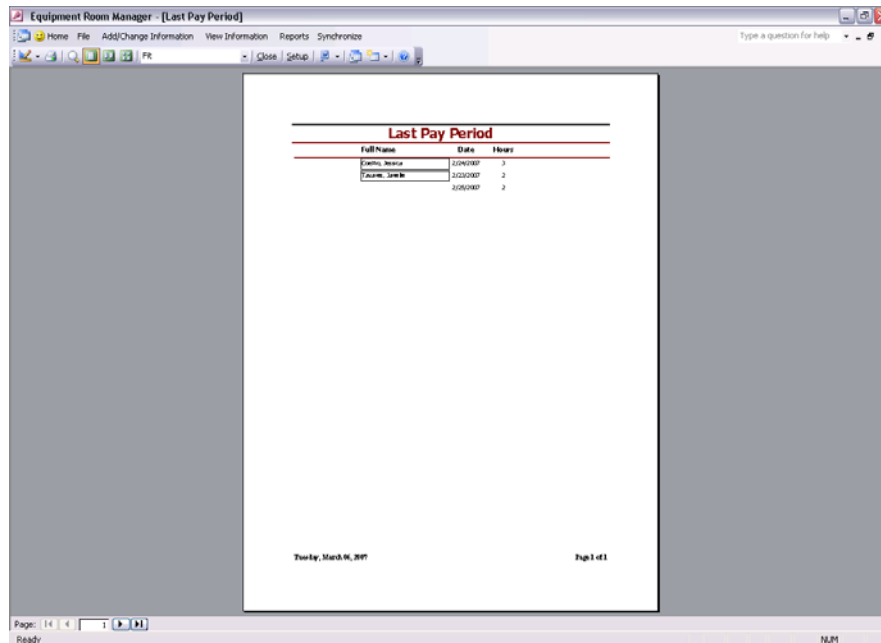
2. The Welcome Screen will appear. Click the **Close** button.
3. If some work study hours have not been entered into the database, refer to **Work Study Schedule** under **Using Forms** before continuing, so that this report will be accurate.
4. Select **Reports** from the navigation menu bar at the top of the window to expand this drop-down menu.



5. Within this menu, choose the **Last Pay Period** option.



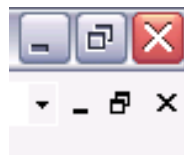
6. The Last Pay Period report will open.



7. To print, click the printer icon on the tool bar.



8. Click the small X in the top right corner to close this report.



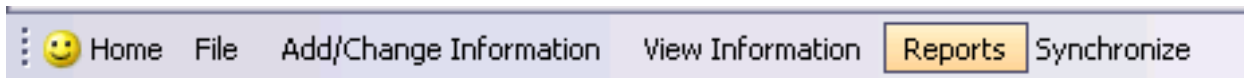
Laundry Inventory

As a means of preventative maintenance, one can view all items which have been taken out of the equipment room that should be returned and laundered. By periodically using this report, one can keep track of some athlete that may not be returning items for laundering at all, or often enough.

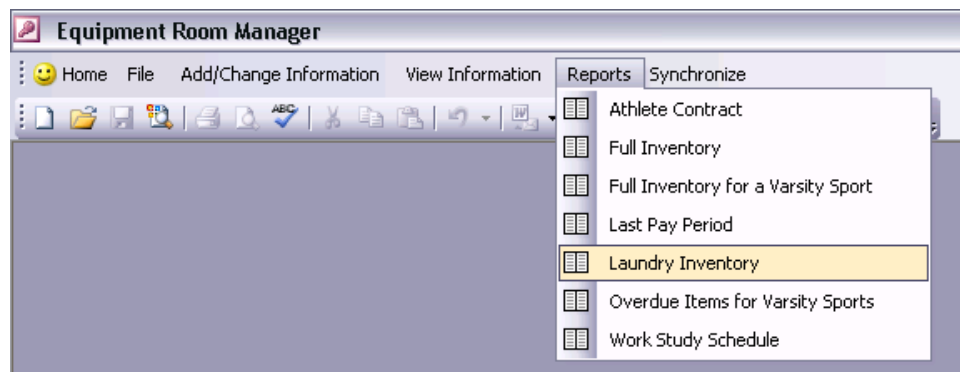
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



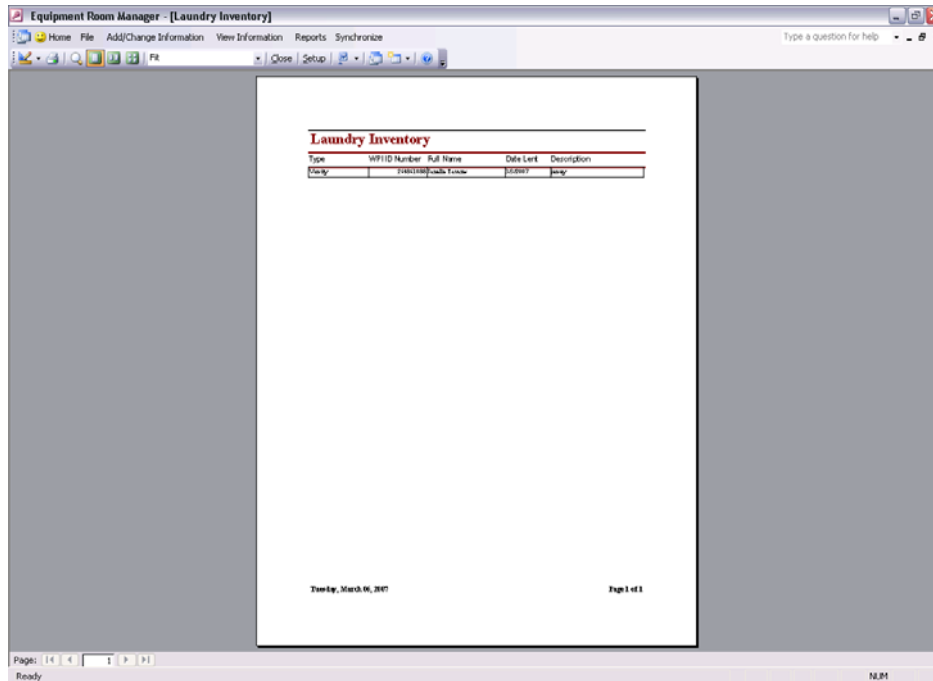
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Reports** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, choose the **Laundry Inventory** option.



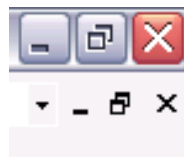
5. The **Laundry Inventory** report will open.



6. To print, click the printer icon on the toolbar.



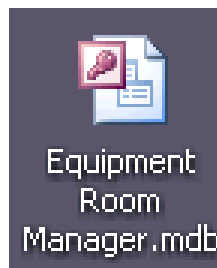
7. Click the small **X** in the top right corner to close this report.



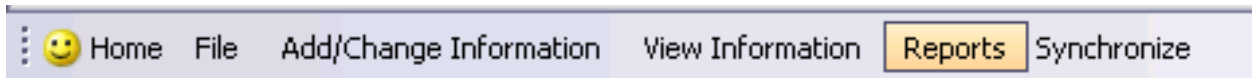
Overdue Items for Varsity Sports

At the end of a season, athletes should return all borrowed items to the equipment room. Those athletes that have not returned all items will be listed in this report. It may be helpful to use this report to track down students and items before performing inventory for that sport, using the Full Inventory for a Varsity Sport report. The following elaborates on how to generate this report.

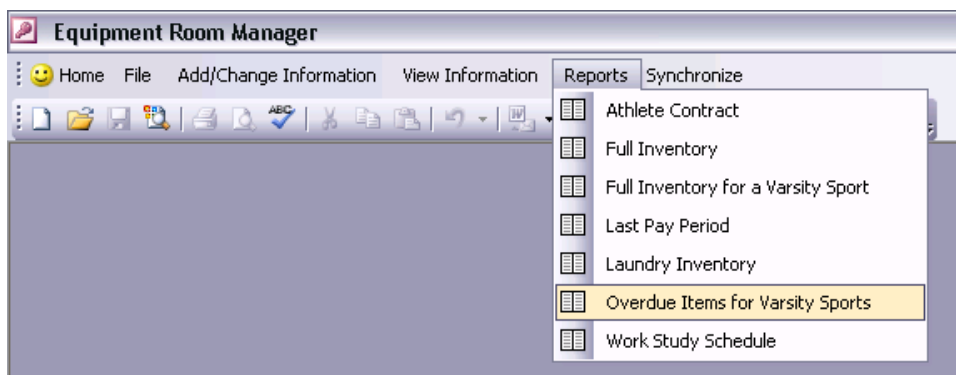
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



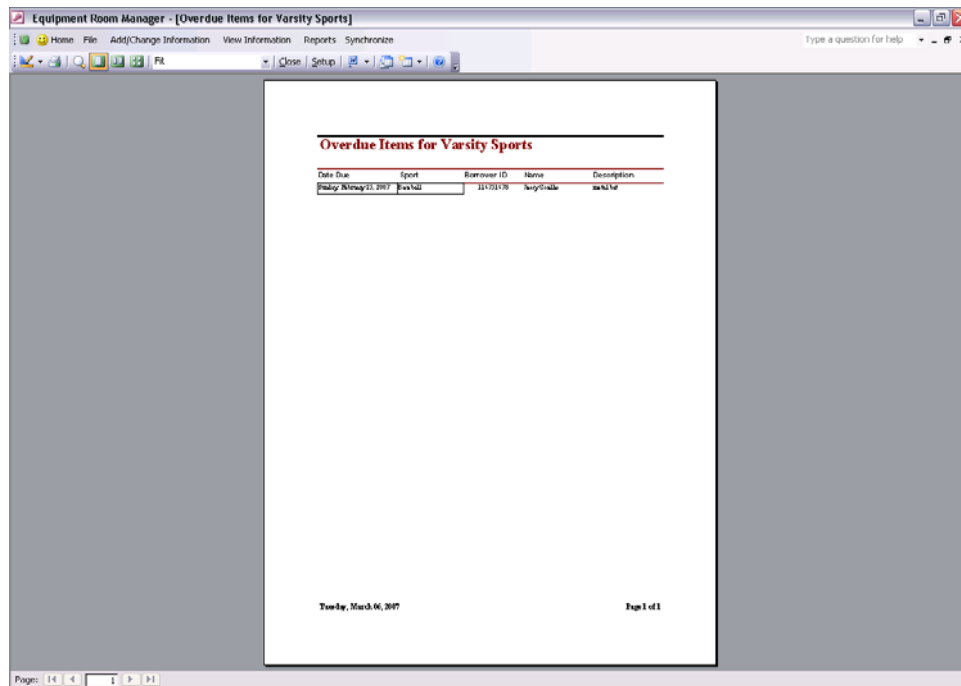
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Reports** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, choose the **Overdue Items for Varsity Sports** option.



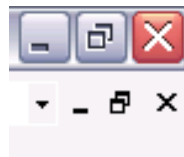
5. The Overdue Items for Varsity Sports reports will open. This is a listing of all items for all varsity sports that have not been returned, and should have been due to the ending of a season.



6. To print, click the printer icon on the toolbar.



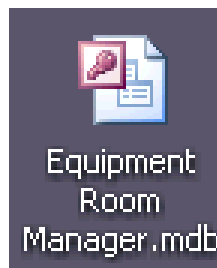
7. Click the small X in the top right corner to close this report.



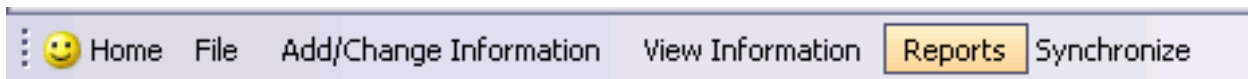
Work Study Schedule

It may be necessary to view a summary of work study activity. This report shows games worked over the last seven days, and the games assigned and the available games over the next fourteen days. Naturally, the information in this report is organized by date. This can help a students choose a game to work or to find a pattern in what games certain students work to continue to assign students to similar games. Use the following steps to generate this report.

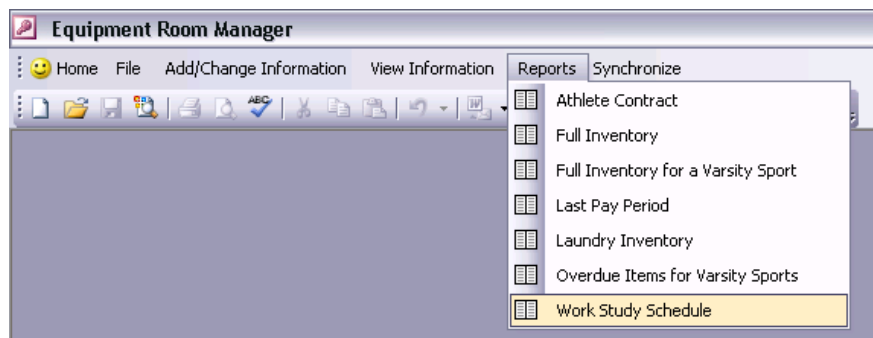
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



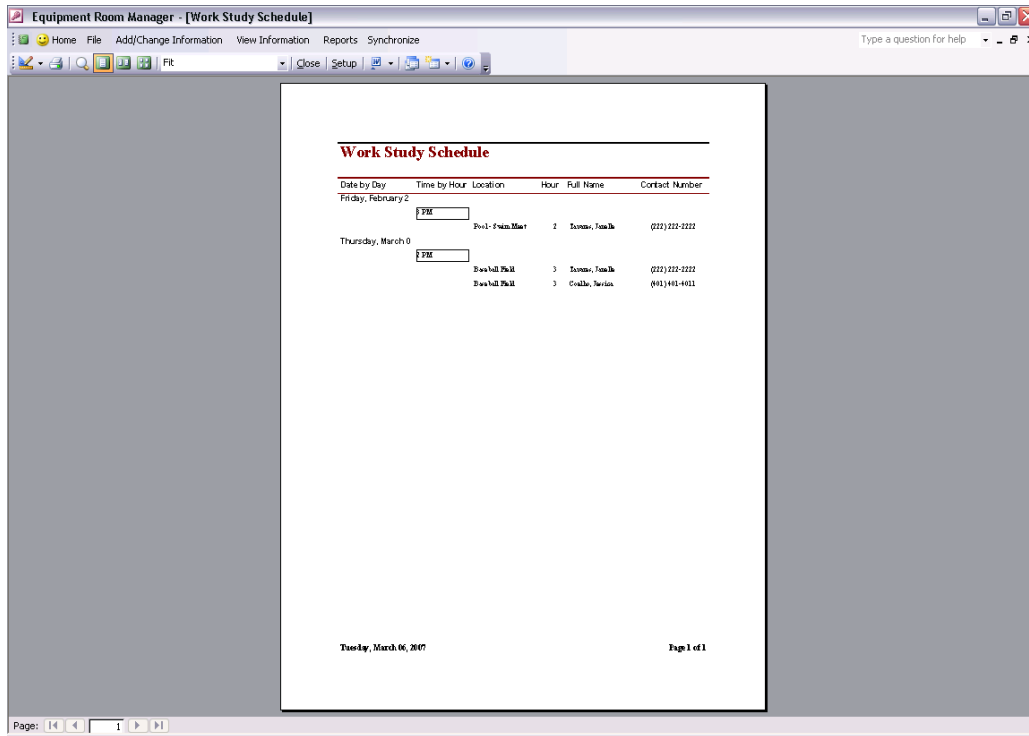
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Reports** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, choose the **Work Study Schedule** option.



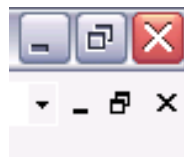
5. The **Work Study Schedule** report will open.



6. To print, click the printer icon on the toolbar.



7. Click the small **X** in the top right corner to close this report.



E. Miscellaneous Tasks

It may be necessary to perform the following tasks periodically, but they are generally not as common as the tasks that can be performed through forms. Therefore, these tasks do not have dedicated forms. Generally, these tasks are performed with queries. They mostly involve updating inventory information. As these tasks change information in the database, be certain that one wants to perform these tasks before beginning. The following describes when and how to perform these miscellaneous tasks.

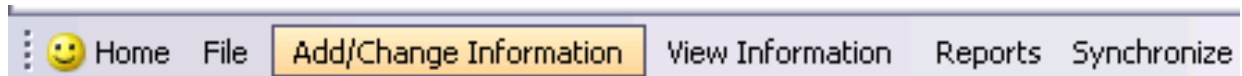
Update Inventory Fields

As time goes by, it may be necessary to update some inventory information. For instance, as some varsity items wear out, they may put into the general lending area of the inventory, or another area. As items age, they may need to be refurbished. This procedure allows one to update these fields and any others as necessary. As this search for items uses the description, it “casts a wide net;” the results of the query may produce more items than one wants to update, so be sure to only update the desired items. Any changes made during this procedure cannot be undone, so verify the changes before proceeding.

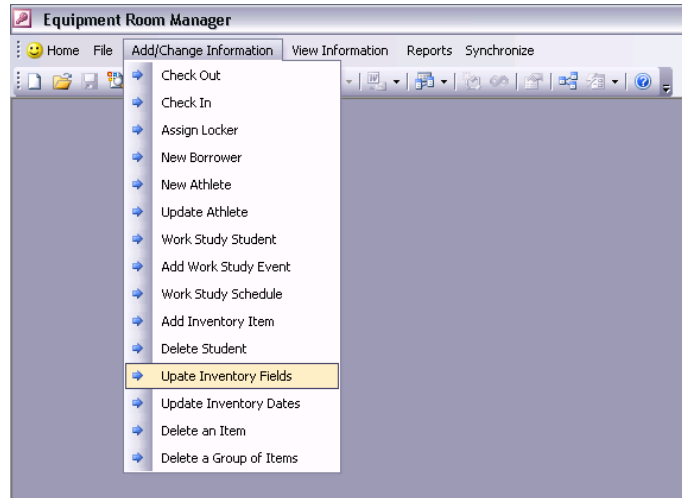
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



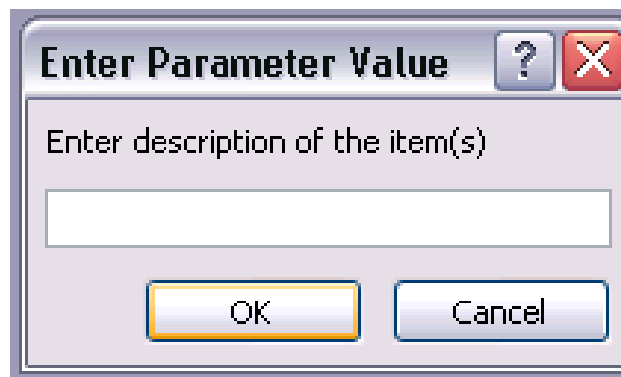
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, choose the **Update Inventory Fields** option.



5. A prompt will appear. Follow the instructions and input the description of the item or items to be updated.



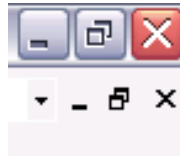
6. A listing of matching records in inventory will appear. More may appear than one wants to update. Update only the fields of the items desired.

Bar Code ID	Generic vs Specific	Full Inventory In	Type	Sport	Storage Location	Uniform Number	Size	Combination	Total Number	Last Updated	Field ID
5555	Generic	metal bat	Varsity	Baseball	Storage Closet				7	3/6/2007	metal bat

7. To save the changes, click the disk icon on the toolbar.



8. Click the small **X** in the top right corner to close this listing.



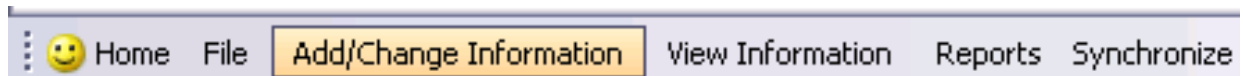
Updating Inventory Dates

After performing inventory, it is necessary to put the current date in all the Last Updated fields for generic items. The following procedure will update all of these fields. This cannot be reverse, so verify that a full inventory has been performed before using this update procedure.

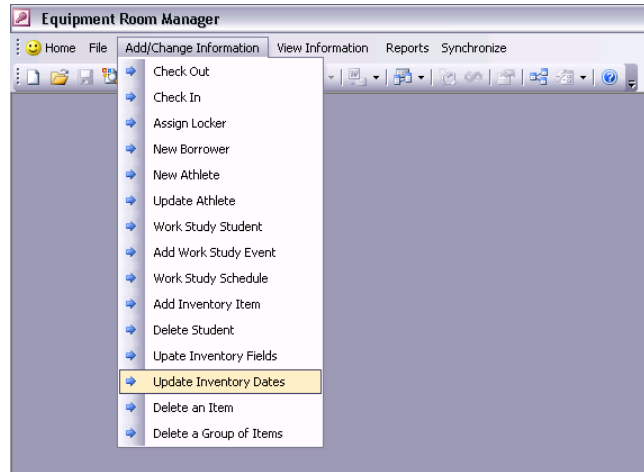
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



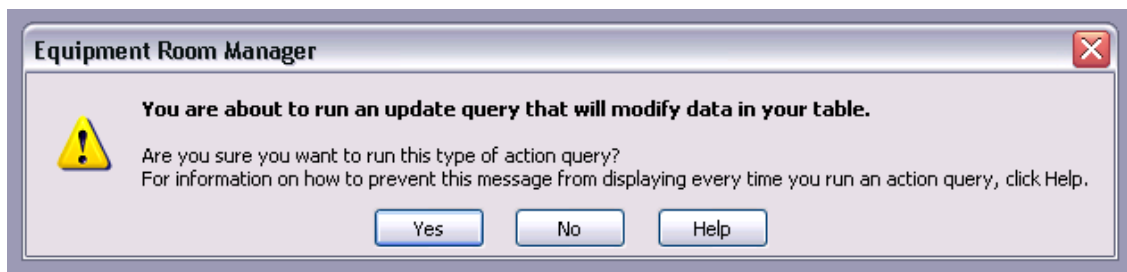
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



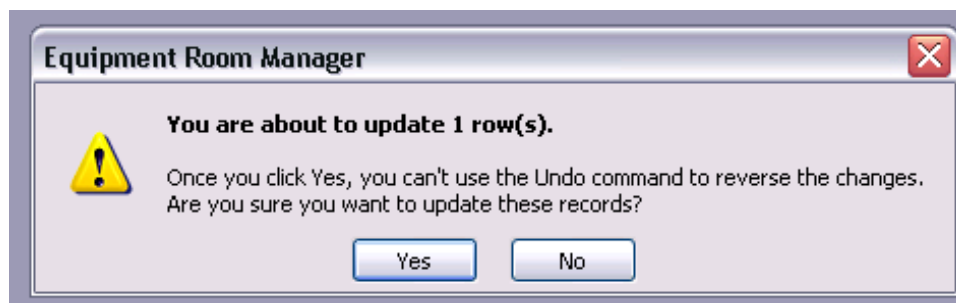
4. Within this menu, choose the **Update Inventory Dates** option.



5. A warning prompt will appear. If one is certain that all the Last Updated fields should be updated to today's date, click the **Yes** button.



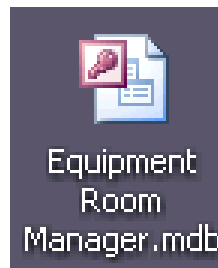
6. Another warning prompt will appear that warns one of the number of records that will be updated. If certain, click the **Yes** button.



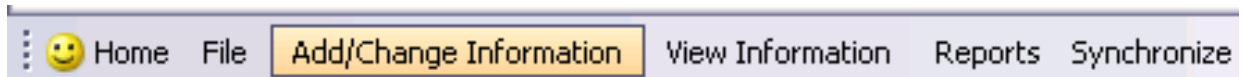
Deleting an Item

After performing inventory, it may be necessary to delete certain items. They may be too used to continue lending them, or the equipment room staff may not be able to locate some items. For these or other reasons, use the following procedure to delete items specifically, one at a time. These changes cannot be undone, so verify them before continuing.

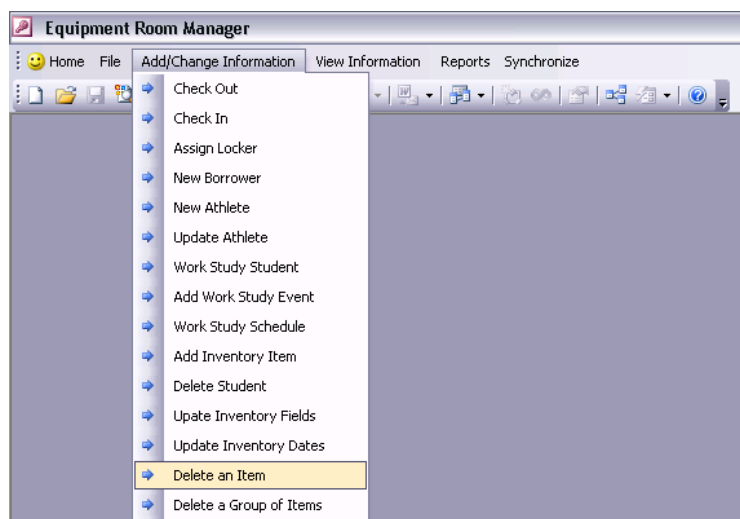
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



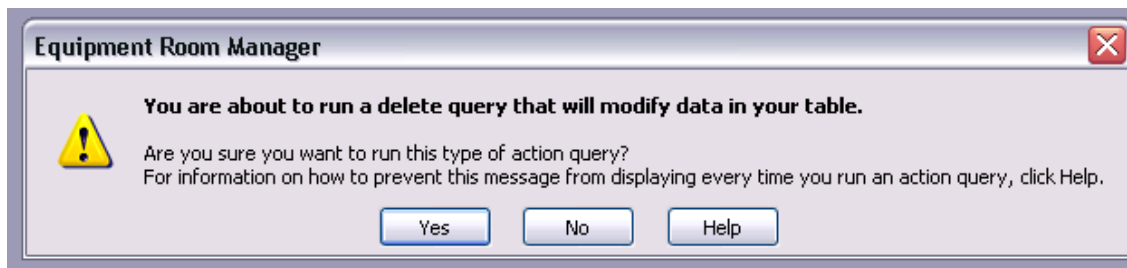
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



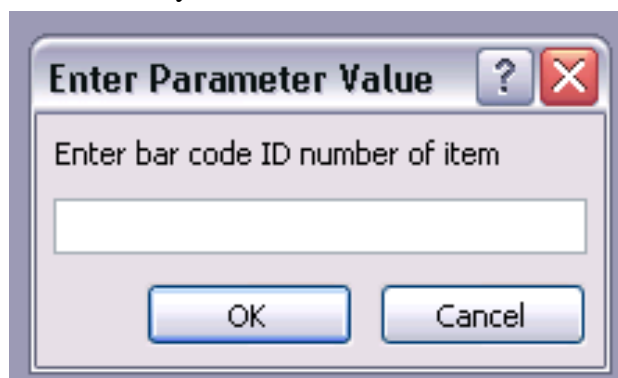
4. Within this menu, choose the **Delete an Item** option.



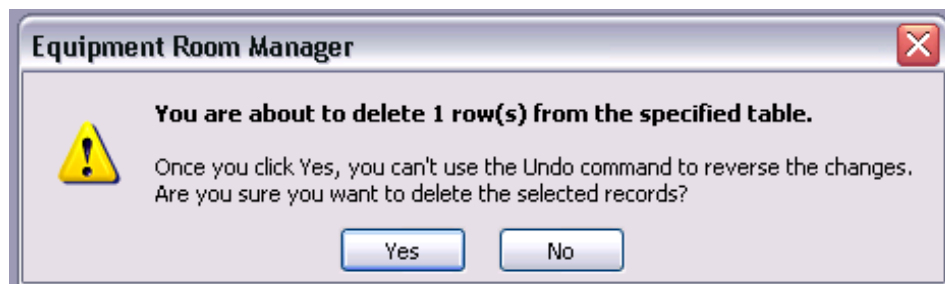
5. A warning prompt will appear. If one is certain that this item should be removed from inventory, click the **Yes** button.



6. Another prompt will appear. Follow the instructions and input the bar code ID number of the item to be removed from inventory.



7. Another prompt will appear warning one that a record is being deleted from the database. If certain, click the **Yes** button.



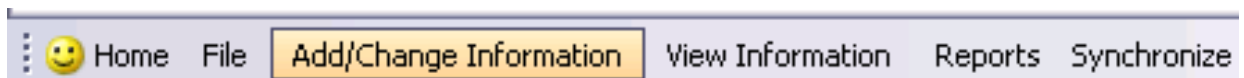
Deleting a Group of Items

After performing inventory, it may be necessary to delete many items. An entire group of items may need to be replaced. The following procedure allows one to delete a number of items generally, by their description. For example, all ping pong paddles may be replaced. Therefore, it may be necessary to delete all the items in inventory with the description “ping pong paddle” and to add the new ones using a form. Before starting the following steps, verify changes as these cannot be reversed.

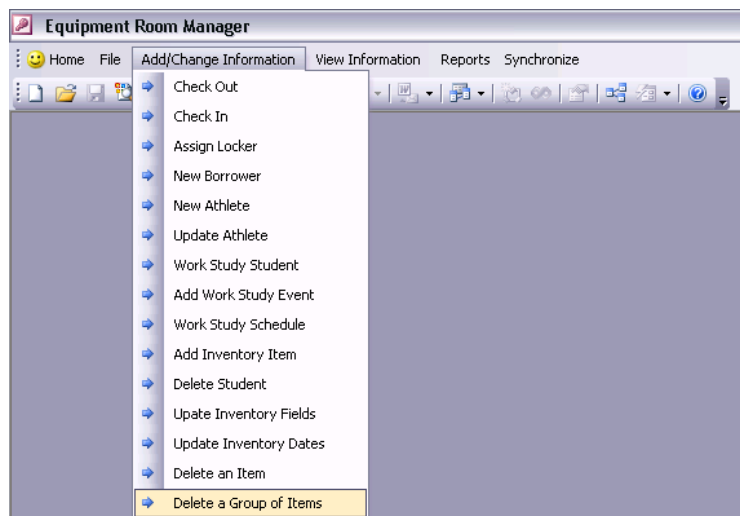
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



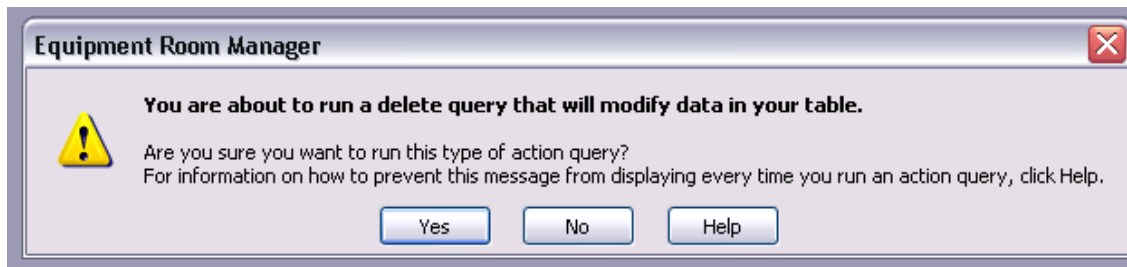
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change** from the navigation menu bar at the top of the window to expand this drop-down menu.



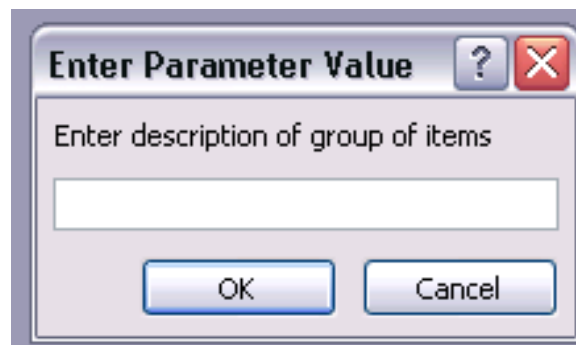
4. Within this menu, choose the **Delete a Group of Items** option.



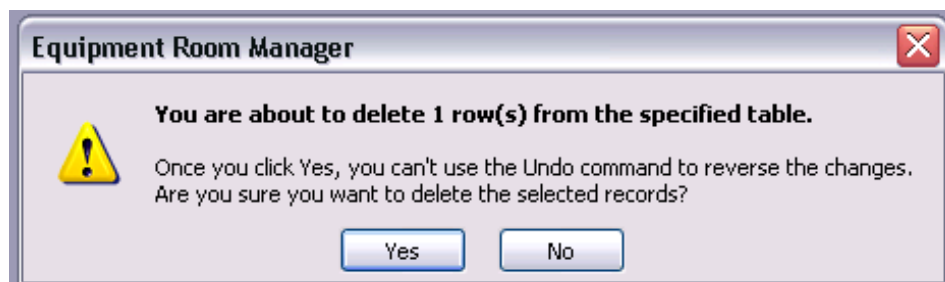
5. A warning prompt will appear. If one is certain that these items should be removed from inventory, click the **Yes** button.



6. Another prompt will appear. Follow the instructions and input the description of the items to be removed from inventory.



7. Another prompt will appear warning one of the number of records being deleted from the database. If certain that only the desired records and no extra records will be deleted, click the **Yes** button.



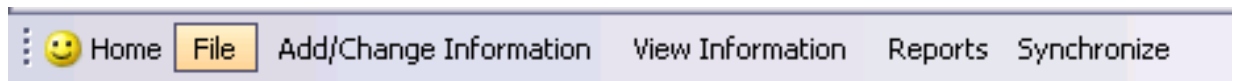
Synchronizing with the Athletic Departments Work Study Records

Work study students must submit paperwork to the Athletic Department office before beginning to work anywhere within this department. As the office and the equipment room now share information about work study students, the equipment room must gather less information than previously. To set up this state of the data, it is necessary to synchronize the equipment room's data with the office's data, potentially every day. This requires one to copy the information from the office and sort it. This occurs in two steps: importing the information from the office's records and then sorting it, which is clicking a button. The following describes this task step by step.

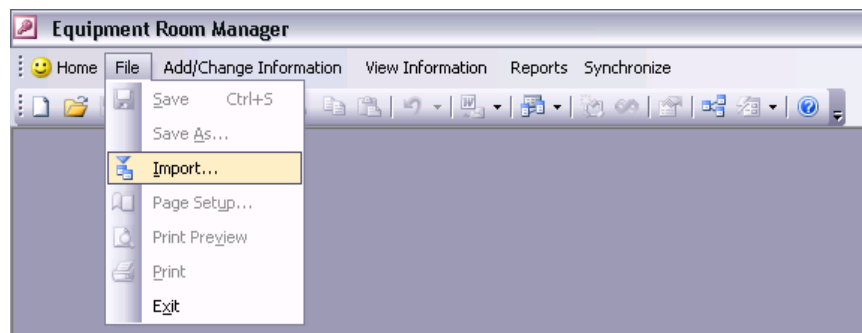
1. If it is not already open, double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



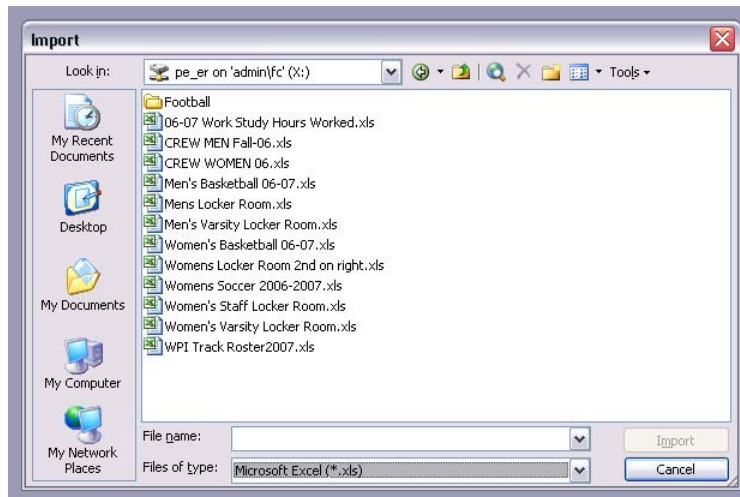
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **File** from the navigation menu bar at the top of the window to expand this drop-down menu.



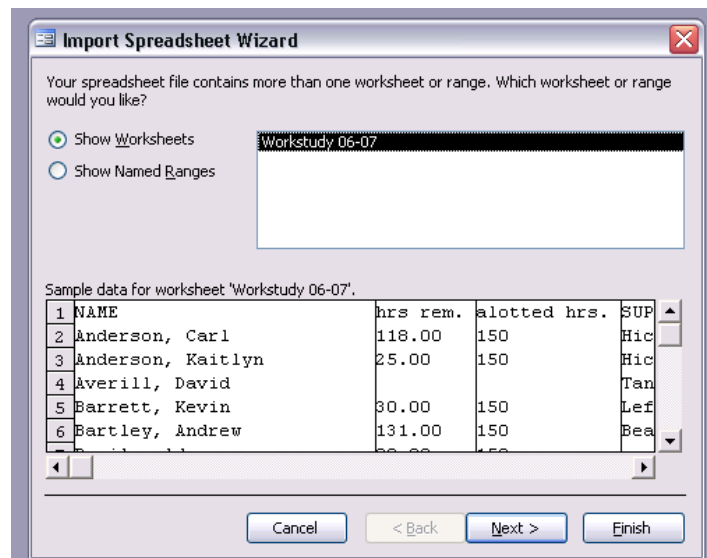
4. Within this menu, choose the **Import** option.



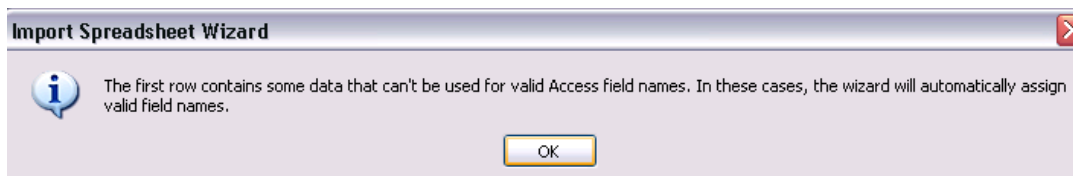
- The Import window will open. Navigate to the file share, admin\pc\pe_er. Under the **Files of Type** menu, select **Microsoft Excel (*.xls)**. Locate and select the office's spreadsheet of work study students, **YY-YY Work Study Hours Worked**. YY-YY indicates the two number abbreviation of the academic year. Click the **Import** button.



- The Import Spreadsheet Wizard will open. On the first page, verify that the Show worksheets radio button is selected and that Workstudy YY-YY is selected on the box to the right. Click the **Next>** button.



- A warning prompt will appear. Click the **OK** button.



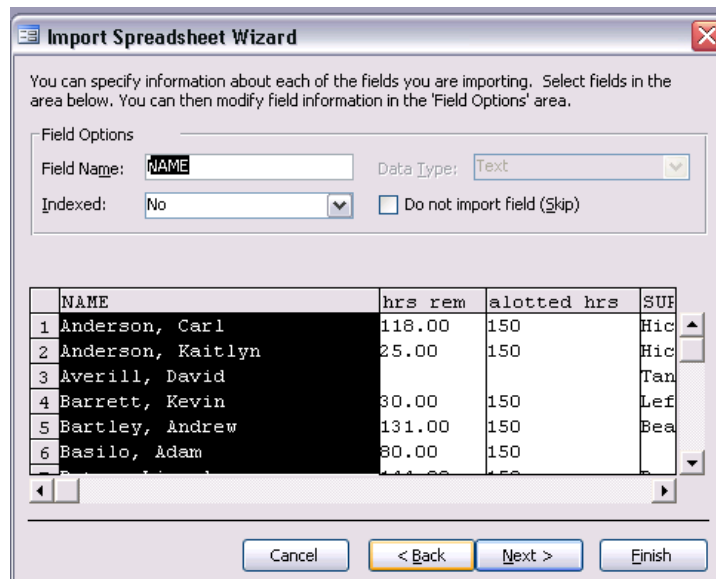
- On the next page, click the check box next to “First Row Contains Column Headings.” Click the **Next>** button.



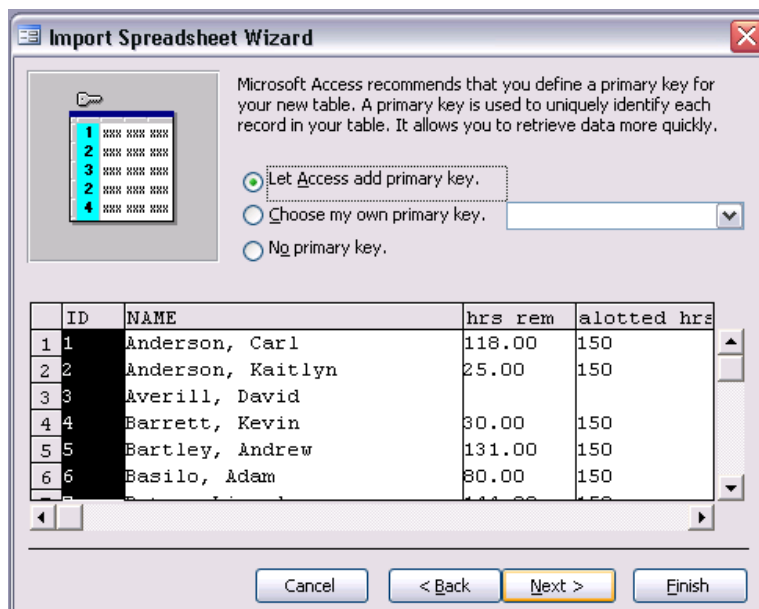
- On the next page, verify that the radio button is selected next to “In a New Table.” Click the **Next>** Button.



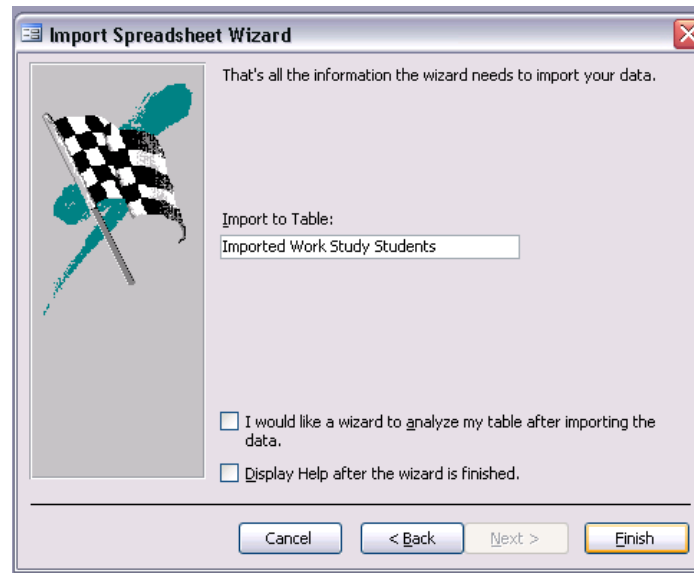
10. On the next page, the wizard allows one to change column information. Just click the **Next>** button.



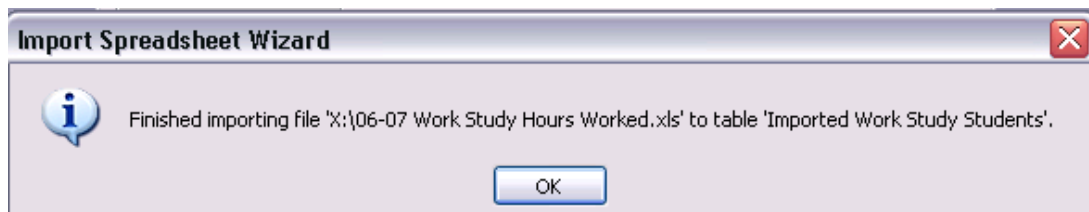
11. On the next page, verify that the radio button is selected next to “Let Access add primary key.” Click the **Next>** button.



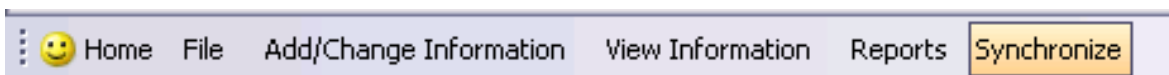
12. On the last page, the cursor will be blinking in the **Import to Table:** field. Enter Imported Work Study Students, exactly. Click the **Finish** button.



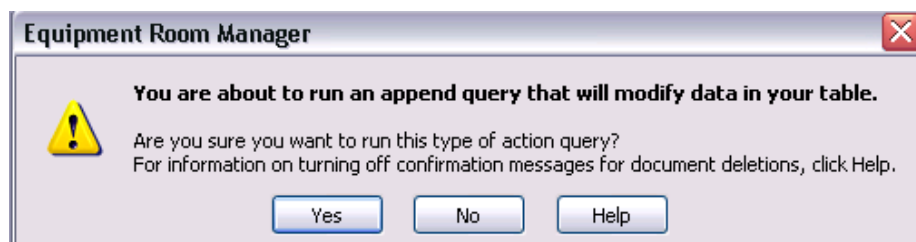
13. A prompt will appear informing one that the file has finished importing. Click the **OK** button.



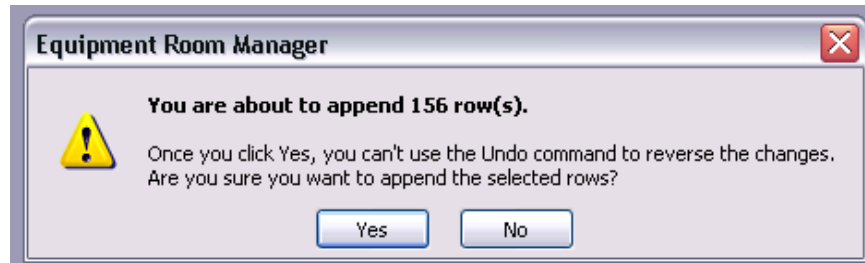
14. Select **Synchronize** from the navigation menu bar at the top of the window. This button will perform the rest of this process.



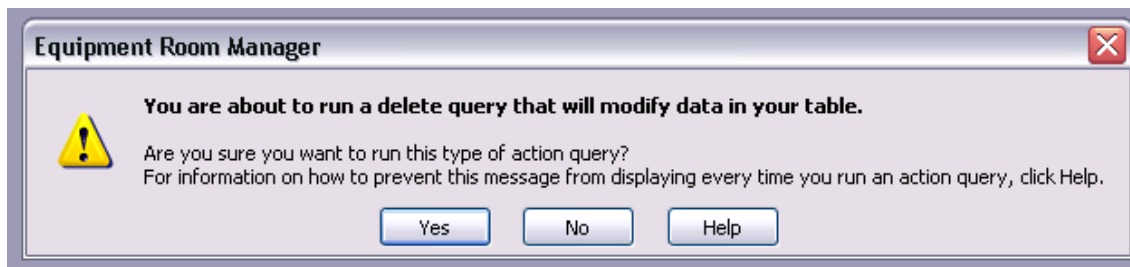
15. A warning prompt will appear about modifying data. Click the **Yes** button.



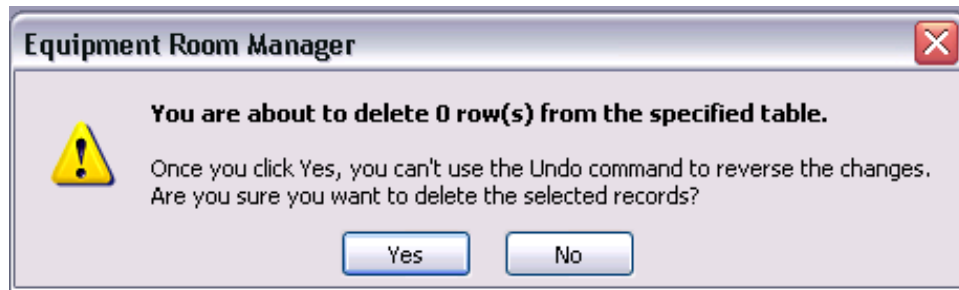
16. Another warning prompt will appear about the number of records modified. Click the **Yes** button.



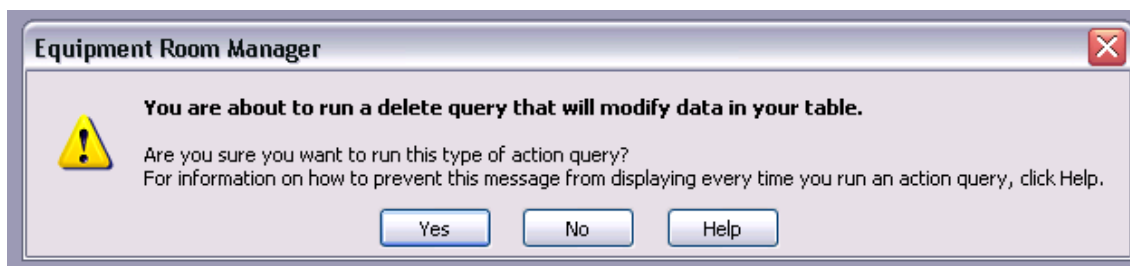
17. Another warning prompt will appear about deleting data. Click the **Yes** button.



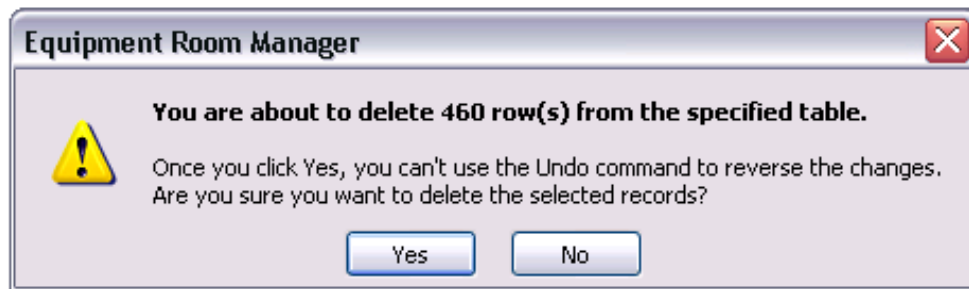
18. Another warning prompt will appear about how many records will be deleted. Click the **Yes** button.



19. Another warning prompt will appear about deleting data. Click the **Yes** button.



20. One last warning prompt will appear about how many records will be deleted. Click the **Yes** button.



Adding New Forms, Queries or Reports

During the set up process or while the Equipment Room Manager is completely functional, the equipment room staff may notice that additional features may make the program more efficient. For instance, a new query with a more narrow set of data as compare to available queries may make a certain procedure more efficient. Also, another form to add or change data may make this program more effective for the staff. The group recommends that the staff member seeking a new feature reference *Access 2003 Bible*. This is an electronic reference that can be accessed through the library's online catalog search. This is found on the home page of the George C. Gordon Library. *Access 2003 Bible* has excellent and detailed descriptions of how to create forms, queries and reports, and it should meet the needs of the equipment room staff as an Access reference.

Bar Code Guide

Generation, Printing and Application

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A. Introduction

Bar codes are the means by which the Equipment Room Manager identifies all items in the equipment room's inventory. To use this system of tracking, it is necessary to generate, print, and apply these bar codes to items in the inventory. A program that fulfills the needs of the equipment room in these capacities is the IDAutomation Bar Code Label Design program. The freeware version of this program generates the symbologies of Code 39 and Code 39 Extended; it also has a flexible print layout. For the purposes of the equipment room, Code 39 is sufficient. In fact, it is ideal as this is the symbology currently used on WPI IDs.

This guide takes one through the process of generating, printing, and applying bar codes for several different situations that will arise while working in the equipment room. For example, if the list of generic bar codes needs to be updated, one must generate a non-continuous set of bar codes and print a partial page of labels. When initially applying bar codes to the entire inventory, one will have to generate and print many full pages of bar codes. This guide will navigate one through the IDAutomation Bar Code Label Design program click-by-click to accomplish any bar coding goal for the equipment room.

B. Bar Code Generation

Before viewing or printing bar codes from within the IDAutomation Bar Code Label Design program, one must generate these labels. Before beginning this process, one should have determine which bar codes need to be generated and how many.

Open a New Project

1. Start at the desktop of the equipment room's inventory management workstation. To launch the IDAutomation Bar Code Label Design program, double-click the **desktop icon**.

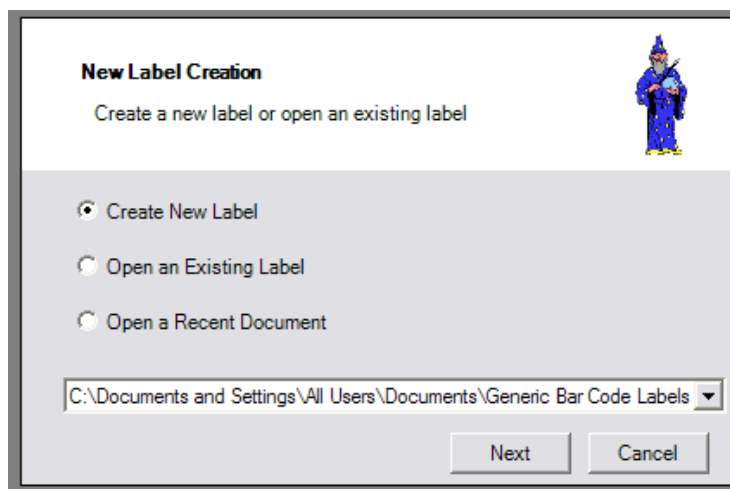


NOTE: Opening this program may cause a pop-up window to appear reading:

A required component for IDAutomation® Free Barcode Label Design Application was not found on this system. IDAutomation® Free Barcode Label Design Application requires MDAC 2.6 or later.
Please contact your system administrator.

Click the **OK** button in this window. This state of the program will not affect any of the instructions in this guide.

2. In the New Label Creation box, select the **Create New Label** radio button and click the **Next** button.



The only printer selection at this point is the Epson Stylus C88, though this may change in the future. For the bar codes generated for the equipment room, two predefined stock labels are ideal. One has been created to fit the height of the symbology and the projected maximum length; another aspect under consideration was the existence of enough quiet zone space on either side of the labels, which allows for maximum readability by the bar code scanner.

3. The next box to appear is the Label Options box. One selects the desired printer, label stock type, and desired units in this box. Verify that the **Inches** radio button in the Preferred Units sub-box is selected and that the current printer for the inventory management workstation is displayed in the Printer Selection sub-box. In the Label Stock Type sub-box, select the **Pick Predefined Label Stock** radio button and click the **Next** button.

Label Options
Select Printer, Label Stock Type, and desired units

Printer Selection
EPSON Stylus C88 Series

Label Stock Type
 Define Custom Label Stock
 Pick Predefined Label Stock

Preferred Units
 Inches Centimeters

Next Cancel

4. To navigate to the predefined label stock layouts for the equipment room, select the **Custom** option under the Label Products menu in the Label Stock Selection box. This will modify the Label Number window.

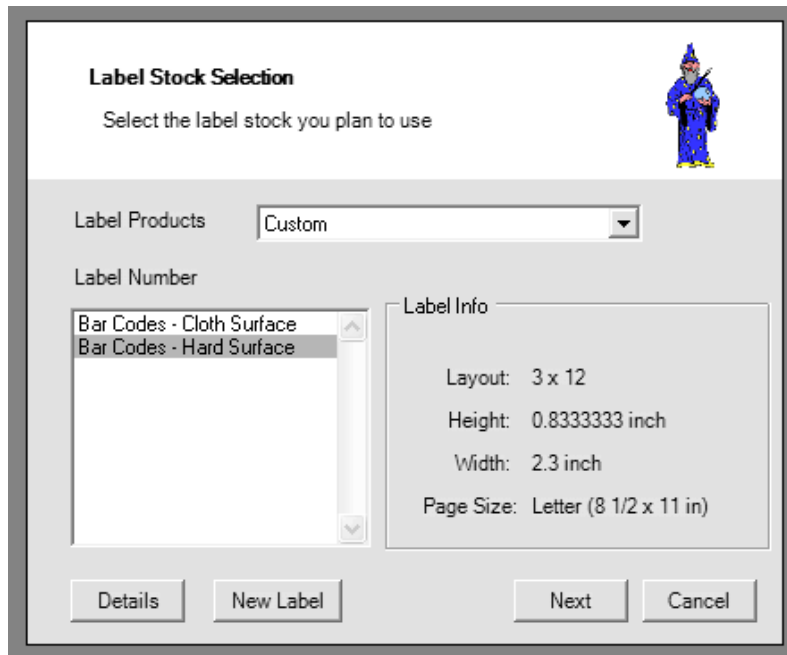
Label Stock Selection
Select the label stock you plan to use

Label Products
Avery Standard
Avery A4 and A5 sizes
Avery Standard
Hema
Other
Zweckform
Custom

Label Number
3111 - Square Sticker
3114 - Full-page
3121 - Full-page
3123 - Full-page
3131 - Full-page
3132 - Full-page
3133 - Full-page
3141 - Full-page
3142 - Full-page
3145 - Full-page

Details New Label Next Cancel

5. If one is printing bar codes for hard surfaces, select the custom Bar Codes – Hard Surface layout. If one is printing bar codes for uniforms, select the custom **Bar Codes - Cloth** layout in the Label Number window and click the **Next** button. This brings one to the Label Editor.

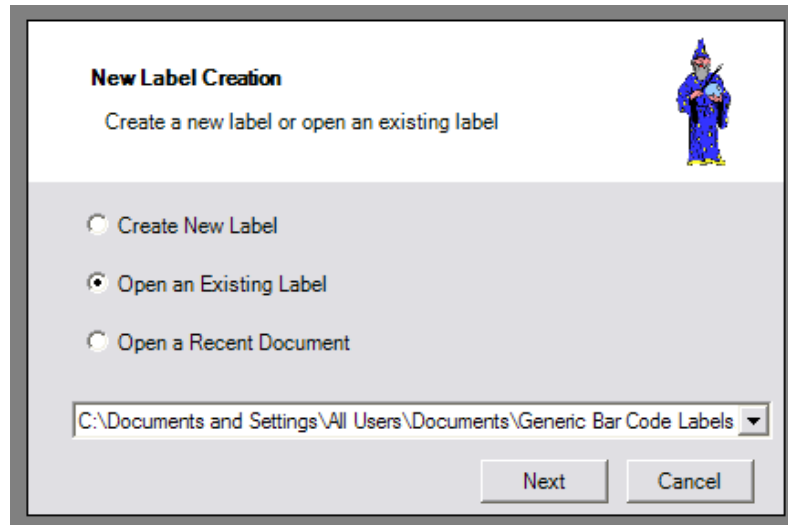


Open an Existing Project

It may be necessary to open an existing project to modify and/or print bar codes. For instance, if the list of generic bar codes needs an addition, one should open the existing project with generic bar codes.

1. Follow step 1 from **Open a New Project**.

2. In the New Label Creation box, select the **Open an Existing Label** radio button. Click the **Next** button. This will open the Open window.

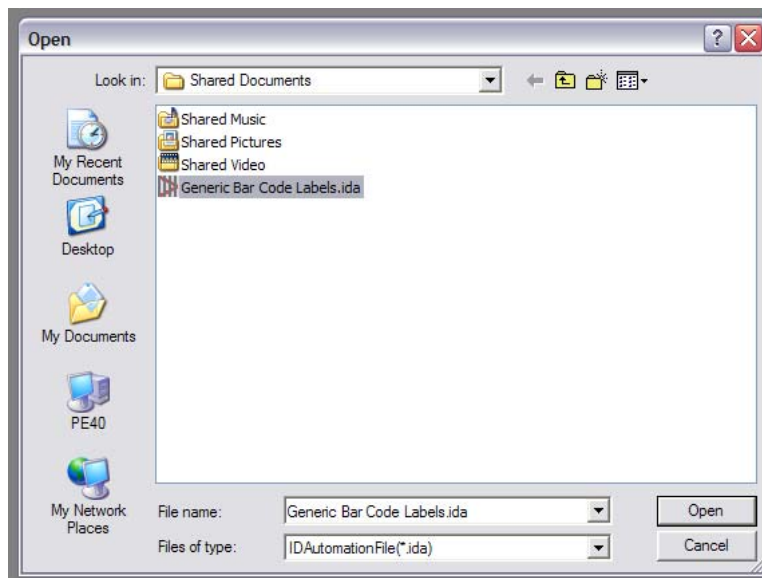


3. If the desired file is not in the current window, navigate to the Shared Documents folder. All files should be in this folder and should have the format *.ida. The address of this folder:

**PE 40(or the current equivalent to My Computer)\Documents and Settings\
All Users\Shared Documents**

Click the **Open** button to open the selected project. This will close the Open window and open the Label Editor.

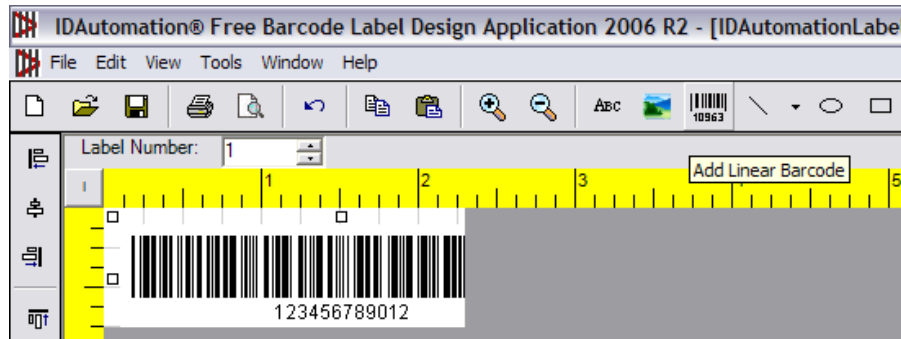
NOTE: The project with the generic bar codes is **Generic Bar Code Labels.ida**.



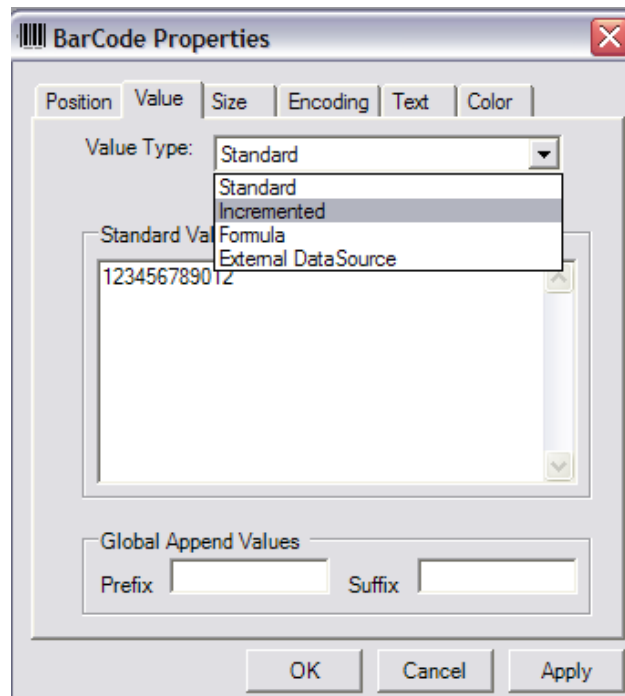
Generate Continuous Bar Codes

When applying bar codes to a set of like items, it will be necessary to generate sheets of bar codes in a sequence. This may occur when initially setting up the bar coding system of inventory tracking or when incorporating new items into the inventory.

1. Follow the steps from **Open a New Project**. In the Label Editor, locate the toolbar at the top of the program window to begin. Click the linear bar code **icon** toward the right. The button pop up will read “Add Linear Barcode.”
2. The default bar code appears on the top left of the layout. With this program, one can only view the first label of any series at a time in the Label Editor. The process of previewing labels is explained later in this guide. To change the value, double-click this **default bar code**, so that the BarCode Properties window appears.

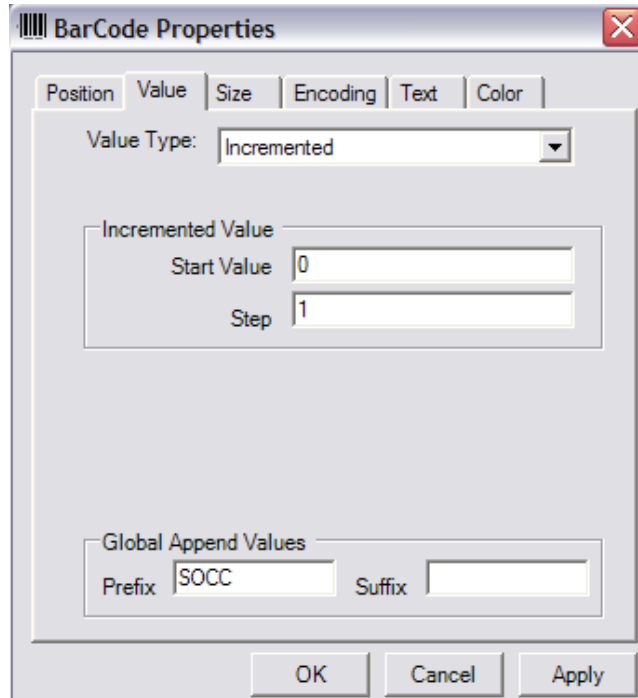


3. Under the Value tab in the BarCode Properties window, locate the Value Type menu. Select the **Incremented** option. This updates the Standard Value box to the Incremented Value Box.



While the value of Step is always 1, **Start Value** and **Prefix** (in the Global Append Values box) depend on the situation. The Start Value depends on if one is starting a series of bar codes for a type of items(then the Start Value will be 0), or if one is adding items to an existing type of item. Prefix choice depending on the type of the item and associated sport. This is explained later in the guide. The Suffix field will not be utilized for the purposes of the equipment room.

4. Input the desired choices into the Start Value field and the Prefix field, and then click the **Next** button. This will bring one back to the Label Editor.



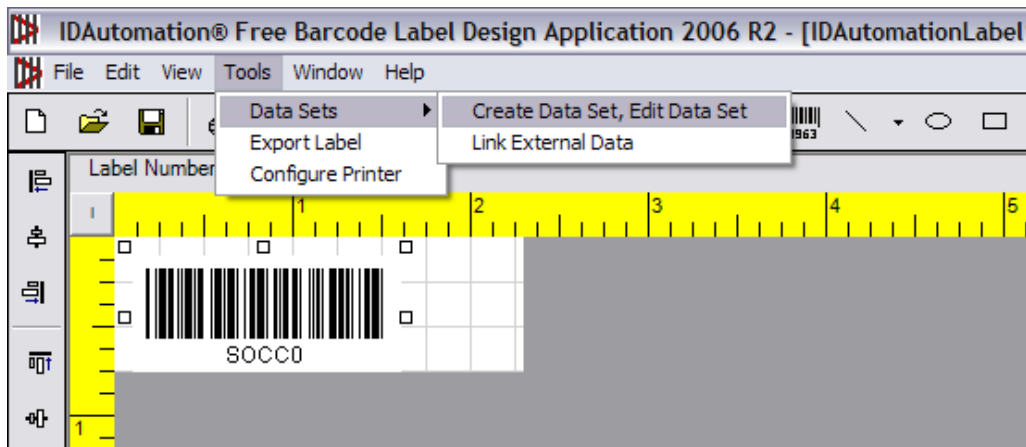
5. To ensure enough white space will exist around the label, click and drag to bar code to a position toward the left of the white grid, as shown below.



Generate Non-Continuous Bar Codes

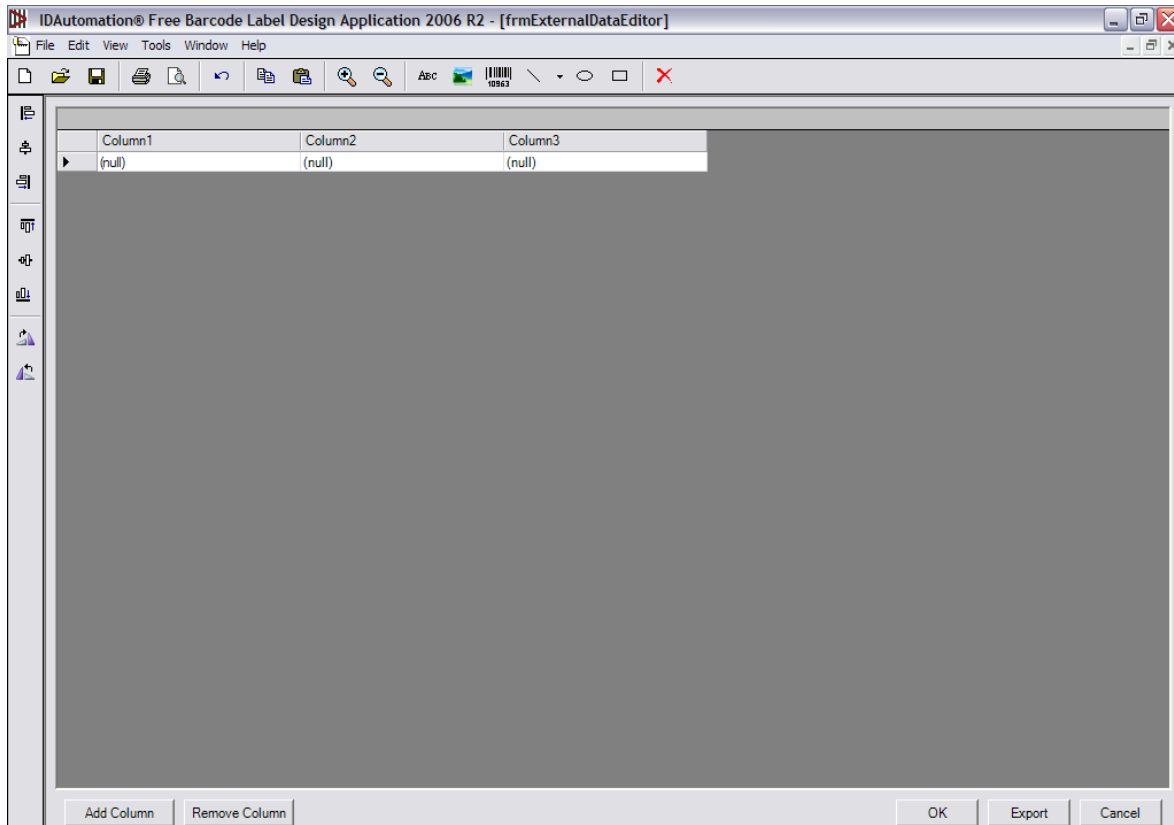
It may be necessary to not generate bar codes in an incremented sequence, but completely unrelated bar codes. This may occur when one needs to replace damaged bar codes or when adding items to the generic bar codes list. One inputs a set of non-continuous bar code values into this program similar to the way one would input values into a spreadsheet. This set is referred to as a data set.

1. Follow the steps from **Open a New Project**. To begin specifying the set of bar codes, or data set, select **Tools** from the Label Editor menu bar to expand the drop-down menu. Then, select **Data Sets** to expand another drop-down menu. Finally, select the **Create Data Set, Edit Data Set, Edit Data Set** option. If one has already created an Embedded Data Set in the current project, select the **Edit Embedded Data Set** option. This will open the External Data Editor.

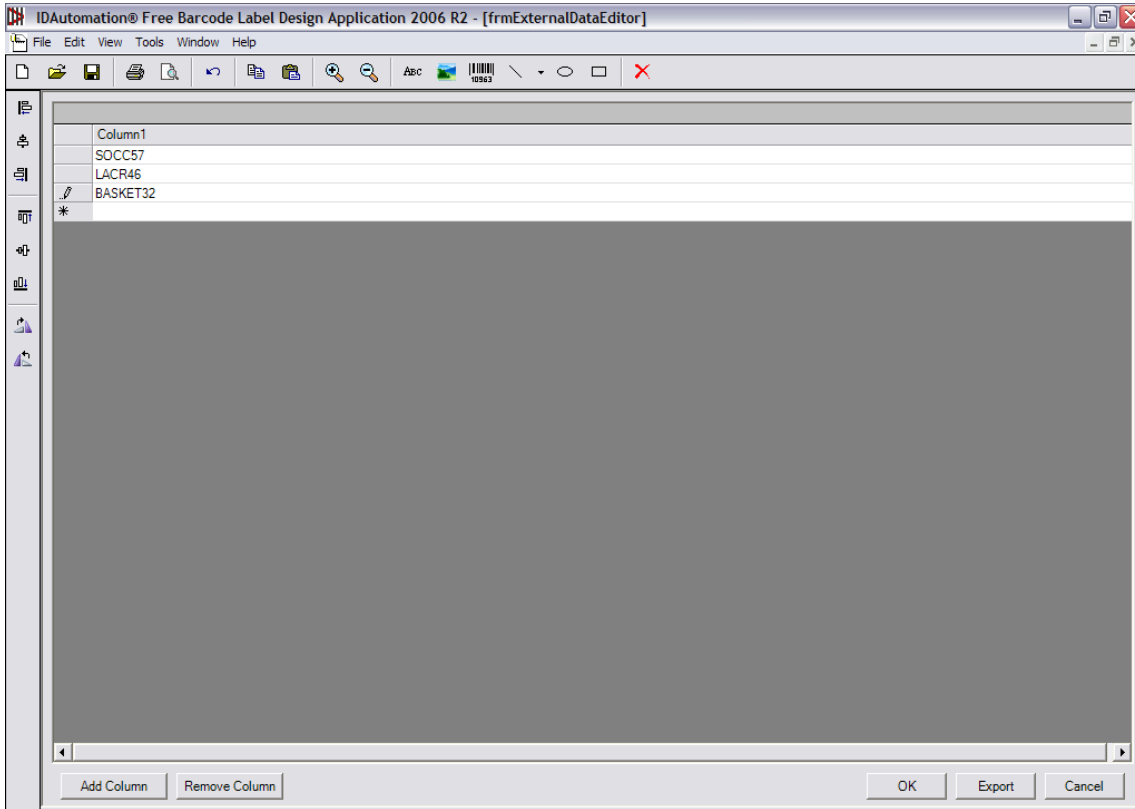


The External Data Editor automatically appears as a spreadsheet with three columns (labeled Column1, Column2, and Column3) and one row. Generally, one will only need to input a single data set at a time, so it is only necessary to have one column.

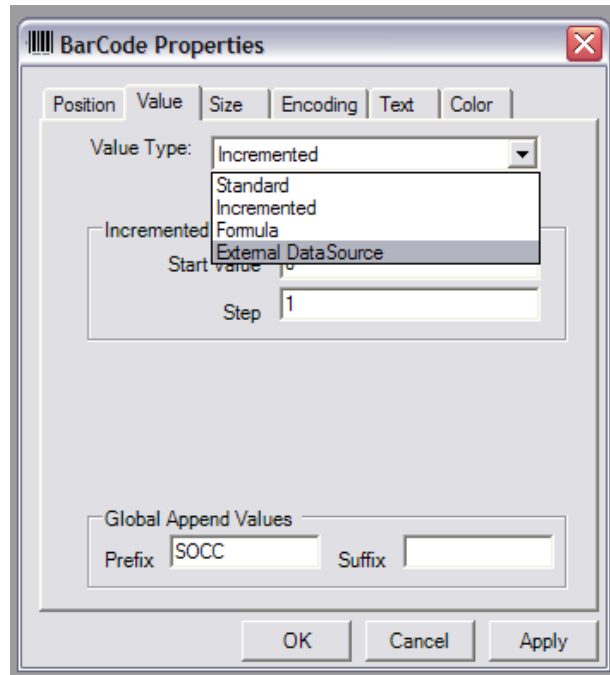
2. Locate the button in the lower left corner that says **Remove Column**. Click it twice so that only one column appears.



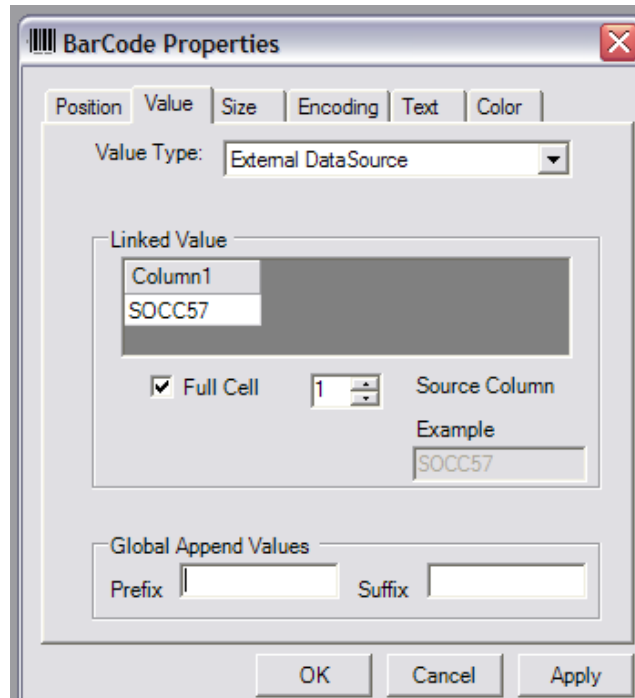
3. To begin to input data, click to put the cursor in the first row. Type the desired values, pressing the **Enter** key to move the cursor to the next row. If one is editing a data set, make the necessary changes now.
4. When one has finished entering values, click the **OK** button. This will close the External Data Editor and return to the Label Editor.



5. To set the bar code values to the set just inputted, double-click the bar code so that the BarCode Properties window appears. Refer to step 2 of **Generate Continuous Bar Codes** for the visual of this step.
6. Under the Value Type menu, select the **External DataSource** option. This will locate the values entered in the External Data Editor. This will update the Incremented Value or the Standard Value box.



7. Verify the settings for using an external data set. The **Prefix** and **Suffix** fields should be empty. The **Full Cell** check box should be checked. The **Source Column** field should be set to 1, as there is only one data set.
8. Click the **OK** button. This will close the BarCode Properties window and return to the Label Editor.

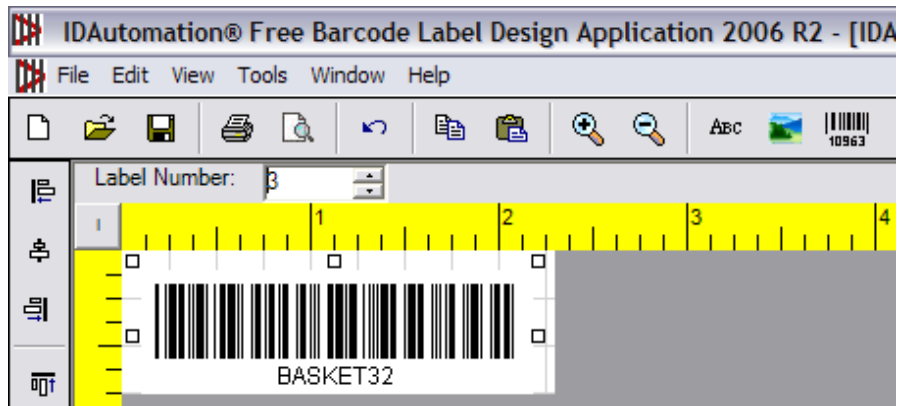


C. Preview Bar Codes

Once one has set the values for the desired set of bar codes, it is useful to verify the values and layout of the labels before printing by previewing them. This program allows one three methods for previewing bar codes – individually, in partial pages, and in full pages.

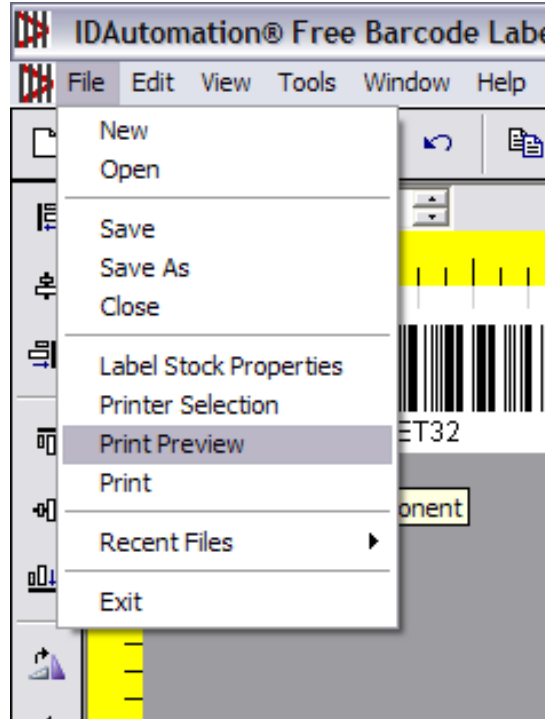
Preview Labels Individually

1. Once bar codes values have been set, once can preview these labels. To preview a label individually in the Label Editor, input the desired number in the set in the **Label Number** field, located in the top left corner. Alternatively, one can click the arrows to navigate to the desired bar code in the set.



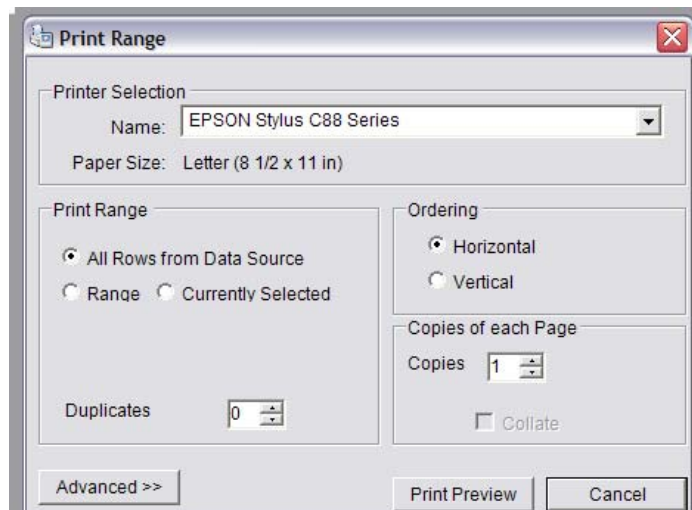
Preview Pages of Bar Codes

1. Once bar codes values have been set, once can preview these labels. To see a preview of one or more pages, select **File** on the Label Editor menu bar to open the drop-down menu, then select the **Print Preview** option. This opens the Print Range window.



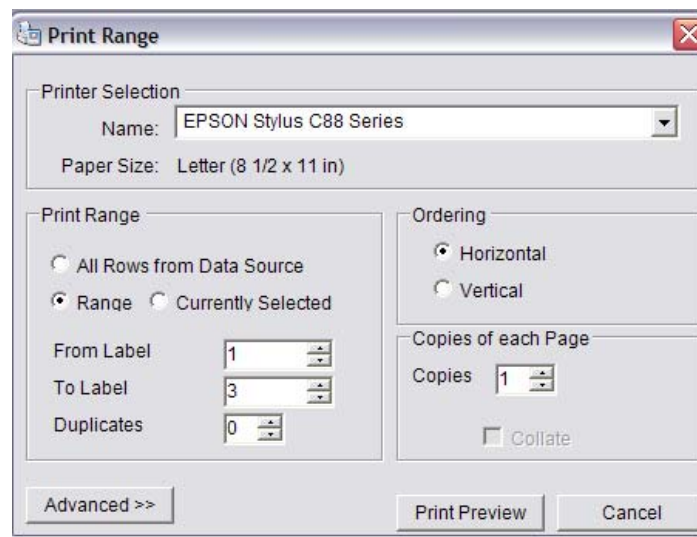
For the purposes of the equipment room, one will want to preview bar codes as a whole or only a portion of the generated set. One can do this by specifying the beginning and end of the set to preview or selecting the whole set.

2. When specifying a number of continuous bar codes, select the **Range** radio button in the Print Range box. With non-continuous bar codes, select the **All Rows from Data Source** radio button, if available. Selecting a radio button in this box may modify the box.



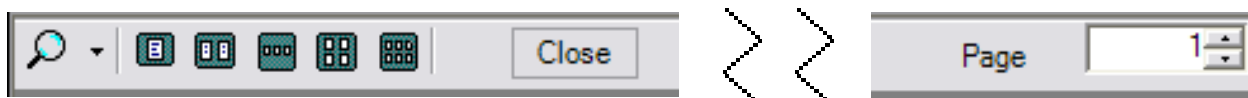
Two print layouts are available. In the custom layout for hard surfaces, each page has three columns of twelve rows of bar codes – 36 labels. In the custom layout for cloth, each page has three columns of seven rows – 21 labels.

3. If one has selected the **All Rows from Data Source** radio button, skip this step, as it describes information related to selecting a range. To preview a partial page, input a number less than the total number of labels for a page into the **To Label** field. To preview full pages, input a multiple of the total number of labels for a page in that field. If the desired set of bar codes has a number of labels that is greater than the total number of labels for a page, but is not a multiple of that number, pages will be filled and a partial page will remain.
4. Click the **Print Preview** button. This will close the Print Range window and open the Print Preview window.



One has several options in the Print Preview window. This guide explains a few of those options that are on the Print Preview toolbar, located at the top left of the viewing window. The magnifying glass is the symbol for the Zoom menu. Clicking the arrow expands the menu to select a ratio for magnification. The next five buttons to the right switch the preview to one, two, three, four, or six pages, respectively. In Page field at the far right, one can specify which page to focus on by inputting the page number or by navigating to it with the arrows in the field.

5. To return to the Label Editor, click the **Close** button, the seventh button from the left.

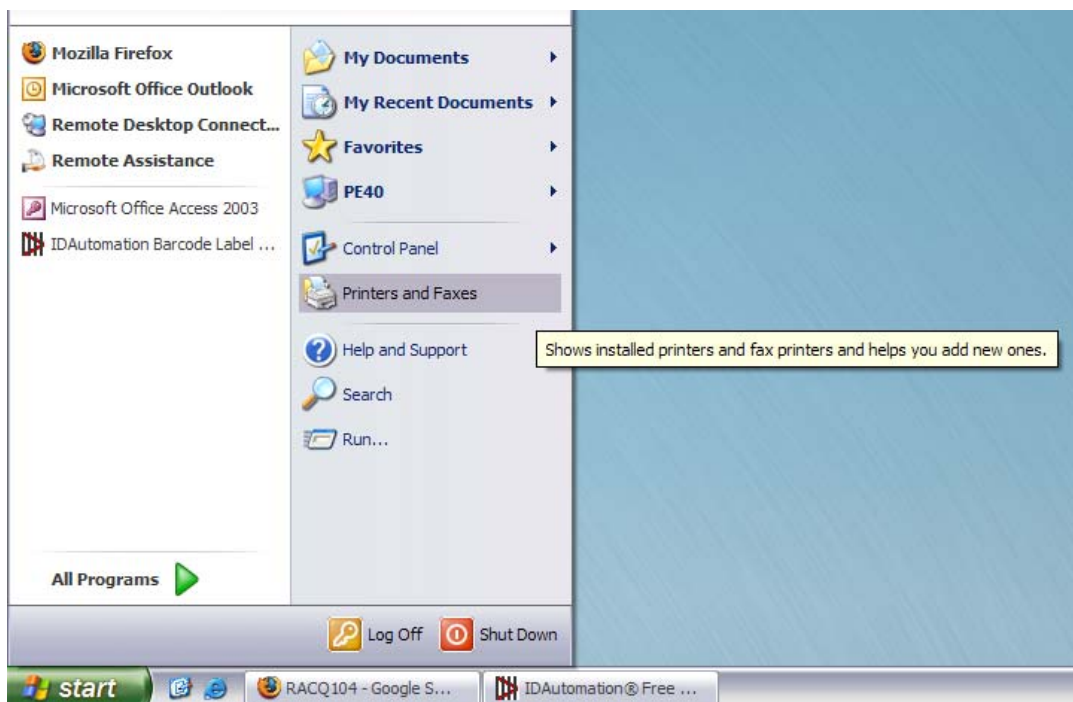


D. Print Bar Codes

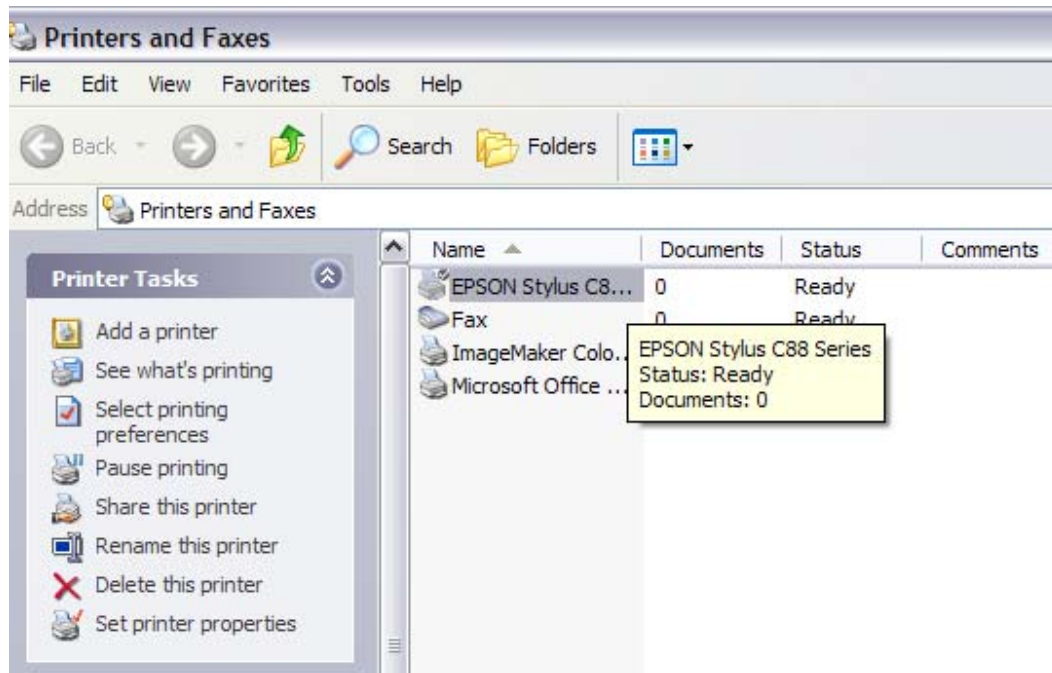
Once one has verified that the desired bar codes have been generated, one can proceed to printing. There are two types of printing methods, which require different steps. First, generic bar codes or specific bar codes for hard surfaces should be printed with regular paper and Epson DURAbrite ink. Second, specific bar codes for cloth should be printed on heat transfer paper with regular ink. So that it is easier for the scanner to read bar codes, it is necessary to adjust the printer settings. The process of preparing the printer is described in the guide first, and then followed by the steps, which are pertinent to both methods, to print the labels.

Set up the Printer to Print Labels

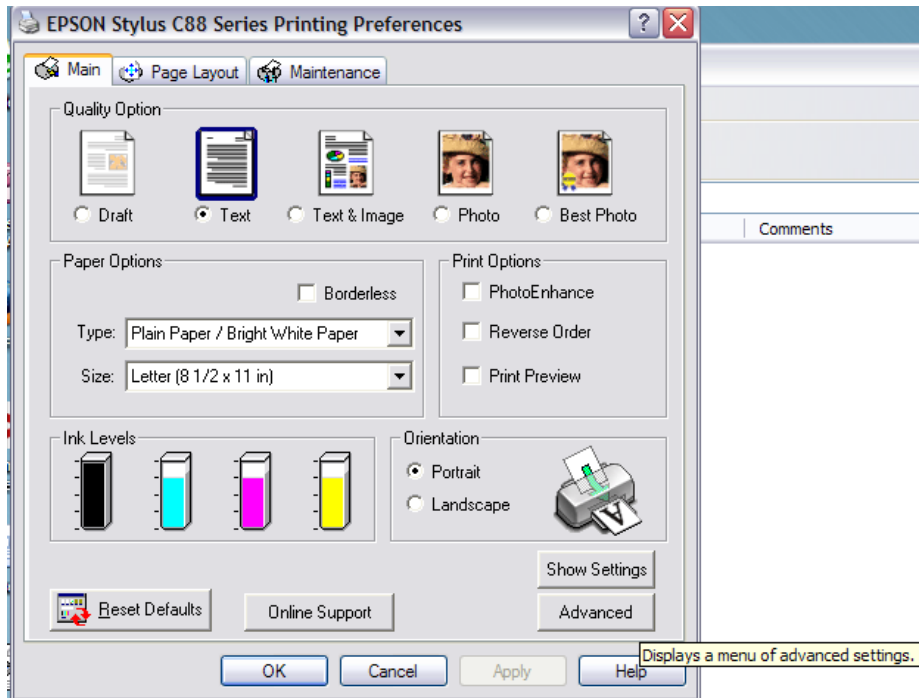
1. From the desktop, click the **Start** button on the taskbar to expand the menu. Select the **Printers and Faxes** option. This will open the Printers and Faxes window.



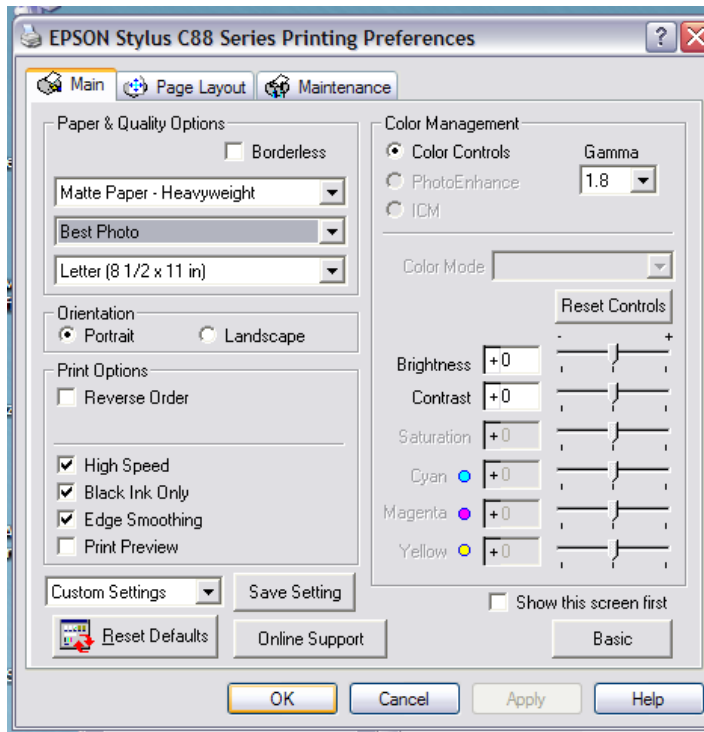
2. In the Printers and Faxes window, select EPSON Stylus C88 Series in the Name column. (If in the future multiple printers or a different model is connected to this work station, select the printer which used to print the bar code labels.) Upon clicking, this may expand the Printer Tasks menu in the left panel if it was not already expanded.
3. Under the Printer Tasks menu on the left, select the **Select printing preferences** option. This will open the Printing Preferences window.



- In the bottom right corner of the Printing Preferences window, click the **Advanced** button. This will activate that subset of options.

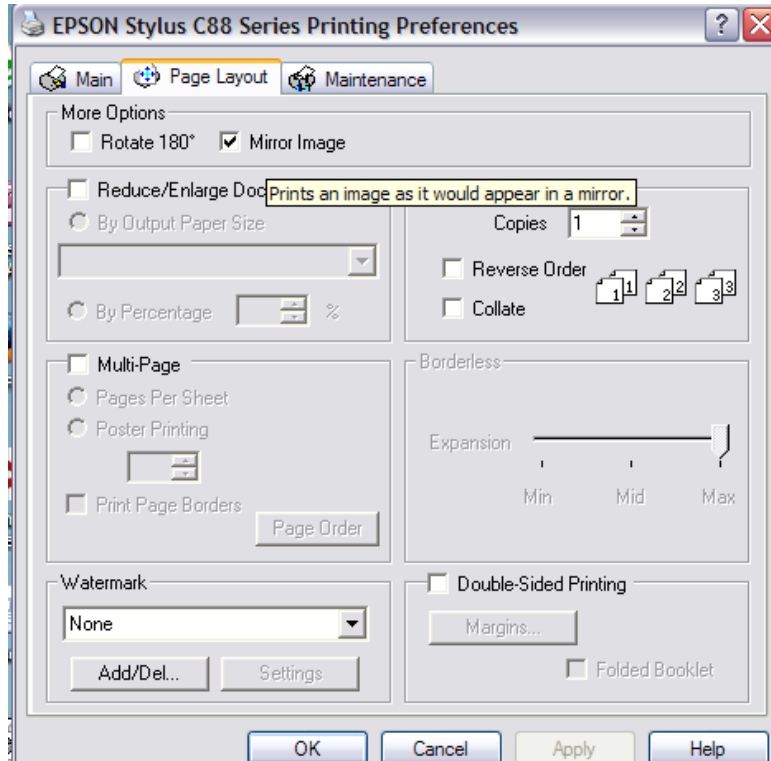


- In the Page & Quality Options sub-box, select the Best Photo option in the second drop-down menu.



6. If one is printing bar codes for hard surfaces, skip this step, as this pertains to labels for cloth. In the Page Layout tab, in the More Options box, select the **Mirror Image** check box.
7. Click the **OK** button to apply this setting and close this window.

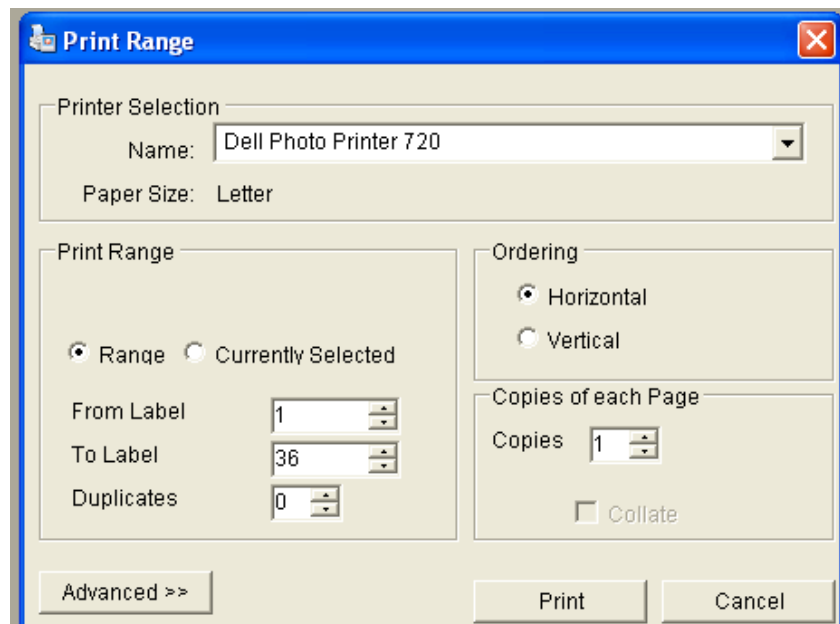
NOTE: When you have finished printing labels for cloth, reverse the Mirror Image setting.



Print Labels

Depending on the set of bar codes generation, one may be printing many pages or only a portion of a page. The following steps apply to both situations. Before printing, verify that the appropriate media are being used – paper and ink.

1. Once the bar codes have been finalized, one is ready to print. From the Label Editor, select **File** on the menu bar to open the drop-down menu. Select the **Print** option. This will open the Print Range window. Refer to step 1 in **Preview Pages of Bar Codes** for a visual of this step.
2. Follow steps 2 and 3 from **Previewing Pages of Bar Codes**.
3. Finally, click the **Print** button. The Print Range window will close, returning to the Label Editor.



Save a Project

It may be necessary to refer to the current project later for printing or for modification, such that one will need to save this project. All files should be saved in the Shared Documents folder, so that all users who log onto the inventory management workstation can access this project.

The address of this folder:

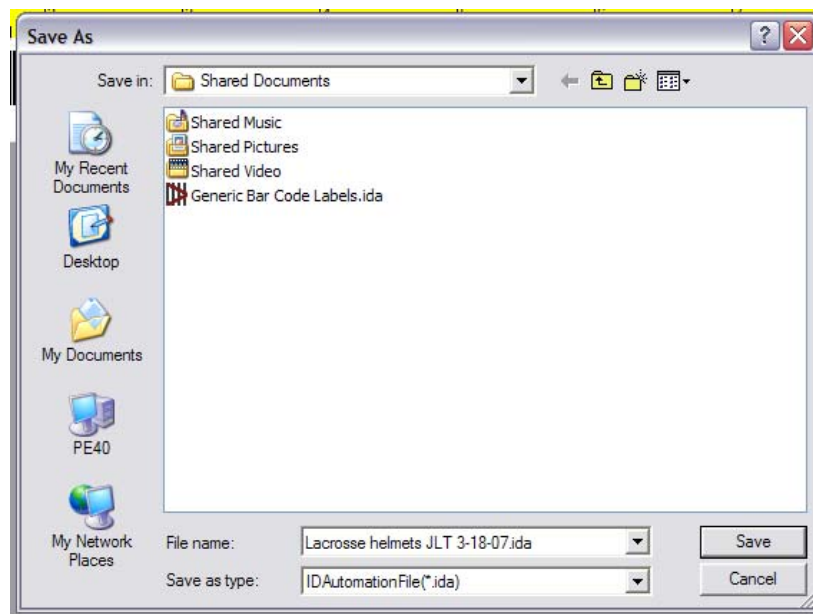
**PE 40(or the current equivalent to My Computer)\Documents and Settings\
All Users\Shared Documents**

In addition, maintaining a file naming convention may make it easier to locate a desired project in the future. When saving a file, append the project name with the initials of the project creator and the date.

For example:

Lacrosse helmets JLT 3-18-07.ida

1. From the Label Editor, select **File** to expand this drop-down menu. Select the **Save As** option. This will open the Save As window. Refer to step 1 in **Preview Pages of Bar Codes** for a visual of this step.
2. In the Save As window, navigate to the Shared Documents folder, if it is not the current location. Type the project name in the **File name:** field, using the file naming convention. Click the **Save** button. This will close the Save As window and return to the Label Editor.



E. Bar Code Scheme

Two types of bar codes exist in the scheme for the equipment room. Generic denotes items which will not have a bar code applied to them. Specific denotes items which will have bar codes applied to them. To decide what information should be on a given bar code, follow the scheme below.

Generic

Generic bar codes only require the one or two word description on the bar code.

Examples: TOWEL, GOGGLES, LOCKER, PING PONG, TNNSBALL, FRISBEE

Specific

Specific bar codes generally have a prefix to denote to which sport the item relates. In addition, a number follows which increments through the entire inventory for that sport. An exception to the prefix rule is a lock. To minimize the length on the bar code so that it can be read easily on a curved surface, the locks are the only items which should not have a prefix.

Table of Bar Code Scheme

Sport	Label
Locks	4 digit number
Baseball	BASE + 4 digits
Basketball	BASKET + 4 digits
Crew	CREW + 4 digits
Cross Country	XC + 4 digits
Field Hockey	FDHOCK + 4 digits
Flag Football	FLAGFT + 4 digits
Floor Hockey	FLHOCK + 4 digits
Football	FOOT + 4 digits
Indoor Soccer	INDSOC + 4 digits
Lacrosse	LACR + 4 digits
Rugby	RUGB + 4 digits
Soccer	SOCC + 4 digits
Softball	SOFT + 4 digits
Swimming & Diving	SWIM + 4 digits
Table Tennis	TBLTEN + 4 digits
Tennis	TENN + 4 digits
Track & Field	TRACK + 4 digits
Volleyball	VOLL + 4 digits
Wrestling	WREST + 4 digits

F. Bar Code Application

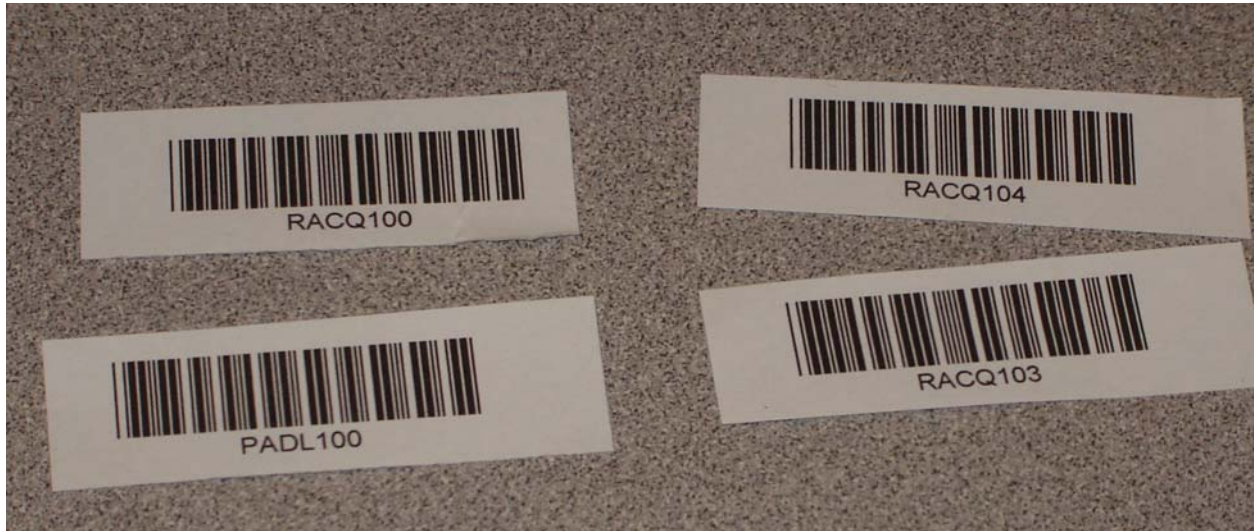
As with printing bar code labels, there are two considerations for applying bar codes. Some specific bar codes will be applied to hard surfaces, such as the inside of a helmet or the edge of a racquet. Some specific bar codes, identifying uniforms, will be applied to pieces of cotton first, then sewn into the uniforms. This guide first describes the steps to apply the first type of bar code, then it will describe the second set of steps.

Hard Surface Application

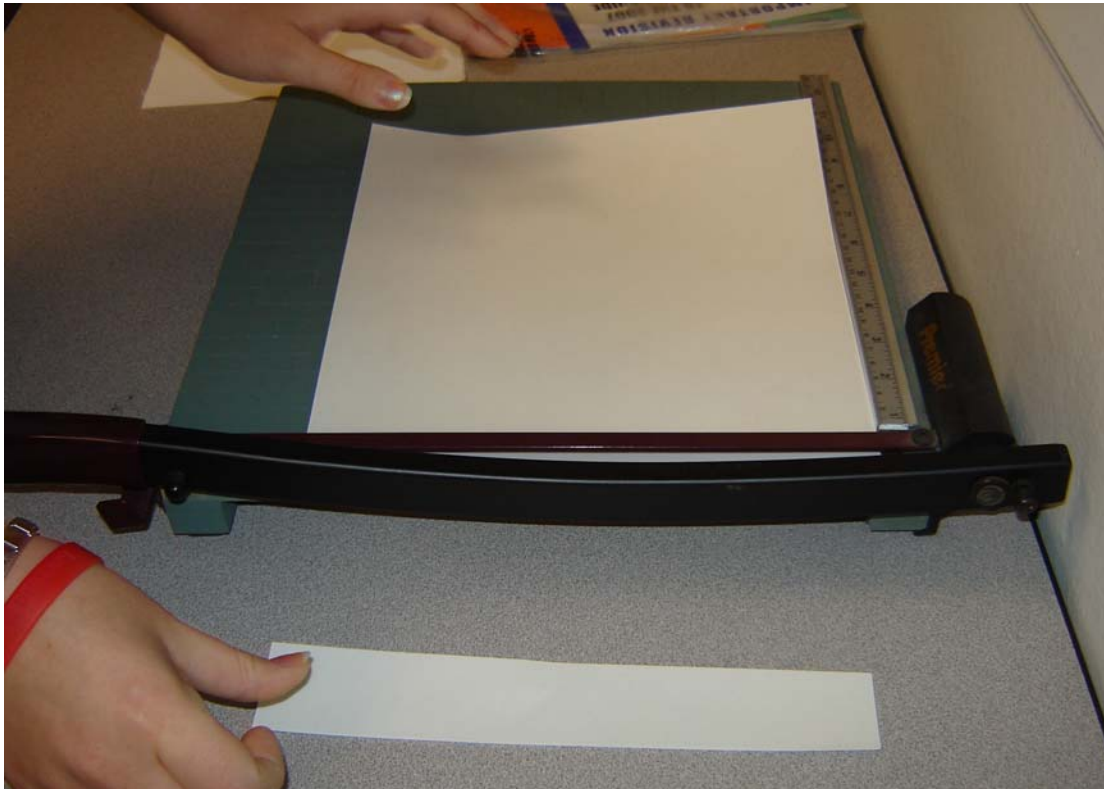
One will have to create bar codes for items with hard surfaces using the specific bar code schemes. The materials necessary for applying a bar code to a hard surface include the printed bar code sheets, the laminate sheets, and alcohol swabs, or some other surface cleanser. This process of applying bar codes follows the instructions for the laminate.

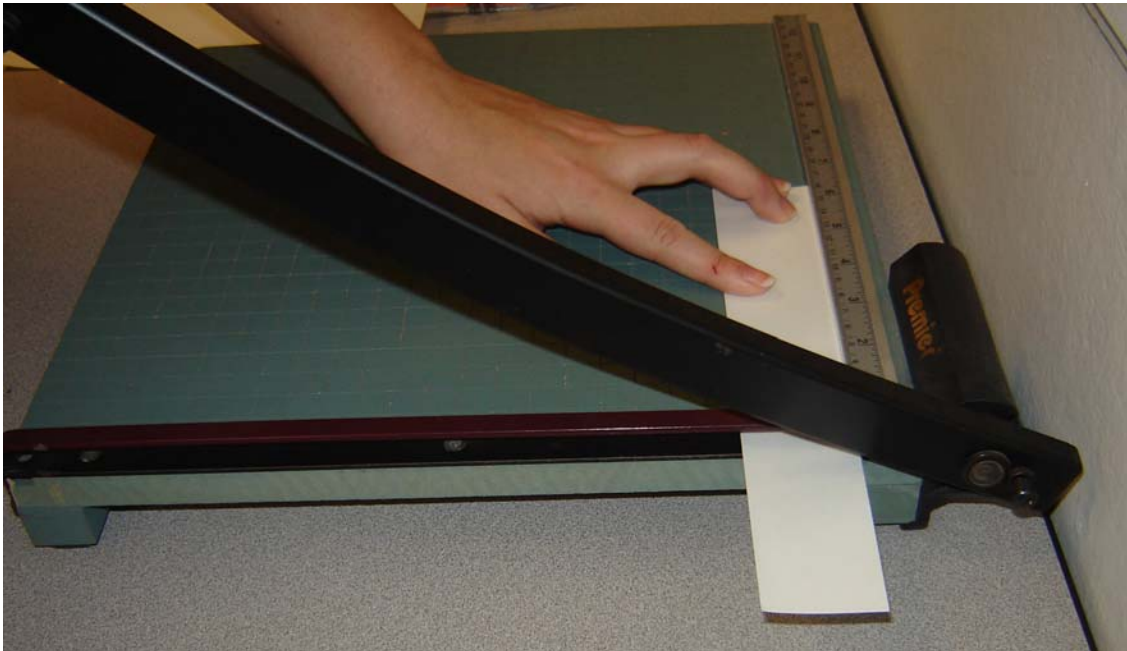
1. To begin, prepare the bar code labels. This involves cutting the labels to separate them. This can be done with the paper cutter in the Athletic Department office. Special attention should be paid to preserving the quiet zone on the left and right of the bar code. There should be at least $\frac{1}{4}$ of inch before the first and after the last bar of the bar code. This ensures the bar code scanner can easily read the bar code.





2. Next, prepare the laminates. These are prepared in much the same way as the labels. When cutting these sheets, make sure they are a little larger than the labels on all sides, so they make good contact with the surface.





3. The third step is to prepare the surface. So that the laminate adhesive has a better chance of making good contact, it is necessary to clean the surface on which the label will be applied. Alcohol swabs are available in the equipment room. Swab the area for the label, then wait for this area to dry before proceeding.



4. Position the bar code on the surface.



5. Remove a small portion of one end of the piece of laminate and adhere to the surface.
6. Smoothing with one's fingers the whole length of the label to remove any air, apply the rest of the laminate to the label and the surface.



7. After application, allow the label's adhesive to cure, preferably overnight, to ensure that good contact has been made.

Cloth Application

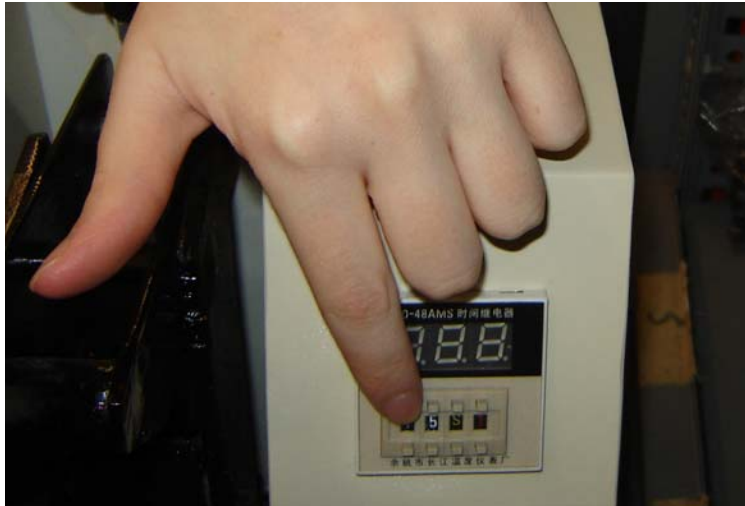
One will have to create bar codes for varsity uniforms using the specific bar code scheme. The materials necessary for this process include bar codes printed on heat transfer paper with regular ink, cotton cut into appropriately sized sheets, heat press, and a sewing machine. This process has two steps – applying the bar codes to the cotton and sewing the bar codes into the inside of uniforms.

1. Prepare the materials. The cotton should be cut into sheets. The sheets should be the size series of bar codes being applied. If this is a whole page, the sheet should be about the size of a standard sheet of paper. If the number of bar codes to be applied is not 36, adjust the size of the sheet of cotton so as to not waste materials.

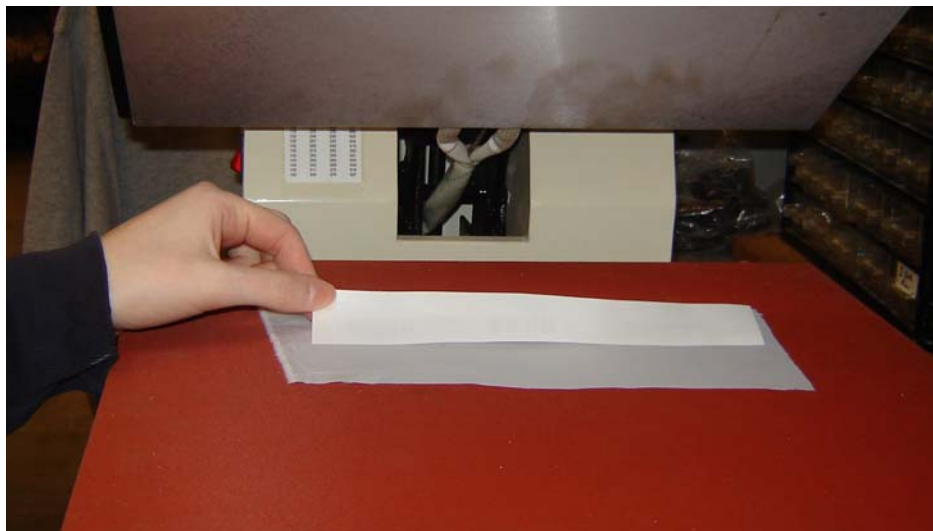


2. Turn on the heat press so that it can heat up. Verify the settings on the heat press. These settings are the suggestions of the heat transfer paper company. Set the temperature to °F, °C. Set the time to second.





3. Once the heat press has pre-heated, place the cloth on the heat press with the bar codes face down on top. Close the top of the heat press; it will lock into place.



4. When the melody begins, indicating the time to press has elapse, raise the top of the heat press. Verify that all these bar codes can be read with the bar code scanner.



5. The bar codes should be cut, so that they are all individual. To make it easier to sew them into the uniforms, about $\frac{1}{2}$ of an inches should be left around the bar codes.
6. Bar codes should be sewn into the inside of uniforms, so that they are protected from some light and friction. Special attention should be paid during this step to keep the lines of the bar codes parallel, so that the scanner can still read the labels.

Appendix M. Procedures Guide

Daily Procedures Guide

A “How To” Reference for Work Study Students

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A. Introduction

This guide is meant as a quick reference for work study students who work as staff in the equipment room. It contains snap shots of frequently used procedures from the complete Equipment Room Manager Guide. In addition, it contains information about how to use laundry loops, which equipment room staff will have to demonstrate for athletes.

B. Adding

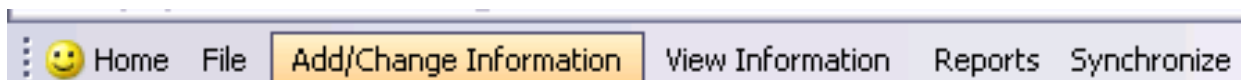
Adding a New Borrower

To borrow an item, use a locker, or be entered into the database as a work study student or athlete, a person must have an entry in the Directory. One will use the following steps to enter a new borrower, which must only be completed once for each person.

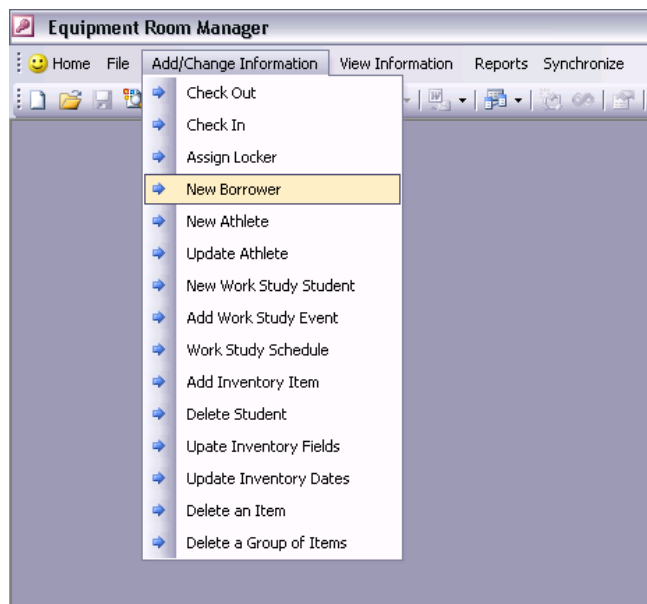
1. Double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



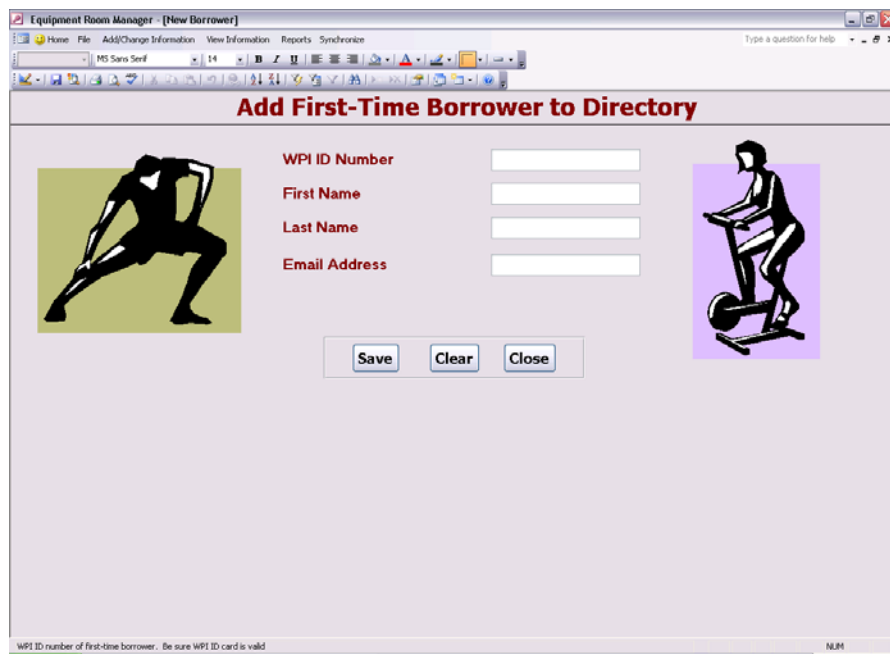
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** on the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **New Borrower** option.



5. The Add First-Time Borrower to Directory form will open.



6. The cursor will be in the **WPI ID Number** field. Scan the bar code found on the back of the borrower's WPI ID card. The ID number will appear in this field.



7. Enter the borrower's first name and last name.
8. Enter the borrower's email address.
9. Click the **Save** button to save the record. If a mistake has been made during this process, click the **Clear** button to start over. Click the **Close** button after the record has been saved to exit the form.

Adding a New Item to the Inventory

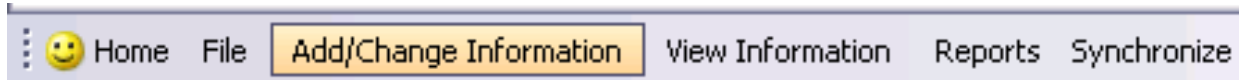
One must enter all items in inventory into the database using the Equipment Room Manager. This will occur during the set up of the Equipment Room Manager and when new items are purchased and added to the inventory.

1. Double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.

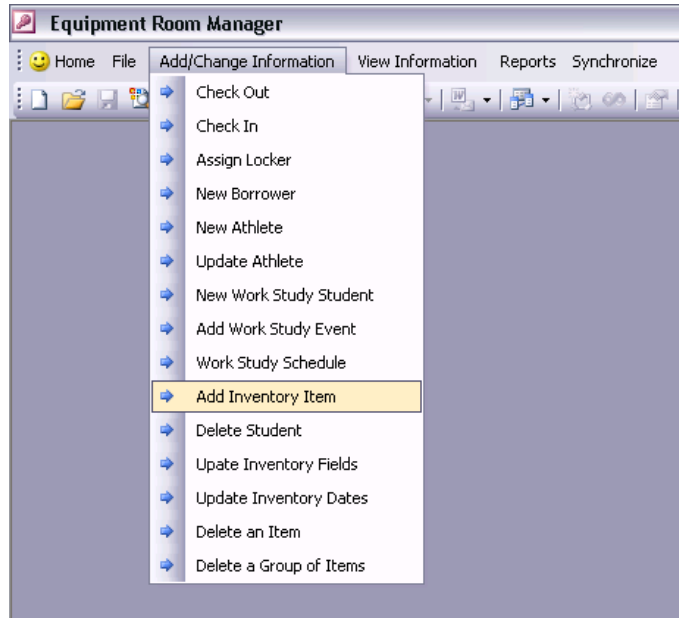


2. The Welcome Screen will appear. Click the **Close** button.

3. Select **Add/Change Information** on the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **Add Inventory Item** option.



5. The Add Item to Inventory form will open.

A screenshot of the 'Add Item to Inventory' form within the 'Equipment Room Manager' application. The form is titled 'Add Item to Inventory' and contains several input fields and buttons. On the left, there is an illustration of a person in a library. On the right, there is an illustration of a computer monitor and keyboard. The form fields include: 'Bar Code ID Number' (text input), 'Generic or Specific' (dropdown menu), 'Description' (text input), 'Type' (dropdown menu), 'Sport' (dropdown menu), 'Date Purchased' (text input), 'Date Refurbished' (text input), 'Storage Location' (dropdown menu), 'Washable' (checkbox), and 'Comments' (text input). At the bottom, there are four buttons: 'Add Generic Info', 'Add Specific Info', 'Clear', and 'Close'. The status bar at the bottom left reads 'Bar code ID of item to be added to inventory' and the bottom right shows 'NUM'.

6. The cursor is blinking in the **Bar Code ID** field. Scan the bar code corresponding to the item.
7. Fill in the remaining fields accurately.
8. If the item is generic (a bar code is not on the item directly), click the **Add Generic Info button**. Another form will open.

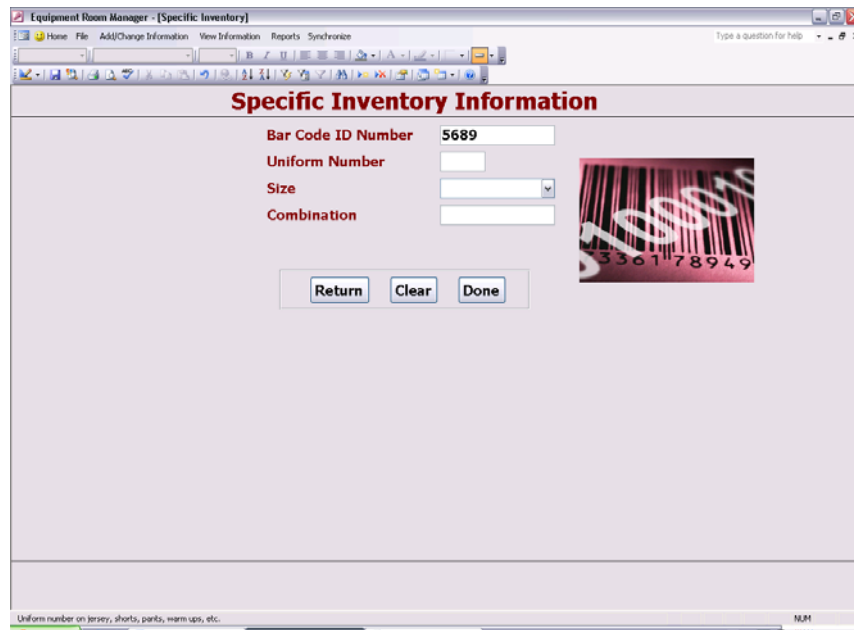
The screenshot shows a web browser window titled "Equipment Room Manager - [Generic Inventory]". The browser's address bar shows "Tahoma" and the page title is "Generic Inventory Information". The form contains the following fields and buttons:

- Bar Code ID Number:** 5689
- Total Number:** (empty field)
- Last Updated:** 3/4/2007
- Buttons:** Return, Clear, Done

There is a small image of a bar code on the left side of the form. At the bottom of the browser window, there is a status bar that reads "Total number of that kind of item in inventory" and "10/01".

9. The Bar Code ID field will be filled in automatically. Fill in the remaining field. Click the **Return** field to return to the original form. Click the **Clear** button to start over. Click the **Done** button to save the information and close the form.

10. If the item is specific (a bar code is on the item directly), click the **Add Specific Info** button.



11. The Bar Code ID field will be filled in automatically. Fill in the necessary fields. Click the **Return** button to return to the original form. Click the **Clear** button to start over. Click the **Done** button to save the information and close the form.

C. Lending

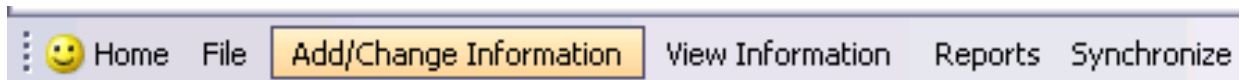
Checking Out an Item

When a member of the WPI community requests to lend an item from the equipment room, one must use the following procedure to check out this item. Be sure that the borrower has a valid WPI ID.

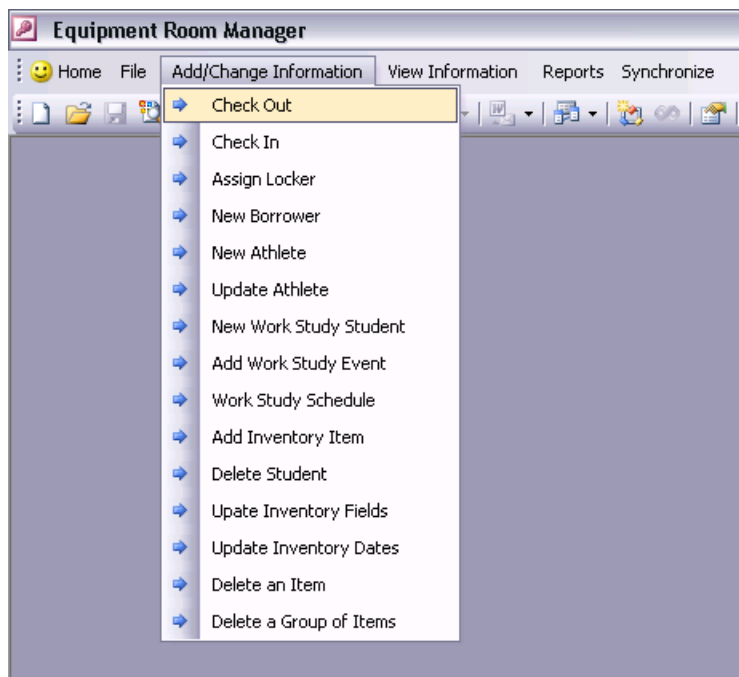
1. Double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **Check Out** option.



- The Check Out form will open.

Check Out

Date Lent: 3/4/2007

WPI ID Number:

Bar Code ID Number:

Date Due:

Initials:

Save Clear Close

Has Checked Out:

Date Lent	Bar Code ID	Type	Description	Deposit	Date Due	Initials
2/28/2007	5555	Varsity	metal bat	<input type="checkbox"/>	2/25/2007	JLT
2/28/2007	11111	General	lock	<input checked="" type="checkbox"/>	3/25/2007	JLT
3/3/2007	2222	Varsity	jersey	<input type="checkbox"/>	3/10/2007	JLT

WPI ID number of the person borrowing the item NUM

- The cursor is blinking in the **WPI ID Number** field. Scan the bar code found on the back of the borrower's WPI ID card. The ID number will appear within this field. Tab to or click in the next field.



- If the borrower's name appears before **Has Checked Out**, then this person has information in the directory. If it does not, the borrower must be added to the directory before continuing. See **Adding New Borrower** in section **B**. If the name does appear, continue.

8. If the borrower has lent an item that he/she has not returned yet, the items will appear in the box at the bottom of the form.
9. The cursor is blinking in the **Bar Code ID Number** field. Scan the bar code corresponding to the item being lent, which can be found on the item itself or on the list of generic inventory bar codes.
10. For varsity items, the due date should be the end of the season. For other items, judgment is necessary. Fill in the **Due Date** field with an appropriate date, in the format MM/DD/YYYY.
11. Type one's initials in the **Initials** field to verify who has recorded this information.
12. Click the **Save** button to save the record. If a mistake has been made during this process, click the **Clear** button to start over. Click the **Close** button after the record has been saved to exit the form.

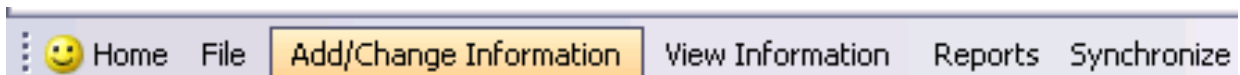
Assigning a Locker

Any member of the WPI community is welcome to take advantage of the lockers available within the WPI athletic facilities. The following will explain how to go about assigning available lockers to a member of the WPI community.

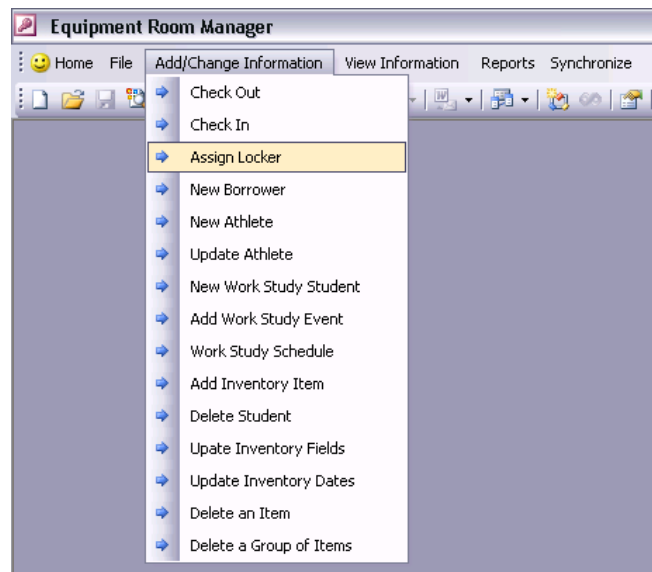
1. Double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **Assign Locker** option.



5. The Locker Assignment form will open.



- The cursor is blinking in the **WPI ID Number** field. Scan the bar code found on the back of the borrower's WPI ID card. The ID number will appear in this field. Tab to or click in the next field.



- A padlock will need to be issued along with the locker. Scan the bar code found on the back of the padlock. The number will appear in the **Bar Code ID of Lock** field.
- Fill in the **Due Date** field with an appropriate date, in the format MM/DD/YYYY.
- If the deposit has been paid, click the **Deposit** checkbox.
- Select a locker from the list of available lockers within the **Available Lockers** box located at the bottom of the form.
- Once a locker is selected, the **Locker ID (Auto)** field will be filled.
- Type one's initials in the **Initials** field to verify who has recorded this information.
- Click the **Save** button to save the record. If a mistake has been made during this process, click the **Clear** button to start over. Click the **Close** button after the record has been saved to exit the form.

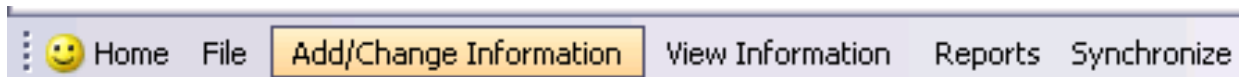
Checking In an Item

When a member of the WPI community returns a borrowed item, keep track of this using the following procedure. In addition, this procedure will be used when a person returns a combination lock and no longer needs a locker.

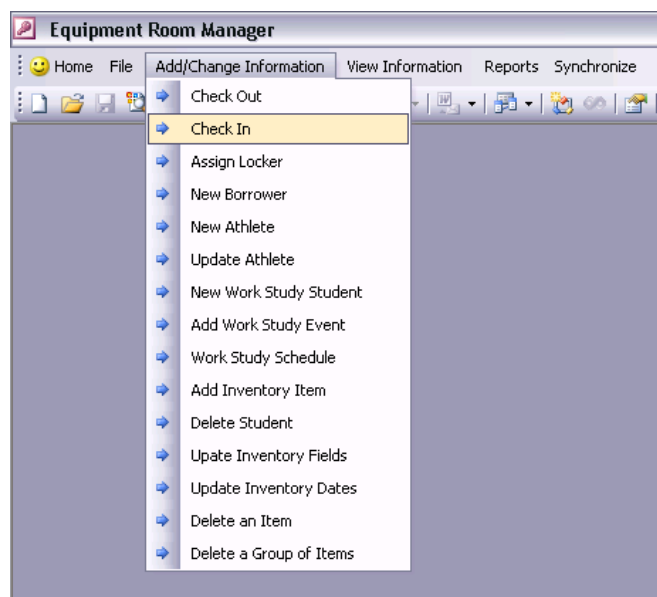
1. Double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **Check In** option.



- Two prompts will appear. In the first prompt, follow the direction and scan the bar code found on the back of the borrower's WPI ID card. The ID number will appear within the white box on this prompt. Click the **OK** button. The second prompt will appear.

- In the second prompt, follow the direction and scan the corresponding bar code ID number for the item being returned. It may be on the item or it may on the list of generic bar codes. The ID number will appear within the white box on the form. Click the **OK** button.

- The Check In form will open.

Date Lent	Bar Code ID	Type	Description	Deposit	Date Due	Initials
3/28/2007	11111	General	lock	<input checked="" type="checkbox"/>	3/25/2007	JLT
3/3/2007	2222	Varsity	jersey	<input type="checkbox"/>	3/10/2007	JLT

8. Verify that today's date appears in the **Date Returned** field. The cursor is blinking in the Initials field. Type the initials of the current staff member returning the item. At the bottom of the form is a listing of all the items that this person has borrowed and not returned. If this person is returning a combination lock and a locker, check below to see if this person paid a deposit; this is indicated by the Deposit check box. If so, that deposit should be returned at this time. Otherwise, the procedure is the same.
9. Click the **Check In** button to complete this procedure and check in the item. The Check In form will close automatically.

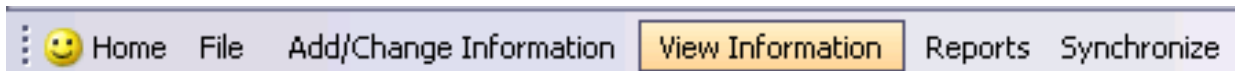
Verifying a Person is in the Directory

Before a person can borrow an item, borrow a locker, or be entered into the database as a work study student or an athlete, this person must be entered into the directory. If there is doubt at any point, one can verify if a person is in the directory with the following procedure.

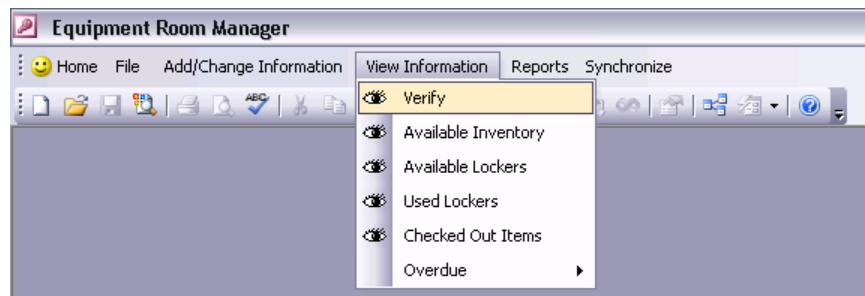
1. Double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



2. The Welcome Screen will appear. Click the **Close** button.
3. Select **View Information** from the navigation menu bar at the top of the window to expand this drop-down menu.

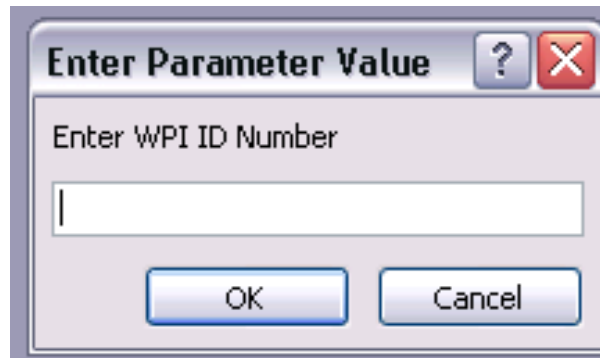


4. Within this menu, select the **Verify** option.

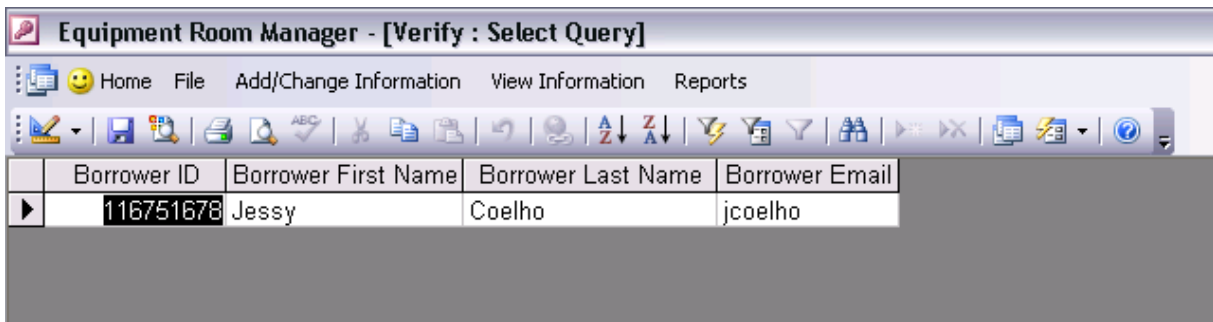


5. A prompt will

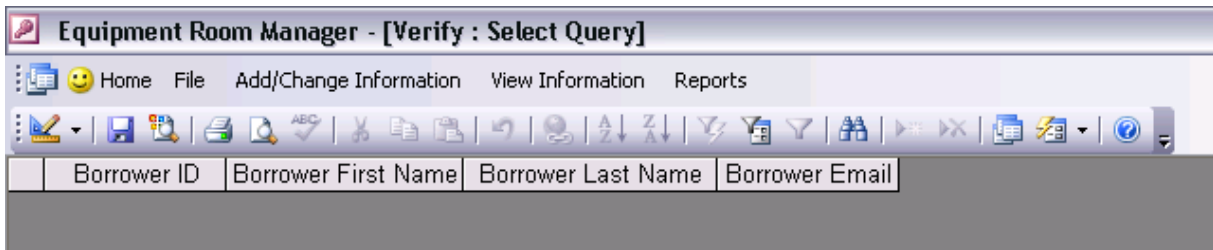
appear. Scan the bar code located on the back of the WPI ID card.



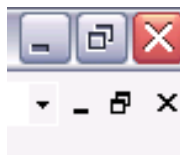
6. If the person is in the directory, the result will look like the following.



If the person is not in the directory, it will be blank like the following.



7. Click the small X in the top right corner to close this listing.



D. Work Study Student Information

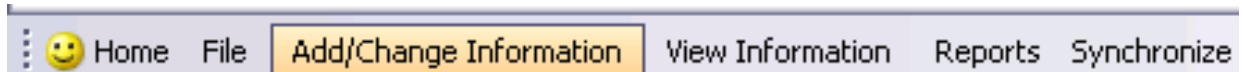
Assigning Work Study Student Hours

All work study students within the Athletic Department should record their hours worked using the Equipment Room Manager program. These hours can be worked during normal operation or during sporting events. The following procedure describes how to record both types of hours.

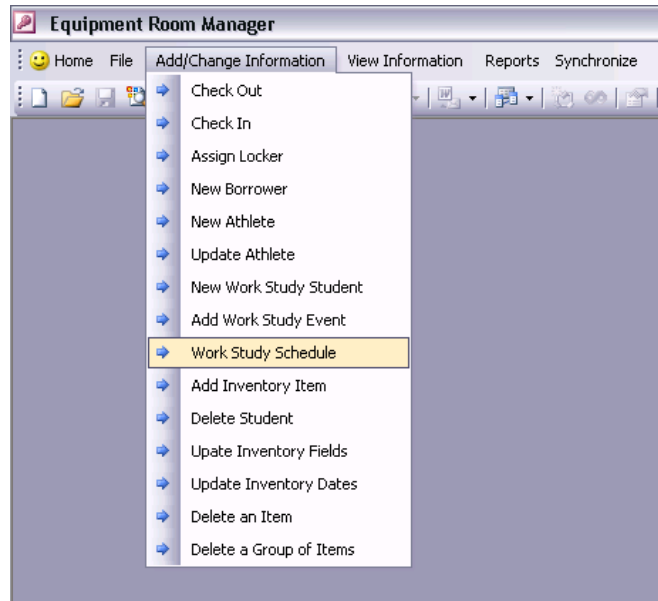
1. Double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **Work Study Schedule** option.



5. The Assigning Work Study Hours form will open.

The screenshot shows the 'Assigning Work Study Hours' form. It includes the following fields and options:

- WPI ID Number:** Input field
- Date:** Input field
- Hours:** Input field
- Location:** Dropdown menu
- Game ID (Automatic):** Input field
- Comments:** Input field
- Buttons:** Save, Clear, Close

There is a note on the left: "If assigning a student to a sporting event, copy the Date, Hours and Location values from the desired event below." To the right of the form is a small image of a baseball field.

Remaining Work Study Slots:

Game	Time	Date	Hours	Sport	Location	Wanted	Assigned	Comments
14	1:00:00 PM	4/1/2007	5	Swimming & Diving - Women's	Pool - Swim Meet	1	0	
17	7:00:00 PM	3/28/2007	4	Basketball - Men's	Harrington	2	1	books
16	2:00:00 PM	3/8/2007	3	Baseball	Baseball Field	4	2	

Picture Courtesy of WPI
<http://www.wpi.edu/Images/CMS/PE/field.jpg>

WPI ID number of student staffing event or recording normal hours

6. The cursor is blinking in the **WPI ID Number** field. Scan the bar code found on the back of the borrower's WPI ID card. The ID number will appear in this field.



7. If assigning a work study student to a game, click on that game in the **Remaining Work Study Slots** list. This will automatically fill in Game ID. Whether or not this work study student is working a game, one must manually fill in the **Date**, **Hours** and **Location** fields.
8. When finished filling in the necessary field, click the **Save** button to this work study student's assignment. Click the **Clear** button to clear all fields and start over. Click the **Close** button to close this form.

Work Study Schedule

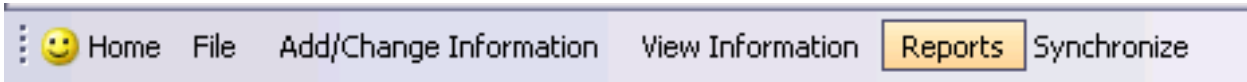
It may be helpful to view a summary of the work study hours on a schedule. These hours include hours during normal operation and hours for games that need student staffing. A report shows these hours from the previous week and for the next two weeks.

1. Double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.

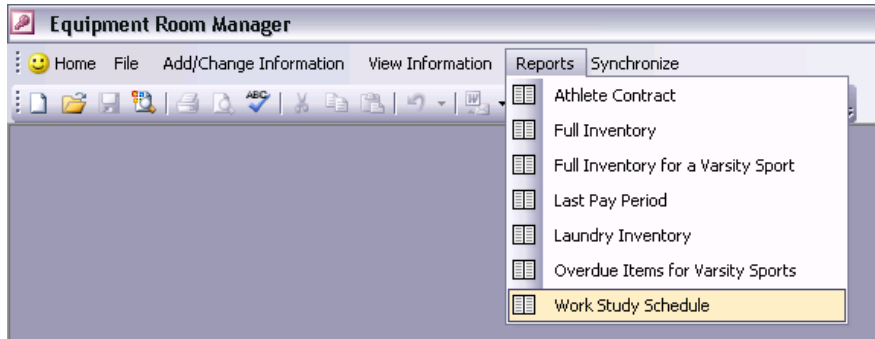


2. The Welcome Screen will appear. Click the **Close** button.

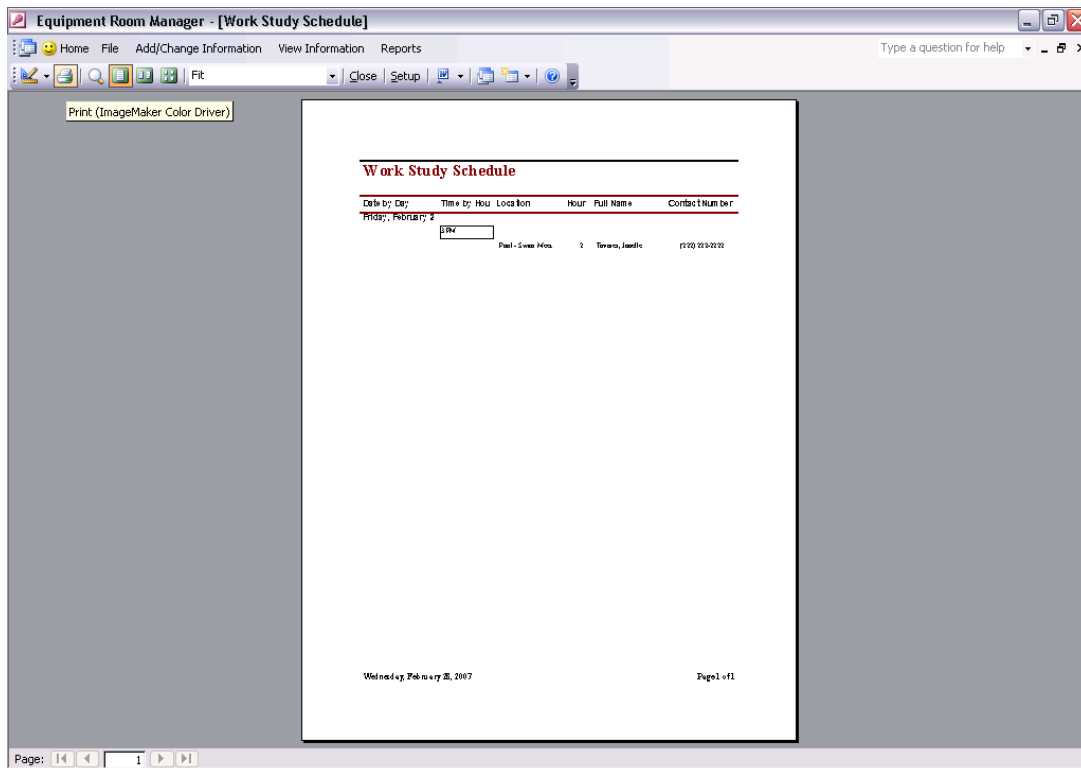
3. Select **Reports** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **Work Study Schedule** option.



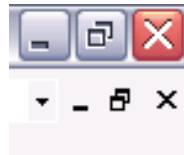
5. The Work Study Schedule will appear in the print preview window.



8. To print, click the printer icon on the toolbar.



9. Click the small **X** in the top right corner to close this report.



E. Athletes

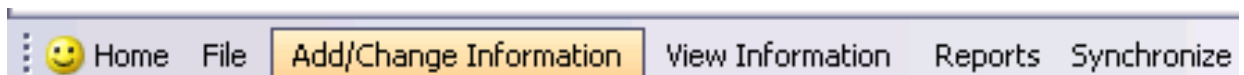
Gathering Athlete Information and Generating a Contract

All athletes on WPI sports teams who borrow equipment from the equipment room must agree to certain terms. A contract is a binding document to those terms and allows the equipment room to take action if these terms are violated. The following procedure takes one through how to add an athlete to the database and how to use the Equipment Room Manager to generate a contract for this athlete.

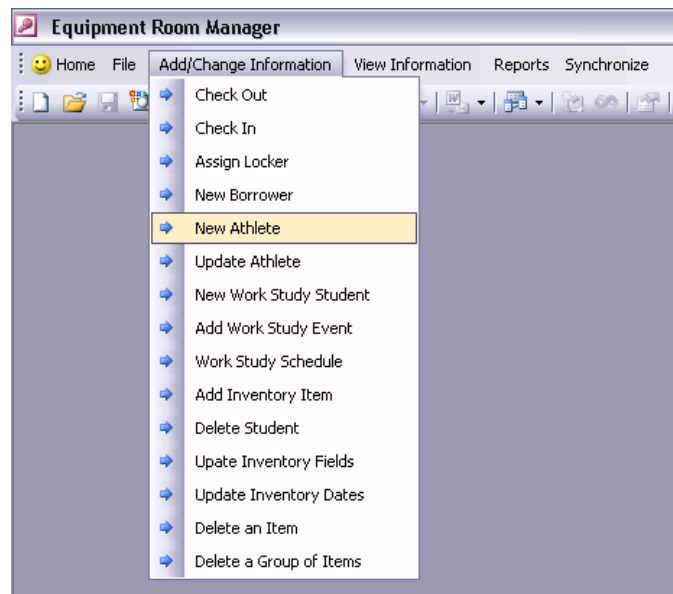
1. Double-click the desktop icon labeled **Equipment Room Manager.mdb** to open the Equipment Room Manager program.



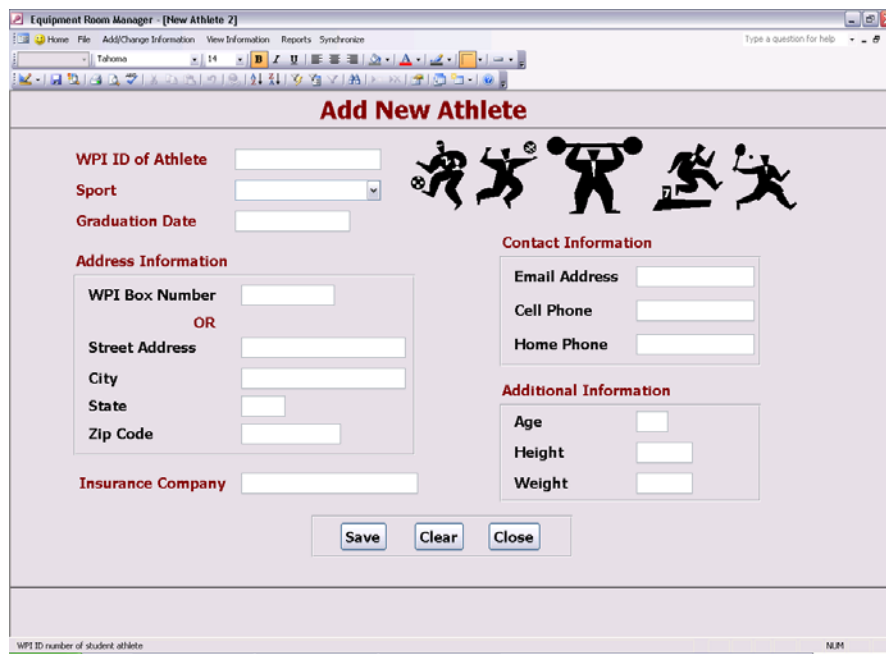
2. The Welcome Screen will appear. Click the **Close** button.
3. Select **Add/Change Information** from the navigation menu bar at the top of the window to expand this drop-down menu.



4. Within this menu, select the **New Athlete** option.



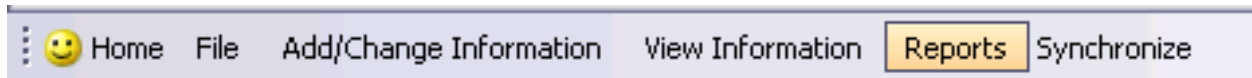
5. The Add New Athlete form will open.



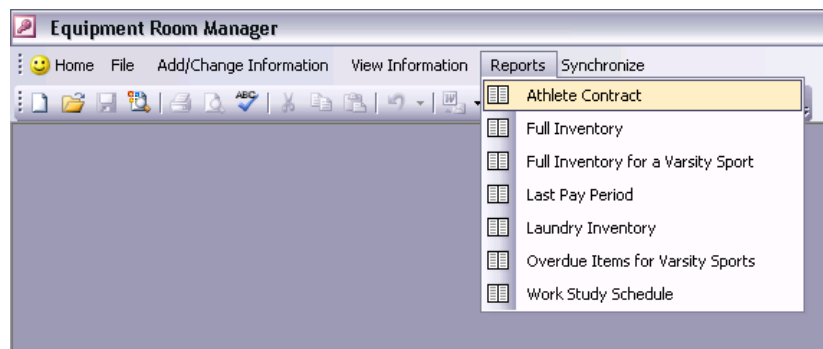
- The cursor is blinking in the **WPI ID of Athlete** field. Scan the bar code found on the back of the borrower's WPI ID card. The ID number will appear in this field.



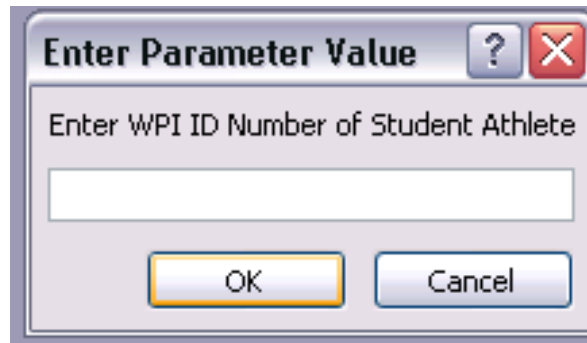
- Fill in the remaining fields as necessary. If one fills in the WPI Box Number field, one does not need to fill in the rest of the Address Information. It is not required to fill in Additional Information for most sports.
- Because the athlete will be borrowing items for the season, follow the instructions under **Checking Out an Item** in section C to check out the athlete's equipment and uniform.
- Once all items have been checked out, one can generate this student's athlete contract. Select **Reports** on the navigation bar menu.



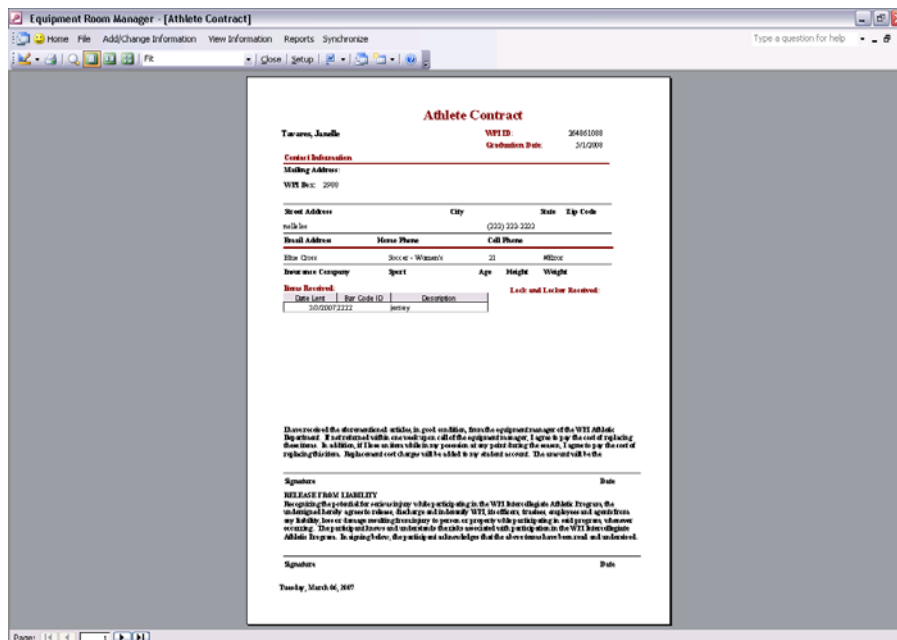
- Select the **Athlete Contract** option.



11. A prompt will appear. Follow the instructions in this box.



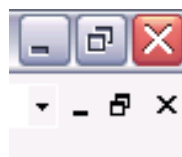
12. The Athlete Contract report will open.



13. If everything appears in order, print it and have the athlete sign. To print, click the printer icon on the toolbar. The report will print automatically.



14. Click the small X in the top right corner to close this report.

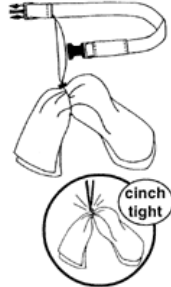


F. Laundry

Using the Laundry Loops

Directions are courtesy of the Laundry Loops Website.

1. Lay socks through the loop of the drawstring. Snugly secure the cordlock.



2. Thread laundry loop through shirt openings.



3. Thread loop through leg openings.



4. Secure the side-release buckle.



Organizational Guide

Inventory and Its Storage Locations during All Seasons

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A. Introduction

This guide is an explanation of part of the organizational scheme of the equipment room. The Equipment Manager Program is used to keep track of lending and what items enter and leave inventory as a whole. Retrieving and storing this inventory is described in this guide. Also, an important addition to the organizational scheme of the equipment room is the use of vacuum-sealed space-saving. Instructions for use also appear at the end of this guide.

B. Inventory Listing

This section of the guide is a reference that lists all types of items in the general inventory category and varsity inventory category. With their alphabetized descriptions, the following two subsections list the quantities of each type of item in general inventory and varsity inventory separately.

General

Items in general inventory can be borrowed by anyone in the WPI community. These items are not designated to club, intramural or varsity sports, or to physical education classes or summer camps. The following is an alphabetic listing with quantities of this portion of inventory.

<u><i>Description</i></u>	<u><i>Quantity</i></u>
Badminton Net	12
Badminton Standard	8
Badminton Racquet	21
Basketball	22
Basketball Net	20
Bat – Aluminum	5
Bat – Wiffle Ball	5
Bat – Wooden	5
Catcher’s Mask	6
Catcher’s Mask Pads Set	4
Dodge Ball	8
Floor Hockey Equipment	2 sets
Floor Hockey Goal	4
Floor Hockey Net	4

Floor Tape	6
Football	20
Goggles	14
Golf Club	8 9s
Golf Mat	4
Golf Practice Ball	15 dozen
Golf Tees (by the dozen)	10
Hockey Puck	15
Inflating Needle	30
Jump Rope	7
Laundry Loop	150
Laundry Pin	150
Ping Pong Ball	157
Ping Pong Net	29
Practice Pinney	50
Punching/Speed Bag	4
Putting Cup	5
Racquet Grip Set	8
Racquetball Racquet	30
Racquetball	15 cans
Rubber Base	3 sets
Rubber Home Plate	3
Shuttlecock	73
Soccer Ball	8
Softball Mask	4
Softball	12
Squash Ball (hard and blue)	12
Squash Ball (soft)	5
Squash Racket	10
Table Tennis Paddle	14
Tennis Ball	15 cans
Tennis Racquet	20
Towel	100
Volleyball Net	6
Volleyball	8
Water Jogger	2

Varsity

Items in varsity inventory can be borrowed by athletes. These items are designated to specific sports. The following is an alphabetic listing of the quantity of both home and away uniforms designated to each varsity sport. M and W after a sport indicate whether or not this quantity includes both the Men's and/or Women's teams' equipment respectively.

<u><i>Sport</i></u>	<u><i>Quantity</i></u>
Baseball	50
Basketball (M)	38
Basketball (W)	40
Crew (M, W)	50
Cross Country (M, W)	50
Field Hockey	45
Football	135
Soccer (M)	35
Soccer (W)	35
Softball	40
Swimming & Diving (M, W)	30
Track & Field (M, W)	40
Volleyball (W)	35
Wrestling	42

C. Inventory Directory

In this section, items are linked to their normal storage location. This is organized by location, alphabetically.

General

All items described in the Inventory Listing under General are now described by location below. Within each location, the items are listed alphabetically.

Main Room

- Badminton Racquet
- Basketball
- Dodge Ball
- Goggles
- Jump Rope
- Laundry Pin
- Racquetball Racquet
- Racquetball
- Squash Ball (hard and blue)
- Squash Ball (soft)
- Squash Racket
- Table Tennis Paddle
- Tennis Ball
- Tennis Racquet
- Towel
- Water Jogger

Back Room

- Racquet Grip Set
- Floor Tape
- Basketball Net
- Inflating Needle
- Laundry Loop
- Practice Pinney
- Punching/Speed Bag

Closet 1

Badminton Net
Badminton Standard
Floor Hockey Equipment
Floor Hockey Goals
Floor Hockey Net
Ping Pong Ball
Ping Pong Net
Volleyball Net
Volleyball

Closet 2

Basketball
Bat – Aluminum
Bat – Wiffle Ball
Bat – Wooden
Catcher’s Mask
Catcher’s Mask Pads Set
Putting Cup
Rubber Base
Rubber Home Plate
Softball Mask
Softball
Squash Ball (hard and blue)
Squash Ball (soft)
Tennis Ball

Closet 3

Football
Golf Club
Golf Mat
Golf Practice Ball
Golf Tee
Hockey Puck
Shuttlecock
Soccer Ball

Varsity

Varsity items will always be in one of two locations, the main room or the back room. During the corresponding sports season, those varsity sport items are always in the main room. During the off season, these items may be in the main room, the back room, or split between the two. The following is a list of sports, separated by storage location during the off season.

Back Room

- Baseball
- Basketball (M)
- Basketball (W)
- Crew (M, W)
- Cross Country (M, W)
- Field Hockey
- Football
- Soccer (M)
- Soccer (W)
- Softball
- Swimming & Diving (M, W)
- Track & Field (M, W)
- Volleyball (W)
- Wrestling

Main Room

- Football
- Track & Field (M, W)

D. Using Vacuum-Sealed Space-Saving Bags

The previous method of storing many of the off season varsity uniforms was plastic bins. These bins use more space than a compact alternative - vacuum-sealed space-saving bags, referred to by the group as space bags. The following section describes how to use these bags when storing several types of uniforms pieces.

Football Jerseys

1. Layer 30 jerseys on a flat surface.
2. Half of the jerseys should have the neck of the shirt facing the near side and half facing the far side.



3. Slide a large plastic bag over the jerseys, keeping them as flat as possible.



4. Slide the bag into the Extra-Large space bag with the opening of the plastic bag in first.



5. Once the jerseys are almost entirely inside the space bag, slide the plastic bag out.



6. Press the air out of the space bag and seal it.



7. Keep the bag on a flat surface and hold it flat while using a vacuum to suck the air out of the valve.



8. Cap quickly.



All Other Jerseys

1. Layer an entire set of jerseys (away or home) on a flat surface.



2. Follow steps 3 to 8 from **Football Jerseys**.

Pants

1. Layer 30 pairs of pants on a flat surface.

2. Alternate the pants as you did with the jerseys, half facing one way and half facing the other.



3. Follow steps 3 to 8 from **Football Jerseys**.

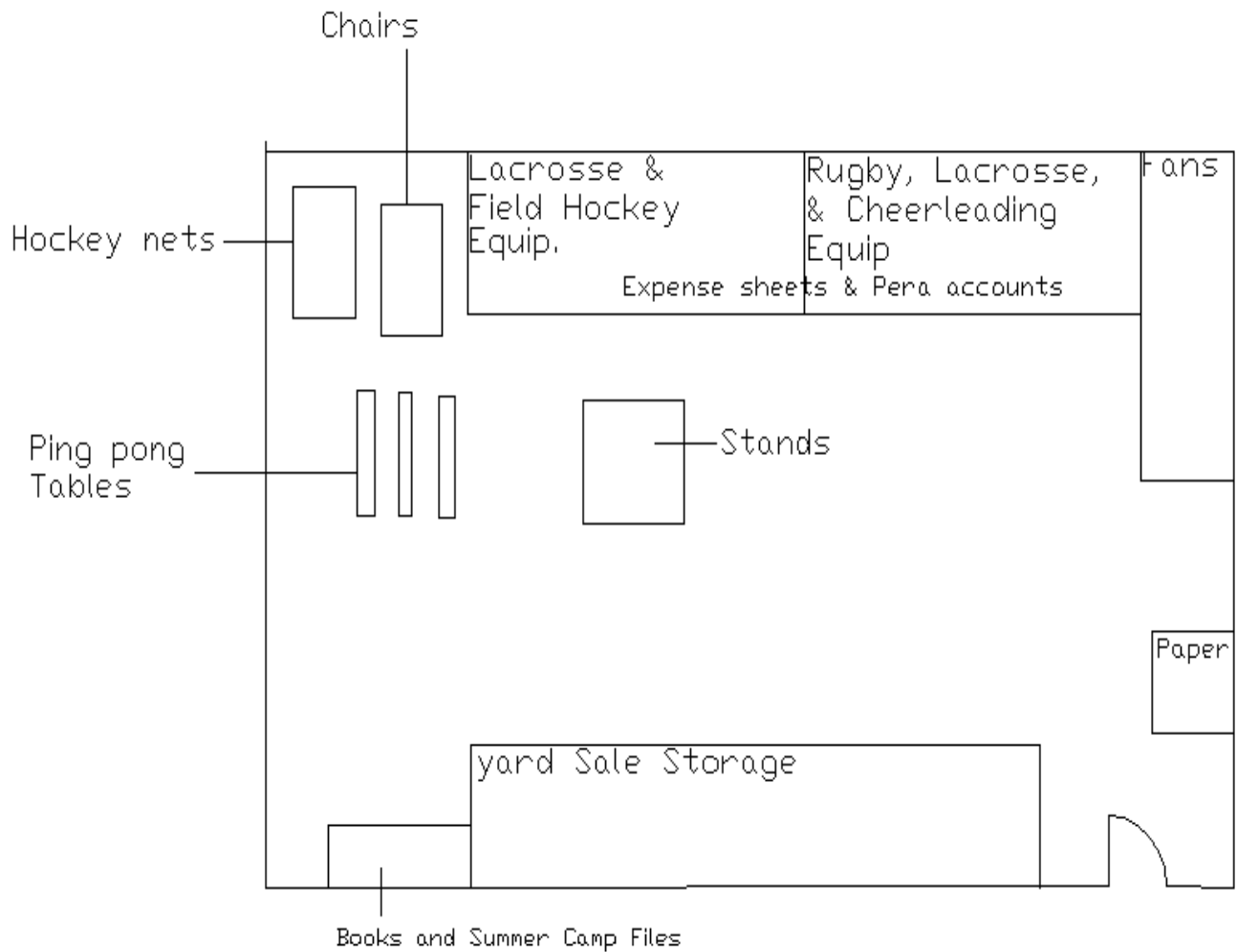
Shorts

1. Follow directions for **All Other Jerseys**.

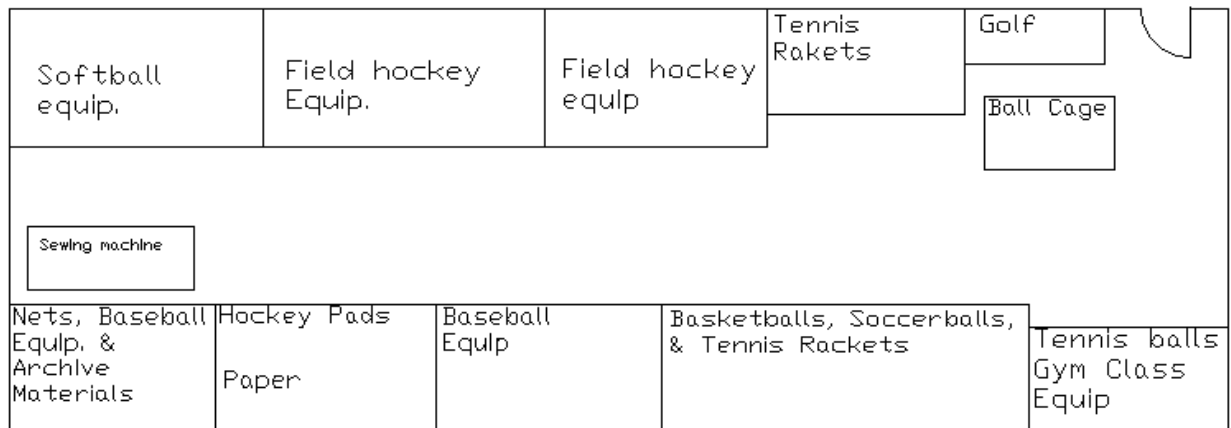
E. Maps

In this section, the physical location of stored inventory is described in a visual form, maps. These are a complement to the verbal descriptions of their storage locations in earlier sections. The maps in this section are sorted by location. In addition, varsity items will have multiple storage locations as they move to a more optimal location during the corresponding season. The rotation of these items is illustrated and explained in this guide, as well.

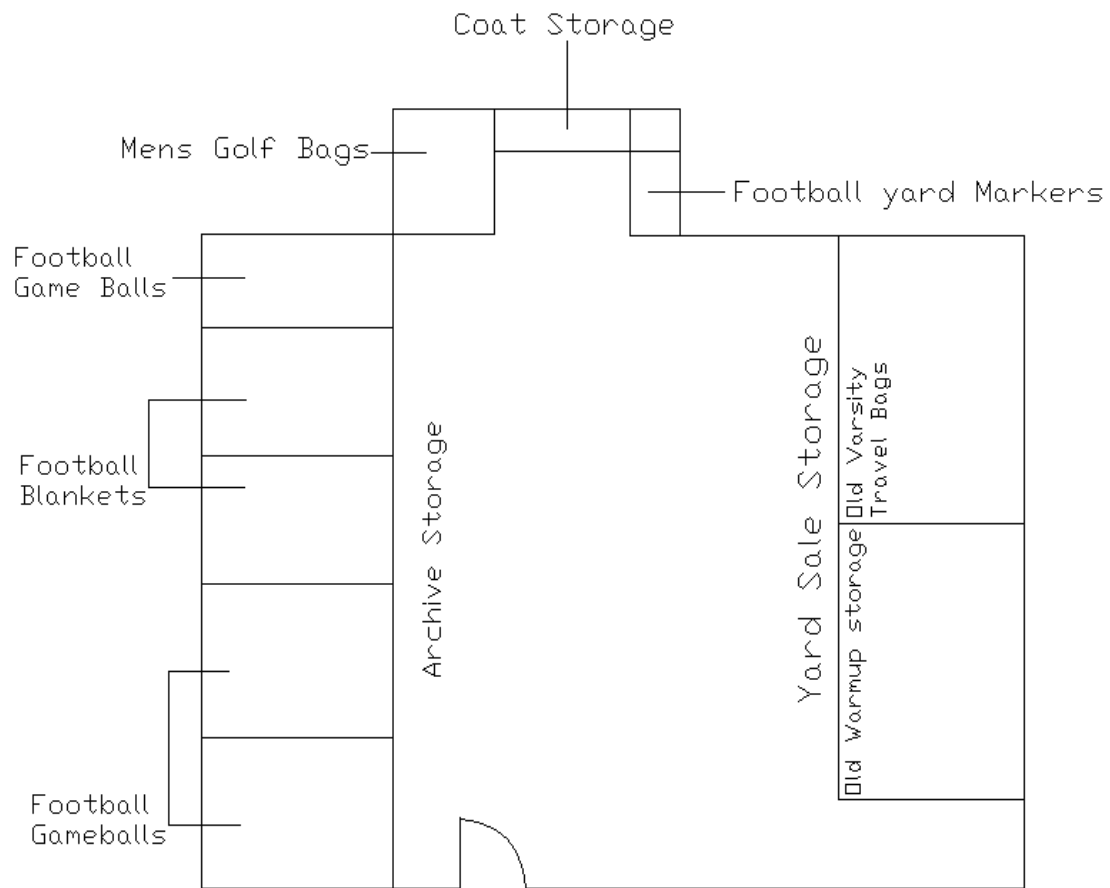
Closet 1



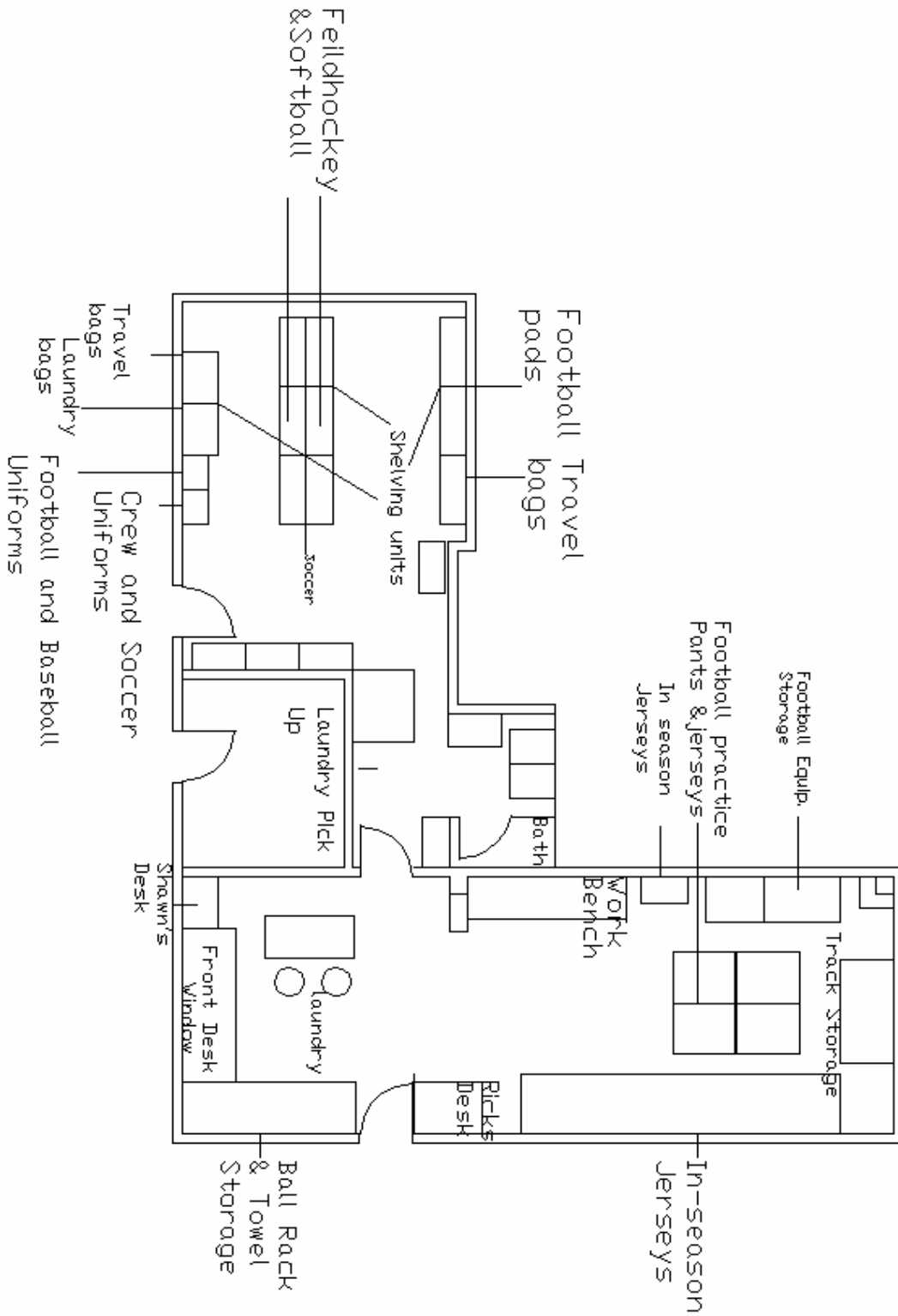
Closet 2



Closet 3



Main Room



Rotation Schedule

The following map shows the rotation of sets of varsity uniforms within the back room and the main room. To make the map easier to read, the sections where the off-season uniforms are held are enlarged and separated by season (fall, winter or spring). The enlarged sections show where the jerseys are stored when they are in-season as well as when they are not in-season.

To further explain the set-up of the map, the following is an example of how to read the fall season. There are two locations for storing the in-season uniforms; one is on the far right of the main room and one is on the left next to the work bench. In the fall, football and volleyball uniforms are stored in the in-season storage on the right. The field hockey and soccer uniforms are stored in the in-season storage on the left. In the back room there are two locations for the storage of off-season jerseys, one location is in the middle of the room and one is in the bottom right of the room. In the fall, basketball, softball and baseball uniforms are stored in the off-season storage location in the middle of the room. In the bottom right of the back room in the off-season storage area, basketball, wrestling and crew uniforms are stored in the fall.

