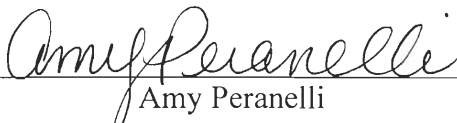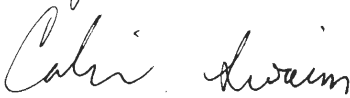Expanding the Scope of the Computer
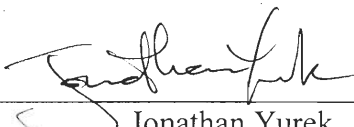
Kindergarten at the Duang Prateep Foundation

An Interactive Qualifying Project Report

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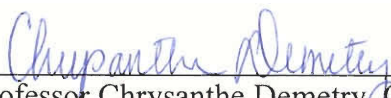
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Abstract

To improve the computer kindergarten program at the Duang Prateep Foundation (DPF) in the Klong Toey slum of Bangkok, an evaluation of its state and interviews with staff and teachers were undertaken. Needs for continued teacher education, along with addition of new computers and curriculum were discovered. To address these issues, we retrained the teachers, developed a manual, and more than doubled the number of software packages. These efforts sought to create a more self-sustainable program.

Executive Summary

The Duang Prateep Foundation (DPF) is a non-government organization (NGO) with the main goal of improving living conditions in Klong Toey, as well as offering education to the children. The DPF has provided educational opportunities for the children of Klong Toey by establishing multiple kindergartens. These kindergartens help to provide a solid foundation for the children's education, an essential step in improving the quality of life. Last year, based on the ideas and funding from a WPI alumnus, Henry Strage, a computer lab was introduced into the kindergarten. The lab, consisting of eight computers, helped to strengthen and enrich the children's educational experience.

The goal of our project was to improve the computer kindergarten program at the DPF with the intentions of making it a self-sufficient program. For us to accomplish this goal, we had to determine what was needed for the computer kindergarten to build a strong base, one that could continue on without yearly assistance from outside organizations. We achieved this by determining the options available to us and then, by analysis, selecting the ones that were the most effective for achieving our goal.

Our first step was to evaluate the facilities of the computer kindergarten at the DPF to assess any problems that may need to be fixed. When visiting the DPF, we surveyed the kindergarten room and the computers, searching for things such as physical damages, operating system health, and possible infection by virus. There was also a need for information from staff and teachers at the DPF. Interviews with these people, both formally and informally, were our main source of information. In addition to information gained from the DPF, a visit to a school with an established computer program was undertaken to assess options for implementation at the DPF.

From our data gathering, we discovered many problems that have developed over the past year and need to be addressed. Although all sixteen of the kindergarten teachers were trained in basic computer skills last year, only two of the teachers work with the children in the lab on a daily basis. The lack of constant use by the other fourteen teachers caused them to forget much of what was taught. As they would be teaching in the future, there was a definite need for retraining.

Although the computers aided the children greatly, limited time for use has prevented the children from learning to the fullest extent from the computers. There are one hundred and ninety children participating in the computer education program at the DPF, and only eight computers. Due to this ratio, each child only receives one half hour every other week with the computers. This limited amount of time is not enough for the children to benefit from the computers. Occasionally these sessions are cut short because of technical problems that go untreated for extended periods of time.

The final problem that was found was the amount of software that the children used during their time on the computers. Much of the software the DPF owned, was much too advanced for the children, as some of them were as young as three. Others simply did not have features that created enthusiasm and in excitement in the children. As a result, only two or three pieces of software were used. Because of this small number, the children would become bored with the software through over use.

By analyzing the data and needs of the DPF, three steps for reaching our goal were evident. The first of which was the need for continuing the teachers' education in basic computer techniques. We provided the teachers with three training sessions that covered many topics such as basic use of programs, directory structure, and an

introduction to using the Internet. To ensure that the DPF would not need to retrain their teachers each year, we developed a detailed, quick reference manual, which contains all the information taught in the training course. We also had the manual translated into Thai, as the teachers cannot read English.

Due to the low ratio of computers to children, there was a need for the addition of more computers. As a result of this fact, we increased the number of computers at the DPF, more than doubling it. By giving the children more time to use the computers, they have a more effective and enjoyable experience. With the increased number of computers in the lab, the number of children in a class is increased and subsequently the responsibility of the teachers. To provide adequate supervision over the children, we recommend that the DPF double the number of teachers teaching the class.

The final need of the DPF was to enhance the educational experience for the children when using the computers. As the children use such a limited number of software packages, it is essential that the children do not get bored with the software because of unusable functions. By visiting the Sriwittayapaknam School, we were able to test many software packages for features and usability in order to create a list of suitable educational software. Some of these programs were purchased and integrated into the curriculum, while some were detailed and recommended to the teachers.

By creating ties with other schools with similar computer programs, the DPF can learn much, as well as share information with other schools. Because of their success, we recommend that the DPF and the Sriwittayapaknam School set up an alliance. During our visit to the Sriwittayapaknam School we found that it's computer program and computer teachers experienced some of the same problems that the DPF is going through

now. The teachers at the Sriwittayapaknam School would be able to give the DPF advice in both avoiding and solving problems. The teachers from both schools would also be able to share ideas about software and teaching methods. Along with providing a communication link, this relationship may inspire other similar organizations to join and benefit.

During our training sessions with the teachers, they were introduced to using the Internet. The teachers exhibited great enthusiasm when we talked about the Internet. Therefore, we recommend that a connection be established in the computer kindergarten for the use of the teachers. This Internet connection could be a valuable resource for the teachers, allowing them to download educational tools and share ideas and advice with other teachers all over the world.

The computer kindergarten at the DPF has experienced a number of technical problems during the past year. To address this, we recommend that one of the teachers from the kindergarten be designated as the person in charge of the computer lab. This person should take a course about maintaining computers to learn how to deal with problems that arise. Without someone to deal with these problems, they will remain and be a constant detriment to the use of the computers.

Everything we have accomplished while working at the DPF has been in an effort to help the computer kindergarten establish a strong foundation. As it is only in its second year of existence, the computer kindergarten program at the DPF still has much that can be done to improve it. Through our work and recommendations, the computer program will continue to grow on its own with minimal assistance from outside parties.

Acknowledgements

Our group would like to thank Henry Strage for all the advice and support he has given us in our project. We would also like to thank our liaison, Khantong Dalad, for all the work he has done with us to make our project a success.

Authorship

We feel that we each have contributed equally to this report. As each section has been written and revised many times by each member, we have each contributed to every section.

Table of Contents

1. Introduction

Throughout the world, education is a necessary component in achieving a better quality of life. The importance of education is even more apparent in developing countries, where many people do not receive formal schooling. In the Klong Toey community, one of Bangkok's largest slum areas, it is very difficult for children to attend schools because of the costs of tuition, books, uniforms, and shoes. Of the children who are lucky enough to go to school, many of them drop out at an early age in order to support their families. These children do not gain the essentials to give them a chance at creating a better life for themselves.

The Duang Prateep Foundation (DPF) is a non-government organization (NGO) which helps to improve the quality of life for people living in Klong Toey. One of its many goals is to create educational opportunities for the children of Klong Toey. The DPF has created multiple kindergartens in an effort to provide an inexpensive and adequate education for these children. The kindergartens help to provide an educational building block that will give children a chance at a better life in Thailand.

In the past, the possibility of making the educational value of computers available to children in the Klong Toey slum was very slim. Most children have never been exposed to computers, as programs to do so are very rare in the slums. As seen in the slums of Brazil, the use of computers can be an excellent way to keep children in school. Using a computer can be very exciting for children and can give them the enthusiasm that they may need to continue with school. The computer can also be a very powerful teaching tool. With the right software, computers can help students to build things such as critical thinking skills, memory, and process of elimination.

Between January and March of 2000, a group from Worcester Polytechnic Institute (WPI) working on an Interactive Qualifying Project (IQP) worked at making computers available to children in the DPF kindergarten. A WPI alumnus, Henry Strage, first presented the idea to introduce computers to the kindergarten. With funding provided by Mr. Strage, the IQP group was able to purchase eight computers and create a lab in which the children could work, play, and learn. The group taught the teachers basic knowledge about how to use computers, as well as how to incorporate the computers into their curriculum. With this new addition to the kindergarten, the children were given the opportunity to use something that they would normally not have a chance.

Although they did a lot with their time at the DPF, last years project group expressed that they could not accomplish everything that they would have liked. Along with this, the DPF has shown interest in further developing the programs at the computer kindergarten. It would now be a good time to evaluate the computer kindergartens' progress and provide direction for the future. There are certain issues that we need to discover to help continue this project. What has the result of the first year since the implementation been? Has the original objective of the project been reached or has it changed in the year's time? Does the DPF have a need for help every year from WPI in continuing the program? And if so, how can we prevent this? While much was done in its initial implementation, there is still much to do with the computer program at the DPF. The desired result would be a program that is self-sustaining. An evaluation and expansion of the kindergarten program is needed to identify problems that have arisen over the past year and to eliminate the need for outside help in the future.

The goal of this project is to improve the current computer kindergarten program at the Duang Prateep Foundation. We began by evaluating the condition of the computers and facilities, teacher aptitude with computers, and the children's enthusiasm. As part of the process, we looked into a similar program to identify any options that we may have to implement at the DPF. After all the data was gathered, through analysis several courses of action were decided upon: adding more computers, strengthening the teachers' base of computer knowledge, instructing the teachers in the use of the Internet, expanding the curriculum, and creating detailed reference manuals.

2. Literature Review

In Klong Toey, one of Thailand's largest slum areas, education is important for children in creating a better life for themselves and their families. Within the slum, the Duang Prateep Foundation works towards making slum life much easier for the inhabitants of Klong Toey. One of its many goals is to offer inexpensive education to the children in the slums. Educating children, especially in the slums of Klong Toey, is so important because it helps to give them the social and intellectual skills that will help them to succeed in life. As technology advances, teachers are finding more and more ways to include such things as computers in the classroom. Last year, a WPI IQP group created a computer kindergarten at the DPF in order to make the advantages of computers available to the children of the Klong Toey slum.

2.1 Slums in Thailand

It is important to understand the conditions of Thailand's slums to fully appreciate how beneficial introducing slum children to computers can be. People living in slums, often referred to as slum dwellers, face many hardships in their everyday lives, some of them being poor living conditions, financial trouble, and a lack of education. Many non-profit organizations have been organized to address these problems. The Duang Prateep Foundation is one of these organizations and it works to help improve the lives of the people living in the Klong Toey slum.

2.1.1 Slum Communities

Of the 60 million people living in Thailand today, roughly 2 million of these people are living in communities known as slums [Bangkok.com, 2000]. A slum is an area of government-owned land where poor people illegally live and have very few resources available to them. [Bangkok.com, 2000]. Slums are usually located in urban areas, which economically advance faster than rural areas, causing them to be full of job opportunities. Sometimes when people move into the city looking for work they have no where to go and are forced to set up their homes in slums, which have become an accepted part of urban life in present day Thailand [Duang Prateep Foundation Homepage, 2000].

Many problems face slum dwellers in Thailand, including poor living conditions. When these people move to a slum community they set up makeshift shacks, which are often unstable and built on stilts above polluted waters. Sometimes cardboard boxes are used on top of the shacks as roofs, and wooden boards are placed around the shacks to serve as walkways [Hata, 1996]. Often in slums there is no public water supply, no electricity, and no waste removal system. The Thai government does not legally recognize slum dwellers because they set up their homes illegally on land that they do not own [Duang Prateep Foundation Homepage, 2000]. Slum dwellers have little security in their homes since the government can kick them out at any time in order for the land to be developed [Breaking Out of a Vicious Circle, 1999].

Being able to support their families has also become a problem for slum dwellers, as it is hard for them to find jobs that pay enough money. Because of the large number of people living in slum communities, there is not a high demand for labor, allowing

employers in these areas to pay their workers very little [Duang Prateep Foundation Homepage, 2000]. Many families are often forced to borrow money from loan sharks at very high interest rates, which they cannot pay back [Breaking Out of a Vicious Circle, 1999]. The lack of financial stability puts stress on the whole family, causing them to take drastic measures to make ends meet. Children often do not finish their education in order to begin working at an early age [Human Development Center Homepage, 2000].

High drop out rates and expensive necessities contribute to the lack of education among the people living in slum communities. While primary schooling is often tuition free and provided by the government, there are many supplies that need to be purchased in order for children to attend these schools, such as books, uniforms, shoes, and school bags [Duang Prateep Foundation Homepage, 2000]. The government does offer some welfare programs that provide loans to underprivileged families so that their children can complete their educations. However, since slum dwellers are considered second-class citizens and have no legal rights, they are excluded from these programs [Breaking Out of a Vicious Circle, 1999].

Many organizations are working to make slum life better in Thailand. For example, the Human Development Center (HDC), run entirely on donations, has several outreach projects going on mainly in Bangkok. These projects include providing shelter for homeless boys and girls, providing an AIDS clinic for the community, and offering a soccer league for the children [Human Development Center Homepage, 2000]. The Hand-In-Hand Foundation and the National Electronics and Computer Technology Center (NECTEC) are two other organizations that are currently helping to get slum children in Thailand familiar with computers and the Internet [Plengmaneepun and

6

Kittikanya, 2000]. The Duang Prateep Foundation (DPF) is another organization that is working to help people living specifically in the Klong Toey slum by providing programs concerning health, education, social welfare, and emergency assistance [Duang Prateep Foundation Homepage, 2000].

2.1.2 The Klong Toey Slum and the Duang Prateep Foundation

The largest and oldest slum in Bangkok is the Klong Toey slum [Bangkok.com, 2000]. The Port Authority of Thailand owns the land in Klong Toey, which is located near the Bangkok Port and the downtown area of the city [Hata, 1996]. The area is overcrowded; about 1500 people per acre reside there due to the large amount of people looking for work in the area. Since Klong Toey is so large and overpopulated it has become the main focus of many of the organizations mentioned above, specifically the Duang Prateep Foundation [Duang Prateep Foundation Homepage, 2000].

Founded in 1978, The Duang Prateep Foundation stands out as one of the most prominent charities in Thailand. The name 'Duang Prateep' fits the organization's mission perfectly, as it translates to: "Flame of Hope." This "flame" has provided new life to the Klong Toey slum community of Bangkok.

The origins and ideals of the Duang Prateep Foundation stem from its founder, Prateep Ungsongtham Hata, and her numerous endeavors and accomplishments conducted before the creation of the kindergarten. Though the 'Angel of the Slums' spent much of her time helping the children and their families cope with the conditions of slum life, she yearned to have the kids exposed to formal teaching. Her prime educational concern was giving the deprived families of Klong Toey hope for the future. By creating the "One Baht a Day School," a safe, inexpensive, alternative for the primary

schools, she addressed the educational quandary afflicting Klong Toey and the social misfortunes of slum life for children [Chatchada Kruakaew: Art Blossoms in Klong Toey, 2000].

In recognition of her work addressing both the educational and social problems suffered by the slum residents, Prateep was awarded the prestigious Magsaysay Award in 1978, a reward equivalent to the Nobel Peace Prize in western society. Though Khru Prateep could have used the $20,000 award money for her own social advancement, she established the Duang Prateep Foundation (DPF) instead, along with the Foundation for Slum Child Care located adjacent to the DPF. Her work has gained her the trust and admiration of both the Klong Toey community and the Thai government [Scott Murray, 2000].

The general health of Klong Toey has always been a major concern of the DPF. Nutritional health and the cleanliness of the slums are well beneath nationally accepted standards. Solutions such as the Lunch & Nutrition Program, the AIDS Project, and the Klong Toey Clean Project have been implemented by the foundation in order to assist the community with these problems [Duang Prateep Foundation: Projects, 2000]. The lack of disaster assistance in the Klong Toey slum contrasts the number of catastrophes involving loss of land and life. For example, the mishandling of dangerous chemicals at the Bangkok Port adjacent to Klong Toey led to an explosion and resulting fire in 1991, killing 4 people and leaving over 5,000 homeless. The DPF has provided a wide array of services for these victims in the past and continues to provide support to them.

The Duang Prateep Foundation has provided a wide array of services for the representation of Klong Toey residents. For years, slum people were denied citizenship

rights and were ignored as valid voting residents of Bangkok. Evicted slum natives are usually relocated to an even worse living condition, far from decent jobs and a comfortable social setting. By negotiating with the government, the Duang Prateep Foundation can assure that members of the Klong Toey community have the rights of any normal citizen living in Bangkok. Communities confronted by the eviction process are assisted by the DPF in order to gain fair brokerage deals with landowners. The DPF also provides building materials and building contractors in order to rebuild shattered communities [Duang Prateep Foundation: Projects, 2000].

To help children suffering from abuse, exploitation, drug use and crime the Duang Prateep Foundation developed the New Life Project. These children are displaced from their slum community and relocated to leased farmland provided by the DPF in the southern province of Chumphon. After learning self-respect and teamwork skills, many young Thais choose not to return to the city and take up farming as an occupation. A chief goal of the New Life Project is to help needy children and young adults to find their place in life. This is accomplished in the form of skill identification and development [Murray, 2000]. A similar program to this New Life Project has been started for young girls in Kanchanaburi [DPF, 2000].

In addition to providing rehabilitation to children and young adults, the Duang Prateep Foundation is involved with financial services in the community. The Klong Toey Cooperative for Community Service, a bank for slum residents, was created by the DPF in 1994. Twenty-one slum communities met with the finance minister of Thailand to devise a plan for this bank [Murray, 2000]. They met with the purpose of creating a

9

service that would empower members of the Klong Toey Foundation and poor slum natives to solve financial problems that were hindering commonplace tasks [DPF, 2000].

In an associated project, the Duang Prateep Foundation initiated the Credit Union of Klong Toey in 1994 to provide financial relief to needy slum residents [DPF, 2000]. By enabling poor slum dwellers to obtain loans from commercial banks, payment dilemmas that plague these less fortunate people can usually be solved. Debt cycles trouble slum residents, as lenders are often ruthless in their collection of repayments. Though schooling is free in Thailand, books, uniforms and other amenities related to education are not. Most parents in Klong Toey are not able to send their children to school because of extra expenditures. These problems have been virtually displaced by the Credit Union's low interest rates and easily obtainable loans [Scott Murray, 2000].

Breaking educational barriers is an important initiative in the plans of the Duang Prateep Foundation to service the Klong Toey slum community. For example, hearing impairment is a prevalent problem in the slums of Klong Toey. The Duang Prateep Foundation provides an expanded educational program tailored to deaf children in the slums. Hearing aids and special classes are provided for these children who have been excluded from the national school system because of their impairment.

A recent study has suggested that slum children in Thailand who attend kindergarten between the ages of 3 and 6 attempt to further their own education and lead more satisfying lives compared to those who forgo the pre-school process [Murray, 2000]. Fifteen kindergartens lie at the focal point of the Duang Prateep Foundation's activities. The DPF has also extended the reach of the kindergartens to poor villages in Northeast Thailand. The kindergartens provide a safe place to learn and grow, both

intellectually and socially. The teachers are volunteers at most of the kindergartens along with many of the other DPF staff members. Once the community structure is well established and the teachers feel comfortable with their teaching tasks, the kindergartens become totally independent of the Duang Prateep Foundation [Scott Murray, 2000].

2.2 Child Development and the Thai Education System

By bringing the instructive approaches of both the kindergarten at the Duang Prateep Foundation and the general workings of the Thai educational system to light, teaching and instructional norms in Bangkok can be better understood. In order to creating and implement a kindergarten computer aided learning curriculum, one should understand the development of a child's mind during the early stages of life. Some examples of incremental child development as well as Montessori's theory are given in order to reveal an appropriate teaching process. An explanation of the educational system in Thailand is given to relate developmental methods to the needs of the Duang Prateep Foundation.

2.2.1 Child Development and Education

The key to implementing a new curriculum or improving upon an existing plan at the kindergarten level is the understanding of the way a child's mind develops. The early stages of a child's mental growth must be nurtured with subject material correlating to both intellectual and physical needs. By identifying some prominent developmental theories regarding teaching techniques, a better understanding of proper teaching methods can be reached.

Many developmental theories describe phases of physical, mental, emotional, and social growth. One such theory is Setzer's incremental learning stages model. The evolution of a human's mind can be broken up into seven-year increments beginning with birth to seven years old, seven to fourteen, and fourteen to twenty one years of age [Setzer, 1989]. In the case of kindergarten experience, development at ages of four, five and six should be explored. Development of the child's will and the desire to learn by doing is especially present at this age. Motor activities are especially important since they develop both physical and mental aspects of the human body. Though the thought process should not and cannot be developed at this age, its precursor, critical thinking, is cultivated by hands-on activities [Setzer, 1989]. When software is chosen for a computer kindergarten, it should contain specific features that augment the child's critical thinking and motor skills.

Another similar incremental learning stage theory involves the child learning about the world through reflex behaviors and by actively manipulating objects. These skills surface and are typically developed at age two, but can continue throughout the next few years of life. The next years are considered as part of the thinking speed and language development phase where the child learns concepts but cannot relay the ideas with perfect logic. According to Piaget, an expert on incremental child psychology and learning, social experiences can also play a major role at these stages in helping the preoperational child to become operational, since these relationships can correct and redirect the child's thoughts [Vogelzang, 1996]. Though a child's development cannot be surely compartmentalized into stages as many critics of Piaget and other child

psychologists have pointed out, the general structure of learning and interacting presented by both Setzer and Piaget is considered a good one [Vogelzang, 1996].

Though criticized as being distractions from learning and discipline, video games can be significant learning tools when used effectively at an early age. Critical thinking, process of elimination, and strategy are three important skills that are acquired from game playing. According to Greenfield (1984), hand-eye coordination and motor skills acquired from playing games build a foundation for learning later in life. Children learn to take in information from multiple sources as a result of playing fast paced games, a skill referred to as parallel processing. Games that use three dimensions promote spatial skills forcing children to use perception when taking action [Greenfield, 1984]. Many games provide a setting where the player must decipher the rules of the game by playing [Neal, 1990]. Neal contends that learning a game requires the use of previously acquired knowledge to make analogies about unknown stipulations, effectively exploring options and paths. The aforementioned skills each have a purpose and a place in a child's development of cognitive thinking [Vogelzang, 1996].

The Montessori educational approach was used in the computer kindergarten at the Duang Prateep Foundation because of the exemplary teaching methods that it employs. Its goal is to allow children to develop a general understanding about the world along with the building of self-esteem by stimulating their senses. The Montessori teaching approach was used while creating the kindergarten tutorials and curriculum at the Duang Prateep Foundation in January 2000 [Curry, Waite, Webber, 2000].

Born in Rome, Dr. Maria Montessori (1870-1952) was the first woman to qualify as a medical doctor in Italy. After working extensively in the medical field, she became

13

concerned about the learning ability of young children. Montessori, in turn, began her life long study and observation of young children, specifically recording their behaviors, needs and interests. Montessori's research led to the development of a unique approach to education. Her philosophy of education is based on the developmental stages of the child. Maria Montessori designed a prepared environment and educational apparatus to meet the corresponding progressive needs of the developing child. She passed away in 1952 leaving over 150 Montessori-style schools in the US and yet more worldwide [Teacher Hero: Montessori, 1998].

The Montessori approach to education is based upon an active, spontaneous teaching session. Critical thinking, concentration, independence and cooperation are essential skills that should be developed at an early age [Teacher Hero: Montessori, 1998]. Montessori's notions of education include the concept that children function best under conditions of trust, free choice, support, encouragement and success. The primary idea is that learning should be an active, learn-by-doing process. Other Montessori teaching concepts include: children develop at different rates and have different strengths and weaknesses, children should learn as cooperative members of a group, children learn best when they are interested in the subject, and children gain decision-making skills through the process of making choices.

Maria Montessori's primary educational directive is that children must learn to separate fact from fiction during *their own* experiences, rather than from what adults tell them. Montessori discovered this method from observing a child's developmental stages, a practice related to the incremental learning theory presented by Paiget and Setzer. She noticed children have sensitive periods. The first six years of a child's life are a crucial

time period when they must learn educational independence. This independence is necessary to the child's conception of how things function in the world [Curry, Waite, Webber, 2000].

2.2.2 Education in Thailand

The Thai education system includes some of the fundamental concepts of child instruction advocated by Montessori and others. An understanding of the education system in Thailand is necessary to see how the computer kindergarten at the DPF fits in. In this section we talk about how the education system in Thailand began and how it is structured today, which is very similar to the structure of the education system in the United States. Over the years the Thai education system has undergone many changes, so we also discuss three major plans for reform that have recently occurred and some of the major problems that these plans have faced. We can learn from the difficulties that previous educational policy makers have encountered while we are trying to introduce new ideas into the computer kindergarten at the DPF.

The formal educational system in Thailand began in 1887 when the Department of Education was established. During this time the Department of Education was the division of the government responsible for the education of the entire country. Since it was established, the Department of Education has grown a great deal, becoming recognized as a full-fledged ministry in 1982. Over time the responsibilities of organizing the education system were divided among three groups: the Ministry of Education, the National Education Commission, and the Ministry of University Affairs. These groups have worked together to create a plan for the education system in Thailand.

Providing education as a way to improve the quality of life has become the main objective of these organizations [Education in Thailand, 2000].

Today the structure of the education system consists of four different levels, as summarized in Figure 1. Most children begin school at the primary level around age 7 and continue at this level for 6 years. The next two levels are the lower and upper secondary levels, each consisting of three years. These two levels are similar to junior high school and high school in the United States. Higher education in Thailand is known as the tertiary level, which consists of four years [Education in Thailand, 2000]. Kindergartens, not part of this four-level system, are a form of pre-primary schooling and are organized by local districts and private organizations [Holmes, 1980].

Age	3-6	7-12	13-15	16-18	19-21
Level	–	I	II	III	IV
Type of School	Pre-Primary Kindergarten	PRIMARY	Lower Secondary	Upper Secondary	TERTIARY

Figure 1. Structure of the Education System in Thailand [Holmes, 1980].

Primary schools in Thailand are equivalent to the elementary schools in the United States. Children learn basic reading, writing, and arithmetic skills while they also begin to learn vocational and craft skills. The vocational skills that each school teaches are dependent on the needs of the community that the school is located in [Holmes,

16

1980]. The government provides free primary schooling for the children of Thailand, which is why the attendance rates are so high [SEAMEO, 1971].

In the lower and upper secondary schools the main focus is on free choice subjects, mainly vocational programs in industry, arts, agriculture, home economics, and business. Again what vocational programs are offered often depend on the community where the school is located. These schools run five days a week, during a minimum of thirty-five weeks per year, and are based on a credit system [Holmes, 1980]. Upper and lower secondary schools are not free, which might explain why there is such a high drop out rate going from primary to secondary schools. In 1986 the drop out rate between these two levels was 53% [Singh, 1986]. Due to the government's offering of scholarships and welfare programs for students, increasing rates have been observed over the years, but the drop out rate between primary and secondary schools in 1999 was still 33.1% [Office of the National Education Commission, 2000].

A college education in Thailand is part of the tertiary level of schooling and also requires tuition to be paid. The number of students who attend universities is far less than the number of students who attend primary and secondary schools. In 1999 only 14% of the Thai population ages 20-24 attended schools at the university level [Office of the National Education Commission, 2000]. Changes at the tertiary level have been made in order to improve the quality of lifelong education. According to the Regional Educational Planning Seminar Final Report, the main goal of improving higher education in Thailand has been to expand the fields of study. More emphasis has been put on fields such as medicine, technology, and teacher education [SEAMEO, 1971].

17

More recent educational reforms at the primary and secondary levels have been made with the hopes of producing a workforce that has the problem solving and analytical skills necessary to satisfy the needs of the ever-changing world [Bunnag, 1999]. This need can be illustrated by comparing the number of scientists and engineers in other Asian countries to the number in Thailand. In 1996, 0.01% of the people in Thailand were employed as scientists and engineers. In China and Singapore these numbers were much greater, 0.035% and 0.25%, respectively [Townsend and Cheng, 2000].

In 1994 Prime Minister Chuan Leekpai was the first to make educational reform in Thailand a major priority [Townsend and Cheng, 2000]. After 1995 the main objectives of education changed from promoting the quality of life in society and promoting nationalism to encouraging analytical skills and the ability to work with others [Holmes, 1980; Townsend and Cheng, 2000]. The amount of money that the government spent on education has greatly increased over the last few years. The major effort that has been made to improve education can be observed in three key projects that occurred recently [Townsend and Cheng, 2000].

The first of these projects is the Basic and Occupational Education and Training Project, referred to as the BOET Project. It began in 1993, ended in 1998, and worked with less than 100 schools. The project was sponsored by the Thai government and the United Nations Development Program (UNDP) and had two main objectives. One was to help local education authorities to create new activities to improve the quality of education, especially in rural areas [Townsend and Cheng, 2000]. By improving education in rural areas a connection could be made with the more advanced urban areas,

where economic conditions are extremely different [SEAMEO, 1971]. The second objective of the BOET project was to help regional educational authorities give technical assistance to schools that were in need [Townsend and Cheng, 2000].

The second project that was created to improve the quality of education in Thailand was the MOE Educational Reform for Thailand of 1996, and it worked with over 20,000 schools. The Minister of Education, Sukhavit Rangsitpol, introduced the program and concentrated on improving four areas: physical infrastructure of the schools, teachers, curricula, and school management. In order to improve the infrastructure of the schools, higher standards were introduced, resulting in the upgrading of computer labs and facilities. More benefits, such as social security, were rewarded to the teachers, giving them a higher standing in society. The status of the teachers was improved with the anticipation that their teaching performance would also improve. New training was provided for the teachers as well, which was needed with the introduction of the new curricula. To improve the management of the schools, local involvement was encouraged, especially from the families of the students [Ministry of Education, 2000].

The third attempt at improving education in Thailand was the National Education Act of 1999. The main objective of this project was to develop a more creative approach to education. Previously, students would learn by memorizing information from lectures and textbooks. With the implementation of this project, students learned to analyze problems and solve them using critical thinking skills. In order to encourage the process, teachers were given the freedom to create their own curricula, consisting of hands-on activities to actively involve the students [Lalitpat, 2000; Ministry of Education, 2000].

The schools of Thailand have encountered many problems while trying to implement these plans, most of the problems dealing with cultural issues. One setback was that stability was taken away from the education system. With new educational reforms being implemented every few years, a number of policies and goals began to conflict with each other. Another disagreement arose when new training was provided for the teachers. The people responsible for the training were not qualified for the job, a situation that caused the teachers not to take the training seriously. Overall, the teachers did not think that the intentions behind the reforms were sincere. A lack of communication between the creators of the policies and the people chosen to implement the policies was evident. It was hard for the teachers to make a serious effort at reform when they did not understand why changes were being made in the first place [Townsend and Cheng, 2000; Office of the National Education Commission, 2000].

Similar problems can be prevented while working with the computer kindergarten at the DPF. When deciding on what course of action to take, it must be made clear that all intentions are sincere. Being consistent with what is done is an important part of making the project a success. It must also be demonstrated that the purpose for being at the kindergarten is serious. If all three of these conditions are met, hopefully some of the problems that the educational policy makers of Thailand have encountered in the past can be avoided [Townsend and Cheng, 2000].

2.3 Computers in Education

Ever since the introduction of the personal computer in the 1980s, there has been a heated debate among educators, government officials, and parents about the importance of computers in our school systems. From this debate, two groups have formed at

opposite ends of the spectrum: those who view computers as a threat to teaching and those who see it as a tool for teaching. One philosophy which supports the use of computers in schools, a constructivits', calls for a rethinking of the current teaching pedagogy to include computers. Despite the change, it could be very advantageous when using computers in education. Computers can also be excellent teaching tools in developing countries, where formal schooling may only be available for the rich. By creating more effective ways of using computers in schools today, and developing programs for the needy in developing nations, we can help to give children the best education they deserve.

2.3.1 Problems with Computers in Schools

Due to an increase in the use of computers in the workplace, as well as support for computers as a teaching aid, computers have found their way into 98% of schools in the United States [Khouri-Dagher, 2000]. Despite all the support that technology has gained, there are still many people who are skeptical about its usefulness, especially in an educational setting. Some people are not convinced that computers are the next step in the evolution of teaching.

By sitting in front of a computer, children may be preventing their natural social and intellectual growth. Childhood is the time when the mind is still developing and most open to stimulation. Children need to be developing emotionally, intellectually, and socially. Studies have shown that children need to have contact with other human beings. They need to experience the world through play and through actual contact with nature. Children should be learning by doing. There is no way that a computer can ever take the place of contact with nature and human beings [Alliance for Children, 2000].

21

Computers are being used in schools today, but much to the chagrin of some teachers, they can sometimes be seen undermining the progress that the teachers are trying to make [Khouri-Dagher, 2000]. By using the computer, students may not think about the structure of the paper. There is a concern that grammar and spell checking programs can hinder children. They may not take the time to learn how to spell words or form good sentences, letting the computer take care of the corrections for them [Khouri-Dagher, 2000].

Computers have only been accessible to the public and inexpensive for the past 20 years or so. Since then, advocates of the use of technology have pushed for the introduction of computers into schools. There have been promises of improvements in student achievement as a result of the new technology. Because of such positive promises, many schools have jumped at the idea of using computers to strengthen their curriculum. But, many schools are having problems obtaining funding for such a venture. They do not have the extra money in their budgets to spend on computers. As a result, the schools must sometimes cut other programs to create the money in the budget for computers. Schools are slowly cutting their music, art, and shop programs, as they are seen as less important today [Rukeyser, 2000].

Another issue of schools creating computer programs is the money needed to maintain the hardware. Many schools are getting equipped with the latest computer hardware on the market. But, at the rate that the technology is advancing, the machines will be out of date soon after they are bought. Then the schools will be left with obsolete machines and would be forced to find a way to procure more money to upgrade the machines, possibly at the cost of other school programs [Rukeyser, 2000].

Along with all these concerns of money, adding a computer program to a school may be premature because there has been no evidence that computers have done anything to improve student achievement. It simply has been too soon to tell if the computers are going to do any good in schools. One study, Apple Computer's "Classroom of Tomorrow," could only conclude from their widely followed project that the use of computers helped the students to collaborate on work as well as give the students more confident with learning and more self-sufficient. This is a positive outcome, but there was no evidence that the computers increased student achievement [Oppenheimer, 2000].

Some people against the use of computers in schools have likened them to two other technologies: television and radio. When they were invented, TV and radio were thought to eventually revolutionize education in our country. Supporters felt that their place in classrooms would be as common as the blackboard and textbooks [Oppenheimer, 2000]. But today, they are both used primarily as a form of entertainment. What if this is the path of computers as well [Khouri-Dagher, 2000]?

Despite all the arguments against the use of computers in schools, there still are those who can see the possibilities, not simply the present state of computers in education. The computer could be a very powerful tool, if used correctly, in educating children. Advocates of computers in education believe that there is a need to rethink the current teaching philosophies to include the computer, so as to utilize the its full potential as a teaching tool.

2.3.2 Constructivists' Approach to Computers in Schools

Many advocates for the use of computers in schools feel the best teaching philosophy is "constructivism," the idea that children perform better by actually forming,

23

or constructing, information and knowledge for themselves, rather than having it dictated to them by the teacher. Constructivism helps to accommodate different learning styles as well. The children are essentially in control of creating the knowledge for themselves. They are not forced to learn in a certain style that the teacher chooses. When teaching, an environment that suits the personal interests, styles, motivations, and capabilities of each child should be provided [Reeves, Pedagogical Dimension 2, 2000]. The children who go out and learn for themselves are more likely to be better at problem solving and much more creative [MicroWorlds Philosophy, 2000].

One key aspect of a constructivist's pedagogy is that it is tailored to each individual student. When children are learning for themselves, they can progress at their own pace. Students who may need extra time to fully understand some subjects do not have to worry about the teacher moving too quickly. The opposite of this is also true. For students who learn at an accelerated rate, there is no longer a need to be held back by the pace of other students. They can proceed at their own rate, hopefully moving on to a higher level knowledge, or even going back to review problem areas [Panel on Educational Technology, 2000].

The teachers' role in this philosophy is much different than that in schools today. Teachers choose what children learn about, and more importantly, how they learn. However, in a constructivist's pedagogy, the children would be able to choose for themselves what they wanted to learn. By giving children a chance to "find" their own knowledge, a certain level of interest can be ensured. If there were no interest in the subject, the child would not pursue it. With this change in position, how should the teacher teach so that the children will want, or be able, to create their own knowledge?

24

The teachers' role in this teaching style is as a source of support. The teacher must be there to help support the child "morally, psychologically, materially, and intellectually in their efforts" [The Children's Machine, 139]. The teacher assists the children in creating their own knowledge by centering lesson plans dealing with things that interest the children and that they understand.

There are several aspects about the computer that makes it a prime candidate to use when teaching with the constructivist philosophy. With all the theory behind a constructivists' philosophy, why are computers the tool for the job? Computers allow the user to engage it through any number of input devices such as the mouse, keyboard, and voice recognition. Once the computer has this input, it can rapidly process it. This limits the time the user has to wait for responses to questions or results of quizzes. The user can get feedback on their work quickly. This way, the students learn of any problems that they are having right away, instead of letting the false knowledge stay making it harder to "unlearn" [Fairweather, Gibbons 8-12].

Computers can also be used to simulate different real world situations. This is very helpful in giving the student knowledge that is applicable to the real world. Students can have experiences vicariously through the computer, which may not be possible otherwise due to cost restraints, resources, or location [Futrell, Geisert, 92]. Computers can accomplish this mainly due to the computing power, as well as its powerful display, the monitor. A computer simulation would lose its effectiveness if it did not portray the situation with realism. But, computers have monitors that are able to depict things in great detail including having the ability to use over a million different colors [Fairweather, Gibbons, 6].

Another way that the computer can be used to individualize each student's education is due to powerful memory capacities. Computers can store information about the course of the students' learning. It "remembers" the students' individual progress. Later, this can be used to create profiles that may be used to help address certain problems a student may be having [Fairweather, Gibbons, 12].

In India, Sugata Mitra, the head of Research and Development Department for the New Delhi branch of the National Institute of Information Technology (NIIT), is a strong advocate of the use of computers in education. His work focuses on Cognitive Systems, Information Science and Educational Technology, specifically on cognitive multimedia in education. His experiment with the use of computers by slum children has shown much of the theories of constructivism in a real life setting.

In January of 1999, without any announcement to the community, Mitra installed a computer kiosk -- a combination of a computer screen and a mouse pad -- into the outside boundary wall of the NIIT building in New Delhi, which faced into the adjacent slum. With a surveillance camera installed in a nearby tree to monitor use of the computer, Mitra simply sat back and observed. He found that mainly young children, ages 6-12, were utilizing the computer kiosk. Although most of them had never used a computer before, the children were able to learn how to use drawing programs and even to surf the Internet [Mitra, 2000]. Mitra contends that any child, through this "minimally invasive education," his term for the process, can gain basic computer literacy. The idea, as with constructivism, is that the children gain the knowledge for themselves by engaging the computer.

Mitra had shown that these children did not have a need for a teacher to learn how to use the computer. The main times that an instructor is necessary is when the children have come to a dead end, has nothing more to learn on their own, or if the instructor sees that they may be going in the wrong direction. In his experiment, seeing that the children had come to a halt in their learning, Mitra simply showed them that the computer could play music, and then walked away. Within a week, the children had found, on the web, information about mp3's, mp3 players and a plethora of Hindi music [Peterson, 2000].

Mitra has found that children can create their own knowledge through playing and experimenting in different ways [Mitra, 2000]. If children can obtain a basic level of computer literacy simply by playing around with a computer, there is significant potential for the computer to be used in education. As seen in this experiment, mirroring the views of constructivism and "minimally invasive education," children can create their own knowledge. Along with gaining their own knowledge, they are getting a higher understanding of the information because of the hands-on experience.

Even though computers have been shown to be excellent tools for teaching, one important issue that needs to be taken into consideration when adding them to the classroom is the ratio of computers to students. If there are too many students for each computer, it will be harder to keep students' attention on the computer. If this happens, the computers have no way of contributing educationally. It has been found that a minimum ratio of one computer to five students needs to be met to effectively use the computer [Panel on Educational Technology, 2000]. With this ratio, in a twenty-minute period, each student would get at least four minutes to work on the computer. Having

enough computers for the children is important to maintain interest and to effectively utilize the educational power of the computer [Panel on Educational Technology, 2000].

Choosing software that effectively covers the needs of the students can also be a very important process, specifically for younger children. One type of computer software that can be used in computer education is microworlds. Microworlds are interactive, educational software that engages the child in exploring and discovering information in a hands-on manner. The software is based on cause and effect navigation, giving the child control over what happens and where they go. By creating "worlds" for the children to explore, the curiosity is increased. They will have a desire to learn [Integrate, Don't Isolate!, 2000].

Seymour Papert, a leading authority on the use of computers in education, believes that the computer must be incorporated fully into the curriculum to effective use its full power as a teaching tool. He feels that a computer is just like any other tool used for teaching. How effective would a pencil be if they were simply placed in a classroom? It would not be as effective as being part of the teaching. Educators have made the pencil part of the educational process. It is not simply thought of as a peripheral object used in helping education. The way the computer is being used now is by simply placing it into a classroom to improve present teaching styles [Diversity in Learning, 2000].

Papert parallels the use of computers in education with the invention of the jet-powered engine through a mock story:

> As a work-out exercise imagine an early nineteenth century engineer concerned with the improvement of cross-continental transportation. Someone comes to them with a design for a jet engine. "Great" the engineer says "we'll attach this to stagecoaches to assist the horses." When they try they soon see that there is a danger that the engine would shake the vehicle to pieces. So they make sure that the power of the engine was kept down to a level at which it would not do any

28

harm. (It is not on record whether it did any good.) [Technology in Schools, 2000].

The idea here is that the jet-powered engine is not being used to it fullest potential because of the application. It is illogical to waste the power of the engine on the stagecoach. As a result, the airplane is invented. Papert says that in order to effectively use the computer (jet-powered engine), we need to rethink our educational system (stagecoach) to include it (airplane).

2.3.3 Computers in Developing Countries

Within one developing country, Brazil, the use of computers in education has seen to be more advantageous than in more developed countries such as the United States. Many people living in slums do not receive formal schooling, as they drop out to support their families. The immediate advantages of staying in school are not seen. But, within the slums of Brazil, there has been a successful program that has had an impact on keeping children in school. This program has shown that using computers in schools can give children the enthusiasm they need to continue, instead of dropping out early to support their families. The people living in slums can use the skills they learn on the computers to help them get much needed jobs, avoiding such things as drugs and violence.

In Brazil, there are major economic problems that prevent people living in slums, or favelas, from being able to advance economically. People living in the slums have a very hard time doing this because many children do not continue with their education; about three out of every ten children drop out [Bornstein, 2000]. Rodrigo Baggio, a computer science teacher in Brazil, has worked towards closing the economic gap

between the rich and the poor and keeping slum children in school. Baggio has done this by making the educational potential of computers available to people within the favelas. The motivation for his work came from a dream that he once had where he saw poor children in the slums using computers. Since then, he has worked at helping to give these poor children the chance to use computers and thus shorten the gap between the rich and the poor [Hart, 2000].

Before working with favela children, Baggio worked as a teacher in high-class private school in the early 1990s. He focused much of his teaching on discussing the problems in society, especially poverty. In an attempt to create discussion, and possibly change, about problems such as poverty, Baggio created a Bulletin Board System (BBS) on the Internet named "JovemLink" (YouthLink). The goal of this venture was to increase discussion among students and poor children about the problems in society. However, the project did not work because there really was no way for the poor children to access the Internet to take part in the discussions [Bornstein, 2000].

Although his first project had failed, Baggio now knew that to get children in the slums involved, that he needed to get them computers. Baggio began to make his plans by recruiting others teachers to help him in his work. In 1994, after gathering together several used computers through donations from businesses, Baggio created the first Community Computer School in Dona/Santa Marta. The school consisted of five 486 computers, a fax/modem and a color printer, and was housed in a local church [Hart, 2000]. The opening drew enough attention to be covered by eleven newspapers, three magazines, and nine television/radio shows [Bornstein, 2000]. In 1995, Baggio founded the Committee for Computer Science Democratization (CDI). Due to outside donations,

30

the CDI was able to set up many computer schools, similar to the one in Dona/Santa Marta [Hart, 2000].

Baggio has used these computer schools to give the people of the favelas a new chance at a better life. Through the use of computers, Baggio helped to give children a new view of education. Baggio even found that the students in the favelas learned much quicker than the students he taught in the private schools. They became aware of their own abilities and are able to see prospects for jobs in the future by continuing schooling, which helped with the students self-esteem [Hart, 2000]. Baggio used the computers to help educate the people of the favelas, creating a higher level of literacy, awareness about heath issues, promoting anti-violence, and teaching people how to be functioning parts of society [Bornstein, 2000].

Along with having a higher level of education, the people of the slums were able to get better jobs because of their experience with computers. Most children in the slums would drop out of school to get jobs, mostly as housemaids, office-boys, or unskilled workers in factories [Hart, 2000]. With the skills they gain, the children can get computer-related jobs. They even have the possibility of returning to a CDI school and teaching, as most of the teachers are returning students.

In one of the schools, one woman has benefited immensely from the computer schools. Before she went to the school, she could not read. With the help of one of the teachers, the woman used the computer and learned how to read and write. As a result she was able to create signs and letters to help advertise her baking sales. By the addition of these little advertisements, she was able to begin selling to people outside her

31

immediate neighborhood. With the extra income, she was able to fix up her house and buy herself a computer of her own [Hart, 2000].

In 1997, Baggio received a fellowship from Ashoka, an organization that provides donations to groups that are trying to deal with social dilemmas such as education, healthcare, or the eradication of poverty [Ashoka, 2000]. Through this fellowship, Baggio was able to get a donation of $50,000 and 120 computers. To date, there are 200 computers schools that service about 75,000 students in Brazil. Baggio and the people at CDI continue to create computer schools, now even branching into other countries. This is all in an attempt to help people living in slums get the educational and financial opportunities they need to create a better life for themselves [Ashoka, 2000].

Throughout the world, there are many problems caused as a result of financial differences, the gap between the "have's" and the "have-not's." Giving people in slums a chance to use computers can help to diminish this gap. Children in slums who use computers are gaining skills that they need to get decent jobs. Another result is children who are much more confident in learning and much more enthusiastic. They are more likely to continue their education. The problem now lies in developing programs that give children a chance to use computers, especially those in areas where financial problems do not permit the use of computers.

2.4 Computer Kindergarten at the Duang Prateep Foundation

Computer education is a valuable asset and is increasingly becoming invaluable for a person to work in today's society. Living in the slums of Bangkok is not a situation that fosters the education of children, and they tend to be left out of possibilities that could help them get better jobs. The Duang Prateep Foundation (DPF) runs a number of

low cost kindergartens for slum children to get the start of an education. Their goal is to provide the children to be able to get the best education possible. In January of 2000, a WPI IQP group created a computer lab at the kindergarten of the DPF in an attempt to enhance the kindergarten experience.

The DPF received a visit from Henry Strage, a WPI alumnus, who first presented the idea of creating a computer lab for the kindergarteners. He also provided funding for the project, since the DPF did not have the means to create the lab on its own. A WPI student project group, who the DPF sponsored in Thailand to begin the implementation, began the creation of the computer kindergarten last year. Even though there was money for the computers, both the teachers and the students had no knowledge of computers. The teachers would have to be trained in the use of the computers so that the children would be able to learn once the project group left. At the end of the project, the kindergarten had eight computers. The teachers learned everything that they would need to know in order to teach the children themselves [Curry, Waite, Weber, 49].

At the beginning of the project, there were four working computers that would form the teachers' lab, which was where the project group taught the teachers. At first, the teachers were hesitant and nervous because they thought they might break something, but they quickly became accustomed to using the computers. When their training was near completion, they even helped set up the lab designed for the students [Curry, Waite, Weber, 49].

The teachers were given a survey when their training was complete. It consisted of eight objective questions and eight subjective questions. The objective questions, which dealt with the teachers' confidence with their knowledge of the computers and

their parts, were almost all answered positively by the teachers. The group had completed its goal of educating the teachers so that they would be able to continue lessons after the IQP had ended and the group had to return home. The IQP did find that a few things were lacking, however. Not all of the responses were perfect. Half of the teachers failed to return their questionnaire, and not every teacher remembered everything that was asked of them. However, they were all observed by the group to be quite capable of teaching the students what they had learned [Curry, Waite, Weber, 49].

The students did not have the same apprehension the teachers did when they came to the computers for the first time. The group report stated that the children "were quick to take the mouse and explore on their own" [Curry, Waite, Weber, 49]. They enjoyed the experience of working with the computers, even though none of the children had gotten an opportunity to use one before. The children were not assessed on their advancement, as the group had to leave after only two of the lessons were complete [Curry, Waite, Weber, 49].

The software the group picked for the students was educational software in both Thai and English. They were Microsoft Paint, "Elmo's Art Workshop," "Music Maker," "B-Jigsaw" for the English software titles and "Animals at the Zoo" and "Magic Kids: Fun School" for the Thai software [Curry, Waite, Weber, 32-35]. These pieces of software were chosen because they were easy to use and fun for the children, and also because some of it, like Paint and B-Jigsaw, was freely available.

The project group created the teachers' first lesson plan for teaching the students about the computers. It was the aggregation of the knowledge the project group wanted the children to have after the first lesson was over. They did not create a lesson plan for

the second and subsequent sessions, as they wanted the teachers to be more comfortable with creating these lesson plans themselves [Curry, Waite, Weber, 49].

The students were taught the very basics of computer use and maintenance. The teachers taught the material the same way they learned it from the project group. The students learned about using the dust covers that were provided for each computer to prevent damage. Then they learned the terminology for each part of the computer. Much of the initial interaction with the computer itself was with Microsoft Paint for the basic mouse practice and calisthenics. Both the students and the teachers were given much free time to simply explore the computers and learn on their own [Curry, Waite, Weber, 49].

Now that we have spent some time at the DPF ourselves, we have seen the amount of help it has given the kindergarten. However, while the previous group's work has been appreciated by the DPF, it was not enough to ensure a proper foundation for future growth. We will evaluate the state of the kindergarten to find out what needs to be changed or improved.

3. Methodology

The goal of this project was to improve the computer kindergarten program at the DPF in an effort to make the program more self-sustaining. To accomplish this goal, we needed to determine what it was that the DPF Kindergarten needed to build a strong base, one that could continue on without yearly assistance from WPI project groups. In an effort to understand the present state of the computer program, the facilities were evaluated and interviews were conducted with the staff and teachers at the DPF. After gathering much information at the DPF, a visit to a more established computer program was undertaken to assess any options we would have to implement at the DPF. Our final step was the analysis of the data and subsequent decision on the most beneficial course of action.

3.1 Assess Needs and Options of the Duang Prateep Foundation

Since the first introduction of computers to the DPF kindergarten and its teachers, almost an entire year has passed. When we started this project upon our arrival in Thailand, we had no idea of what the condition of the kindergarten would be. To begin, an evaluation of the kindergarten room and the computers was done to identify problem areas. In order to gain further insight into how the computer kindergarten had run in the past year and identify possible improvements to be made, the teachers and the staff were interviewed. Options for improvements were also found and evaluated.

3.1.1 Examination of Computers and Facilities

During the first week of work at the DPF, we evaluated the facilities used for the computer kindergarten. It was important to have a good understanding of how the kindergarten lab was set up and how the computers were running. In the evaluation, we took into consideration both the computers and the room the computers were located in. The evaluation criteria of the computer room and the computers can be found in Appendix A.

The evaluation of the computers was conducted first. Any number of things could have happened over the year, including infection from viruses, general downtrodden condition of the software and running system, physical damage, or hardware failure. We created a checklist for the evaluation of the computers so that we did not overlook a factor on any one computer. The checklist is not an exhaustive list of what could be wrong with the computers, and contains only what were likely problems. Any aberrations that did not appear on the list were recorded. The evaluation only covered the main students' lab and not the separate teachers lab. It was found through our liaison, Khun Khantong that the teachers chose to use the children's computers, as they were much faster.

The room containing the computers was evaluated as well. As some of our initial plans for implementation included adding computers and interfacing with the telephone system, there was need to evaluate the feasibility of each. In adding new computers, issues such as the amount of electricity that could be safely drawn and space constraints were considered. As for the inclusion of Internet access, there had to be an easy access to telephone lines.

3.1.2 Staff and Teacher Interviews

While the information gathered from the observations of the rooms and computers told us a lot about the condition of the kindergarten, we still had very little information about the day-to-day operation of the kindergarten and the DPF itself. By talking with those people of the DPF who were familiar with the kindergarten, we could learn more about the present state of the computer kindergarten as well as problems that have occurred over the past year. It would also give the DPF a chance to voice any concerns or wishes they may have for further implementation. From this, a better course of action could be determined.

On our first visit to the DPF, we were eager to get all the information we could about the kindergarten. We met with our liaisons, Khun Khantong, Dr. Vithavas, and the founder of the DPF, Khru Prateep, along with the heads of the administration and the department of education at the DPF in order to find out what state the computer kindergarten was in. Dr. Vithavas served as the translator, as the head of the administration and department of education did not speak English. This was an informal meeting, with no set questions, but it did serve to give us a much more in-depth understanding of the kindergarten's operation than we had before. They were very forthcoming about telling us what they wanted and needed from us. Our meeting gave us a good insight on how the kindergarten runs and what we need to accomplish in order to best serve it.

The teachers were the biggest influence on the direction of our project, since they were the people who needed to be able to use the computers comfortably and knowledgeably. Our interviews with the teachers had three major objectives. We needed

38

to determine the average computer experience and knowledge of the teachers. Also, we wanted to find the usage of the computers and software as it related to the children. And finally, we tried to determine how involved the parents were in their children's educations. A series of formal interviews were conducted with the teachers in which we asked them questions concerning these main topics. The interview questions are listed as Appendix B.

In interviewing the teachers at the DPF, we wanted to make sure that we would get the most honest and accurate responses from our questions. To accomplish this, we did several rounds of pre-testing. By reading the questions to an individual with a similar background to those whom you will be interviewing, you can find out if there are any problems, inconsistencies, or possible unintended offensiveness in the questions. Pre-testing is perhaps the most important part of the process for creating an effective interview.

Our initial pre-test was conducted with Aacaan Sumalee, our Thai language teacher. Aacaan Sumalee is Thai and has a good understanding of the cultural differences between Thai and American people, as she has lived in both countries. She informed us that it was important to make sure that our respondents know that we need their help and how their answers will benefit them in the future. By keeping them informed why we are interviewing and what we plan on doing, our respondents will be much more forthcoming in their answers. After altering our questions to fit the advice from Aacaan Sumalee, we pre-tested the questions with our liaison, Khun Khantong. It was also important that he have advance knowledge of the questions, as he would be our translator.

We interviewed seven out of the sixteen kindergarten teachers at the DPF. Khun Khantong did the running translation of the questions as we asked them. First, we interviewed the two teachers who taught the computer classes for the children. After the interview questions were finished, they were more than forthcoming about things that they thought should be changed or added in the kindergarten. After we interviewed those teachers, we interviewed five others who did not have as much experience with the computers as the first two.

The interviews were conducted in two sessions and in a focus group style. We did this because it was more convenient for the teachers and it fit into their schedule better. Not all of the teachers spoke during the interview, and chose to let one or two do the speaking for the group. When prompted for individual input, however, they did not hesitate to answer. Those teachers also did not object to anything the main speaking teachers said.

The answers regarding teacher computer experience were used in planning the refresher courses that we taught in the following weeks. It was important that we were able to tailor the courses to what the teachers wanted to learn about and what they needed to learn, as we did not want to waste any valuable class time. We regarded these responses as the most important ones of the interviews, since without well-trained teachers, the children would not benefit as greatly from the computers.

3.1.3 Sriwittayapaknam School visit

After we had interviewed the teachers, we had a very good idea of what we could do to provide a strong base for the kindergarten. However, we had exhausted the information we could get directly from the DPF. There was a need to find other similar

programs to the DPF computer kindergarten program so that we could draw upon what other programs have found to be successful. In order to gather ideas about ways to improve the computer kindergarten, we visited the Sriwittayapaknam School. A list of the questions asked at the school appears in Appendix C.

The Sriwittayapaknam School, a private school located just outside of Bangkok, was chosen as a model for options for several reasons. This school has an excellent computer program, very similar in setup to the DPF's program, with 150 computers for the students to use. At the kindergarten level each student gets an hour every week in the computer lab. In addition to this time the students can use the computers during lunch or on weekends. There are different levels of the kindergarten just as there are at the DPF. Because some of these students are so young the curriculum for this level is based on simple programs that build memory and thinking skills. Richard Barrow and the principle of the school, Seesagoon Krishanachinda, were quick to offer us advice on how to choose the most effective software, but they explained that purchasing software was a trial and error process. By examining the features of their software packages and by testing programs recommended by Mr. Barrow, we compiled a list of possible options.

The computer program at the school is only in its fifth year of existence and, according to Mr. Barrow, went through some of the same problems that the DPF is experiencing now. Their teachers, like the teachers at the DPF, were not previously trained in how to use the computers. The teachers gained proficiency in teaching the kindergarteners with computers by using them on a daily basis. Like the DPF, there are two teachers who are in charge of teaching the computer classes to the kindergarteners.

While these classes are going on the regular kindergarten teacher is also present to aid in the instruction of the children.

3.2 Analysis Methods and Implementation

After all of the data had been gathered, we analyzed it in order to create a plan of action that would further the goal of our project. The data gathered consisted of the needs of the kindergarten as well as other options that could be implemented. We analyzed the data so that all of the possible options available to us in improving the kindergarten would become evident. After the analysis of the data was complete, we conducted analysis of the options themselves to find the best plan for meeting the needs of the kindergarten and meeting our goal of creating a self-sustaining kindergarten program.

Most of the information obtained had come from interviewing, both formal and informal. To extrapolate information from the interviews, we did content analysis of the transcripts. This technique was used to analyze the interviews in a qualitative manner. In reviewing the interview transcripts, we looked for any similarities or themes in the responses. By identifying any reoccurring themes, the information could be used to develop several courses of action. Also, in developing the plans, information that was gathered at the Sriwittayapaknam School visit was incorporated to aid the analysis of possible implementations. Using the themes and options that the analysis of the information presented us, we created a list of all the possible courses of action we could take that would satisfy a need or option of the DPF. The compilation of this list ensured that all possibilities were taken into consideration.

We then performed a cost/benefit analysis of all the options that we had compiled. Each plan was evaluated concerning how important it was to achieving out goal as well as what costs were involved with implementing the plan. Some of the costs involved included the actual monetary cost of implementation and the amount of time we had remaining for the project. The cost/benefit analysis was conducted in such a manner that plans that were not feasible, not appropriate, or not an aid in creating a self-sustaining program were culled from the final implementation plan. Some of the courses of action, which were left out of the final plan, were available as recommendations for future groups to implement since, while they would eventually help the kindergarten greatly, they would not serve in building a self-sustaining program. Several courses of action were decided upon for the final plan once all the data was analyzed. These courses of action all aided the goal of helping to improve the computer program at the DPF.

4. Results and Analysis

Through analysis of the data gathered from the DPF and the Sriwittayapaknam School, three evident ways in which we could improve the computer program at the DPF emerged. The initial finding from the interviews was that there was a need to continue the education of the teachers in basic computer techniques. It was also found that the children at the DPF were not getting enough time on the computers. The software available to the children was not varied enough, as they only used two to three different software packages. This section contains the full results of our data gathered, along with explanations of how the needs of the computer program at the DPF were met.

4.1 Education of the Teachers

In the first few weeks at the Duang Prateep Foundation, a basic need for the continued computer education of the teachers came to light. As a result of inexperience with computers, it was identified that the teachers retraining would have to cover material from their initial training as well as teaching new information. To promote a more self-sustaining program, there was also a need for the teachers to retain the information after the lesson. This section contains information about how we dealt with these two issues.

4.1.1 Teaching the Teachers

Through qualitative analysis of our interviews, the retraining of kindergarten teachers was found to be an essential step of our project. It was found that all the teachers would need to be taught more about the use of computers. The first lesson plans consisted of the basics of using the computers. There was also the introduction of new

software for the teachers to use with the children. The final lesson conducted was used as an introduction to use of the Internet.

It was found from interviews with the DPF staff that not all the teachers teach with the computers. Although two of the kindergarten teachers had taught with computers in the last year, the remaining fourteen teachers had not. Though the previous teaching session given by last year's group was complete, lack of constant use by the fourteen teachers caused them to forget much of what was taught. The content and focus of the lesson plans were designed based on material forgotten by the teachers along with new information that would be needed by the teachers.

Another reason for continuing the education of all the teachers, and not simply the two who taught them currently, was that the other fourteen teachers would eventually teach with them computers. There was a need to continue the education of all the teachers at the DPF because each year, the teachers rotate jobs. In essence, two new teachers will be teaching with the computers in the coming year. To help them to prepare for taking over, we found that a refresher course on computer basics, along with continuing the education further, would be necessary.

The lesson plans were designed around the needs of the teachers. These needs were derived from our interviews with the teachers and observation of the teachers during the first lesson. Through interviews we decided to provide the refresher content with the lessons. For example the teachers expressed that finding files was a problem in the interviews. Our observation of their use of the computers during the first lesson augmented their need to learn this apparently absent skill. Observation of the Sriwittayapaknam School kindergarten as well as the interviews conducted there also

affected the lesson plan content. One method of teaching that was used during the lessons was the lead-by-example technique, which was used at the Sriwittayapaknam School. Examples were given, and then time was allocated for the teachers to explore the computer using newfound techniques provided by those examples.

Because of time and classroom constraints, the sixteen teachers were divided into two groups of eight. The first group consisted of the two computer teachers along with six others. The second group contained the remaining eight teachers in the kindergarten. Each lesson was broken up into three-hour sessions.

The first session on the first day of instruction was a review of computer basics. This includes parts of the computer, booting up, basic mouse and windows techniques such as dragging, and lastly, Microsoft Paint. The first lesson was tailored so that the teachers would gain basic mouse proficiency and learn the various parts of the computer. Microsoft Paint techniques were taught because it illustrates many basic mouse uses as well as it is one of the programs that the children use in the computer class. A Microsoft Paint and Microsoft Word tutorial that included skills such as copy, cut, and paste, opening a document, and creating a new document was prepared in case the first group was fast to learn the prior material. Though Microsoft Word would not be introduced to the kindergarteners, the teachers could use it to build text documents, i.e. lesson plans and newsletters. An allotted amount of time was given to the kindergarten teachers for exploration of the Microsoft Windows environment. We demonstrated the shutdown procedure to the kindergarten teachers and administered an informal quiz on the material, which concluded the first session.

The second learning session included a more detailed look into the workings of a computer's functions as well as some software instruction. Files and directory structure were covered, namely the creation of new directories and files. The find file command was incorporated into this lesson plan. These techniques were especially important since many teachers stressed that they had forgotten directory structure basics during the interviews. A CD-ROM tutorial was created to give the teachers skill in handling compact discs and accessing them using a CD-ROM drive, important as all the software is stored on CD's. The session also involved a review of starting and operating the children's software, a method that incorporates the CD-ROM and other Microsoft Windows techniques. During this lesson, we introduced two new pieces of software, CD Learning Center and Elmo's World. The teachers were extremely pleased with both pieces of software. An informal quiz on the more advanced material was presented ended the session.

During the interview process, some teachers expressed a desire to learn about the Internet and surfing the World Wide Web. The teachers had many benefits of using the Internet such as communication with other kindergarten teachers, downloading educational programs, and downloading graphics. Though an Internet connection could not be implemented in the computer kindergarten for the children's use, we surmised that the teachers would benefit greatly from learning how to use the Internet. It would help to lay the groundwork for adding an Internet connection in the future.

The third lesson involved the introduction to using the Internet and networking basics. Using Microsoft Internet Explorer, the teachers were instructed in basic ways to explore the Internet. Navigational buttons, the reload function, and the home page button

are examples of what was included. The concept of a home page was taught as well as the process one uses to set a home page. The teachers were given links to enter into the URL window and browse to. Hyperlinks were explained by walking the teachers through a sample page created to simulate a real web page. This Internet session was concluded with the disconnecting process. Networking was covered next, especially the network structure of the kindergarten. The hubs and Ethernet card connections were included in this section of the lesson. The teachers were taught how to configure the network and restore it to its natural state if a problem occurred. Sharing files was demonstrated by an activity where the teachers had to find Microsoft Paint on an arbitrary computer residing on the network and copy it to their respective desktops.

4.1.2 Developing a Manual

One major concern for the program at the Duang Prateep Foundation is to eliminate the need to retrain the teachers with the computers every year. Because of this, we developed a quick reference manual for the teachers at the DPF. This manual for the teachers has the possibility of being one of the most important items that we leave behind. It will be the teaching aide that the teachers can use to refer to if they need more information. In designing the manual, two main issues have arisen concerning its creation: the amount of detail in it and the language it is written in. By dealing with these issues, the manual will be much more effective and a major benefit to the teachers.

The first issue we addressed while creating the manual was the amount of detail that it contained. In the interviews with the teachers and staff, it was found that the teachers did not refer to the lesson plans that were left at the DPF last year. The teachers said that they would have used the lesson plans but they did not have enough detail in

them. The lesson plans were written more like an outline, while the WPI students provided more explanation to the teachers during the class. It made it impossible for the teachers to gain anything by reading the lesson plans by themselves. The reference manual has full, step-by-step instructions about how to accomplish certain tasks, and gives enough detail, both in explanations and illustrations, that the teachers will be able to use it to maintain their computer knowledge.

The second issue that was taken into consideration was the language barrier. These teachers have a limited knowledge of English. To handle the language issue in the best way possible, we took the manual to a translation service to have the English translated into Thai. The manual contains all the information that was taught during the lessons to the teachers. They will be able to use it to look up any information that they may need to "relearn" in the future. The English version of the manual can be found in Appendix F.

4.2 Addition of New Computers

Analysis of both interviews with the teachers and the heads of staff provided arguments for the addition of new computers at the Duang Prateep Foundation. The amount of time that each child is given on the computers is short. Due to the large number of kindergarteners present at the DPF, this problem was dealt with by the addition of more computers. Maintenance issues such as repair and upkeep due to the larger number of computers also had to be addressed.

The children may not be getting the most out of the computers as a result of the amount of time they get to spend on the machines. Each student gets approximately one half-hour on the computer every two weeks. This amount of time is very minimal. It is

49

compounded by the fact that it takes the children a while to become comfortable with the computers and software. It was found from the computer teachers at the DPF that it takes the children four sessions to become fully capable and comfortable with using the computers. With the amount of time they get on the computers now, it takes them around two months before they are comfortable with the computers. To help give the children a better, more effective learning experience, computer usage time needed to be increased. The best way to do this, without rescheduling the entire school day and disrupting their other studies, was to increase the number of computers.

After communication with WPI alumnus Henry Strage, the sponsor and founder of last year's IQP effort, an argument to fund the expansion of the computer kindergarten was prepared. Through interviews it was found that purchasing twelve new computers, bringing the total number to twenty, was appropriate in providing an effective learning experience. Through our observation of the kindergarten facility, it was discovered that the physical space available was able to contain twelve new computers. With the addition of more consoles, this two-month acclimation period is more than cut in half.

Through careful searching at Panthip Plaza, the computer mega-center of Bangkok, we found Hardware House Inc. to be the best option for purchasing hardware and other peripherals such as power supplies and a new 16-port hub. The same company was used last year because of the low price and good warranty. Since a major part of enhancing the computer kindergarten is providing longevity to both the previously purchased and new equipment, a new warranty covering all twenty computers was purchased. A financial breakdown and specification list of the equipment can be found in Appendix E.

With the addition of new computers, maintenance also became an outstanding issue. After an interview with a representative from McKinsey & Co., it was found that prohibitive costs and the complexity of communication would prevent a technician from being hired. Also, training an individual from Klong Toey, for instance a kindergarten teacher, would prevent the need for outside help, but would take a large amount of time and would introduce skill and reliability issues. The best solution was to extend the warranty at Hardware House Co. so the computers could be brought back. To provide structure and longevity to this maintenance plan, a log was introduced to the teachers. Whenever something unexpected or wrong happens with one of the computers, it must be logged under its respective computer number along with a description of the problem.

4.3 Introduction of the New Curriculum

By analyzing all of the information gathered while working with the DPF, the need for a new curriculum in the computer kindergarten was established. The main objective of the kindergarten, which is to provide the children with a stimulating foundation for their education, was taken into consideration when deciding on how to improve the curriculum [Duang Prateep Homepage, 2000]. All of the interviews showed that in order to enhance the existing curriculum new software was needed. A visit to a school with an exceptional computer education program helped establish what type of software to purchase. Using the ideas gathered from this visit along with the information gathered at the DPF, four software packages were purchased to benefit the children of the computer kindergarten.

During the research and data gathering period, it was discovered what aspects of computer software are valuable for early child development. All three software packages

that were purchased possess these qualities. The programs include activities that encourage learning by doing and allow the children to proceed at a speed that is comfortable to them. When children make the choice to learn, and do so at their own pace, they gain creativity and improve their problem solving skills. Each of the programs provides rewards and encouragement when the child has correctly completed an activity. As mentioned in a previous chapter, Maria Montessori and others advocate that children learn best when they are encouraged. The activities in these four software packages promote exploration of different areas, generating curiosity and the desire to learn in the children of the kindergarten.

Analysis of the interviews with the directors and teachers at the DPF showed that the selection of software the kindergarten owns is limited. There are two pieces of software that they frequently use, "B-Jig Saw" and "Elmo's Art Workshop". The two computer teachers expressed a need for more software that had characteristics similar to these two programs. Our liaison, Khun Khantong conveyed that limited software was one of the computer kindergarten's biggest problems. He also expressed that the purpose of the computer classes is to break up the children's day and to give them experience with using computers. Remaining consistent with this intention, the types of software that the two computer teachers prefer is not necessarily used to educate the children, but to keep them entertained.

During the past year, "Elmo's Art Workshop" and "B-Jig Saw" have become the most popular software programs among the children because they possess excellent qualities. "Elmo's Art Workshop" is a program that builds hand-eye coordination and stimulates auditory learning by allowing the children to dress up Sesame Street

characters. The program has a variety of characters and uses numerous sounds, which are two characteristics that appeal to the children. "B-Jig Saw" is a program that enables the children to create jigsaw puzzles out of existing pictures or ones they have created in Microsoft Paint. The skills this program promotes are shape recognition, problem solving, and process of elimination.

"Animals at the Zoo" and "Magic Kids: Fun School" are two pieces of Thai software that have been rarely used by the kindergarteners during the past year. These two programs focus on educating the children, while the two programs described above focus on keeping the children entertained. The two computer teachers had expressed during their interviews that the Thai software uses sounds that are unclear and dull colors that are ineffective. Because the quality of the Thai software is lacking and is not entertaining, these two programs are not used often in the kindergarten.

To ensure that new software would not go unused at the computer kindergarten, the results of the interviews with the people from the Sriwittayapaknam School and the DPF were analyzed. During the visit to the Sriwittayapaknam School a list of potential software packages was generated. This list served as a guide while purchasing software, but it was also made certain that the programs contained all of the important qualities discovered. During the interviews, the two computer teachers at the DPF expressed that the children prefer English software because it uses a wide variety of shapes, colors, and sounds. It was discovered from Khun Khantong that most of the teachers at the DPF could only understand a small amount of English. So it was also important to ensure that the programs could be used without a solid understanding of the language.

The first piece of software purchased was "Jump Start Toddlers," by Knowledge Adventure. Children from 18 months to 3 years are the ones targeted by this particular program, so it is especially useful for the children in Kindergarten 1, but can be used by the other levels as well. The program has a number of activities that help children with recognition and pronunciation of English letters and numbers. There is also a toy building activity, which helps children become familiar with different shapes and colors. An example of a toy wagon being created can be seen in Figure 2. Some of the other skills that this software benefits are mouse control, listening skills, and the ability to find similarities and differences.
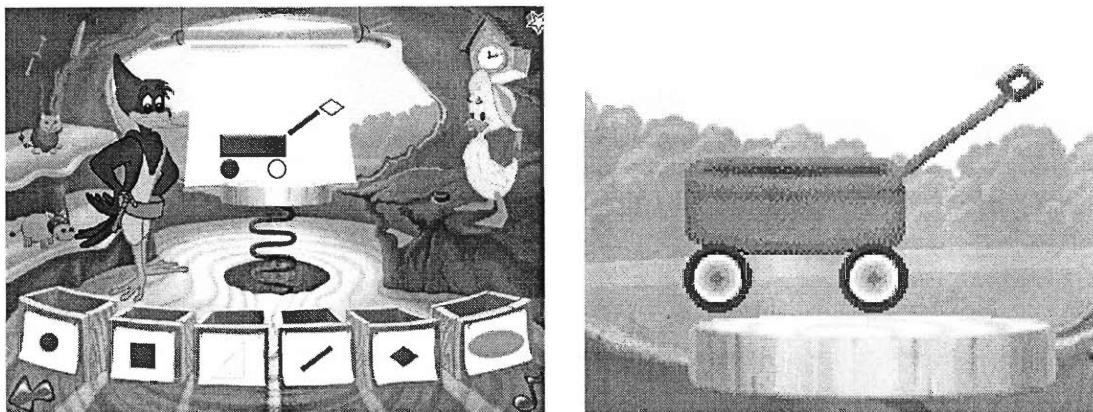
Figure 2. Building a Wagon in "Jump Start Toddlers"

The second piece of software purchased was "Big First Grade," by CD-ROM Learning Center. The program is in English and ideal for children ages 5-7. The activities in this program help to build the same skills as "Jump Start Toddlers," but in different ways. There is a concentration game to help improve memory skills, a drawing and painting program to help learn colors, and short movies to keep the children entertained. One of the activities that can help the children to recognize sequencing of

English letters and numbers is the "Dot-to-Dots" activity. Figure 3 is an example of a cat being created by connecting the letters of the English alphabet.
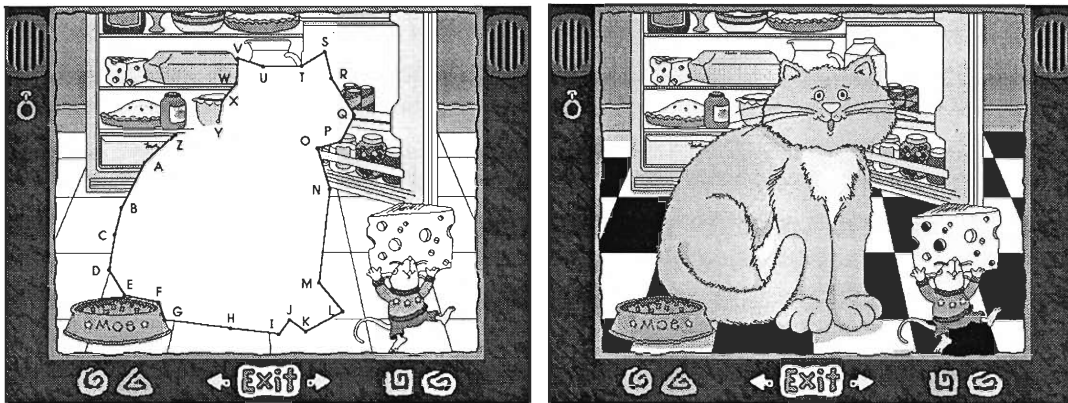
Figure 3. Making a Cat in "Big First Grade"

"Furby Babies Nursery School," by Europress is the third piece of software obtained, and is recommended for children of all ages. Children are rewarded when they complete an activity by being able to play with a virtual furby baby, which can be seen in Figure 4. Some of the activities the children can do include catching balloons to give to the furbies, playing a furby board game, and matching the correct hat to the baby furby. These activities help to improve hand-eye coordination, recognition of English numbers, counting skills, and the ability to find patterns.

Figure 4. Virtual Furby Baby

The last piece of software that was purchased was "Create and Draw in Elmo's World," by Sesame Street. This software package concentrates on encouraging children's creativity. It allows the user to draw an object, such as a train or a boat, and then animates it in a movie-type setting. One activity helps the children learn about different animals and the sounds that they make by transforming Elmo into a variety of figures. Building hand-eye coordination and understanding cause and effect are two concepts that this software promotes. It is recommended for children ages three and up, so it is appropriate for the children in all three kindergartens.

By the addition of new software to the curriculum, the children can have a more enriched experience with the computers. This software can both entertain the children, as well as help them to develop many skills that are necessary such as critical thinking, process of elimination and concentration. With a variety of software, the children have no reason for getting bored or distracted when using it. Through our addition, the children will benefit greatly from this software.

5. Conclusions and Recommendations

The computer kindergarten program at the Duang Prateep Foundation, being only one year old, is still in its infancy. Because of this, now is the perfect time to help the DPF make its program more self-sustaining. We, through the course of this project, have improved and strengthened the kindergarten through several actions. By providing continued education and detailed manuals, we want to eliminate the need for continued assistance from WPI IQP groups. To enrich and enhance the children's experience with the computer kindergarten, we've increased the number of computers as well as introduced a new curriculum. Along with our work at the DPF, there are several other ways in which the computer kindergarten program could benefit from greatly.

Our initial concern was the continued education of the teachers. In the year that has followed the introduction of the computers, the teachers have learned much about computers. However, they do not get enough regular practice with the computers themselves. As a result, we conducted three training courses with the teachers, helping to give them a stronger base of knowledge about using computers. A manual, translated into Thai, was also developed for use after our project has ended. By using the manual, the teachers can go back at any time and relearn material that they may have forgotten. Even though they may not teach that year, if they were to teach in the near future, it would benefit them greatly to have retained the information.

Another problem that was prominent before this project started was the amount of time that each child had on the computer every other week. One half-hour every two weeks was insufficient for the children to properly become accustomed to the computers.

By adding twelve new computers to the kindergarten, we have alleviated that problem. Maintenance of these computers was addressed by both the warranty and a logbook created for the teachers to use. By recognizing common themes among entries in the logbook, problematic issues could be identified quickly.

The expansion of the computer kindergarten curriculum by addition of software was a very important step in our project. Through observation and analysis of the current state of the curriculum at the DPF, we have discovered software should be purchased with variety in mind. Features such as cause-and-effect activities, pattern-based games, and colorful graphics build hand-eye coordination and concentration skills. These qualities were the criteria for our software selection process because of their importance in a child's intellectual development. Also, a large selection of suitable software will enable teachers to switch programs often, thus keeping children from distraction.

Our work at the DPF has helped the computer kindergarten program to become a more robust and self-sustainable program. However, much can be done in the future that can help improve the program and continue the success it has already had. The DPF must take precautions against any physical damage the computers may have, such as fire insurance. The DPF should keep in touch with a more established computer program as well as make their program more widely known through a dedicated web page. By connecting the computer lab to the Internet, the teachers will have a valuable resource to use for themselves and the children. Finally, to help maintain the working state of the computers, a technician should be appointed at the DPF. Through these recommendations, the computer kindergarten program at the DPF will be one step closer to becoming self-sustaining.

The DPF must take certain precautions to ensure the continued existence of the computer program at the DPF. One major problem in the Klong Toey slum is the possibility of fires. If there were to be a fire at the DPF, specifically involving the computers, the damages and resulting costs of replacement and repair of computers and facilities would be substantial. Despite this, the DPF does not have fire insurance for the computers. It is extremely important that the DPF have insurance for these machines due to the amount of money that has already gone into them. It would be a mistake for them not to take the necessary precautions against damages.

To help insure the sustainability of the computer program at the DPF, we recommend furthering DPF teacher ties with the Sriwittayapaknam School. The computer program at this school is in its fifth year of existence and contains 150 computers. As the Sriwittayapaknam School has gone through many of the problems as the DPF is having now, they would be able to help in dealing with these problems. They could also give suggestions on how to avoid problems in the future. The teachers between the schools would be able to share information about software and teaching techniques that they have found to work best with the children. Also, the shared experience in working with the computers would allow the teachers from both schools to ask questions and get answers from each other, creating a richer environment. To begin this connection between schools, we brought the DPF teachers to the Sriwittayapaknam School. We feel that this is the first step. In our absence, we strongly urge the DPF to continue to stay in contact with the Sriwittayapaknam School.

In order for the DPF to raise the exposure of the computer program, we recommend that the DPF create a dedicated web page to it. Publicity is an excellent way

to receive assistance and recommendations that provoke new ideas. For example, the extensive web page dedicated to the computer classes at the Sriwittayapaknam School helps to get them new sponsors for funding as well as useful advice. The Duang Prateep Foundation has plans to revamp its entire web page, so a section dedicated to the computer kindergarten could be easily integrated. It could serve as the clearinghouse for all the information that relates to the kindergarten and computers in education.

In the future, the teachers at the DPF would benefit greatly by connecting the computer lab to the Internet. Most of the teachers had shown an interest in learning how to use the Internet, and because of this, we offered an introductory training session. By using what they have learned from our course, they could contact other schools, search for educational software, and download movies and pictures for the children's benefit. If the teachers became proficient in using the Internet, they could update the computer kindergarten section of the DPF web page and keep the world informed about its progress.

Although our liaison, Khantong Dalad, is the only person able to maintain the computers at the kindergarten, there should be someone dedicated to this job. These tasks are time consuming and are neither part of Khun Khantong's job nor anyone else's. By appointing a manager for the computer kindergarten along with formulating a responsibility list for that person, problems that arise can be dealt with in a timely manner. A teacher or a member of the community could do this job, given that the proper training was involved. If a problem for funding were involved in training someone, the DPF could find someone willing to donate his or her services.

During our time in Bangkok, we have done much to strengthen the computer kindergarten program. The computer program is a work in progress. It has the ultimate goal of becoming a self-sustaining program. Because of our work and the possible implementation of our recommendations, we are confident that the DPF will be able to become independent and no longer require outside assistance.

6. Appendices

Appendix A – Computer and Room Evaluations

State of Computers

1. Has the dust cover been used consistently?

2. Is there any physical damage to the computer (cracks, etc.)?

3. Are there any other physical problems with the computer (dirty mouse, broken or dirty keys, etc.)?

4. Are all the components working?

5. Is the computer properly connected to the network?

6. Can the computer use the CD-ROM over the network?

7. Can the computer print over the network?

8. Are there any viruses on the computer?

9. Is there any extra software installed on the computer?

10. Has any extra hardware been added to the computer?

Condition of the Kindergarten Room

1. What is the maximum power allowed for the combined outlets in the room?

2. How much power are the computers drawing?

3. What are the physical dimensions of the room?

4. What are the approximate dimensions of the current computer area?

5. Are there any telephone jacks in the room?
   a. If not, where are the closest telephone jacks?

6. Has the security of the room been breached?

Appendix B – Teacher Interview Questions

Education

1. What subject do you teach?

2. What are the children taught when not using the computers?

3. What do the children like learning about most?

4. In which areas do they have trouble learning?

5. Do the kids ask to use the computers more after class?

Computers

1. Is there anything about the computers that you would like to learn more about?

2. Do you use the lab manual when there is a problem with the computers?

3. Do you ever re-read the lesson plans if you forget how to do something on the computer?

4. If something goes wrong with the computer, do you think you could be able to fix it?

5. Have you ever used the Internet before?

6. How often do you use the computer? If not often, why?

Software

1. Which software do the children use the most?

2. Is there any software that never gets used?

3. What do the children like about the software they use? What do they like least?

4. What features (subject matter, features, etc.) would you like to see more of in the software?

5. Do you know how to use all the software?

6. Do you prefer English of Thai software?

Parents

1. What role do the parents have in their children's education?

2. Are the parents informed about what goes on at the kindergarten?

3. Would you know if the parents like or dislike the use of computers in the kindergarten?

4. What happens to the kids after they leave the kindergarten?

Appendix C – Questions for the Sriwittayapaknam School Visit

1. What software do your students use? How did you come about selecting that software for them? What ratio of Thai to English software do you use? Where did you get your software?

2. Do the computers have Internet access? How is it paid for and how is it maintained? Who is your service provider?

3. Have you made any deals with computer hardware companies for either reduced prices or service and support?

4. How do you deal with technical problems like failing components and viruses?

5. How do you keep your teachers trained and up to date on the computers? How do you train new teachers or anyone else who has never used a computer before?

6. Do you have any type of maintenance manual that can be used as a reference for the teachers?

7. How often do the children use the computers for educational purposes? Do they have a schedule set up for their usage? What subjects do the students learn on the computers?

8. We believe that it would be in the interest of both the Sriwittayapaknam School and the DPF Kindergarten if we could work out some sort of relationship. Would you be interested in helping us form that relationship?

9. Do you have any computer-related programs that take place outside of the normal school hours?

10. How proficient are the children with the computers before they get to the school? If they are not proficient, how long does it take for them to become comfortable with using them?

11. How has the introduction of computers to the school effect the students enthusiasm and achievement?

12. Have any parent-oriented programs been implemented to keep them informed about the use of the computers in the school?

Appendix D – Teacher Interviews

Interview #1

1/18/01
1:30- 2:15 pm
Jon- Interviewer
Amy- Note taker
Khun Khantong- Translator
Khru Hong Netlacat- Interviewee
Khru Geetlapon Kudomblap- Interviewee

The two teachers we interviewed are the two who mainly use the computer lab. Khru Hong talked most of the time, while Khru Geetlapon added a few things.

Q: What subject do you teach?
A: First is the introduction of computer, how to use the mouse. The program is about how to use Jig Saw, how to draw Thai characters, and things like that.

Q: What are the children taught while not using the computers?
A: Not just one subject, how to take care of themselves at that age. Not one subject in class. Teachers make special activities.

Q: What do the children like learning about the most?
A: In the computer class they like games the best.

Q: Which are the areas they have the most trouble with?
A: They have the most trouble with computers and how to use the mouse. Sometimes they can't change from program to program. It takes a child (in kindergarten 3) 4 sessions to get comfortable with the computers.

Q: Is there anything about the computers you would like to learn more about?
A: Normally the teachers have no knowledge of computers. After training they know a little bit. They want o know more about how to maintain computers, how to solve simple problems.

Q: Do you use the lab manual when there is a problem with the computers?
A: They use it, but sometimes they do not understand it. After training they can understand.

Q: Do you ever reread the lesson plans when you forget how to use something?
A: They use the plans, but they think the time is too long in between sessions for the children. They would like to go from 1 session in 2 weeks to 1 session every week.

Q: If something goes wrong with the computer do you think you would be able to fix it?
A: In some cases, in one program the letter disappears and they cannot make it reappear.

Q: Have you ever used the Internet before?
A: She knows of it, but never uses it.
Q: How often do you use the computers?
A: They started using them in February of last year and they use them everyday.

Q: Which software do the children use the most?
A: Jig Saw, how to dress program, and games.

Q: Is there any software that doesn't get used?
A: How to draw characters. They learn to do this in regular classes.

Q: What do the children like about the software they use (best features)?
A: Shapes and colors.

Q: What do they like the least?
A: Depends, different students like different things.

Q: What features would you like to see more of in the software?
A: Pictures are very limited in Jig Saw. And in paint program they would like to see more colors and shapes. They would like more diverse pictures.

Q: Do you know how to use all of the software the children use?
A: No, they want to develop new programs for children.

Q: Do you prefer English or Thai software?
A: The problem is language, they don't understand English. The Thai programs are not very good. In the English programs, the voices are clear and louder, the colors are bright and more effective.

Q: What role do the parents have in the children's education?
A: The teachers have meetings with the parents two times a year. In the first they talk to them about new things, like the computers. Many parents want their children to come to this school, so they have to explain everything.

Q: What happens to the kids after they leave the school?
A: That depends on the parents. Around here there are private schools and public schools. If they have enough money they go to private school. It depends on the family. Most of the children can pass the exam to enter school. The students report to their parents that they use the computers in the schools. They tell them how they paint and draw on the computers. Khun Khantong says that his son comes home and shows him how he can do everything.

After the interview the teachers stressed that using the computers once very two weeks was not enough for the children. They asked if possible, to get more computers because if one computer has a problem, then those students cannot work. If there were more computers and one broke, then that group could use the other computers with another group. They said if there were more computers then other students in the community could use them or connect to the Internet. They also stated that there is one telephone line in the building.

During the interview, the teachers seemed very confident. They seemed a little nervous (laughing) when asked if they knew how to fix all of the problems and use all of the software.

Interview #2

1/19/01
1:15- 1:30 pm
Jon- Interviewer
Amy- Note taker
Khun Khantong- Translator
Khru Tanowan Bongut- Interviewee
Khru Guakoon Pandgen- Interviewee
Khru Sukrankaron Otipate- Interviewee

The 3 teachers we interviewed in this session teach kindergarten 3, which consists of children ages 5-6. Khru Tanowan and Khru Guakoon did most of the talking, while Khru Sukrankaran only added a few things in at the very end.

Q: What subject do you teach?
A: Thai, English, math, giving them knowledge, basic social skills.

Q: What do the children like learning about the most?
A: Life experience, adventure. They like to have experience.

Q: Which are the areas they have the most trouble with?
A: The problem is in math, adding and subtracting 2 digit and 3 digit numbers.

Q: Is there anything about the computers you would like to learn more about?
A: They want to learn about the Internet and how to make simple programs for students.

Q: Do you use the lab manual when there is a problem with the computers?
A: She uses the manual if they are not clear in some lesson or some part of the program. If they cannot understand then the text helps very little. They have to have basic knowledge about computers first.

Q: Do you ever reread the lesson plans when you forget how to use something?
A: Yes, sometimes they spend time after class.

Q: If something goes wrong with the computer do you think you would be able to fix it?
A: Yes, sometimes we can fix it, sometimes we can't.

Q: Have you ever used the Internet before?
A: No.

Q: How often do you use the computers?
A: After class they come to the computer room and use it.

Q: What role do the parents have in the children's education?

70

A: Not all of the parents have knowledge of computers, they cannot help the children at home.

Q: Are the parents informed about what goes on in the kindergarten?
A: Yes, they are informed.

Q: Do you know if the parents like or dislike the use of computers in the kindergarten?
A: They are excited, but when they come to see the computer room they are worried because there are so few computers. They are afraid that their child may not have time to use the computers.

Q: What happens to the kids after they leave the school?
A: They go to primary school. Nowadays many public schools have computers, so our children can learn form here and continue their knowledge.

Q: Do you know how many kids don't go onto school?
A: Very few, only about 1%. Most of these parents don't understand the importance of education.

Interview #3

These 2 teachers teach kindergarten 1, children age 3. They both participated equally in the interview.

Q: What subject do you teach?
A: Everything, but computers.

Q: What do the children like learning about the most?
A: Art activities.

Q: Which are the areas they have the most trouble with?
A: Math and English.

Q: Is there anything about the computers you would like to learn more about?
A: They would like to learn more about how to use them, how to open files, how to search files.

Q: Do you use the lab manual when there is a problem with the computers?
A: Yes.

Q: Do you ever reread the lesson plans when you forget how to use something?
A: Yes to review, but it is still a difficult subject.

Q: If something goes wrong with the computer do you think you would be able to fix it?
A: No, not yet.

Q: Have you ever used the Internet before?
A: No.

Q: How often do you use the computers?
A: Not often, except for computer class.

Q: Why don't they use the computers often?
A: Because they are busy looking after students all of the time and at home they have no computers.

Q: What role do the parents have in the children's education?
A: Parents look at their children's homework closely. They help the students to do the homework.

Q: Are the parents informed about what goes on in the kindergarten?
A: Yes, they are.

Q: Do you know if the parents like or dislike the use of computers in the kindergarten?
A: They ask parents if they would like their children to use the computers. The ask permission about the idea of teaching computers.

Q: What happens to the kids after they leave the school?
A: They continue on to primary school.

After the interviews the teachers of kindergarten 1 told us that the mouse is too big for the children of that age group and they have problems using it.

Appendix E – Break Down of Computer Costs

Computer Specifications and Financial Sheet

Equipment	Quantity	Price Each	Price (Total)
Cpu	12	24100	289200
16-Port Hub	1	12700	12700
Power Supply	6	2400	14400
Network Cables	12	115	1380
Security Cables	8	1175	9400
Tables	12	1290	15480
Chairs	24	220	5280
Electrical Outlet	1	2500	2500

	Baht	USD
Total =	350340	$8,341.43

Computer Specification

Cpu:	Pentium III 667 MHz
Memory:	64 MB 133MHz SDRAM
Monitor:	15" LG Digital Monitor
Hard Disk:	10 GB Ultra ATA
CD-ROM:	52x
Graphics:	3D AGP 8MB
Sound:	Yamaha 744 Creative Vibra 128
Speakers:	160 Watt Speakers
MotherBoard:	GigaByte GA-6VXC7-4X
Other:	Mouse, Keyboard, Windows 98
	10/100 Lan Card

Appendix F – Reference Manual – English Version

Computer Reference Manual
for the
Computer Kindergarten at the

Duang Prateep Foundation

By
Geoffrey Graves
Amy Peranelli
Calvin Swaim
Jonathan Yurek

Table of Contents

Parts of the Computer

CPU

Central Processing Unit

The CPU is where all the action takes place in the computer. It is what actually does the work and draws the graphics that show up on the monitor. It also interprets what the keyboard and mouse do and makes things happen. The power button is also located on the CPU.

Monitor
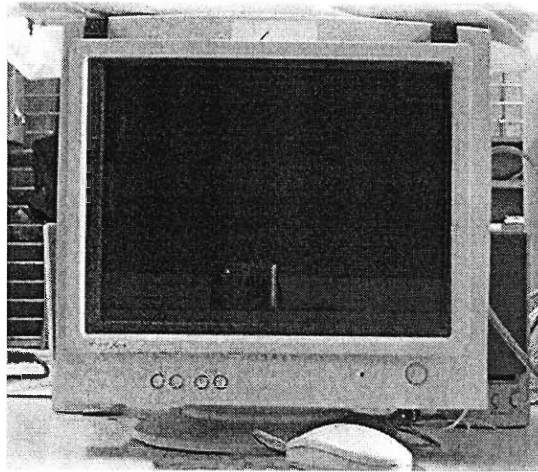
The monitor is where the graphics are shown to you. It is like a television set. The monitor does not do anything on its own. It needs a CPU for it to display anything.

Keyboard
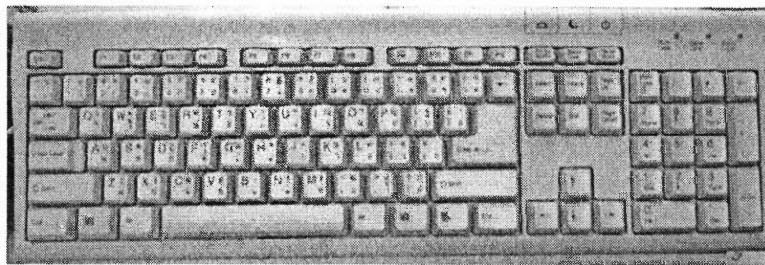
The keyboard is where text is entered into the computer. The keyboard can type both Thai and English characters. To switch between Thai and English character, simply hit the "tilda" key. It is located at the top left of the keyboard, below the "esc" key.
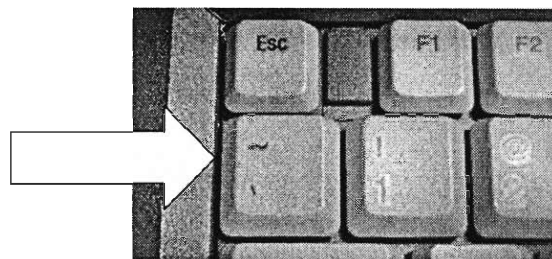
Mouse
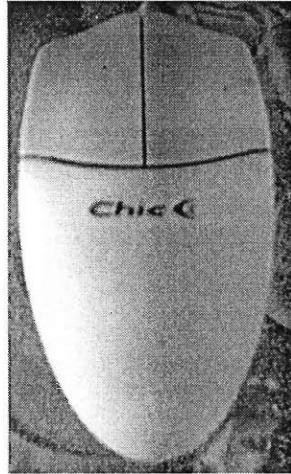
Pointer

The mouse is how you will access most things on the computer. As you move the mouse, a little arrow on the screen, called a Pointer or Cursor, moves along with it. The mouse can be picked up and repositioned in the air without disturbing the arrow on the screen. The mouse has two buttons. The button on the left is the button you will be using to activate or select most things. The button on the right will usually give you a number of options to pick from that pertains to the item you clicked on. Clicking twice on the left button quickly is known as "Double Clicking" and is how you open programs.

Speakers
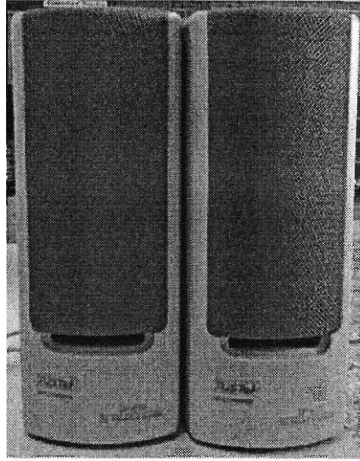
The speakers are where the sound that is created by the computer comes from. There are volume controls on the speakers if you want to change the volume of the sounds.

Printer
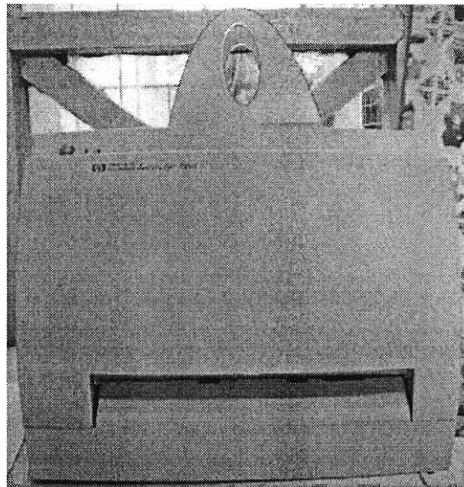
The printer is where the computer turns the electronic documents you make in Paint and Word and other programs into paper documents. The pictures and words will appear on the paper just like they did on the screen.

Back of the CPU

The back of the computer is where all of the devices we just described attach to the CPU.
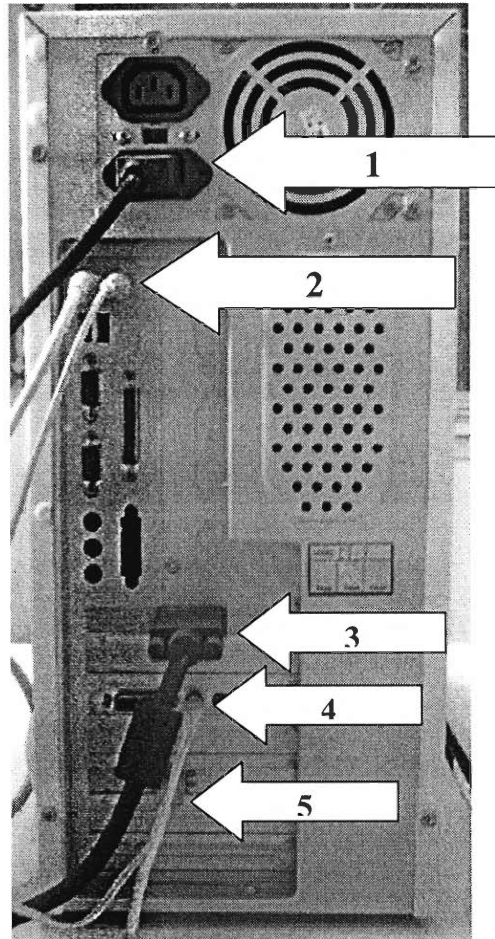
The first arrow from the top is the power cord. Like all electrical devices, computers need electricity to operate. The second arrow points to where the mouse and keyboard connect to the CPU. In the picture, the mouse is on the left and the keyboard is on the right. The third arrow is where the monitor plugs into the CPU so that it can display the pictures. The fourth arrow is where the speakers plug in. Notice that the speakers are in the small gray hole and not the blue or red ones.

The bottom arrow points to the network cable. The network cables connect all the computers together. This is how the computers can "talk" to each other. It allows you to access files from other computers.

Power and Reset
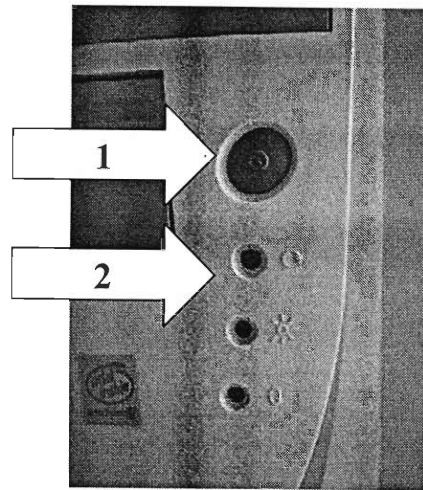
The power button, on top (arrow 1), is what you push to start the computer. The reset button, on bottom (arrow 2), is what you should push in case the computer "freezes" and you are unable to keep working. This button is small and hard to push so that you don't hit it by accident.

The Desktop
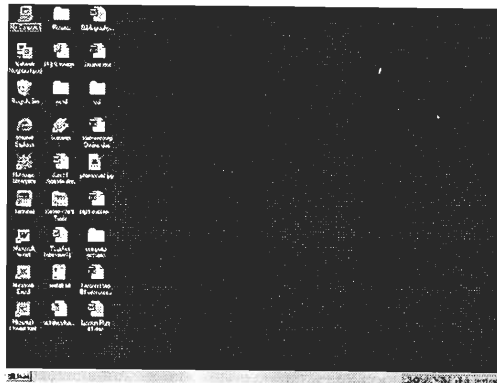
The desktop is where all interaction with the computer and the files starts. The desktop contains a few pictures called icons, which are what files look like in Windows. Each icon is supposed to represent what it contains, for example, folders are subdirectories.

Microsoft Paint

Starting Microsoft Paint

There are two ways to start Microsoft Paint. The first is to use the **START MENU**.

Select **START**, **PROGRAMS**, **ACCESSORIES**, and then **Single-Click** on **PAINT**
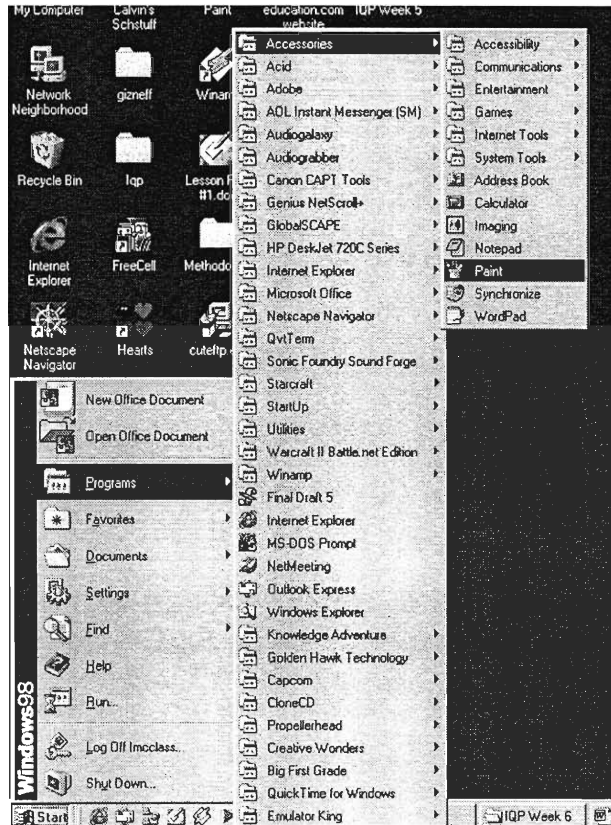
The second way of opening the program is by **DOUBLE-CLICKING** the **ICON** on the desktop.

When you start up Microsoft Paint, you will see the following screen.
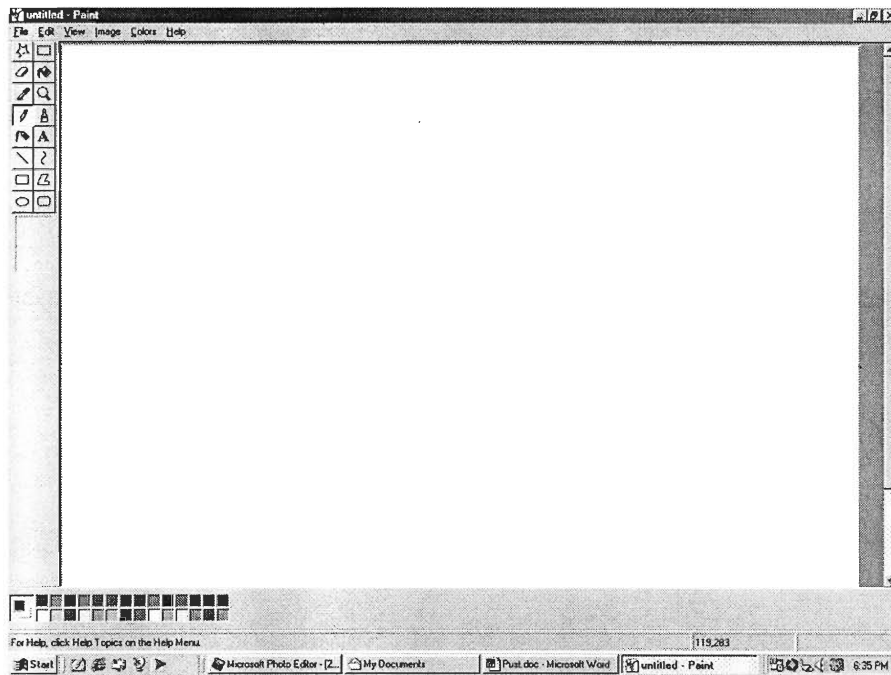
To draw in Paint, first select the **PENCIL** tool from the **TOOLBAR**.
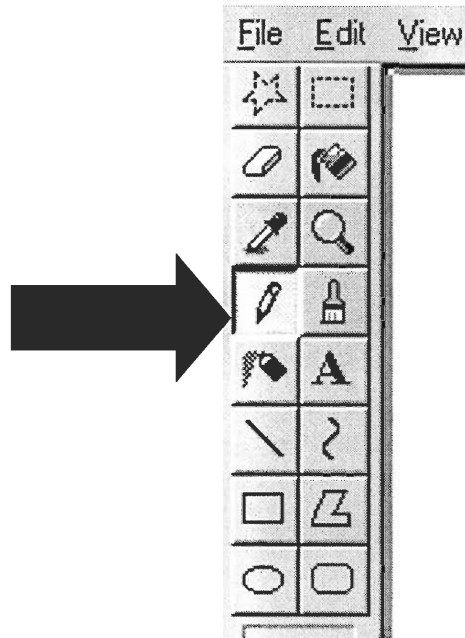
To draw, click the left mouse button once and hold it down. Then **drag** the pointer to create a line.

11
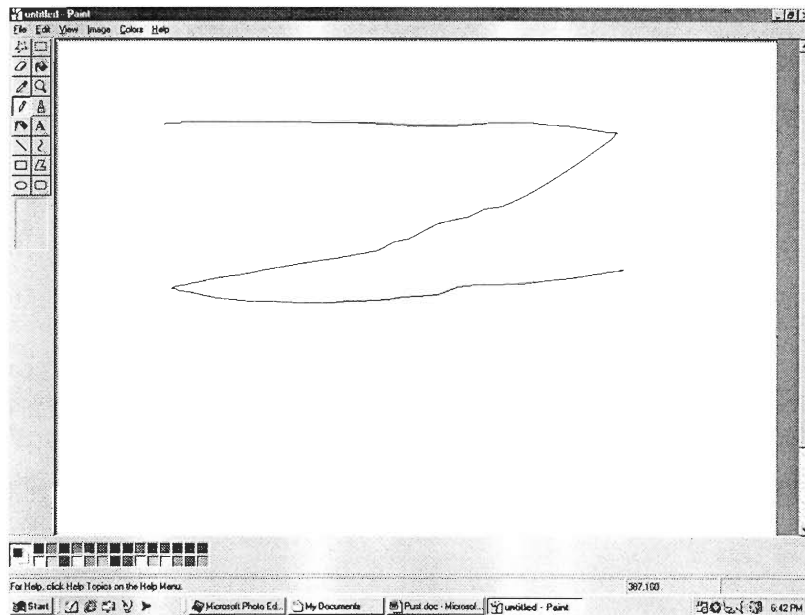
Tools in Microsoft Paint

Paint Brush
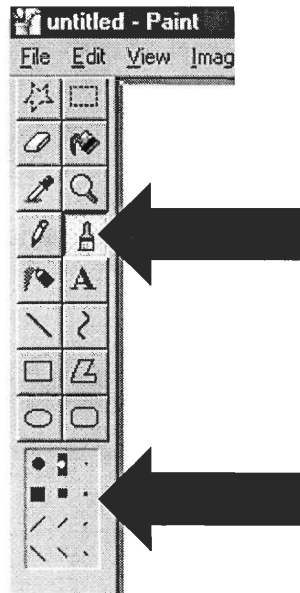
Notice that there are different choices at the bottom of the toolbar. These buttons change the shape and size of the line being drawn.

Airbrush
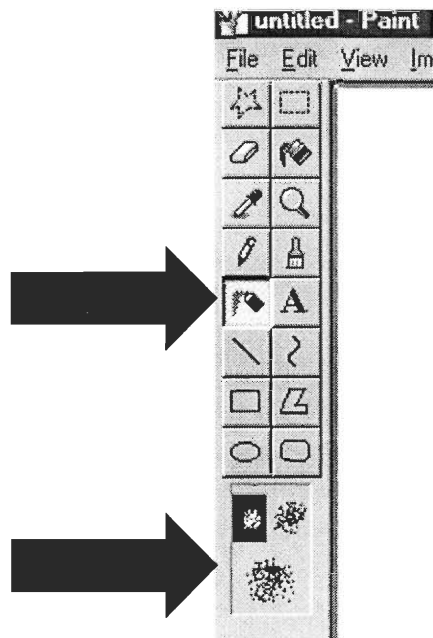
The Airbrush makes a different type of line, more like using a spray can. You can choose three different sizes of the airbrush line.

13
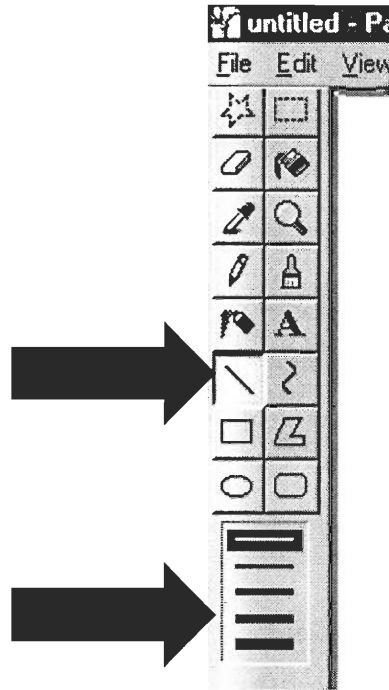
Line Tool

To draw a line, click and hold the left mouse button. Then drag the line across the screen until you see the line you want. Then, release the mouse button. You can choose different widths for the lines at the bottom.

Shape tools
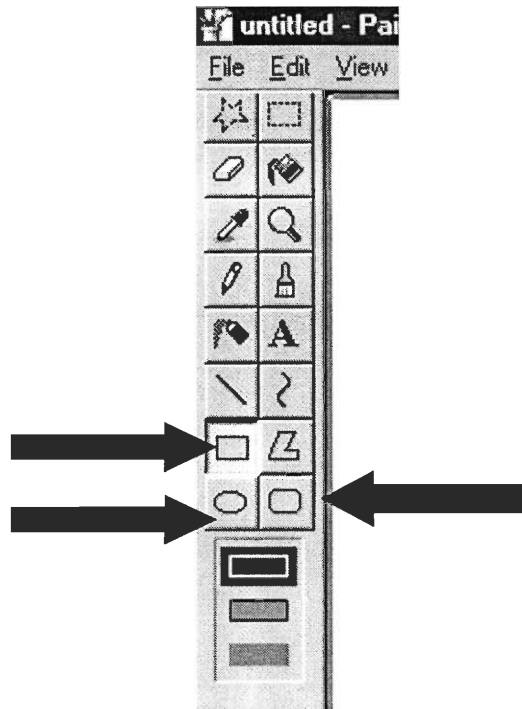
These tools can be used to make three different shapes: rectangle, circle, and a rounded edge rectangle.

To create a shape, click and hold down the left mouse button. Drag the pointer across the screen until the desired shape is created. Then, release the mouse button.
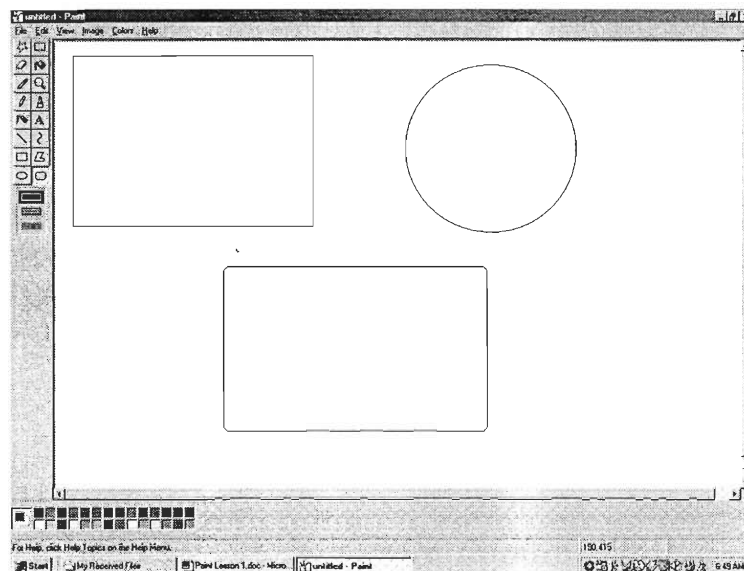
Adding Text
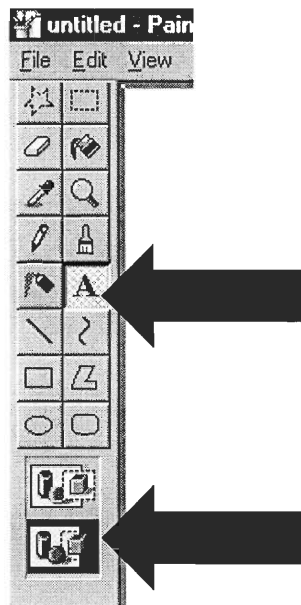
To write text, choose the "**A**" on the toolbar. The second arrow points to two options with text. The top choice adds text to the picture with a white background. The second choice will add the text without changing the existing background.

Fill With Color
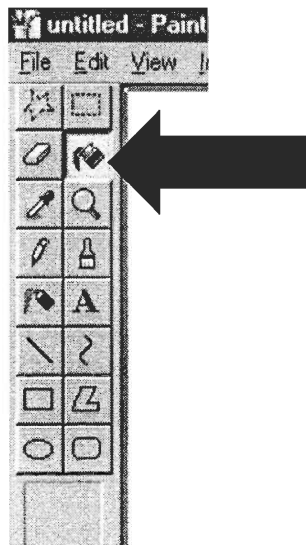
The Fill With Color tool can be used to fill color into an enclosed object. To use, place the pointer inside of the object you want to fill with color and press the left mouse button once.

Choosing Colors
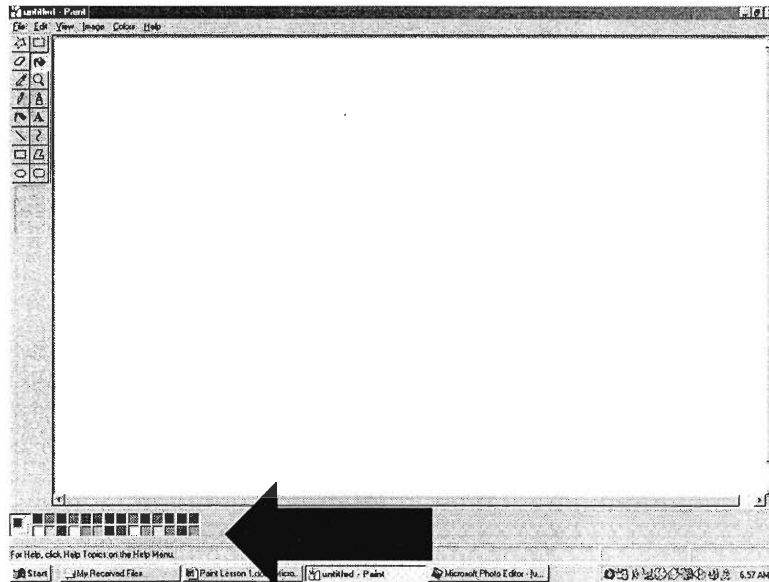
To choose a color, look at the bottom left hand corner.

For Help, click Help Topics on the Help Menu.
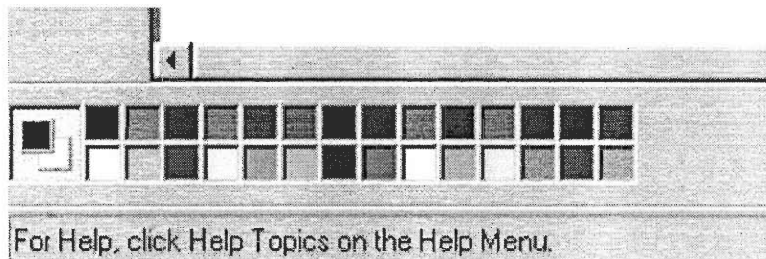
You can choose any color, and it will work for any tool. You choose your primary color by left clicking on the color. You choose the secondary color by right clicking on a color. To utilize these colors with the tools, just press the left or right mouse buttons according to which color you would like to use.

Erasing
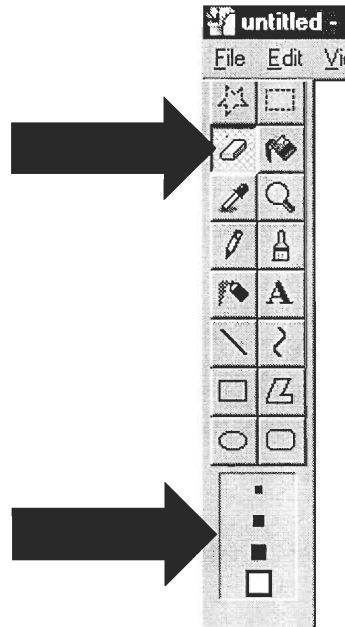
To erase any mistakes, choose this tool. The second arrow points to where you can choose what size of area you want to erase.

Copying and Pasting

The **Copy** command is useful for making copies of objects on the screen. It can be used to copy both text and graphics. Let's explore how it works in Paint.
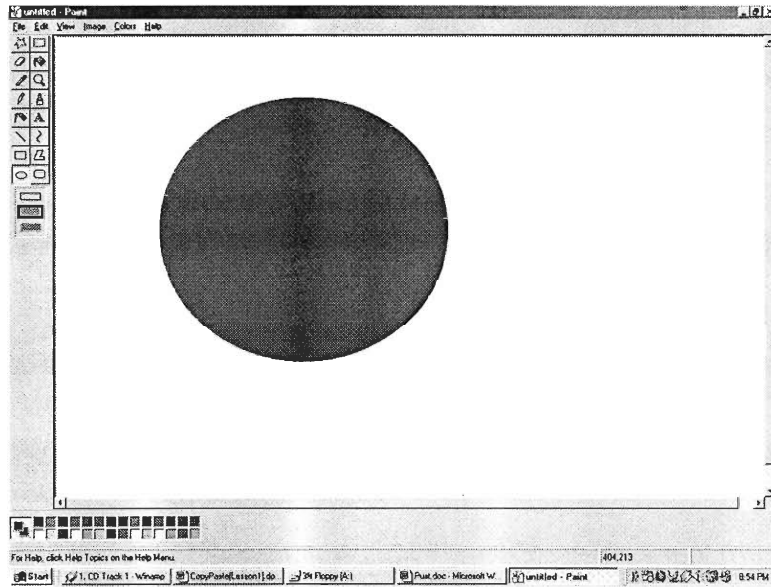
By now you have learned some of the useful Painting tools. Draw a circle with the circle tool. If you desire, you can fill the circle in!

Now lets copy the circle onto the clipboard. Think of the clipboard as a space in the computer's memory where it stores temporary pictures and writing.

Press the **SELECT** button on the toolbar.
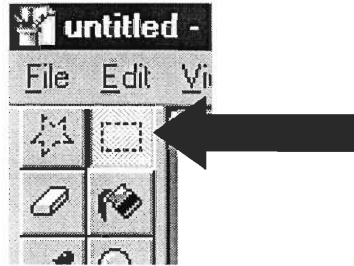
The **SELECT** tool creates a rectangle around any object you want to choose. To select an object, **SINGLE-CLICK** and then **drag** the mouse until the rectangle is around the object.

You can also use the **Free-Form Select** tool to select an object of any shape you choose.

To select what you want to copy, simply use the mouse and draw whatever shape you wish around the object. When you copy, it will be the same shape that you drew around the object.

Now, use the **SELECT** tool and make a box around your circle like this…
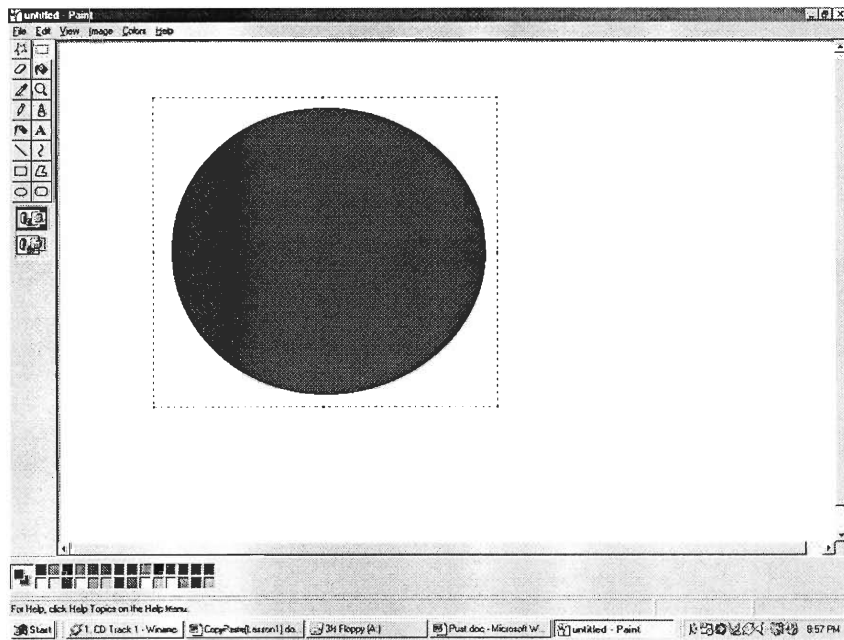
Select the **Edit menu** (arrow 1), and select **Copy** (arrow 2) from it. The circle is copied to the clipboard when you do this.
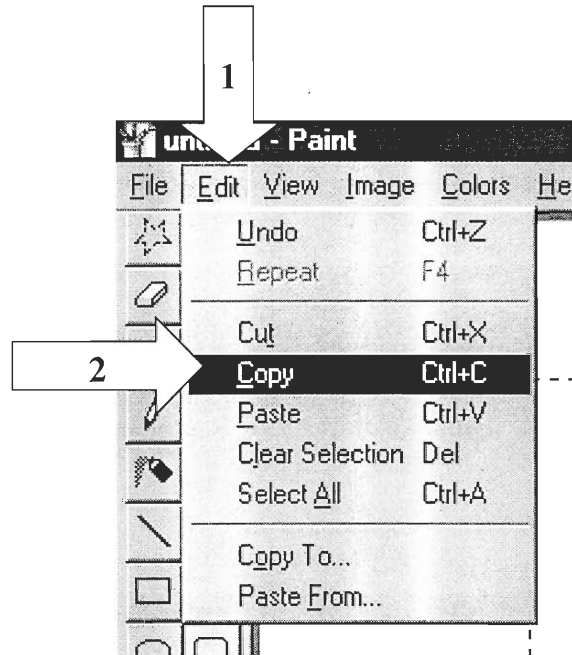
Now you can Paste the circle from the clipboard to the screen. Just go back to the **Edit menu** and select the **Paste** (arrow 1) command.

22
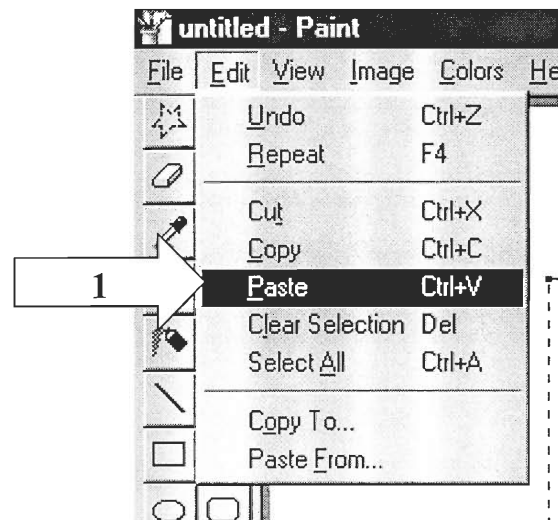
Another circle appears in the top left hand corner of the Paint screen.
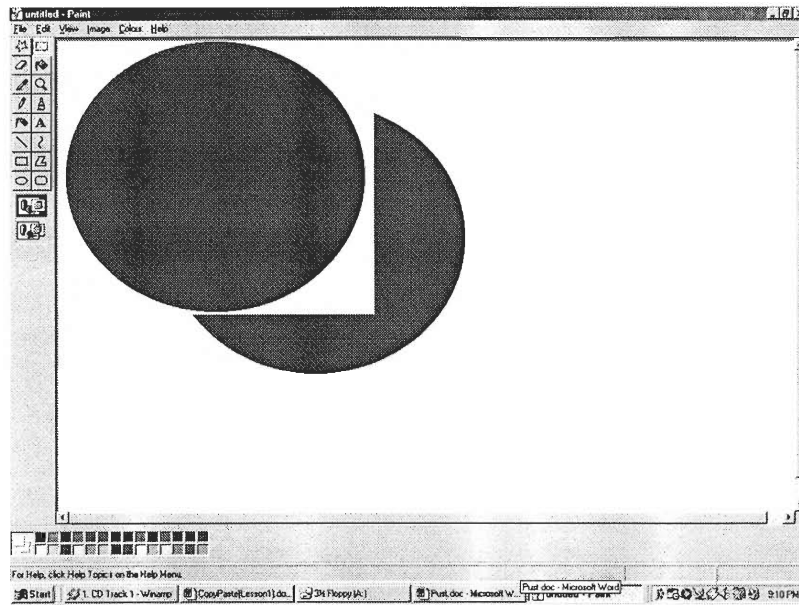
You can drag that circle so it is next to the original circle. **Drag** the circle by clicking and holding on the left mouse button while it is over the copy.

Now move the pointer to the place where you want the circle to be.
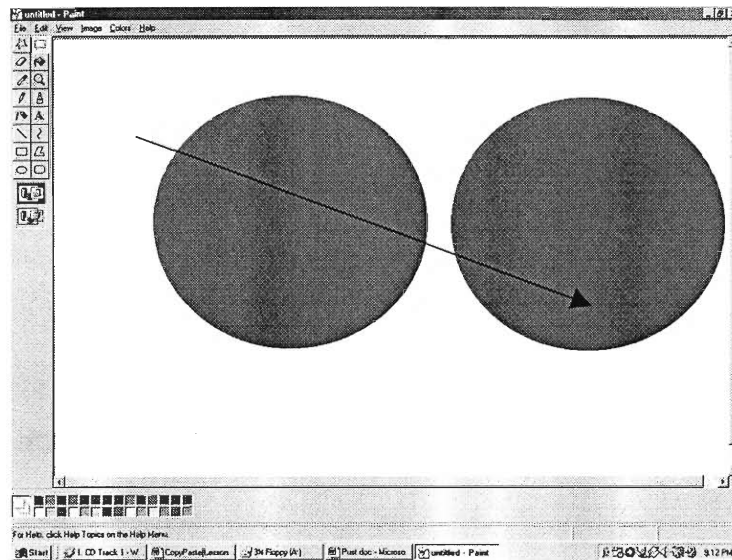
The circle should move in the same motion as your hand! Let the left mouse button up after you drag the circle. This places the circle on that spot.

Did you place it in a place where you did not want to? Don't worry, since you can **Undo** the movement.

Go to the **Edit menu** and select the **Undo** command from it.
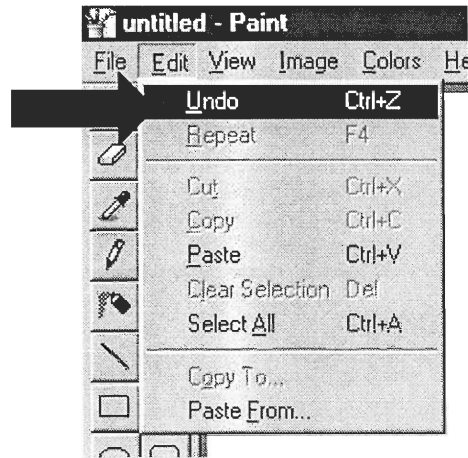
The circle that you dragged should disappear.

Closing Paint

Closing Paint, as with all programs, is very easy. All there is to it is clicking the "**X**" button in the top right hand corner.
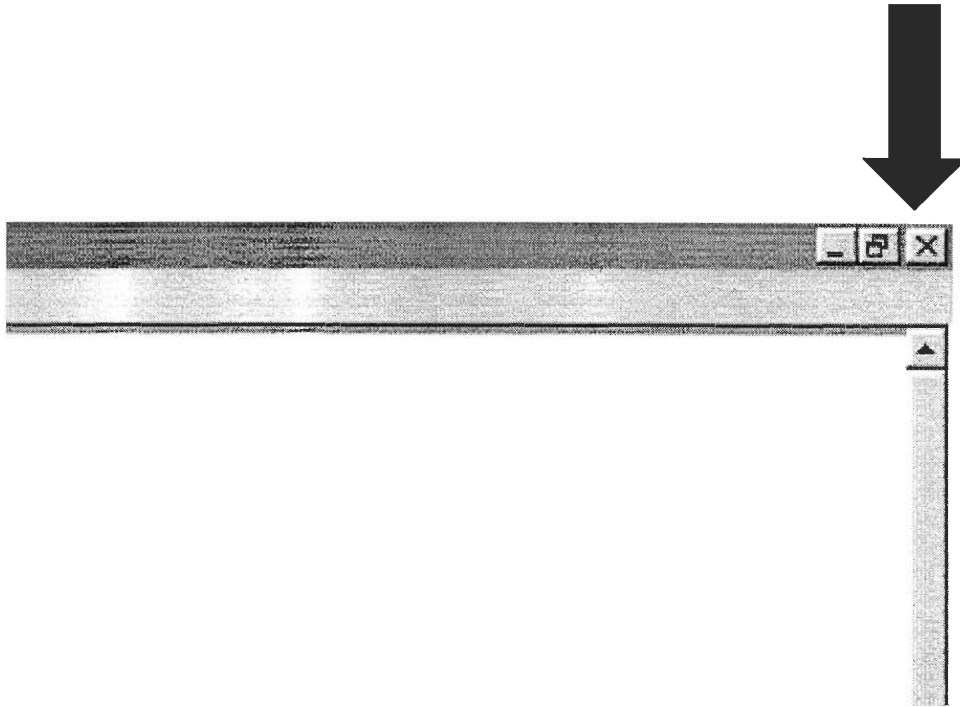
Now, lets take a look at Microsoft Word.

Microsoft Word

Open Microsoft Word by **DOUBLE-CLICKING** on the icon that looks like the one
pictured below.

Microsoft Word.lnk

Word can also be opened by using the **START MENU**. Go to **PROGRAMS**,
MICROSOFT OFFICE, and select **MICROSOFT WORD**.

When you start up Microsoft Word, you will see this screen.
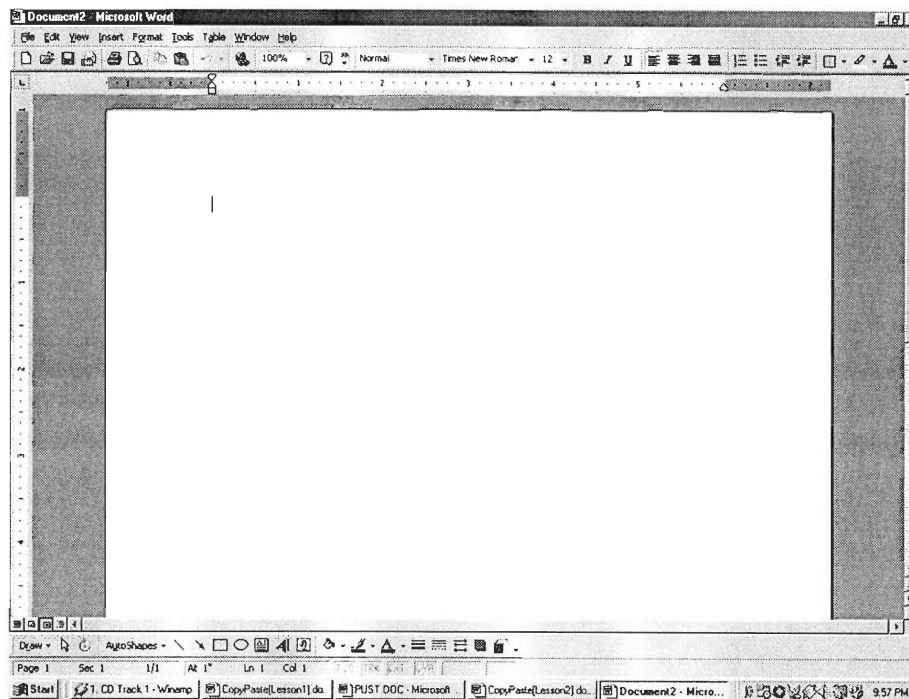
New Documents

To create a new Document, choose File → New
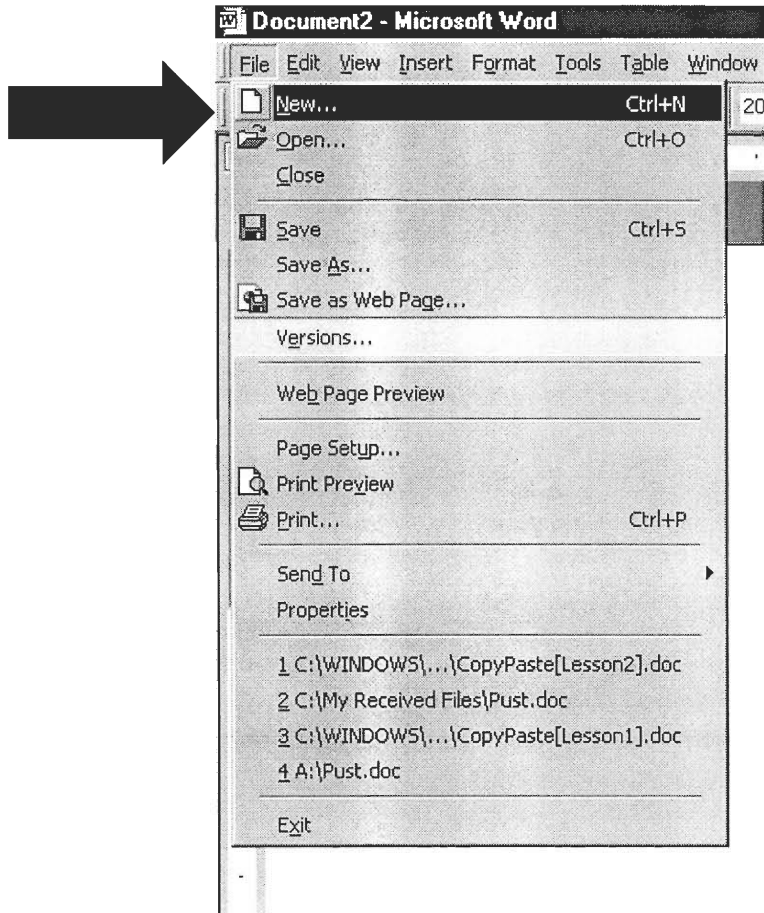
This command will open a blank document sheet.
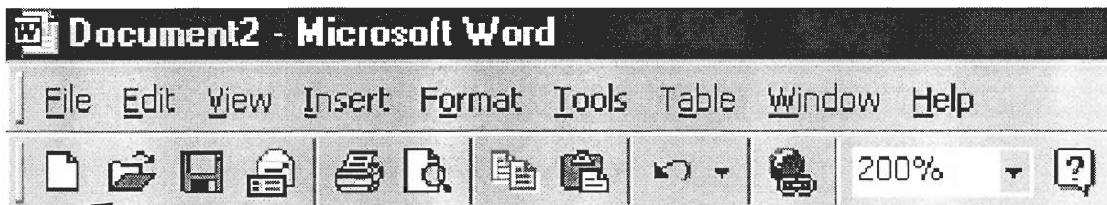
By Clicking on this icon, a new document will open as if you chose File → New.

Opening Files

To Open an Existing Document, choose File → Open   .
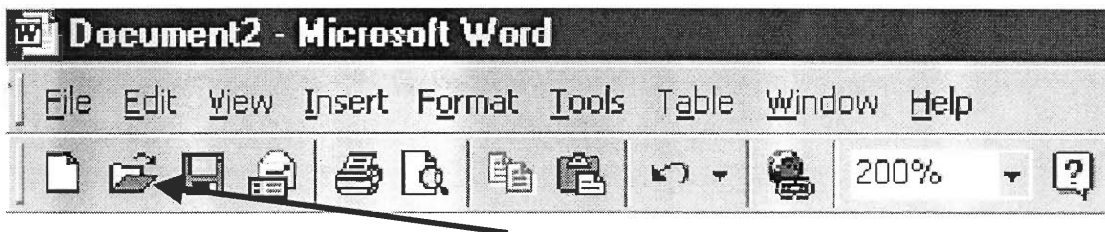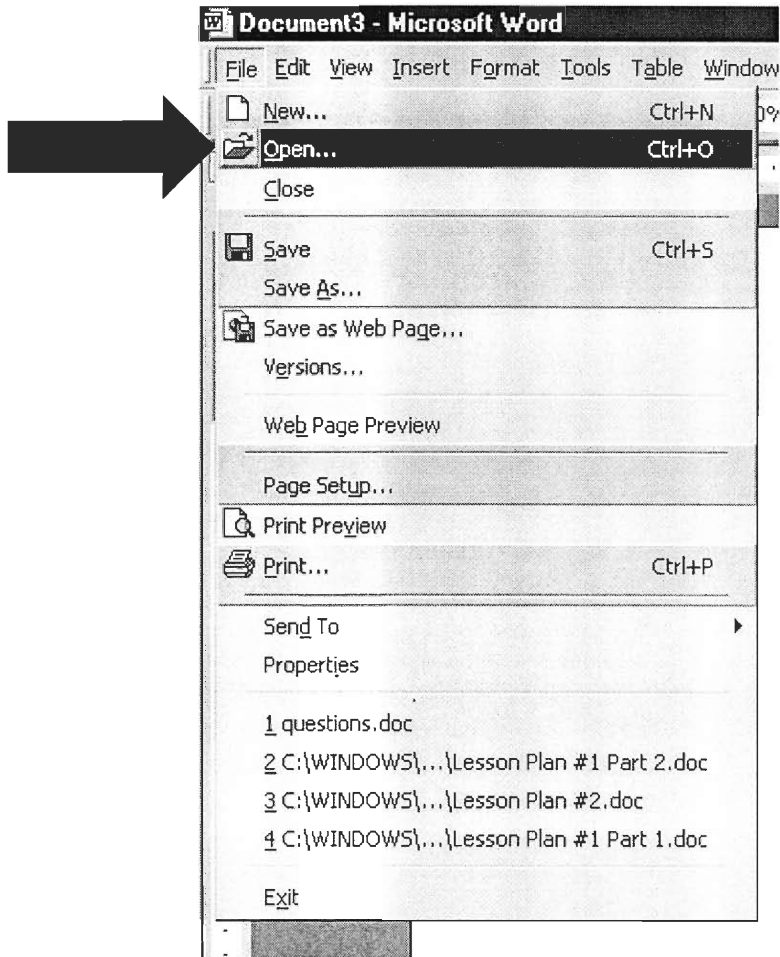
By clicking on the folder icon, you can chose a document to open just like File → Open.

The Open Dialog
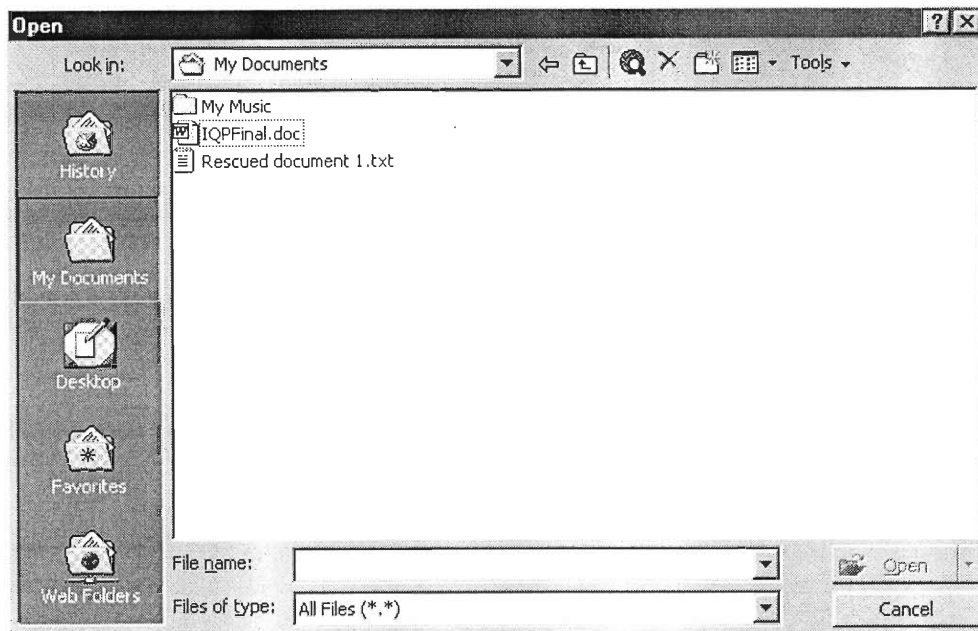
Click on the file that you wish to open.
Single-click on the open button.

Typing, Cut, Copy, and Paste

Type a message on the keyboard.

Hi, nice to meet you!
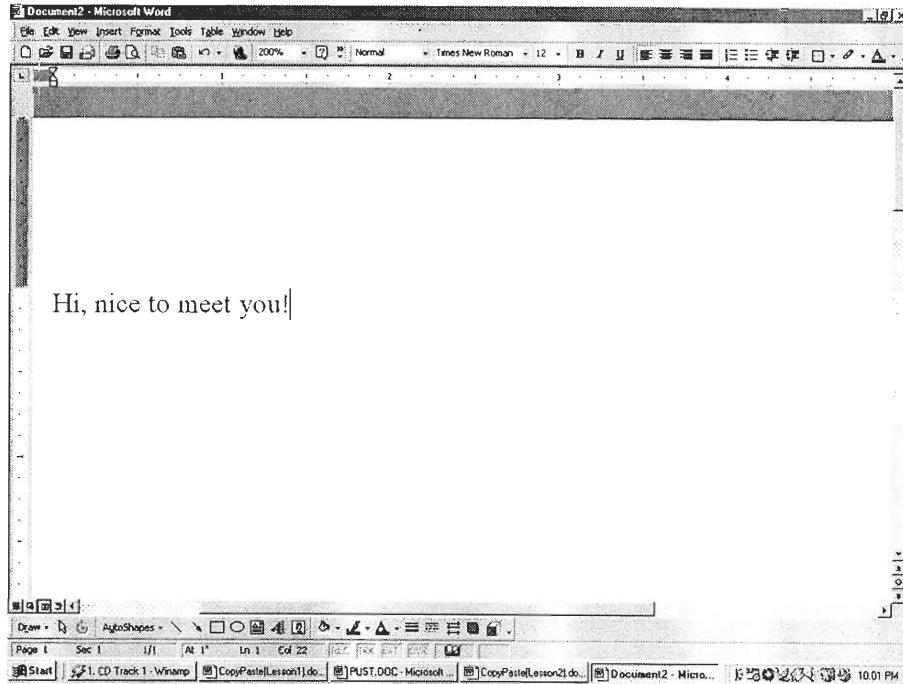
Cutting and Pasting takes a word or a phrase and moves it.
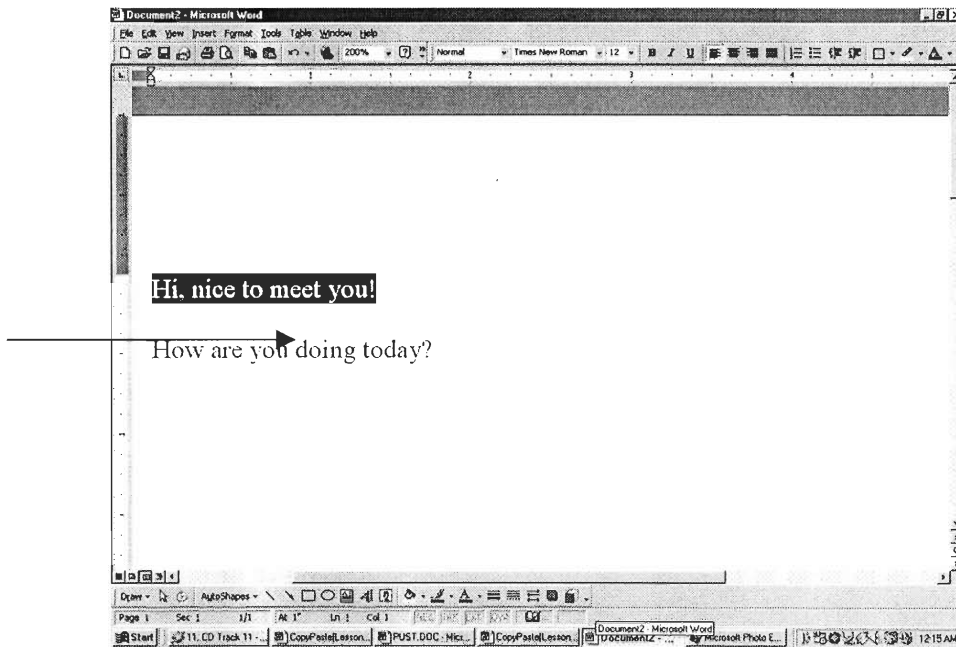
Use the **Dragging** technique to highlight your sentence. Now choose the **Edit → Cut** command. Notice that the sentence disappears. Don't worry, the computer still knows that you want to use it.

Now move your pointer to a different location. In this case we will move the pointer one line down. Choose **Edit → Paste** from the toolbar.
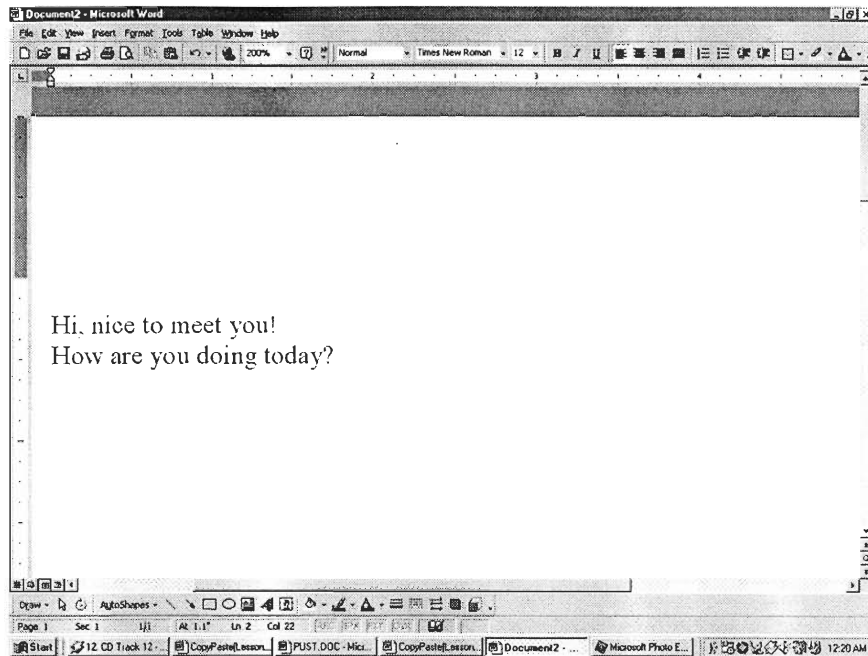
The "Hi, nice to meet you!" phrase has been pasted to the next line.

You can also use the Copy command with the text, rather than having to erase the sentence and then type it again. It works the same as with Microsoft Paint. Highlight the text you want to copy, choose **Edit → Copy** from the toolbar. Then, place the cursor where you want the text to be place and Choose **Edit → Paste**.

Saving Files

To save a file so that you can work on it later, choose File → Save
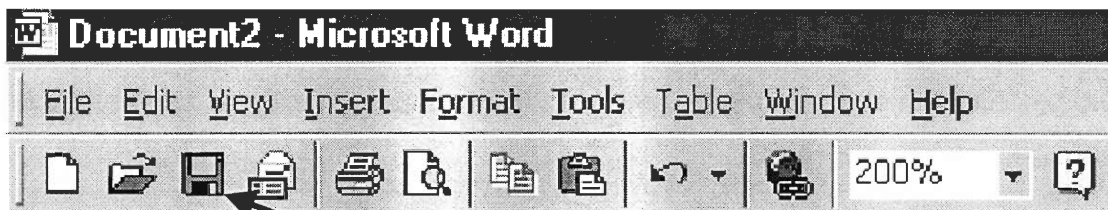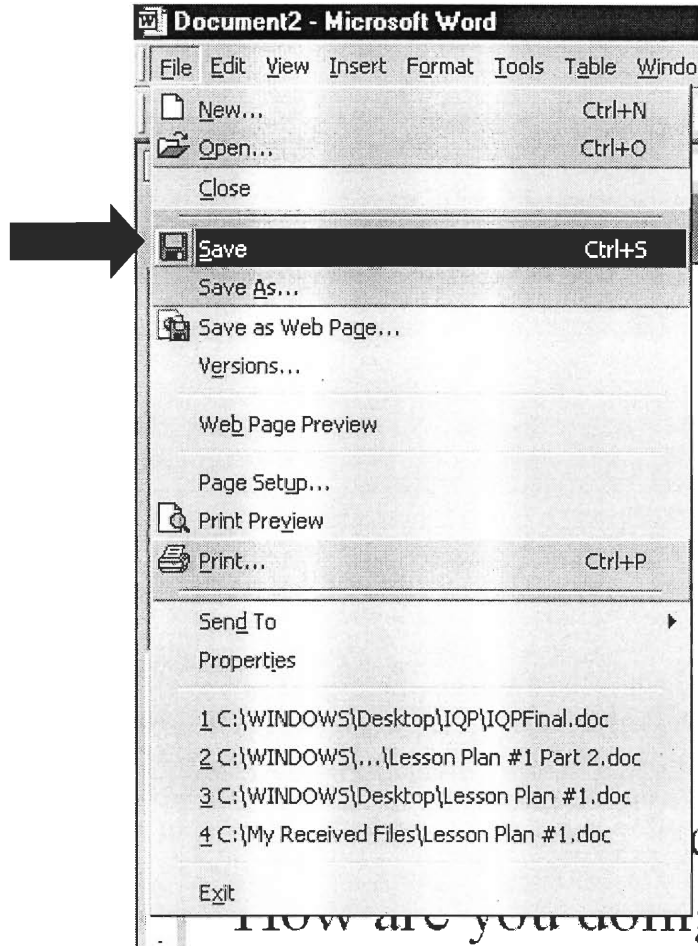
By clicking on the folder icon, you can save your document just like choosing File →
Save.

The Save Dialog
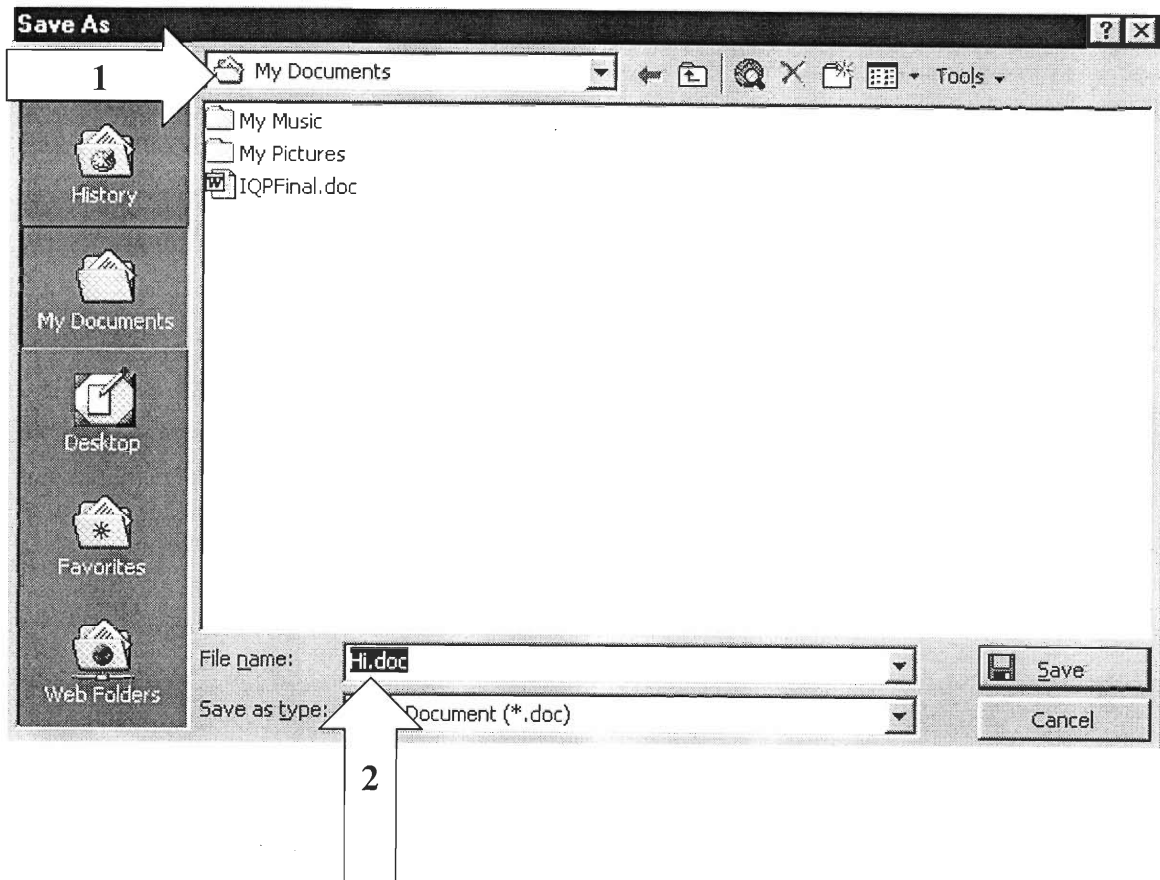
The top arrow (arrow 1) shows you what directory you are in. The bottom arrow (arrow 2) shows the name of the file you are saving to. You can change this name to whatever you want.

When you have found the directory you want, and typed the name you want for the file, simply hit the SAVE button and the file will be saved on the computer.

Shutting the Computer Down

When you are done using the computer, you want to be able to shut it off correctly. To do this, go to the **START MENU** and choose the bottom most option – **SHUT DOWN**.
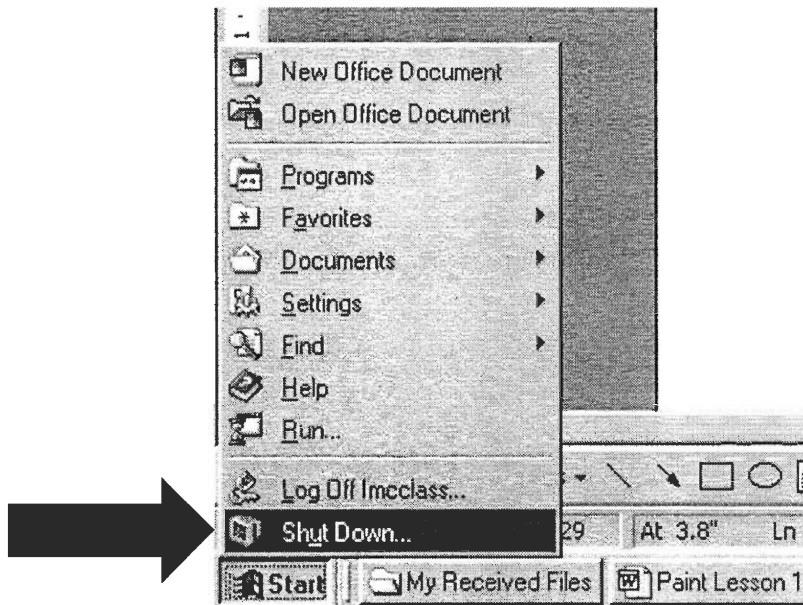
After selecting this, you will see the following dialog box pop up.

Make sure that the "Shut Down" button is chosen. It is usually the second button from the top. Then, choose ok, and Windows will begin shutting down. The computer will power down on its own.

Using Windows

Start Menu
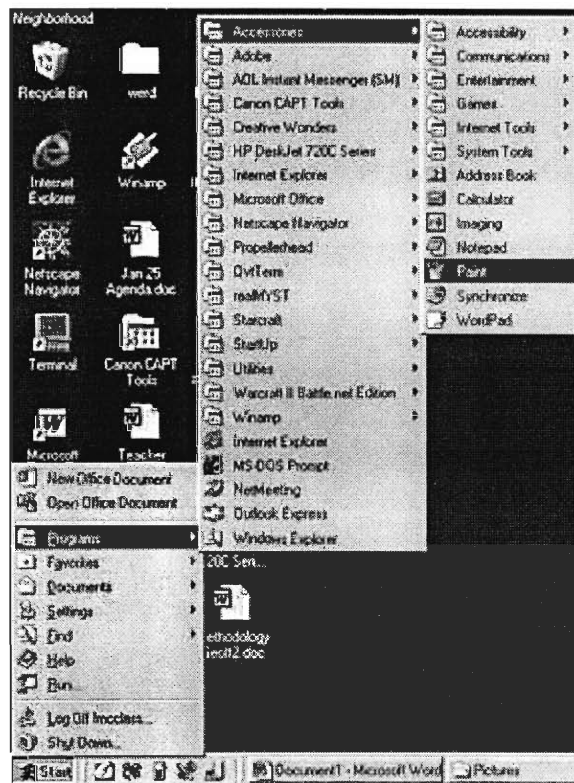
The Start Menu is where you can access all of the programs on the computer. If you move the pointer to an item that has a small black triangle on the right, you will get more choices to pick from. You can keep getting more menus until you find the program you want to run.

Taskbar
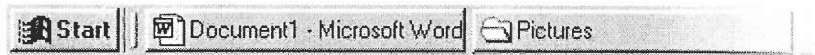
The taskbar is where all the running programs are listed. When you click on one of the buttons, that program will come onto the screen.

The other side of the taskbar shows programs that are hidden when running. This is called the System Tray. Many programs will put icons here so that you know they are running even when you have not started them yourself.

The clock also resides in the System Tray. By placing the pointer over the time, the date will automatically appear. If you see that the date is wrong, you can change it manually. To change, double click on the time in the System Tray. The following screen will pop up.
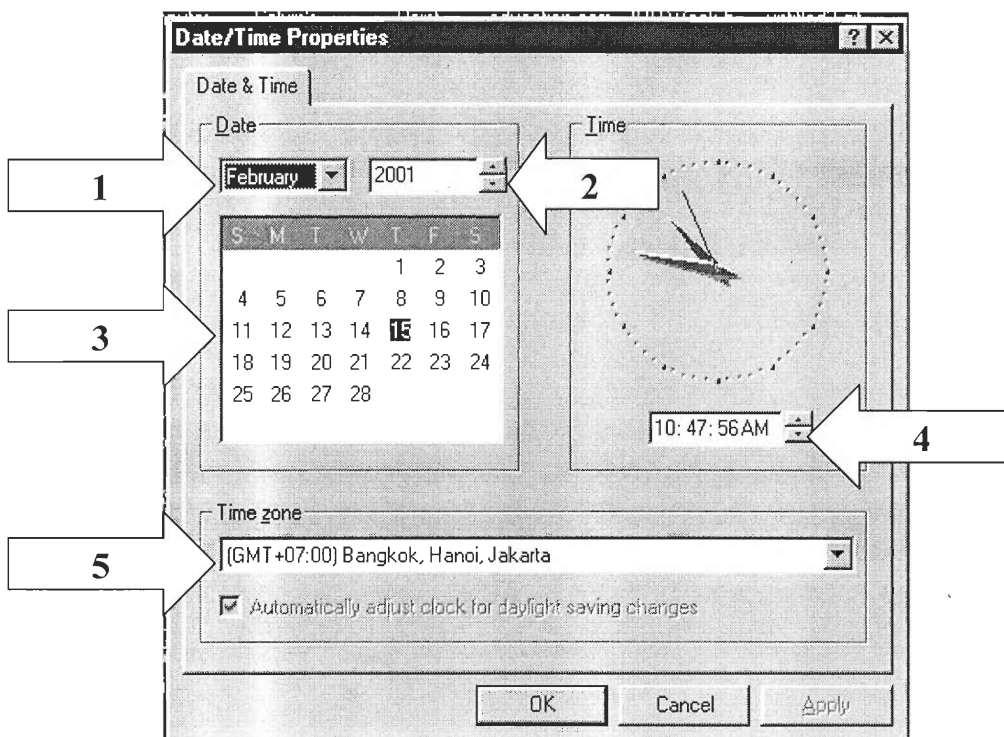
You can change the day (arrow 3), month (arrow 1), year (arrow 2), time (arrow 4), and time zone (arrow 5) with this menu.

My Computer

"My Computer" is where all the disk drives are located. It also contains some other icons for controlling some things more easily like the Control Panel and Printers. When you double-click on the My Computer icon, this window, or a window similar to this, will appear.
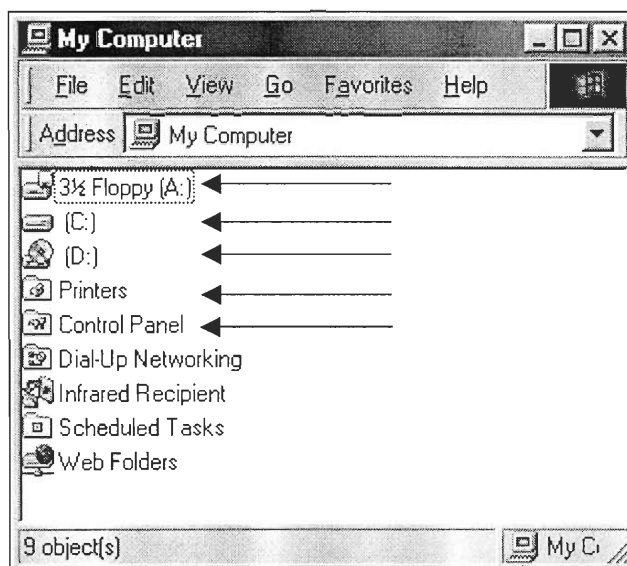
The A: drive (top arrow) is the floppy disk drive. The C: drive (second arrow) is the main hard drive that stores all of the data on the computer. The D: drive (third arrow) is the CD-ROM drive. "Printers" (fourth arrow) has information about the printers that the computer is connected to. "Control Panel" (bottom arrow) is where all the settings for the computer are stored.

Directory Structure

```
Folders                          X
🖼 Desktop
⊟ 💻 My Computer
   ⊞ 💾 3½ Floppy (A:)
   ⊟ 💽 [C:]
      ⊞ 📁 Ati
      ⊞ 📁 audio
      ⊞ 📁 Compaq
      ⊞ 📁 Cwonders
      ⊞ 📁 Dmi98
         📁 Jon's
      ⊞ 📁 My Documents
         📁 My Music
         📁 My Received Files
         📁 Ncdtree
      ⊞ 📁 Program Files
         🗑 Recycled
      ⊞ 📁 System.sav
      ⊞ 📁 Windows
   ⊞ 💿 (D:)
      📠 Printers
      🖥 Control Panel
```
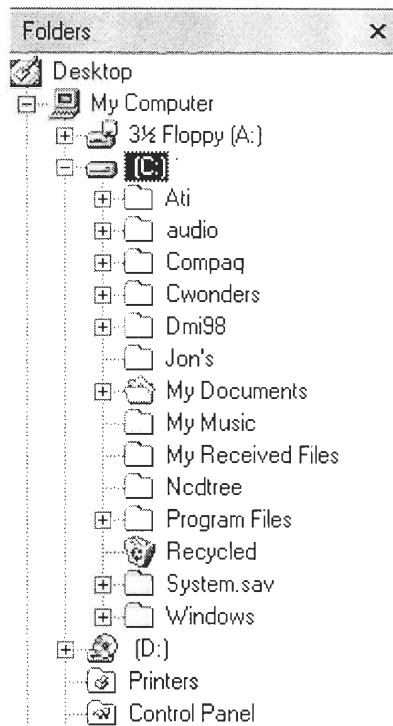
This is a directory structure. It is very much like a file cabinet system. As you can see, there are several different levels of organization. Think of the C: Drive as the file cabinet and each folder as a different drawer in that cabinet. When you open a folder, you can see the files that it contains. In a computer file cabinet, folders can contain other folders too.

📁 Program Files

Search through the different directories and notice how things are organized on your computer. For example, look at the Program Files directory in the C: drive. Notice that it contains many of the programs that you use! The Windows directory contains the software that Microsoft Windows uses to be able to run.

When you are looking through the directories, you'll notice that when you change directories, the address at the top of the window will change. This tells you where you are located in the directory structure.
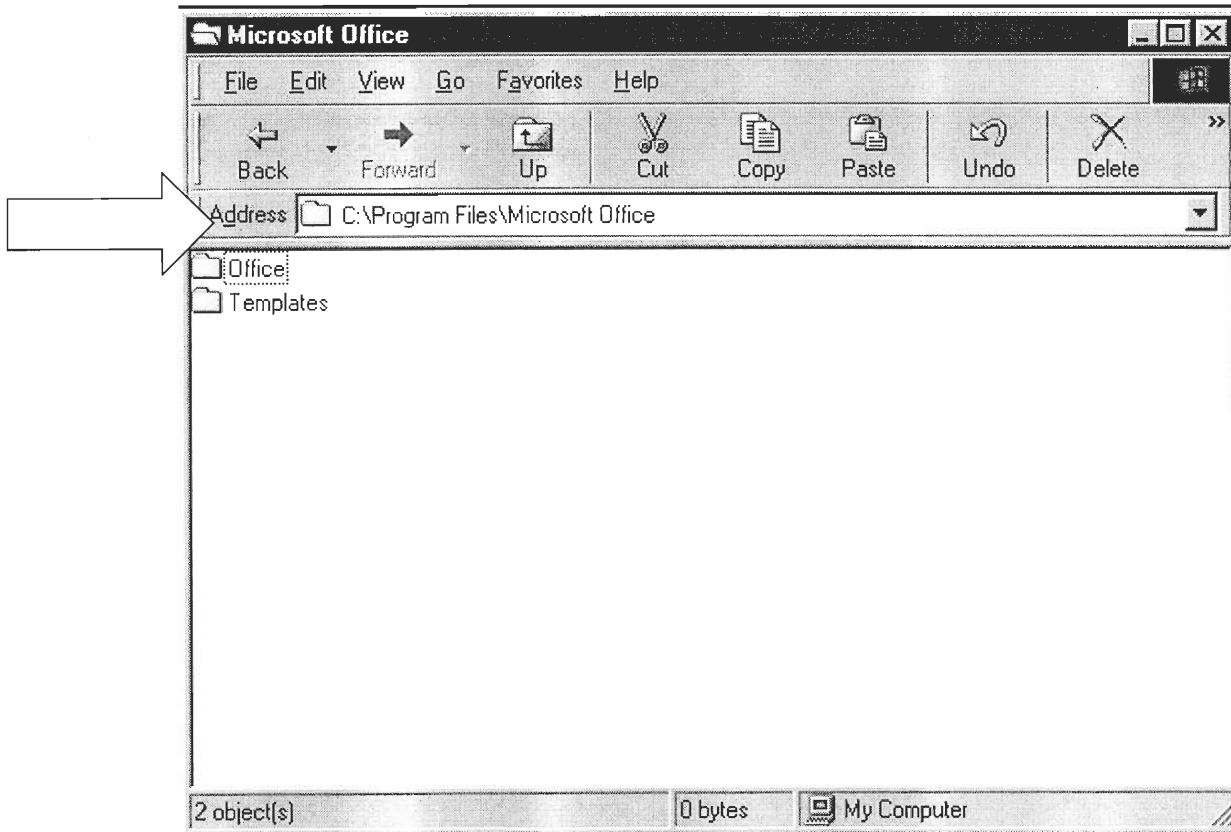
Each directory is separated by the " \ " character. You can see here that we are in the directory Microsoft Office, which is inside the directory Program Files.

Creating your Own Directories

It is good to create your own directories to store your files on the computer. If both you and your friends use the same computer, you can each keep your pictures and text documents in separate folders that are labeled. This keeps files better organized on the computer.

To create your own directory, you must first go to the place where you want to create it! For example, if you want to create a directory on the desktop, then just make sure that the desktop is showing.
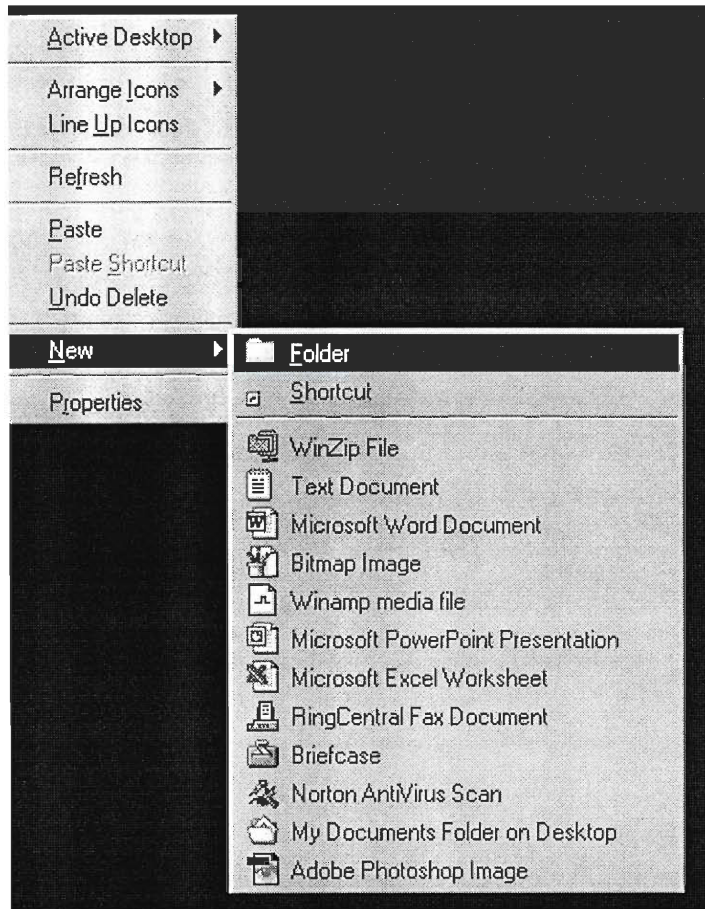
To create the folder, right click on the desktop, and then select the **New** option. Another menu pops up with things that you can create. Select **Folder** from this menu.

A new folder is created on the desktop. Notice how the blinking cursor will allow you to rename this folder, since the default name is "New Folder". You can now type a new name for this folder.

When you are done, press Return or click outside the area of the folder. You now have access to the folder that you created on the desktop.

You can do the same steps to create a new folder within a directory. Simply go to **My Computer**, then click on the **C:\ drive**, and find the directory where you want to add a new folder.
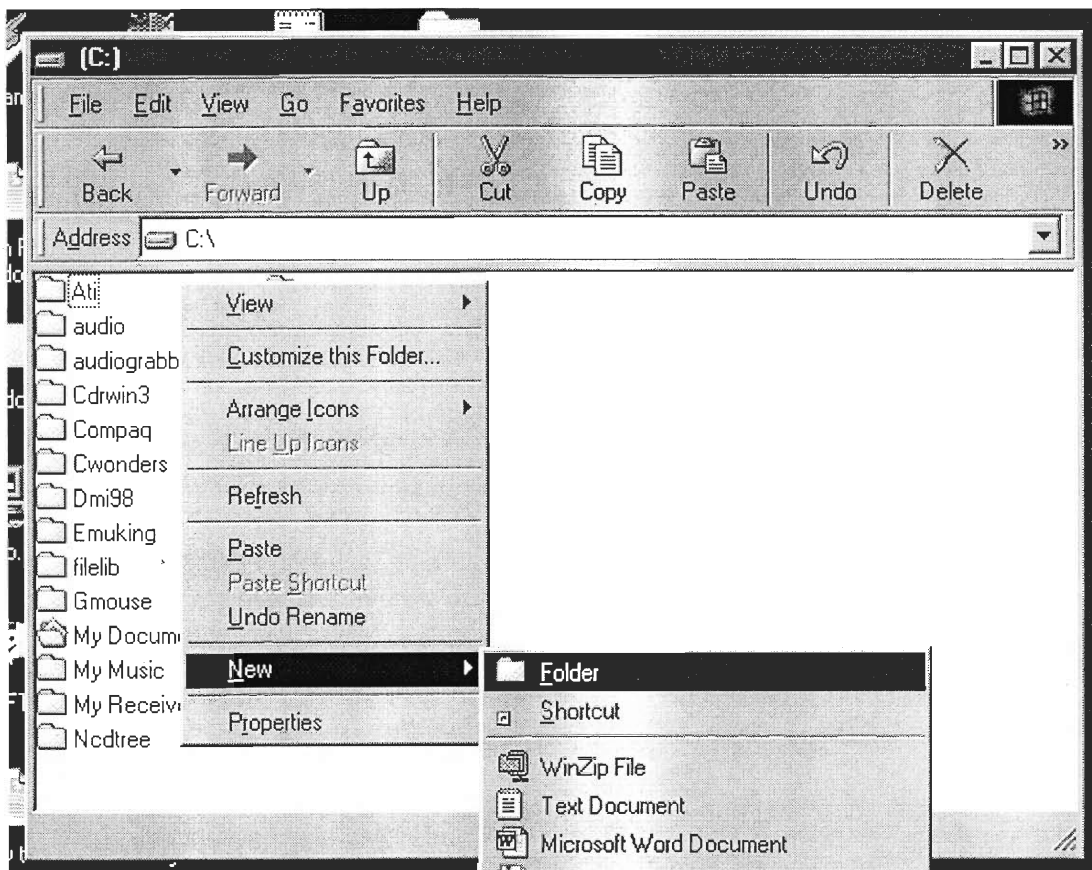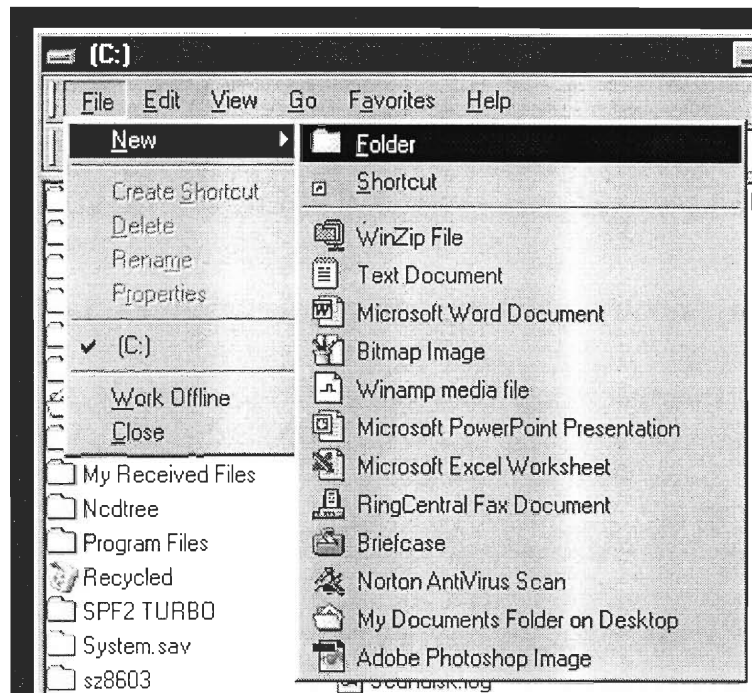
You can also select the File menu in the window. There is a "New" option just like in the Right-Click menu where you can create a folder in the same way. The folder will appear in the window and ask you to rename it.
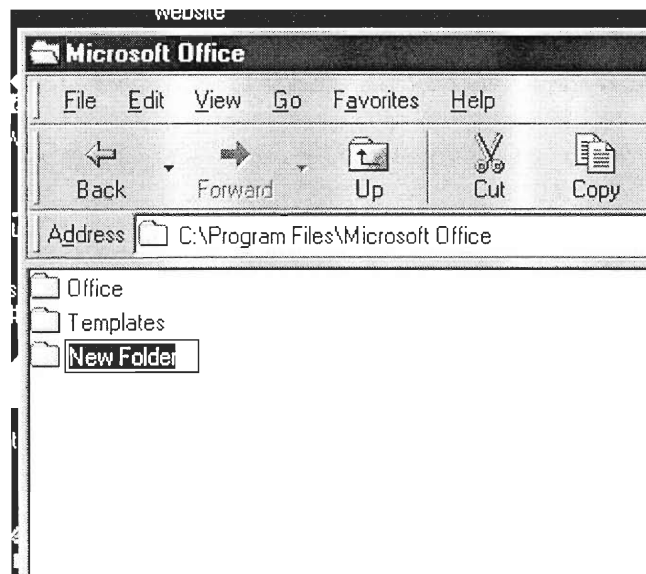
Properties
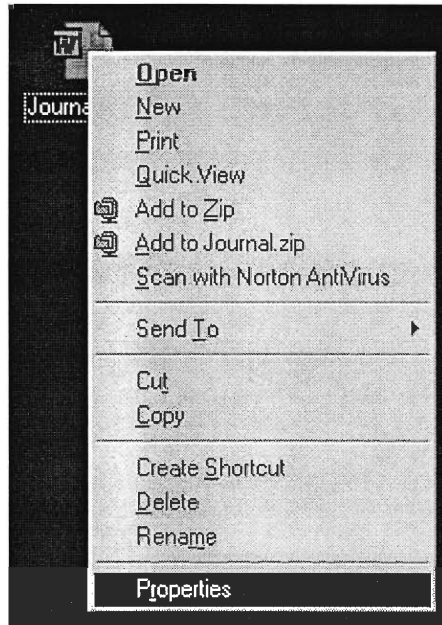
Checking the Properties of a file gives you information about that file, including size, location on disk, type of file, and the days it was both created and last changed. To check the properties, right-click on a file and select "Properties", which is the last item in the menu. A window will appear with the information.

46

Journal.doc Properties

General | Summary | Statistics | Contents | Custom

Journal.doc

Type: Microsoft Word Document
Location: C:\WINDOWS\Desktop
Size: 28.0KB (28,672 bytes), 28,672 bytes used

MS-DOS name: JOURNAL.DOC
Created: Tuesday, January 16, 2001 3:56:43 PM
Modified: Tuesday, January 16, 2001 3:56:44 PM
Accessed: Tuesday, January 30, 2001

Attributes: □ Read-only   □ Hidden
               ☑ Archive   □ System

               OK   Cancel   Apply
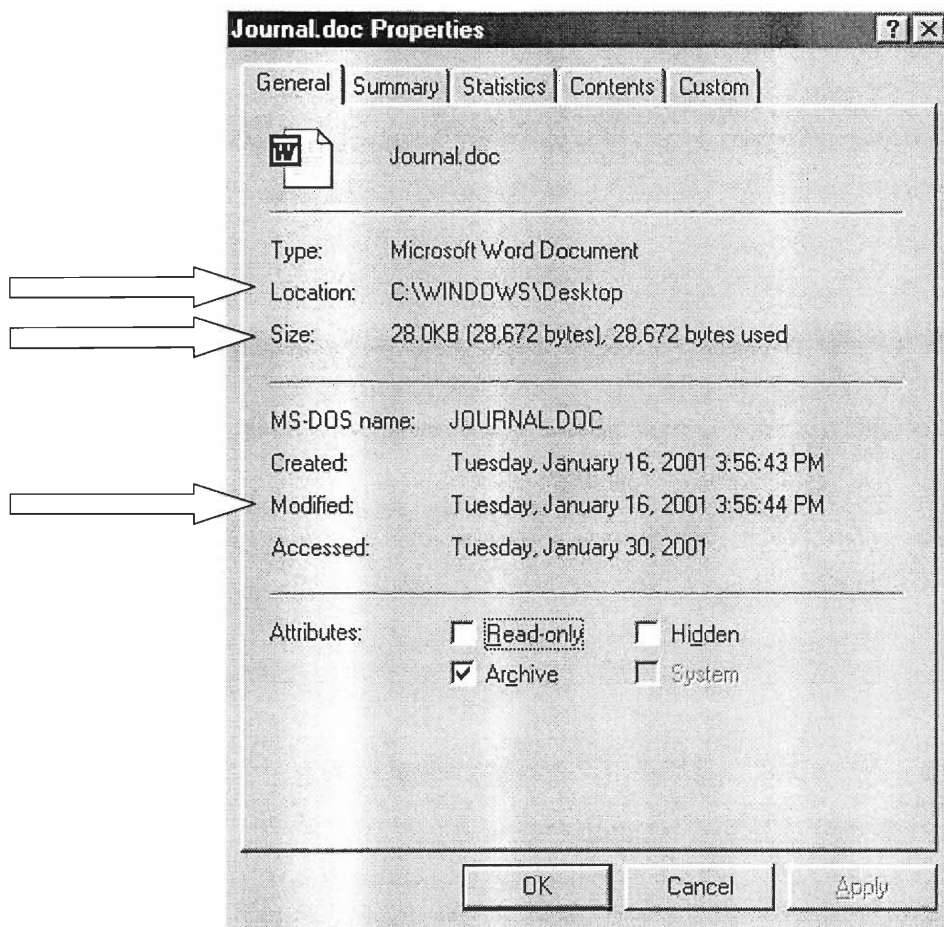
This is the Properties Window for the file Journal.doc. Notice how it tells you the
location of the file on the disk (first arrow), the size of the file (second arrow) and the
dates it was created and last changed (bottom arrow). The Properties of a file contain all
the information about a file that you need.

47

(C:) Properties

General | Tools |

Label: [   ]

Type: Local Disk
File system: FAT32

Used space: 2,613,841,920 bytes   2.43GB
Free space: 1,681,956,864 bytes   1.56GB

Capacity: 4,295,798,784 bytes   4.00GB

Drive C   Disk Cleanup...

OK   Cancel   Apply
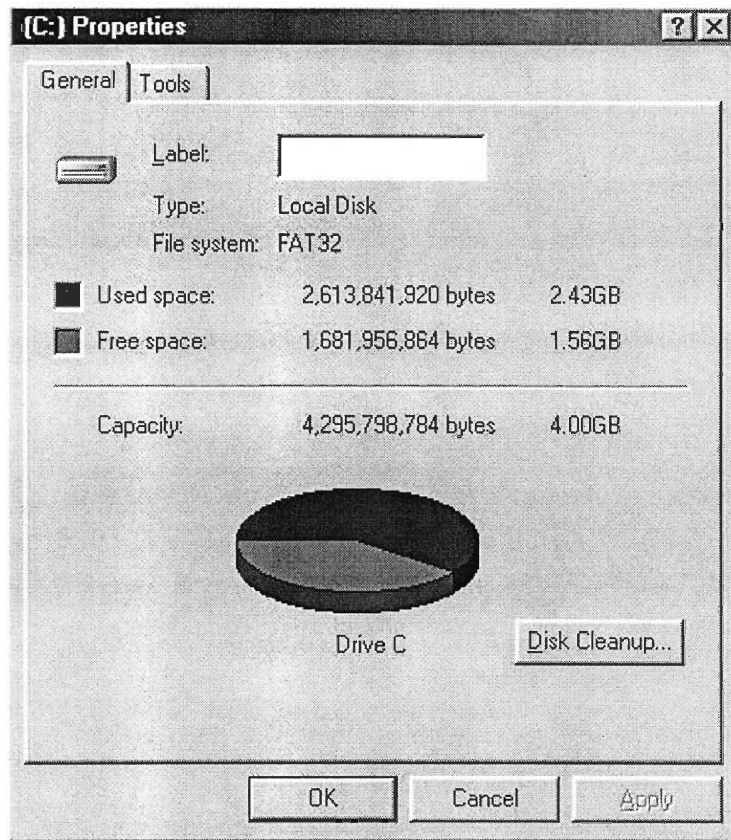
Notice that everything has Properties, not just files. This window is the Properties for the C: Drive. It tells you how much space is left on the disk and has some tools that can be used for disk maintenance.

Try looking at the properties of other things. Almost everything has properties, even the desktop itself.

Desktop Properties
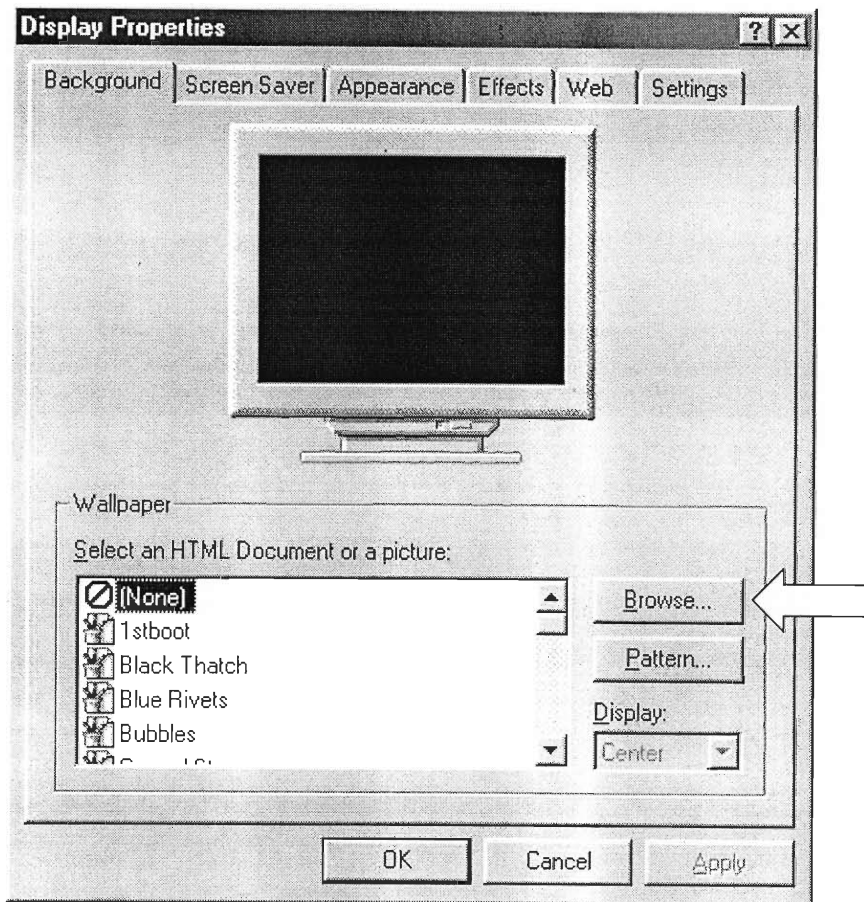
If you try to look at the properties for the Desktop, you will see this window. This is the Display Properties window, and it lets you change a number of things that has to do with the monitor and the desktop. For example, as the window shows right now, you can change the desktop picture from here. In order to change the picture, click on "Browse" and find the picture you would like to change the background to. The picture should have a file extension of ".bmp" for it to be a background picture.
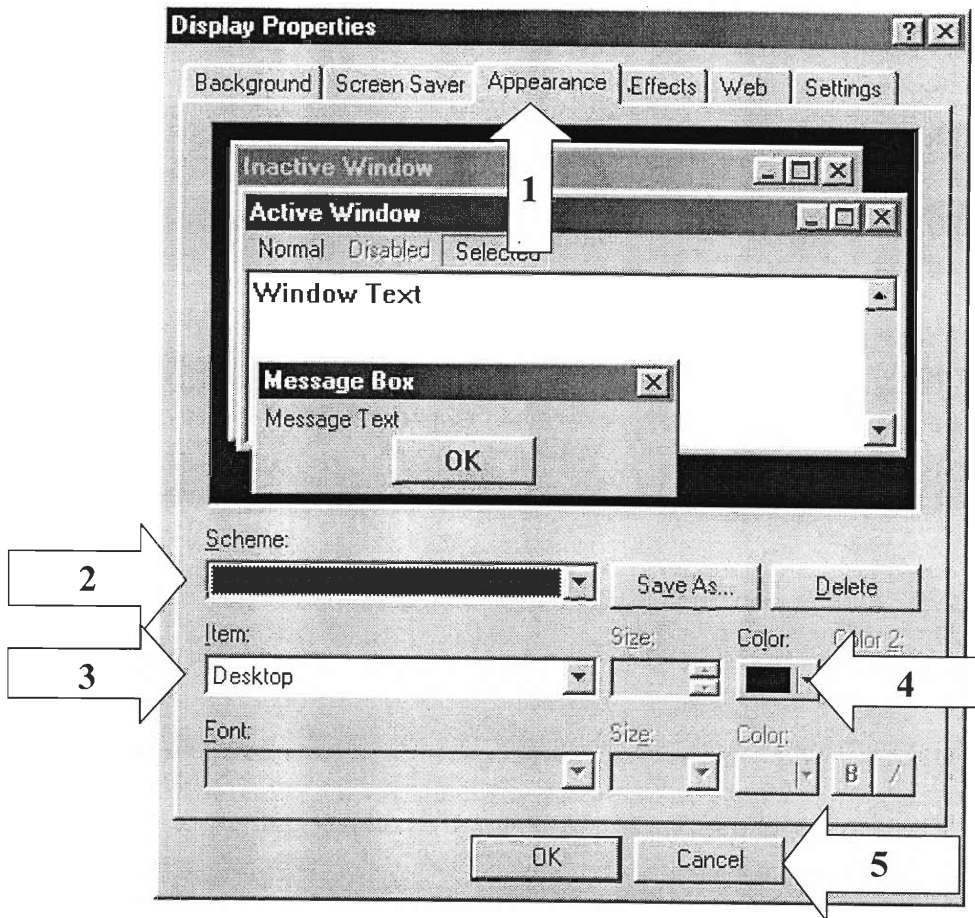
Also in the Display Properties window is the Appearance section. Click on "Appearance" (arrow 1) now to make the window show what the picture illustrates. This is where you can change the colors of many of the parts of Windows. There are many premade color schemes that you can select from in the "Scheme" menu (arrow 2). You can also pick what item you would like to change the color of in the "Item" menu (arrow 3) and change its color in the "Color" menu (arrow 4). All the changes you make, you will be able to see in the small preview window just below the Appearance button. If you don't like the changes you made to the colors, but can't get them back to how they were before, just click on the "Cancel" button (arrow 5). If you want to keep the changes, you should click on the "OK" button (to the left of the "Cancel" button).

To change the screensaver, click on the Screen Saver tab (arrow 1).
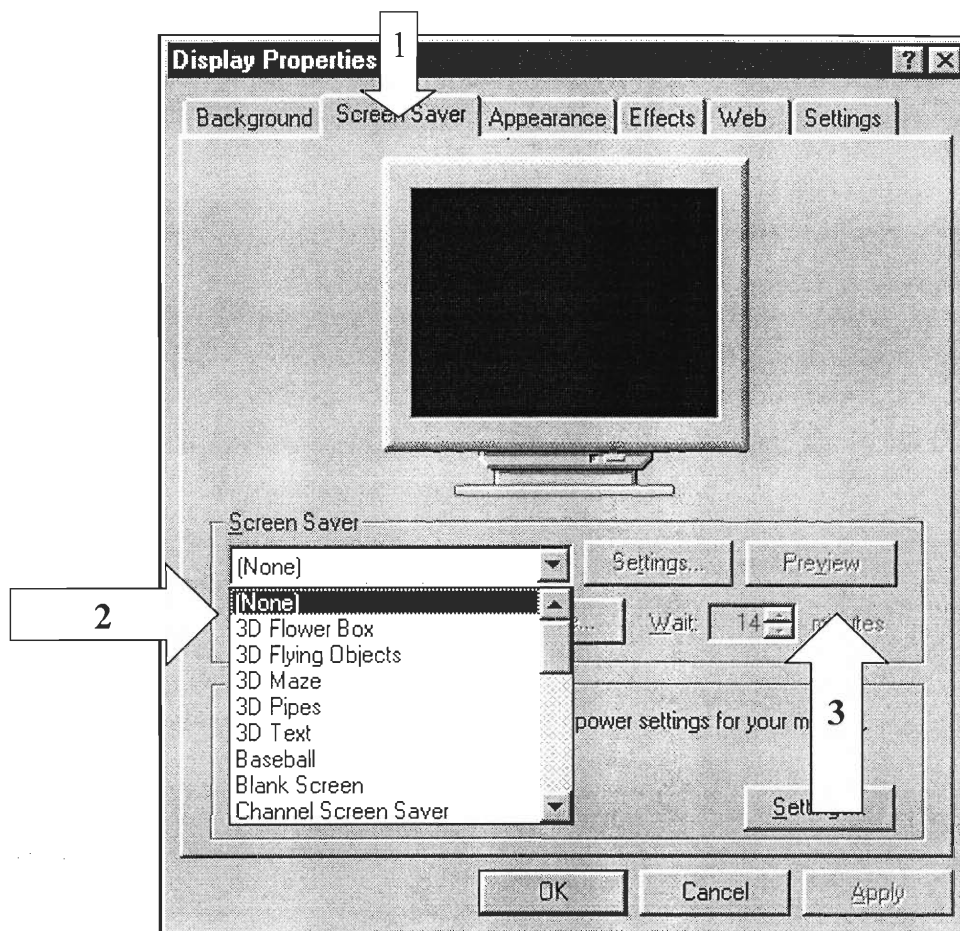
You can choose what screensaver from the selection given to you (arrow 2). If you want to see what each does, click on "Preview" (arrow 3). When you are done watching the screensaver, simply move the mouse.

Files and File Extensions

Each file on the computer has a period and a few (usually 3) letters that tells you and the computer what the file is. These letters are called "extensions," and are why you can double-click on a Microsoft Word file and Microsoft Word will open. Sometimes these extensions are not shown to simplify things, but they are always there. Notice each file above. The Text File has an extension of ".txt", the Word Document has an extension of ".doc" and the graphics file has an extension of ".jpg". Each time Windows sees a file with the extension ".doc", that tells Windows the file is a Word Document. It knows that it needs to use Microsoft Word to open the file. Other extensions that are common to Windows are ".exe" for programs you can run, ".html" and ".htm" for web pages, ".gif" for another kind of graphics file and ".lnk" for links (or shortcuts) to other files.

Renaming Files

To rename a file, Right-Click on it. Then select "Rename" from the menu that appears. The text below the icon will change so that you can edit it like you would in Microsoft Word. You can make the file's name anything you want.

Remember that the file extension is very important to Windows and that if you change it, the computer might not be able to tell what kind of file it is anymore. Don't change the extension of the file unless you know exactly what you are doing.

Shortcuts
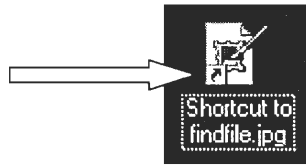
A shortcut is a file that points to another file. It ends with the extension ".lnk". When you double-click on the file, it will open the original file. The link to the file is **NOT** the original file, only a pointer. If you delete the shortcut to the file, the original file will still be there. Shortcuts can be identified by the small arrow at the bottom of their icons (where the arrow is pointing to in the picture).
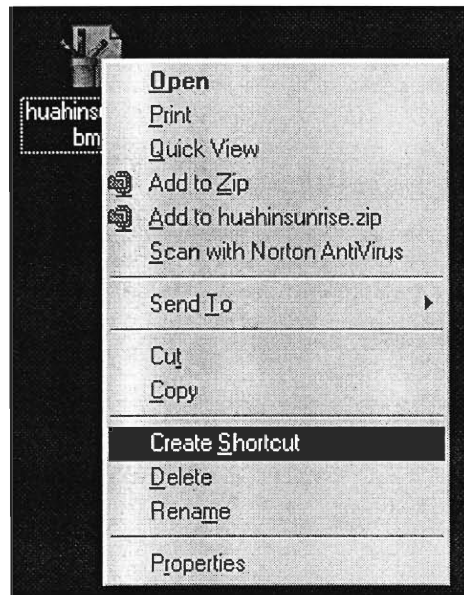
In order to create a shortcut, right-click on the icon you wish to create a shortcut of, and select "Create Shortcut" from the menu. This will create an icon named "Shortcut to …" and the name of the file you clicked on. You can now move this shortcut anywhere and it will act like the original file. You can also rename the shortcut like a regular file in the same way described above. Remember that since the shortcut and the original file are not the same, changing the name of the shortcut will not change the name of the file it points to.

54

Recycle Bin

Recycle Bin

The Recycle Bin is where files go when you want to delete them. If a file is in the recycle bin, it is still possible to get the file back. Once you empty the recycle bin, the file is gone and cannot be brought back.
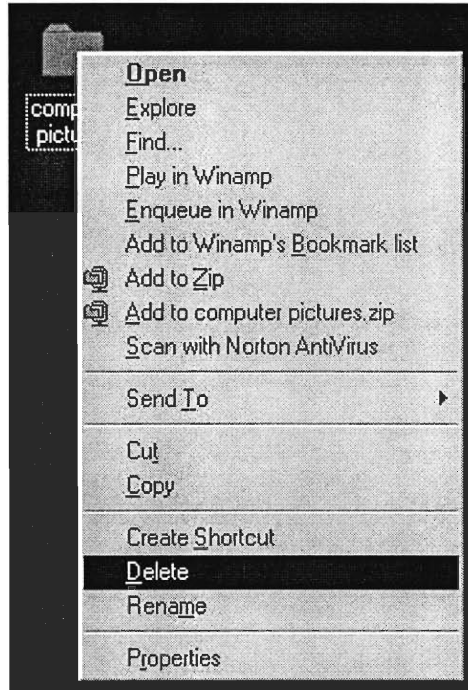
Here we are deleting this folder named "computer pictures" by Right-Clicking on the icon and selecting "Delete." This puts the file into the Recycle Bin, which you can see if you double-click on the Recycle Bin icon.
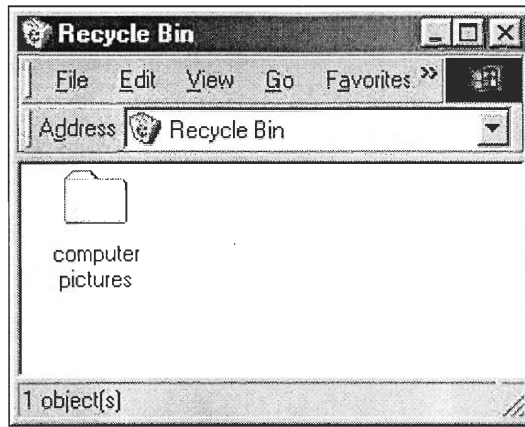
This is the "computer pictures" folder we deleted inside the Recycle Bin. Since it is still inside the Bin, we can still get it back in case we made a mistake.
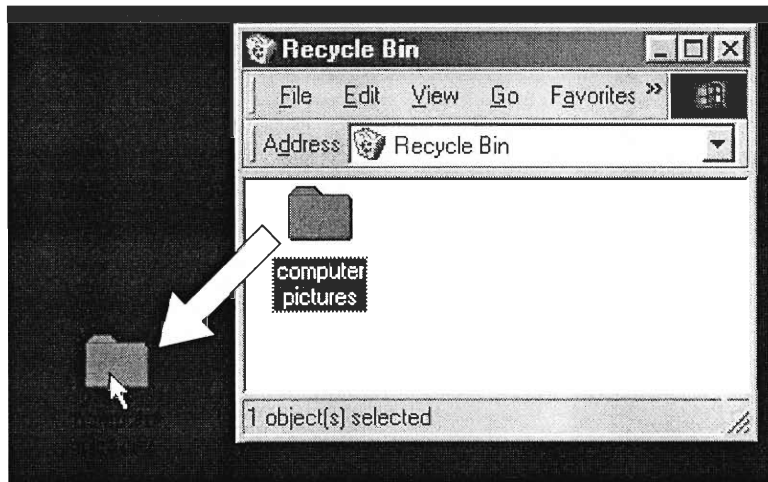
To get a file out of the Recycle Bin, double-click on the Recycle Bin to open it, and then drag the icon out onto the Desktop or into some other window where you want to keep it.
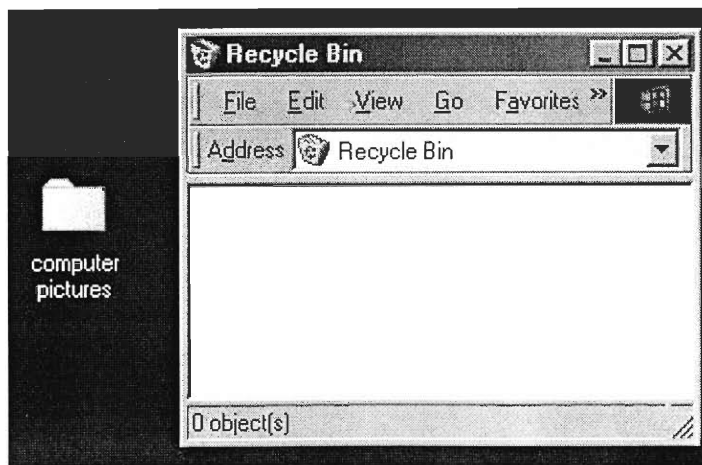
You can also restore the file to its original location. To do so, simply Right-Click on the file inside the recycle bin.
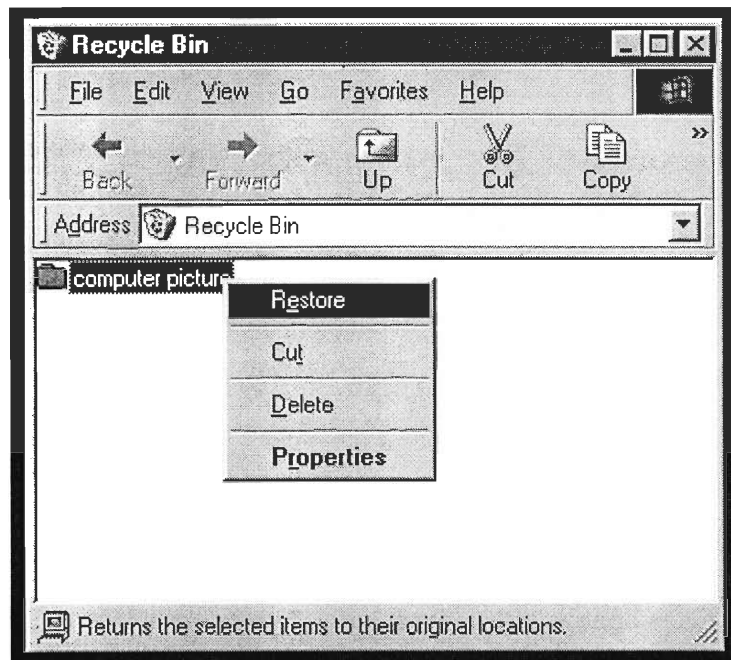
Choose "Restore," which will be the top choice, and the file will be replaced to its original location, or "Undeleted."

You can also Restore files using the **FILE menu.** Highlight the file you want to restore, then choose File menu and then select Restore . The file will be restored.

Emptying the Recycling Bin

When you want to clear the Recycling Bin, you must permanently delete all the files inside of it. It is good to check the files that are in the Recycling Bin before you permanently delete them.

When you are sure that there is nothing that you want to save in the Recycling Bin, you can empty it. There are two ways to do this. This first is by Right-Clicking the Recycling Bin icon on the desktop. Select "Empty Recycle Bin"
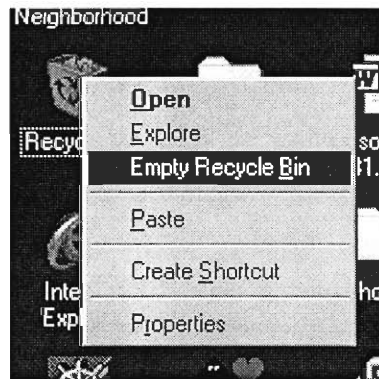
To empty the Recycling Bin in a different way, open the Recycling Bin by double clicking on it. Select File, and then Empty Recycle Bin.

58
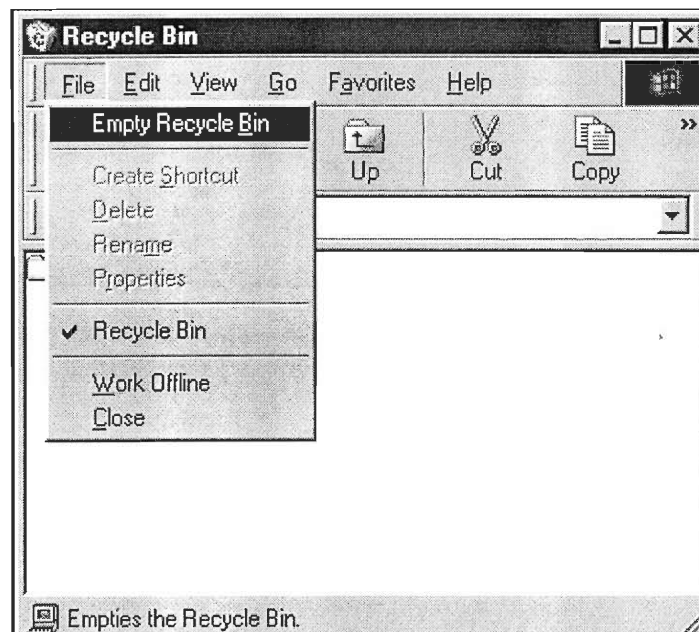
You will then get a confirmation to make sure that you want to permanently delete the files in the Recycling Bin.
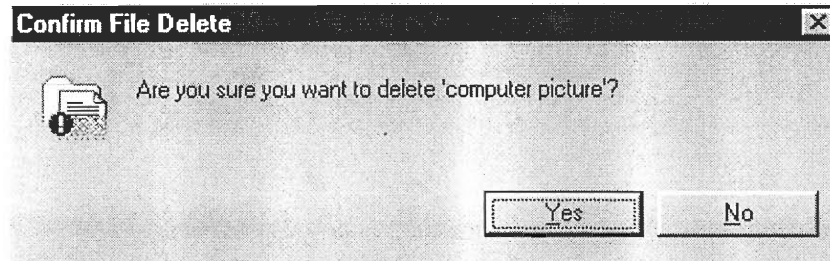
If you are sure there is nothing that you want to save, hit the "Yes" button.

Finding Files
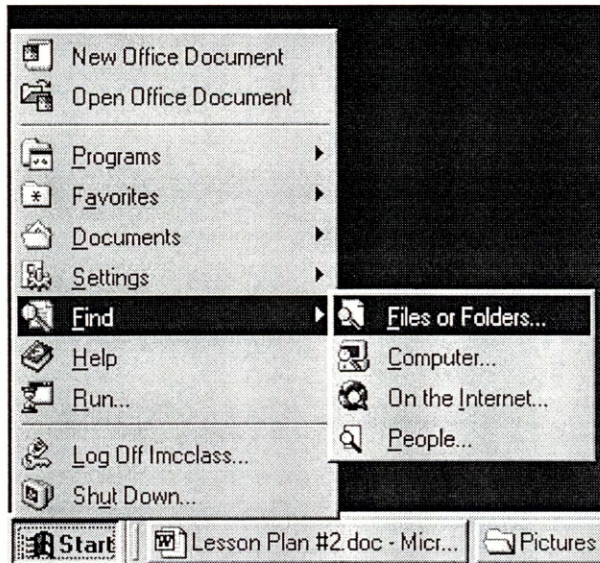
To find files that you have misplaced, use the Find File tool. You can get to it by going to the Start Menu and selecting "Find" and then selecting "Files or Folders..."
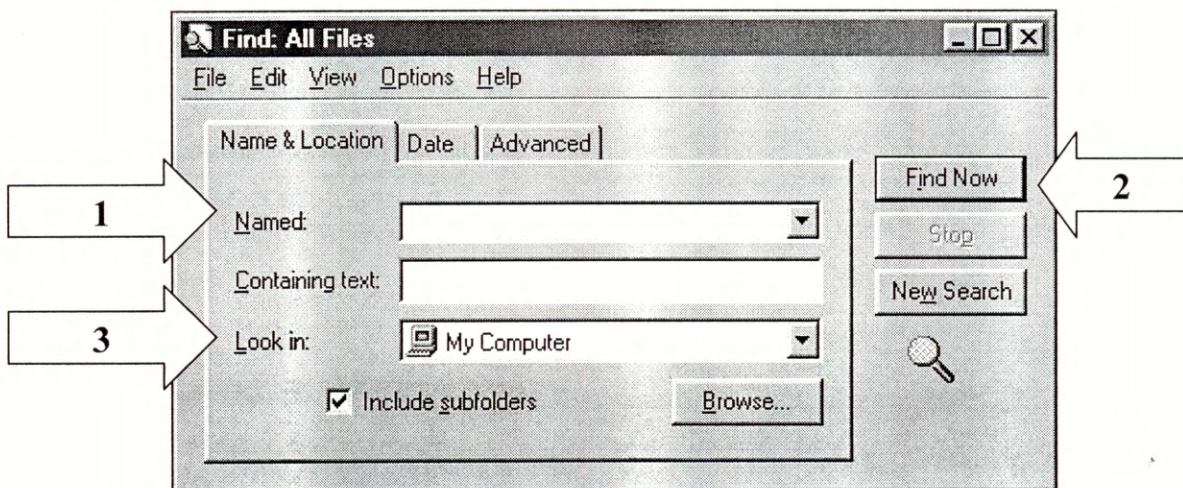

In the first text entry line labeled "Named" (arrow 1), you type in the name of the file you are looking for. You can limit your search to a specific part of the computer by selecting a specific folder or disk drive with the "Look in" menu (arrow 2). If you search "My Computer", it will look in every one of the disk drives on the computer and will definitely find the file if it exists on the computer. When you have entered all the information you need, click "Find Now" (arrow 3) and Find File will find the file or folder you wanted.
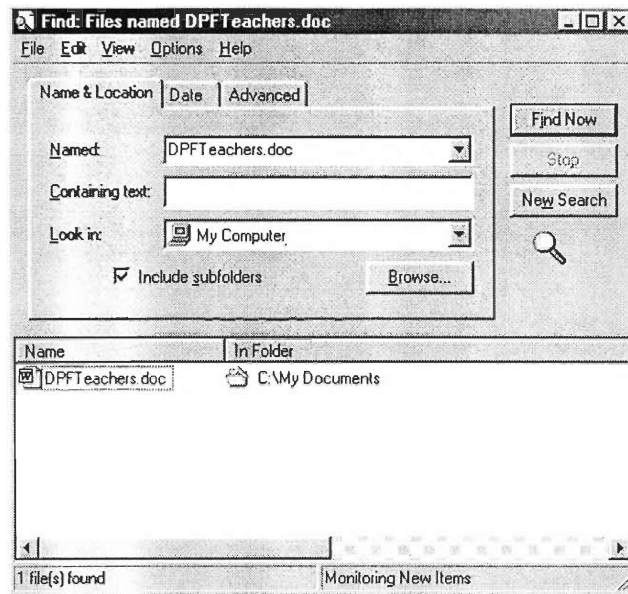
When you have clicked on "Find Now", the computer will attempt to find the file you have entered. If it can find it, it will put the file into a list like the one shown. Here, you can work with the file like normal. It will show the file name as well as its location on the computer.

You can double-click the file and it will open. If you right-click it, then a menu will pop up like it usually does, allowing you to rename or delete the file as if it were on the desktop or in a regular window. You can even drag the file to another window or the desktop to move it.
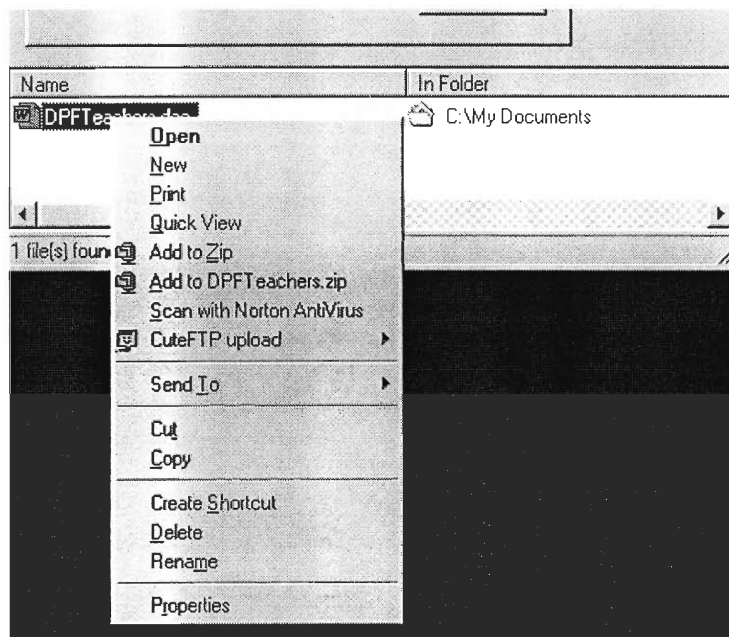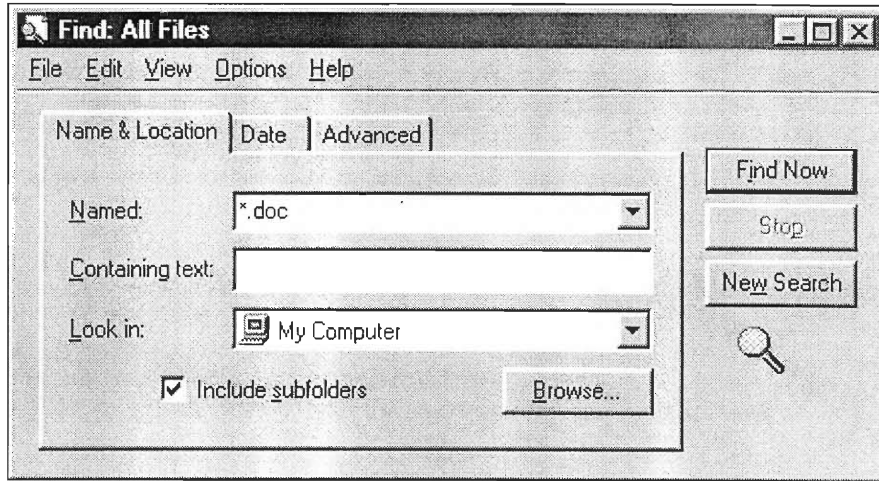
Remember we told you that each file has a file extension at the end of its filename. You can use characters called "wildcards" to find all of a certain type of file. There is a certain character, the asterisk "*", which represents all characters. If you enter "*.doc" in the "Named" field of the Find File program, it will find all the Microsoft Word Documents on your computer and list them for you.
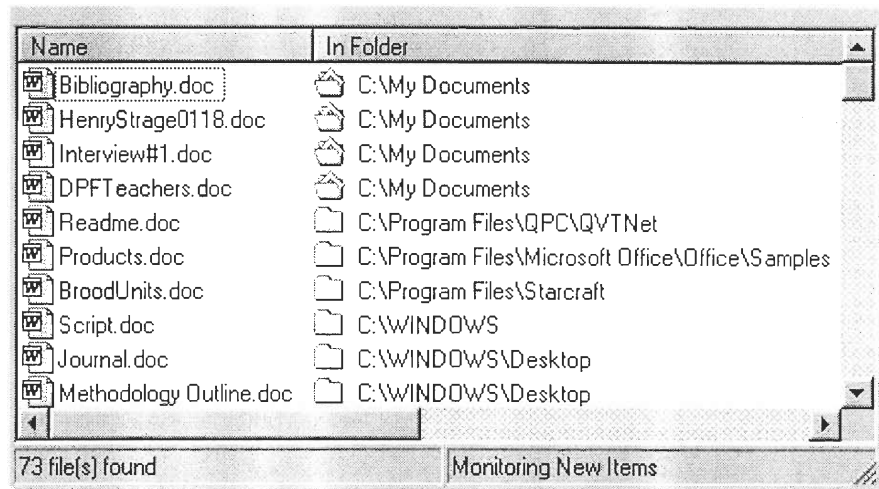

This is the list of Documents that Find File will give you when you search for all the Word Documents on the computer.
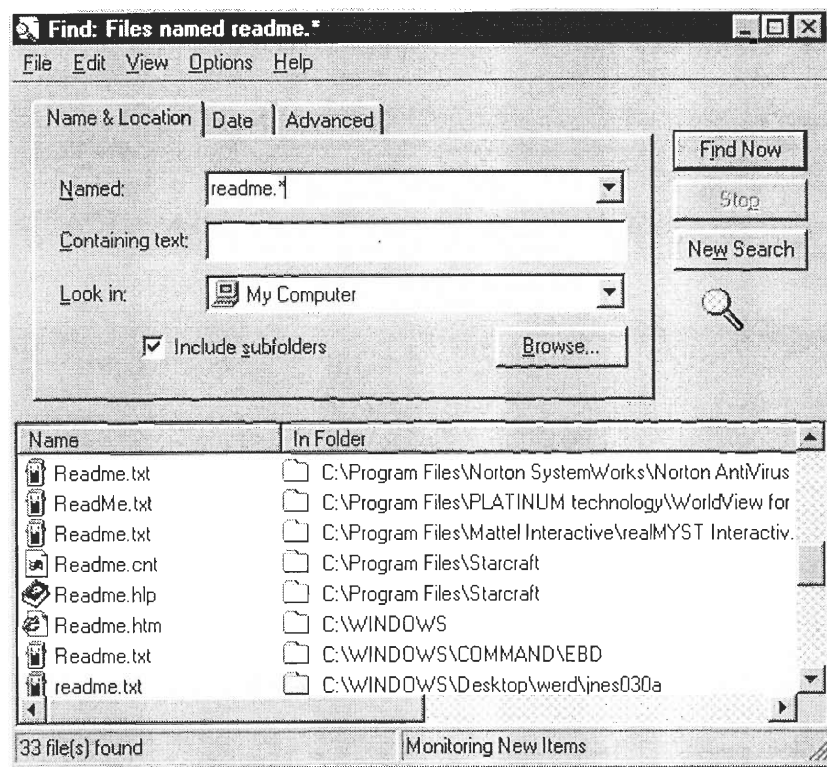
You can also use wildcards in other ways. Here, we have searched for all files with the name "Readme" but which can have any extension. Notice the files are named "Readme.txt" and "Readme.htm" because both of those filenames match the wildcard we gave in the search field.

Now search for all files that begin with the letter D on your computer. Do this by typing in "d*" into the "Named" field in the Find File program and clicking "Search Now."
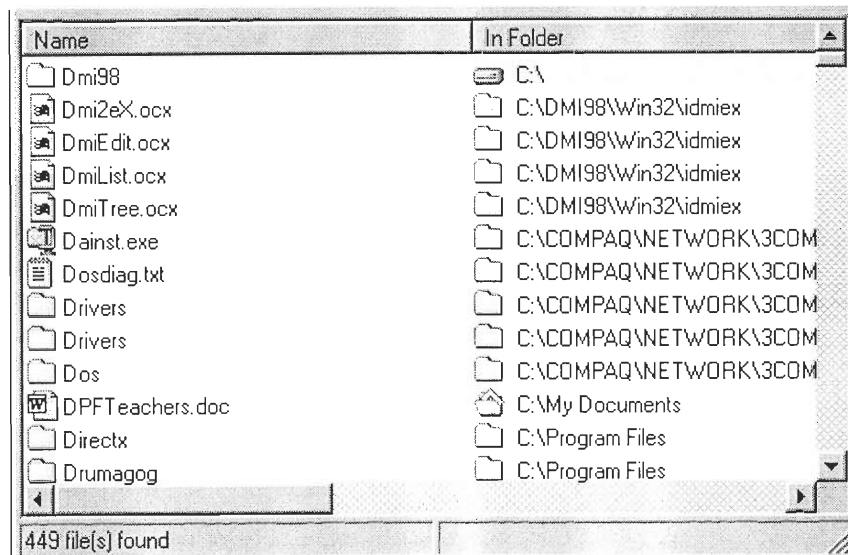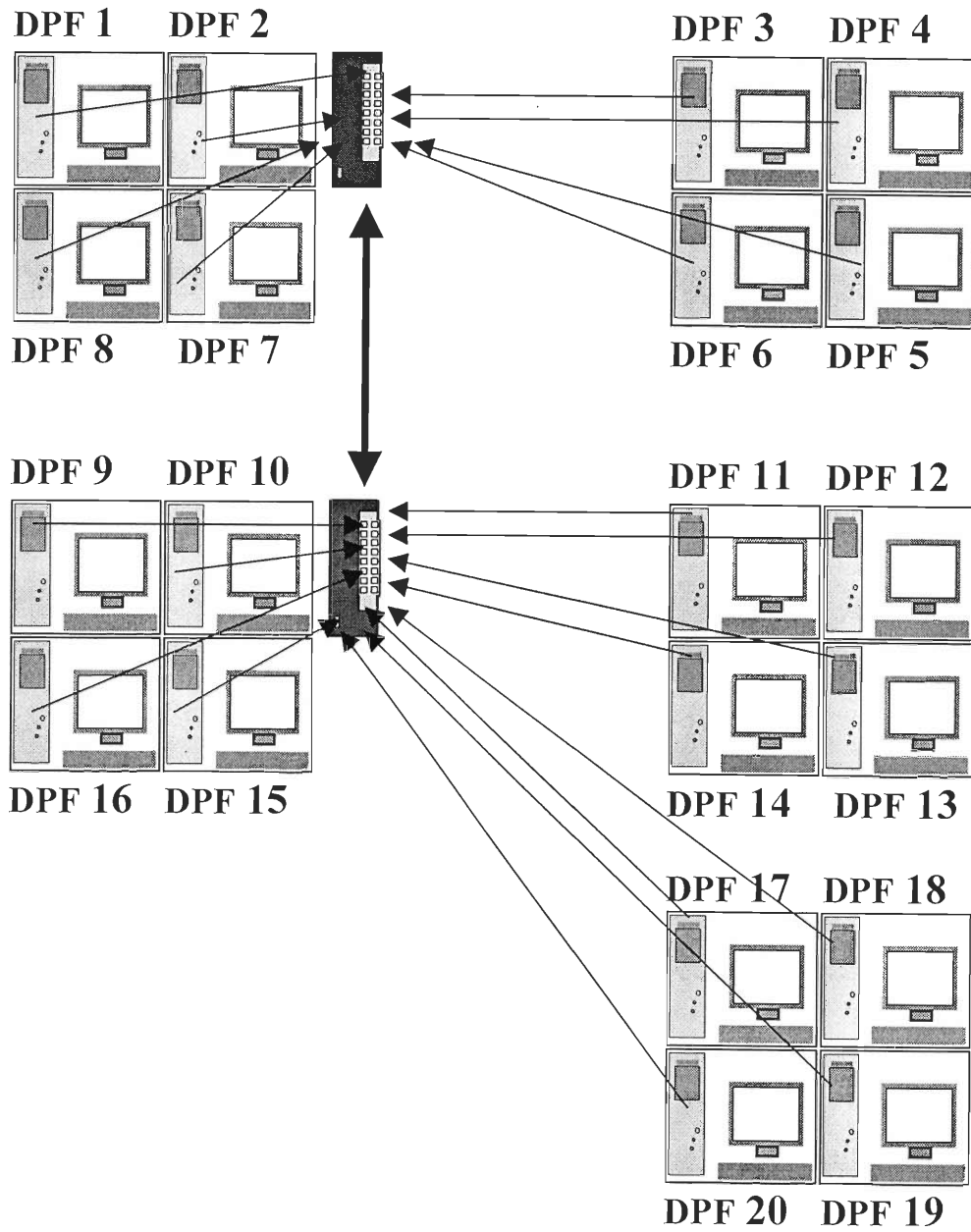
Networking
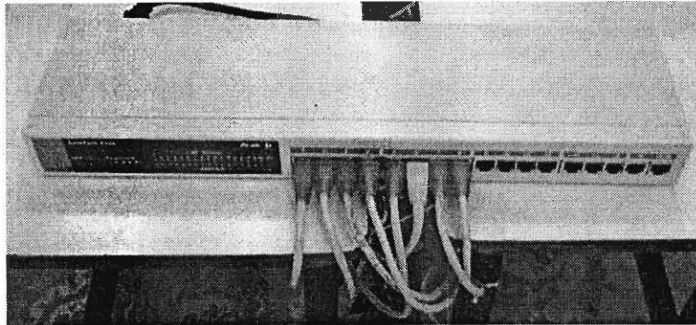
Networking is what allows the computers to be able to "talk" to each other and share files and CD-ROMs. A network is made up of computers and all the computers have cables going to and from each other. These cables are what carry the messages to and from each computer. The computers plug into a box, called a "hub", as shown in the picture. When the computer sends the hub a message, the hub sends that message to all the computers connected to it, who respond to the message if it is for them.
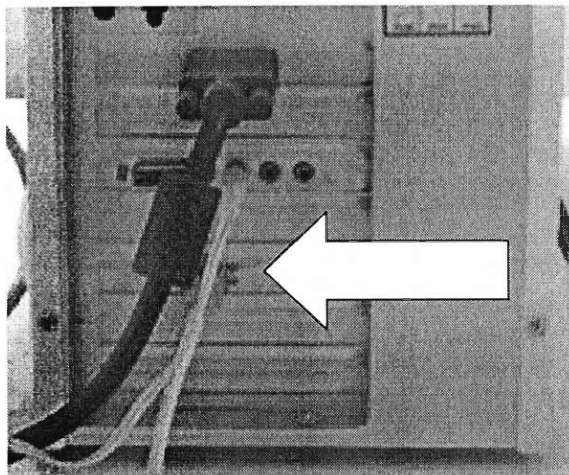
The computer connects to the network by means of a special connector on its back. The connector looks a little like a phone connector. This connector plugs into the computer on one end and the hub on the other. The network at the DPF is set up as shown on the following page.

Network Diagram

DPF 1   DPF 2

DPF 3   DPF 4

DPF 8   DPF 7

DPF 6   DPF 5

DPF 9   DPF 10

DPF 11   DPF 12

DPF 16   DPF 15

DPF 14   DPF 13

DPF 17   DPF 18

DPF 20   DPF 19

Network Neighborhood

The Network Neighborhood is where everything starts with the network. This is where you can see all the other computers you are connected to. You can also change the network settings here. When you double-click on the Network Neighborhood, you will see all the computers you are connected to in a window much like how the drives look in My Computer.
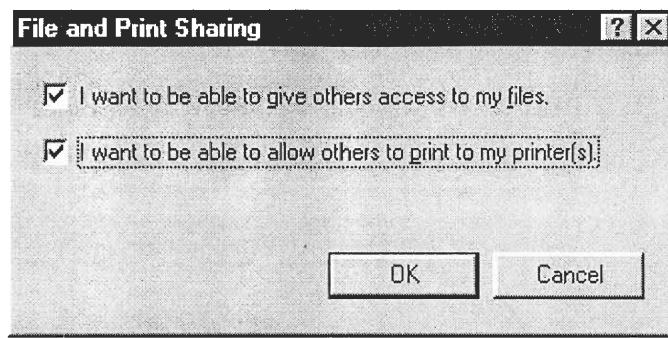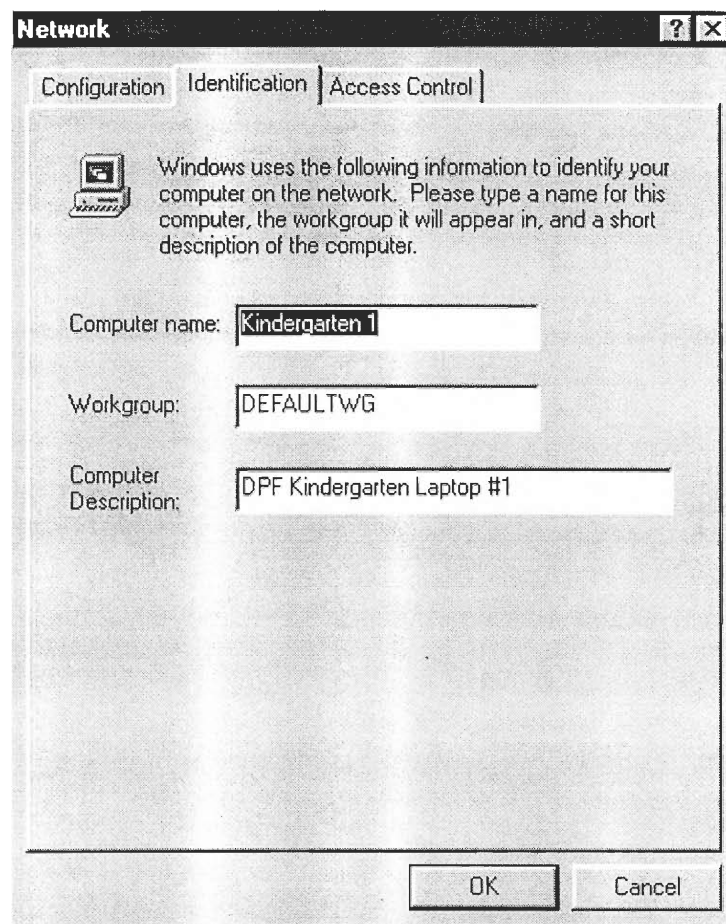
Network Properties
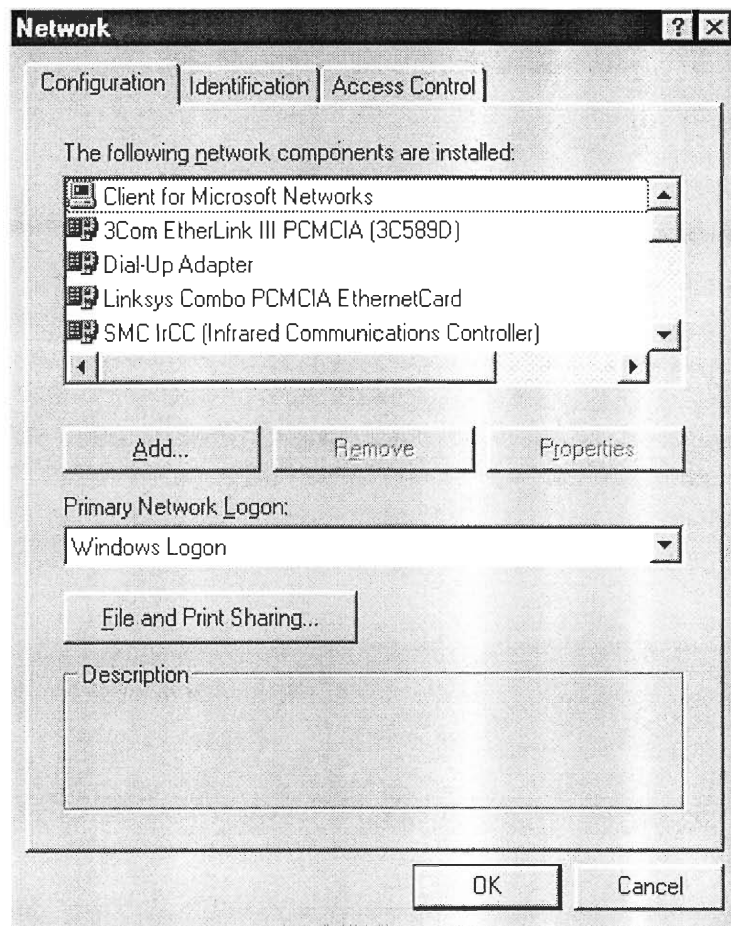
This is the Properties for the Network Neighborhood. Like all other Properties, you can get to this by Right-Clicking on the Network Neighborhood and selecting "Properties" from the menu.

This window will tell you everything about the Network connections that have been assigned to your computer. Notice the button labeled "File and Print Sharing..." This button will bring up the following window:

File and Print Sharing

☑ I want to be able to give others access to my files.

☑ I want to be able to allow others to print to my printer(s).

OK   Cancel

This is what this window must look like if you are going to share files and CD-ROMs. In fact, your computer will not even show up in the list of computers for the Network Neighborhood unless these boxes are turned on. When you click OK after turning them on for the first time, Windows will tell you it is installing more components. Afterwards, it may ask you to restart the computer, and when it does, you should restart.

This is the second tab on the Network Properties window. This is the identification of the computer. Here is where you can give the computer a name which is how the rest of the network will see it. The computer used in the screenshot has a name of "Kindergarten 1". When a computer sees this computer in the Network Neighborhood, it will be called "Kindergarten 1".

The second field in the window is the computer's Workgroup. The Workgroup is the group of computers that this specific computer belongs to. This can be used to separate computers in businesses into departments like Accounting and Sales, etc. In this case, the computer is in the DEFAULTWG Workgroup. This means that any other computers in his workgroup will show up in the Network Neighborhood when the user opens it. If there were another computer whose Workgroup were "Classroom", for example, then he would not see it unless he looked into that specific Workgroup.
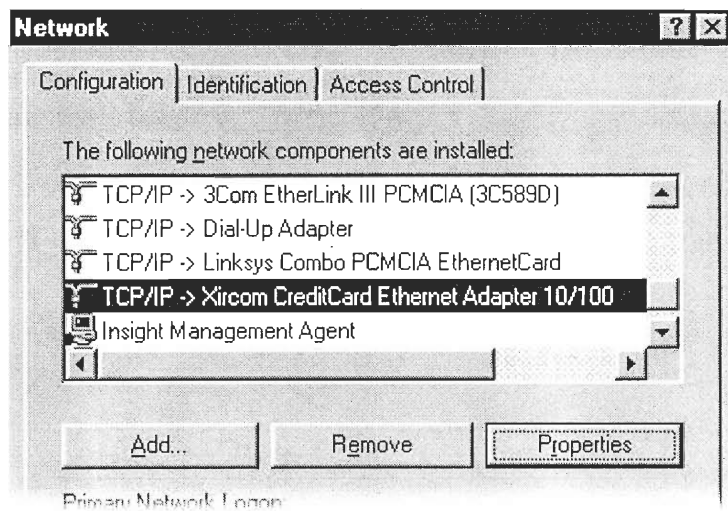
In order to see other Workgroups on the network, you should double click on the "Entire Network" icon in the Network Neighborhood window. This will give you all the workgroups that you have access to from the computer you are using. As an example, we have separated the DPF kindergarten into two Workgroups, "Classroom 1" and "Classroom 2". All the odd numbered computers are in Classroom 1 and all the even

numbered computers are in Classroom 2. Try to determine what Workgroup you are in, and then get the Network Neighborhood window to show the other Workgroup.

The last field in the window is the description of the computer. This is what other computers will see when the window's view mode is set to "Details". It is only there to give people an idea of what's on that computer and does not affect its operation in any way. You can leave this field blank in you wish.
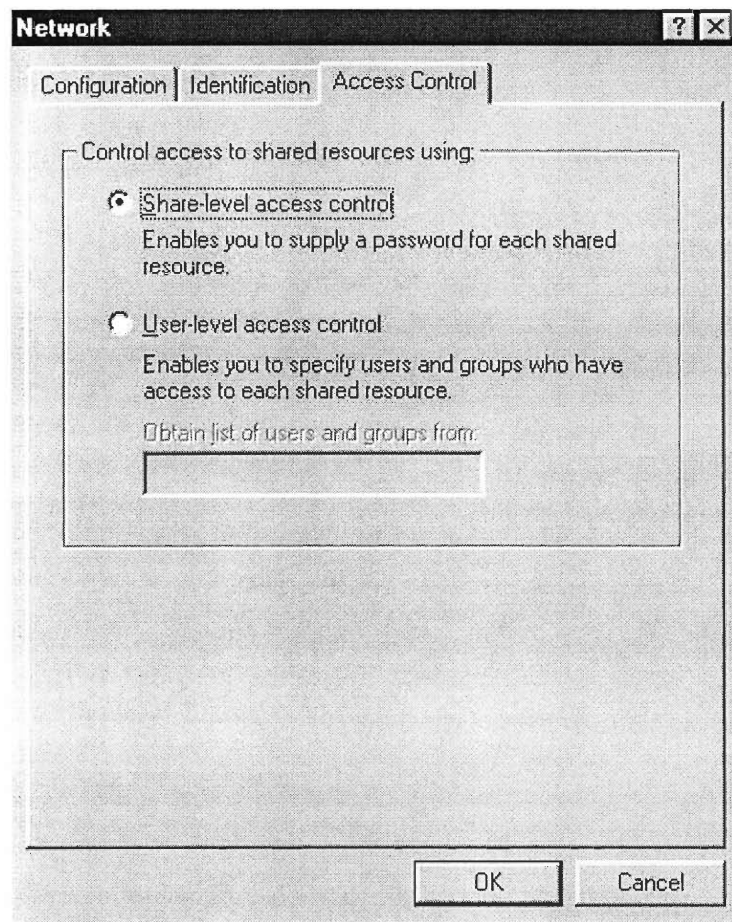

The last tab of the Network Properties window is the access for shared files and folders. Normally, this will always be set to "Share-level access control" because it is the simpler method. You can set a password for each file or folder you wish to share in this method.

Network [?][X]

Configuration | Identification | Access Control |

The following network components are installed:

TCP/IP -> 3Com EtherLink III PCMCIA (3C589D)
TCP/IP -> Dial-Up Adapter
TCP/IP -> Linksys Combo PCMCIA EthernetCard
TCP/IP -> Xircom CreditCard Ethernet Adapter 10/100
Insight Management Agent

Add...   Remove   Properties

Primary Network Logon

One important part of making sure that the Network is running well is checking the TCP/IP Properties. TCP/IP is, basically, the language that all the computers speak so that they can talk to each other. To check the TCP/IP properties, select the TCP/IP Protocol that says "Ethernet Adapter" next to it, as shown in the picture above, where we have selected "Xircom CreditCard Ethernet Adapter 10/100". After you have selected that, click on the button labeled "Properties" and you will be presented with this window:
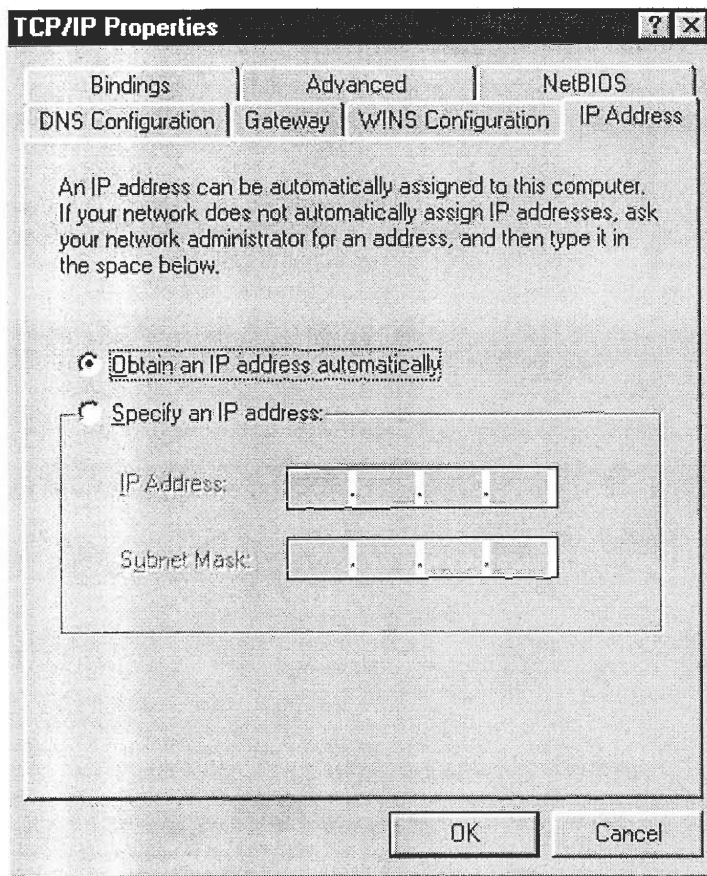
This is where all the properties for TCP/IP can be changed. The first thing you should notice is that this screen looks different than the DPF's computers do. The DPF's computers should have the "Specify an IP Address" button selected and the numbers 192, 182, and 1 should be in the first three boxes of the IP address field. The last number should be the number of the computer. The Subnet Mask field should say 255.255.255.0. When configured correctly, the settings should look something like this:

73
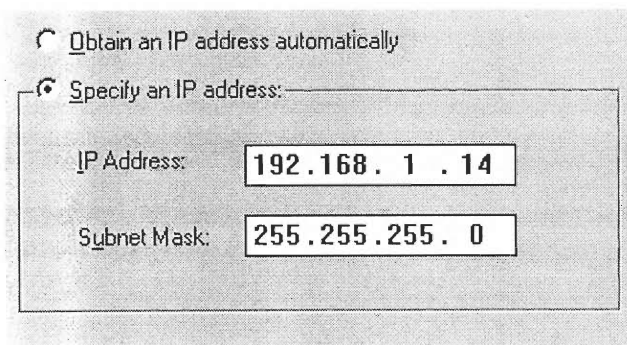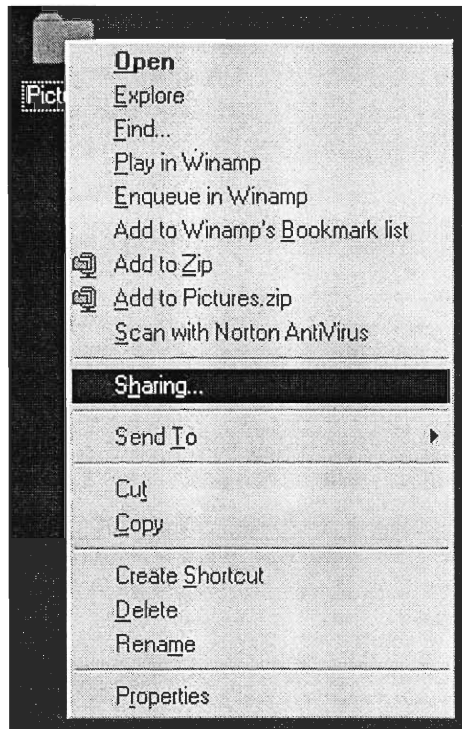
Sharing Files

In order to share files you have to make sure that you have turned on both buttons in the File and Print Sharing in the Network Properties as we showed previously. When you want to share a folder or drive, Right-Click on it and select "Sharing..." from the menu. This will give you a window with all the options for sharing the files.
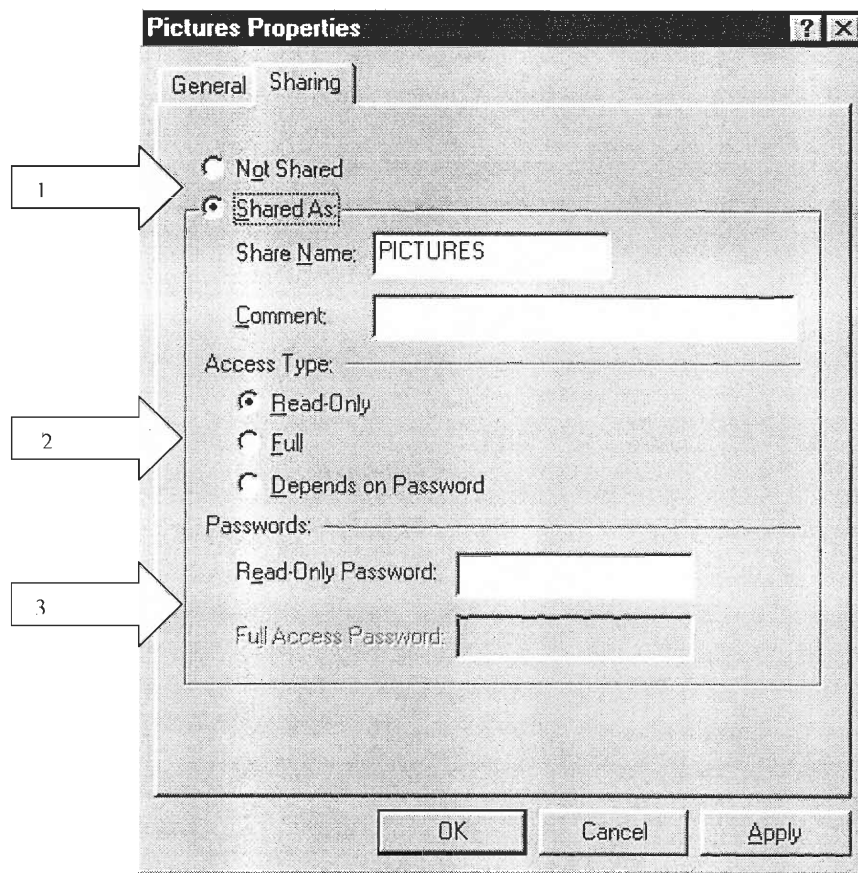
This is the window that appears when you select "Sharing..." from the menu. Notice that this is just the normal Properties for the file, but under a different tab. That is, if you click on "General" at the top, you will get the same thing you see when you select Properties from the menu.

The top arrow (#1) points to the buttons that turn sharing on and off for the folder you have selected. If the "Not Shared" button is selected then no one will be able to see the folder over the network. If you want to share this folder, you have to select "Shared As." Directly below the "Shared As" field is the name of the folder as it will appear on the network. Below that is the comment and is the description that people will see.

Arrow #2 points to the permissions of the folder. This is what the people accessing the folder over the network are able to do with the folder. If the permission is set to Read Only, then no one can write anything to the folder, but they can still open files inside it. If the permission is set to Full, then people can change the contents of the folder as if they were on the same computer. They can add files, delete files, and change files. If the permission is set to "Depends on Password" then the permission can change when a different password is given.

The bottom arrow (#3) points to the passwords. You can set up to two different passwords because of the "Depends on Password" permission setting. The Read Only

password gives the person permission as if you had selected "Read Only" for the permission. The same happens with the Full Access password. If the user enters that password, then they will be able to access all the files as if you had set the permission to "Full".

It is not recommended that you set the permissions to Full for everyone, since that means that people you do not know might be accessing and changing your files without your permission or knowledge.

You can share a CD-ROM or other disk drive in the exact same way as sharing a folder described above.

When the Sharing is all set up and configured, click on OK in the Properties. The folder you have selected for sharing will have its icon changed to have a small hand holding it as shown above. This means that the folder is being shared over the network. In order to turn sharing off, go back to the Sharing Properties and select "Not Shared" and click OK. The icon will return to normal, signifying that the folder is no longer being shared.

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162

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