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Increasing Donations to CyberCycle

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ABSTRACT

CyberCycle is a charitable computer-recycling project based in London. To fulfil its plans of future expansion, CyberCycle needs to develop a marketing strategy to attract more donors. We researched motives for donations and donors' concerns. Then, through interviews and questionnaires, we surveyed CyberCycle's past and potential donors. Based on our research, this strategy must alter existing policies and procedures, and start new marketing techniques.

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EXECUTIVE SUMMARY

CyberCycle is a charitable computer-recycling project based in London. To expand in the future, CyberCycle needs to develop a marketing strategy to attract more donors. To help develop this marketing strategy, we researched motives for donations and potential donor concerns. Then, through questionnaires and interviews, we conducted a survey of past and potential donors. Based on our research, this strategy must change existing policies and procedures, modify current marketing media, and start new marketing techniques.

To research motives for donation and potential donor concerns, we reviewed existing literature regarding altruism, corporate donation, data security, Year 2000 compliance, and computer recycling. We familiarized ourselves with strategic giving and how it applies to soliciting donations from the corporate sector. We examined ways of ensuring the security of previously stored data and correcting many Year 2000 compliance problems. Finally, we spoke with a few managers from charitable computer-recycling projects in the United States to learn from their experiences in the field.

In London, we questioned past donors to the CyberCycle project to learn how and why these companies had given to CyberCycle, and how they felt about the project. We spoke with potential donors to investigate how they learn about charities and what they look for when donating. We contacted local technical journals to explore the possibility of having articles written about CyberCycle. Finally, we formulated our suggestions based on the information we had gathered.

CyberCycle must increase the corporate sector's awareness of the project by modifying existing marketing and starting new forms of advertising. First, CyberCycle needs to update its

existing webpages and informational pamphlet to provide current information about the project and its goals. Second, CyberCycle must prepare a charitable donation request package telling companies about the project, and send this package to companies. Third, CyberCycle must provide existing donors with information about the project so they can pass this information along to their customers who are potential donors.

CyberCycle must improve its relationships with past donors and potential donors alike. Donors must feel connected to CyberCycle. They must remain informed about CyberCycle's actions. New donors must find CyberCycle easy and convenient to deal with. CyberCycle needs to improve its pick-up arrangements and communications with its donors. Donors need to know that CyberCycle is an effective partner in assisting the community around them.

To help CyberCycle begin addressing the concerns of its donors, we wrote a software package that integrates data security and a Year 2000-compliance fix. Implementing this automated software will help CyberCycle reassure its donors of the security of sensitive data while allowing CyberCycle to use non-compliant computers after the Year 2000.

We believe that by implementing our recommendations, Charity Logistics can attract the necessary donations to fulfil its aspirations of expansion of the CyberCycle project in the near future.

INTRODUCTION

Recycling old computer equipment has become a rapidly expanding practice in the last few years. In Europe and the United States (U.S.) many charities have recently formed to provide inexpensive, used computers for schools, charities, the disabled and economically disadvantaged. Companies, schools and government agencies have begun replacing old personal computers (PC's) after only three to four years. To help address the problem of disposing of these computers, the Department of Trade and Industry in the United Kingdom published a handbook listing charitable organizations that refurbish used computers and distribute them to other charities.

One such organization operating in the London area is Charity Logistics, through its CyberCycle project. CyberCycle receives used computer equipment from companies, charities, schools, and government agencies as they update and replace their older equipment. CyberCycle then dismantles, tests, and re-assembles these computers to sell them at a low cost to other charities around the world. According to the Charity Logistics' advertising pamphlet, Charity Logistics' goal is to help "charities achieve their objectives effectively, efficiently and economically." Besides the CyberCycle project, Charity Logistics provides several resources for other not-for-profit organizations in London through its various projects including Charity Insurance, Charity Properties, Charity Vehicles, Charity Supplies, and the Advisers. In order to improve Charity Logistics' ability to provide for charities in a more effective manner, its management has asked us to devise a marketing strategy to increase the donation rate to the CyberCycle project. They need to augment the quantity of computers donated to the CyberCycle project because there is a great need for these computers at charities that cannot afford new computers.

Through our research and investigations, we will provide CyberCycle with a series of recommendations to increase the quantity of usable equipment donated to that project. Specifically, we will address methods of soliciting additional donations, concerns of potential donors and operations of similar charities in the U.S. and United Kingdom (UK). We will also address the major donor concern of data security and analyze methods of increasing the usability of systems that are not Year 2000 compliant.

At the end of this project, we will present Charity Logistics and CyberCycle's management with our final recommendations as well as the results of the implementation of our new software programs. To provide the best possible information, we will personally interview a number of London companies, prepare a questionnaire for previous donors, and attempt to implement our Year 2000 and data security solutions. We must interview the people responsible for deciding how to dispose of old computer equipment. We need to determine what companies are doing with used equipment, what factors cause them to choose a particular method of disposal, and what changes in the CyberCycle project might make them consider possible donation. We must also survey CyberCycle's existing donors to confirm our expectations regarding donor concerns, and identify any additional unexpected concerns for CyberCycle to address in the future. Finally, unexpected problems may appear in the implementation of our software, so it is imperative that we begin implementing these solutions as soon as possible so we can deal with them while in London.

This project will help CyberCycle improve its relationship with its current donors. The report will provide CyberCycle with guidelines to attract more donations from other corporations as well as securing future donations from the current donors. Thus, CyberCycle will be able to

assist more charities and help other communities that have yet to benefit from the CyberCycle project.

It is possible that a huge increase in the donations to the CyberCycle project will swamp the organization. However, their current plans to expand, their attempts to increase the efficiency of their internal processing capabilities, and their current storage capacity should minimize this problem. This threat of supply exceeding processing capacity is one major reason why we placed the implementation of the proposed marketing strategy outside the scope of this project. Our goal is provide Charity Logistics with the means to expand the CyberCycle project by increasing the quantity of donations to that project once the internal processing capacity is increased to handle the donations.

This report was prepared by members of the Worcester Polytechnic Institute London Project Center. The relationship of the project center and the relevance of the topic to Charity Logistics are presented in Appendix A of this report.

LITERATURE REVIEW

1.0: A BRIEF INTRODUCTION TO THE LITERATURE REVIEW

Charity Logistics is an England based not-for-profit managing organization. It provides services to many charities with the goal of giving these smaller, local charities a common voice. Together, these charities can act in a more efficient manner. Charity Logistics' service projects include Charity Insurance, Charity Properties and CyberCycle. For more information regarding Charity Logistics or the CyberCycle project, see Appendix A.

Charity Logistics' CyberCycle project collects corporate donations of office equipment, including used computers. CyberCycle secures, repairs, and resells the computers to local charities and schools, with the intention of providing computer equipment to those charities that cannot afford expensive new computers. The CyberCycle project collects donated computers from corporations in and around London and dismantles them for parts. Volunteers and unemployed trainees later reassemble the working parts, while learning valuable computer maintenance skills.

George Cook, Chief Executive of Charity Logistics, wishes to expand CyberCycle's operations in London, but he realizes CyberCycle must increase its supply of donated computers and operational capacity before increasing demand. Without an increase in donations and the ability to process the donated equipment, an increase in the demand from local charities for used computers would only generate a backlog of requests for equipment. We addressed the supply side of this problem in this project.

To address the supply of donations, we focused on three major points: donors' motivation, their concerns, and the utility of donated material. First, donors' motivation

addresses why people and companies give and how to increase the quantity of their donations. This is important to understand in order to increase the volume of donations to CyberCycle. Second, donors' concerns address the possible costs and benefits of donating to CyberCycle. Third, the utility of donated material is the capability of reusing the donated equipment.

2.0: Motivations for Altruism

In order to understand the reasons why people and organizations donate, we examine the psychology behind donation. Prior experience or familiarity with a cause is one of the motives for donation; people will most likely give to causes that they can relate to rather than causes with which they have no experience (Jacoby, 1997). A research group interviewed 49 people in the UK about their preferences for methods of donation, causes, and beliefs about the role of charities in society. From these interviews, the research team identified two main themes: the experience people have had with those in need, and the organization of either formal or informal giving within social institutions. These themes reflect variations in the relationship of individuals to the community of which they are a part. The result of that study indicated that people usually give to causes with which they are familiar (Radley & Kennedy, 1995).

In an attempt to find why people give to charity, Daniel Yankelovich's market research company conducted a survey in the United States. The survey found three basic reasons why people give to charities: 1) a sense of moral obligation; 2) the personal satisfaction from helping others; and 3) a way to alleviate the guilt they would have felt if they did not donate (Bakal, 1979). In contrast, Alfred Siegman claims that people feel uncomfortable about the less fortunate in their midst, or in their idealized society. Indeed, not giving is one way of denying the presence of these undesired aspects of society (Bakal, 1979).

Furthermore, the contributions of others can significantly influence a person's charitable contributions. For instance, the National Survey of Philanthropy in the United States indicates that a sizable fraction of the population believes that people consider what others give when determining their own contribution. Fundraisers also feel that large leadership contributions by wealthy individuals can be influential in encouraging more and larger contributions by others (Andreoni, 1998). Psychologists have also learned that those who have recently witnessed an altruistic act are more likely to be altruistic, and people will be more altruistic when others contribute more. Sociologists studying reference groups have shown that the choices individuals make often depends on their perceptions of the choices of others who are similar in age, education, and social status. Such reference groups appear to be important in determining altruistic and charitable activity (Andreoni, 1998). Formal models of altruism assume that a contributor's choice depends on the contributions of all others, largely because of the public aspect of charities.

Other models look at the motives for giving, which include a desire for acclaim, status, or simply personal satisfaction (Andreoni, 1998). Charitable giving may also be a response to fund raising, the donors' objective being to obtain rewards such as lottery tickets or invitations to gala occasions. Likewise, individuals and firms may give to improve their reputation; e.g., politicians adopt altruistic postures to increase electoral support and prestige. Also, volunteer work effort may be given with the intention of acquiring on-the-job training experience or valuable personal contacts (Jones et al., 1998).

According to C. H. Deutsch, one cannot depict donors in terms of complete, disinterested or spontaneous altruism; there must be some sense of obligation, approval, and interest. The donor requires some feeling of inclusion in society and an awareness of the need and purpose of

the gift. For example, Avon Products, a cosmetic company in the United States, used to support causes that alleviated human suffering. Today, it gives only to programs that relate specifically to women. As the senior vice president of the company reports, giving has to be in line with the company's vision for the business (Deutsch, 1997). Companies increasingly support causes that are related to their customers. For instance, Whirlpool, whose main customers are women, focuses on funding projects such as childcare and job training for women (Kadlec, 1997). For a corporation to donate there must be some interest and benefits in return. Asking for a gift is not enough; the recipient must first demonstrate the potential return to the company (Pollack, 1998).

Companies are also more inclined to give to causes that are important to their employees. American Telephone and Telegraph (AT&T), a United States telephone company, has stopped financing charities in foreign countries where it had manufacturing plants, since it no longer manufactures telephone equipment. AT&T is now investing the money into internet-related education programs in places where it has introduced telecommunications services. The company's executive director argues that the company should invest only in communities and causes that represent its primary markets (Deutsch, 1997).

Now, companies no longer use the term "corporate-giving" when referring to corporate donation; rather they employ the term "strategic giving", where corporate philanthropy is considered as a means to serve the company's self-interest (Deutsch, 1997). For example, when the Johnson & Johnson Company sends drugs to a disaster area, more doctors grow familiar with those products, increasing the company's potential sales. Also, when Avon Products donates cosmetics to a homeless shelter, it displays the products and the company's largess to social workers, family members, doctors, and others with a larger buying power than the immediate recipients (Deutsch, 1997). Thus, strategic philanthropy is an approach many corporations take

in making decisions about giving (Somers, 1997). Companies have begun adopting strategic philanthropy as part of their corporate contribution management. It is "the process by which contributions are targeted to meet both business objectives and recipient needs" (Marx, 1998). This concept represents the integration of philanthropy into the overall strategic planning of the corporation (Marx, 1998). Companies have realized that they can not give to every good cause; instead they have concluded that each company's philanthropy should be aligned with its business strategies, the message, and the wishes of its employees (Pollack, 1998).

Kathleen Flanagan, Vice President of Corporate Communications for John Nuveen & Company, Inc., emphasizes that most corporate executives want to be involved in charitable activities in their community. Indeed, a company is likely to give its financial support where they have interests and involvement. (Kayton et al., 1998). Furthermore, U.S. Representative Paul Gillmor, from Oregon State, wants Congress to require all public companies to give shareholders a major say in deciding which charities should benefit from a corporation's contribution. He said that since the money belongs to the shareholders, they should have input into who receives the money. By contrast, company leaders say that they fear their grant making would be less effective if shareholders started scattering money to charities of all kinds, including those that might have missions that conflict with corporate goals (Moore et al., 1997).

American business has discovered that charitable contributions can be beneficial to the company. Doing good deeds is an effective marketing technique in a shrinking and precarious economy. With the diversification of the U.S. consumer base, charitable marketing is an effective strategy to obtain a favorable response for companies. Charitable marketing is also less expensive than conventional advertising. Many firms employ charitable marketing knowing that any affiliation with charity can favorably influence customers, prospects, stockholders, and

government regulators. When charitable donations are covered by the media, the value is immense because such publicity is effectively a third-party endorsement of the company's benevolence (Graham, 1995).

One of the ways that charitable giving proves to be beneficial is by building the company's image. Since lack of concern quickly tarnishes the corporate image, one of the most controversial, yet necessary, areas of identity building is corporate charity. By asking local managers and corporate branches to decide on allocation of charitable funds, large corporations ensure that they are in touch with the needs of local communities. Corporate executives establish policies about charities and determine what form of philanthropy best serves the corporation's long-term self-interest. One factor in making this decision is the corporate image. Survey results indicate that patterns of corporate giving fit well with the theory that corporations provide funds to causes that serve the broadly conceived interests of the firm (Gray, 1986). The recipients thus serve to promote a favorable corporate image (Gray, 1986).

Furthermore, enlightened companies recognize that their own health can be no better than the health of the society in which they operate. These companies contribute to the health of the society around them as an effective business strategy. Therefor, carefully planned philanthropy, related to the company's own self-interest, is not only a valuable communication tool, but also builds sensible community relations (Garbett, 1988). However, besides contributing toward the general well being of the public, CEOs look for benefits that accrue to their business. Associating with charity as volunteers gives corporate employees an opportunity to improve the community in which they live and work, enhance their corporation's reputation, give their company visibility, and increase the opportunity to network with others (Kayton et al., 1998).

Aside from the desire to build the company's image, the tax rate and structure also influence corporate giving. To investigate the charitable giving of large corporate donors in Britain, a group of investigators analyzed pooled information on 53 U.K. companies over the 1979-86 period. During this period, the U.K. reduced its corporate tax rate from 52 percent to 35 percent. In response, corporate charitable contributions increased, thus making the tax rate and charitable contributions inversely related. The study did not report the correlation coefficient, however, the study noted a small, but significant upward trend in charitable giving (Arulampalam & Stoneman). Moreover, the firm's level of charitable giving varied positively with the size of a firm's net pretax profits. Interestingly, the study found firm size did not affect charitable giving in firms with fewer than 50,000 employees (Arulampalam & Stoneman, 1995).

U.K. businesses donate billions pounds to charity per annum, but to justify the expenditure of billions of pounds of pretax profits, boards have to demonstrate that there is something to gain from such action (Lonsdale, 1997). Charities are urging firms to become "corporate citizens," while acknowledging the financial realities faced by these firms by offering previously unheard of marketing incentives to generous firms. Citing confidentiality, Londsdale did not specify what such incentives might be. Also, selecting which charity to support, initiating payroll giving, and other ways of raising funds for charity can be time consuming and costly for wages and financial departments. Therefore, the Charities Aid Foundation offers to assists many firms in overseeing the complex administrative processes required in making these initiatives viable. In addition, rather than a single donation to different worthy causes, businesses can initiate long-term partnerships with charities with the full involvement of the corporations' marketing departments (Lonsdale, 1997).

Actually, partnership is the key to securing corporate support. Corporations seek to participate to build a stronger community, enjoy a good reputation in their areas of operations, be good "corporate citizens," and better the lives of their employees. Business motivations have driven the collaboration between corporations and not-for-profit institutions to achieve a more business-friendly environment, to enhance the corporation's identity and image, and to introduce new products to the public. Indeed, corporate donors gain significantly through partnership. Over 75 percent of Americans now say that when price and quality are equal, they would likely switch to brands associated with a good cause (Kayton et al., 1998). Furthermore, solicitation evolves out of the relationship building effort. The recipient has to work on the strategic interaction to develop an alliance with the corporation first, and then money will follow. Also, if the charity has a plan regarding its relationship with potential donors, companies will be more willing to help. To this end, the prospective recipient has to find companies already active in the field of giving and resonate the companies' interest in the organization. If a company is active in every arena, it is more likely to give philanthropic support (Pollack, 1998).

Before contributing, companies look at convenience; they need to know who to contact about anything regarding their relationship with the charity. They look for a charity that can help them with their inside affairs or publicity (Pollack, 1998). Business can have many philanthropic objectives. They may wish to give back to the community in which they have a presence, become good corporate citizens or establishing research linkages. They may also recruit employees from the institution's graduates or gain greater access to the institution-research and training. Finally, they may donate to enrich the business community or satisfying employee gift matching programs (Somers, 1997).

Furthermore, the motives for corporate giving include getting a tax write-off, building a positive public image, influencing opinion makers, and cultivating stockholder's good will. Corporations also donate because they want to build business community relations, return a favor, support employee services, increase productivity, foster employee training and associate with quality (William, 1980).

Smith and Alcorn conducted a study to examine the marketing motivation of altruistic behavior. They collected data in a telephone survey of 300 adults over the age of 18 living in the U.S. The results indicated that 56.6 percent of the sample believed that it was at least somewhat important that corporations make charitable donations. However, 70.7 percent of the respondents said that it was important that the local area be the beneficiary of these contributions. In addition, they believed that it was important to donate to local charities and to buy products from companies that support charitable causes (Smith & Alcorn, 1991).

To reach their objectives, companies adopt various donation procedures. Many of them implement matching gift programs in which gifts by employees to their alma maters are matched by the corporation and result in a larger gift to the institution (Pollack, 1998). However, many factors impede corporate giving. These factors include prolonged recession, economic decline of the company, and a lack of interest in corporate giving. Mergers and buy-outs may also have a negative impact on charitable giving, since companies may have to rethink their policies about giving. (Pollack, 1998).

The public image of a charity affects the amount of aid it receives. A charity in the United States conducted a study to examine how public image affects donations. Individuals soliciting money for charities approached college students walking in the hallways of their school. Half of the charity delegates were dressed in "preppy" attire and the other in "messy"

attire. The individuals found that those in nice clothes collected more money than those in poorer dress did (Levine et al., 1998). Similarly, how the public views a charity can affect the amount of aid it receives. Since corporations view donation as one way to get recognition, associating with charities that have good reputations will be more effective for the companies.

One factor that a company looks at before contributing is its own self-interest. Companies look to align contributions with their corporate mission and see how they can benefit either directly or indirectly from the contribution. Unless the charity can demonstrate the advantages donating will bring to the corporation, the company will not contribute.

3.0: Donor Concerns

Once we understand the general motivations in donations, we can focus specifically on the donors of computer equipment. Since we know that the benefit of a donation must outweigh the costs caused by the act, it is important to identify and address concerns of past and future donors to the CyberCycle project. These concerns include a few technical matters such as the security of information they have previously stored on the hard drives of the donated computers, the legal implications of possible software licensing violations, and the utility of Year 2000 non-compliant systems. These concerns are inherently technical in nature, and thus a glossary of ***italicized*** terms is available (see Appendix B).

3.1: Data Security

According to George Cook and his counterparts in the United States, when companies donate computers to a charity they want the charity to assure them that a third party cannot read their confidential information. Currently, CyberCycle is performing a ***low-level formatting*** on all hard drives they receive. Although its employees do not feel this method is secure, they realize they must do something and this is the only method available (Charity Logistics, 1998).

The United States Department of Defense (DoD) recommends that an organization sanitize all ***non-removable rigid disk*** containing sensitive data in one of three ways (United States Department of Defense et al, 1997). One option is to remove all of the magnetism from the hard drive. This process, called ***degaussing***, is not feasible for CyberCycle because its cost is prohibitive, and it often makes the hard drive unusable (National Computer Security Center et al., 1991). Destroying the devices by means of disintegration, incineration, or pulverization is also impractical since CyberCycle wishes to use them. The final, and only practical, option for CyberCycle is to "Overwrite all ***addressable locations*** with a character, its ***complement***, then a random character and ***verify***. [However] this method is not approved for ***sanitizing media*** that contains top secret information" (United States Department of Defense et al, 1997). This option is nearly secure and leaves the hard drives in usable condition, but for very sensitive "top secret" information, the DoD suggests only the destruction of the hard drive. Overwriting has become the commercially accepted standard and has been included in commercially available software packages, such as Pretty Good Privacy™, for securely deleting files off the hard drive (PGP User's Guide, 1998).

Such commercial programs delete individual files off the hard drive; they do not secure the entire hard drive, as CyberCycle requires. Also, CyberCycle needs to be able to sanitize multiple hard drives at the same time. Since no such program exists, we wrote a software package that secures the information on the hard drive to the specifications of the Department of Defense document. (See Appendix G and Appendix H).

One question regarding the program we have written is "Is the data secure?" The answer is a tentative yes. Tentative because if one does not destroy the hard drive, there always remains a chance of recovering the data, regardless of the method used to delete it. There is a magnetic

remanence, residual information that remains on the storage media even after erasure. Some government agencies and private corporations can, at a great expense, perform a ***laboratory attack*** to recover the information, even after overwriting (National Computer Security Center et al., 1991). However, this is a cost prohibitive process, especially for a charity or a not-for-profit organization and there is no guarantee that the recovered data will be the original data. The default value for the previously mentioned Pretty Good Privacy™ commercial program and various other disk security programs was ten "passes" (PGP Users Guide, 1998). However, from product to product, what the term "passes" means is inconsistent and the National Security Agency has no records available to the public to explain any further. (Personal Communication, December 18, 1998)

3.2: Software Licensing

After erasing a hard drive, the original operating system, the software that controls how the computer operates internally, is gone. Restoring this and other software makes software licensing an important issue for CyberCycle. Information from a telephone conversation with a Microsoft licensing employees revealed that it is legal to reinstall the original software that came with the computer, even if the computer changed owners (Personal Communication, November 5, 1998). In order to install a different operating system, the company has to be a registered ***OEM reseller*** of software and make bulk purchases from an authorized distributor. However, a conversation with an Apple licensing employee, revealed that installing MACOS 8.5 (Macintosh Operating System Version 8.5), requires someone to purchase a copy of the operating system. Otherwise, any other version of Macintosh OS can be freely distributed (Personal Communication, November 4, 1998).

Because Charity Logistics and CyberCycle dealt with the software licensing issues and became a Microsoft Registered OEM, we are not considering the software licensing issue further.

3.3: Year 2000 Compliance

With the fast approaching millennium, CyberCycle must address Year 2000 compliance. According to Edward Saulnier, a Year 2000 specialist, in the 1970s, memory, logic gates, disk storage space and computer devices in general were expensive, and software had the life expectancy of five years (Personal Communication, December 3, 1998). Consequently, many early computer systems represent the year as a two-digit number. Because of this, At midnight on January 1, 2000, many computers will switch from the year 99 to 00. However, pre-Pentium 166 computers will not switch from 1999 to 2000. By not recognizing the year 2000 correctly computers have cause errors in mathematics, logic, and sorting, affecting both hardware and software.

Hardware errors start with the Basic Input Output System (BIOS) chip. A BIOS chip is the heartbeat of any computer's hardware. The chip, among other functions, handles low-level input and output, and accesses the Real Time Clock (RTC) (Tanebaum, 1992). When the BIOS chip does not comply with the Year 2000 standard, it reports the incorrect date, reports the wrong day of the week, or does not recognize leap years correctly. Some BIOS chips are compliant, some chips are not compliant but can be easily fixed, and some chips must be replaced by new BIOS chips or external cards. Software is available to test and fix most Year 2000 hardware problems (Mitre Corporation, 1998). We found a free, public domain, software program that fixes the Year 2000 problem on most computers and integrated it into the software package we are providing for Charity Logistics.

Once we address hardware compliance, we must also consider software compliance. Some software packages do not internally support the Year 2000 because programmers never considered how the change of the millennium would effect the operation of their software. Year 2000 compliance experts divide software into two categories: those that will have upgrading fixes available and those that will not. Commercial software packages many people use, such as Windows™ and Microsoft Office™ already have software fixes available (Microsoft Corporation, 1998). However, shareware, freeware, and older software most likely will not have software upgrades unless the original author of the program can devote the hours needed to fix the program. Edward Saulnier claimed that one of the reasons why freeware and shareware programs might be hard to diagnose, is that programmers frequently use the names of family members or friends as variable names (Personal Communication, December 3, 1998). Since it is impractical to come up with a list of all available software, it is up to the individual user to ensure that the software they are using is Year 2000 compliant.

4.0: United States of America Case Studies

Having addressed CyberCycle's known concerns regarding data security and Year 2000 compliance, Charity Logistics asked that we consider operations in the United States similar to the CyberCycle project as models for that project. In this investigation, we contacted local charities who also repair and redistribute used computers from corporate sources, and obtained a copy of an Environmental Protection Agency report on the subject of reusing and recycling computers.

Charles Thompson of East-West Educational Development Foundation and Wayne King of Mindshare agreed that a computer recycling charity must address donors concerns regarding data security. Their organizations use a low-level format procedure to secure any data on the

donated hard-drives. Thompson and King both felt that this formatting process was sufficient to assure their donors of the security of the data stored on donated hard drives (Personal Communications, King and Thompson. November 17, 1998). According to George Cook, since CyberCycle has been able to recover data on a reformatted hard disk, a low-level format is insufficient for CyberCycle. George Cook agreed that the secure reformatting procedure used by the Department of Defense would be more appropriate (Personal Communications, Cook, November 5, 1998).

King and Thompson also agreed that such a charity needed to consider the Year 2000 non-compliance problem. Both of their organizations use an inspection and database method. This method includes inspecting every system to identify its manufacturer and model number to confirm whether it is Year 2000 compatible or not. If a system is not compatible, they inform the recipient of the system that it is not compliant. Thus, the recipient will be aware of the problem and will be able to take the steps needed to correct or avoid it (Personal Communications, King and Thompson November 17, 1998).

In addition to the usability of Year 2000 non-compliant computers, we thought competition with commercial resellers might be a problem. Thompson stated that Mindshare started as a commercial reseller of used equipment, but the falling costs of new computers forced Mindshare to change into a charitable organization. From his experience, most systems worth less then approximately $400 are not saleable computers. He believed that families who have less then $400 of disposable income were thinking of other items to buy rather then computers, and most people looking in to the used computer market want the best computer they can afford. Since new computers with much higher performance specifications are available as low as five or six hundred dollars, the market was not there to support Mindshare as a commercial reseller.

If the market cannot support commercial resellers, their competition should not be a problem or concern to a charitable recycler (Personal Communication, Thompson. November 17, 1998).

To research the possibility of charitable recyclers in the United States, in 1996, The United States Environmental Protection Agency (U.S. EPA) sponsored a computer-recycling project in San Jose California. The goal of the project was to investigate the cost, environmental impact, and feasibility of operating a computer recycling collection agency by collecting old computers at retail stores. During a five-week period in the fall of 1996, they collected some 30.8 tons of computer equipment, mainly from individual consumers as opposed to corporate donations. The equipment was collected from retail computer stores and brought to a central processing center. (U.S. EPA)

The San Jose project could not resell most of the equipment obtained. The project scrapped 90 percent of the 2800 pieces of equipment because they were beyond useful repair. The resold equipment consisted mainly of black and white monitors, which produced $1200 of revenue. The main other source of income was from scrapped parts since the project could not resell any complete systems. Of the scrapped material, 49.1 percent was unusable computer monitors that had to be recycled. While the sale of scrapped material produced some income, most was recycled for the environmental purposes rather than revenue. (U.S. EPA)

The major costs involved in the San Jose Project were the processing of non-sellable computer monitors, the sorting and dismantling of collected equipment. Cathode Ray Tubes, the screen of a monitor, contain numerous chemicals that classify them as a hazardous material making the proper disposal of a computer monitors an expensive process. Also, sorting and dismantling computer equipment for recycling is a labor intensive and time consuming process. In fact, maintaining this labor force was the second major cost involved in the San Jose Project.

The EPA compared the cost of the project to the approximate cost of landfilling the collected material and determined that the cost of the project was worth the environmental savings of responsibly managing the disposal of the material. They realized, however, that even a not-for-profit organization could not afford to operate by losing money. They must at least break even (U.S. EPA, 1998).

CyberCycle could not afford to be operating at such a loss, but there are a number of differences between the San Jose project and CyberCycle. First, CyberCycle receives its donations from corporations, who donate a greater percentage of newer usable equipment. Large corporations are replacing computers every few years, which produces more usable computers than those generated by the San Jose collection project. These newer computers have greater resale value and produce less material that needs to be scrapped (Personal Communication, November 5, 1998; U.S. EPA, 1998).

Second, according to their webpage, (http://www.cybercycle.com), CyberCycle charges a small fee for the disposal of non-working monitors (CyberCycle). Proper disposal of computer monitors' cathode ray tubes is an expensive process, and dumping them in a landfill is illegal, since the lead, phosphorus and barium content makes them hazardous material. Therefore, CyberCycle charges a fee of £4.50 per non-working monitor to cover the cost of their proper disposal. This policy should limit the effect of the most expensive portion of the San Jose Project (U.S. EPA, 1998).

Third, the British government subsidizes CyberCycle's labor force. CyberCycle trains the long term unemployed and youth of London to repair computers. This limits CyberCycle's labor costs for sorting and dismantling the collected equipment. (Personal Communication, November 5, 1998)

Despite these differences, the U.S.EPA report provides many valuable points of reference. The report identifies the major costs, determines which materials have scrap value, and stresses the need for publicity. It suggests that steel and plastics, which did not generate revenue, be used in resold computers whenever possible, while ***high-grade breakage*** and circuit boards could be sold as scrap if not usable (U.S. EPA, 1998). Hence, despite the differences cited, the report can still serve as a guide to a charitable computer recycling organization.

The report stresses the value of publicity, the advantages of commercial donors, and the need to limit collection policies in operating a computer recycling organization like CyberCycle. The obvious increase of donations following the EPA radio interview and newspaper article and the overwhelming success of the collection site that advertised the program, in comparison to the site which did not advertise, shows the value of publicity of such a project (U.S. EPA, 1998). The vast quantity of unusable equipment collected by the San Jose Project as opposed to the 500 - 1000 Personal Computers (PC's) per month that CyberCycle is currently dealing with demonstrates the advantage of corporate donations to a computer recycler. Since the report cites the largest single cost as being the processing of unusable monitors, it would be advisable to promote a policy which either charges for their disposal or attempts to limit the quantity of such monitors donated (U.S. EPA, 1998).

5.0: Conclusion

In conclusion, we can identify several areas of possible changes to improve CyberCycle's donor base by proper marketing and addressing the concerns of the donors. Some increased advertising may be required, but this should focus on the good accomplished by the project, the need for the project's continued expansion and the previous donors already participating in the CyberCycle project. CyberCycle must inform donors and non-donors alike of their ability to use

Year 2000 non-compliant computers and to address their data security concerns. Finally, the evidence presented by the EPA report provides a solid backing and support for the viability and success of the CyberCycle project.

METHODOLOGY

1.0: General Overview

We completed a number of tasks to provide CyberCycle with the best possible marketing strategy for attracting new donors. First, before we left for London, we designed a questionnaire for distribution to all of CyberCycle's existing donors. It is important that we identify the reasons current donors choose to donate equipment to CyberCycle and any existing concerns past donors have about donating to the project. Second, once we familiarized ourselves with CyberCycle's existing procedures, we incorporated our software solutions into these procedures. Several unexpected errors occurred during the London implementation, and we needed to time to fix them. We tested our programs at WPI. Although they worked, CyberCycle requested we re-write of them. Third, we researched possible solutions to CyberCycle's virus problems after we discovered numerous viruses propagating through their computers. Fourth, we interviewed several donating and a few non-donating organizations in the London area to identify why these companies are or are not donating computers. Further, we had to research the factors involved in deciding how to dispose of used computer equipment.

2.0: Donors' Questionnaire

In Worcester, we designed a questionnaire to send to all of CyberCycle's donors. Several of the questions were purely demographic questions. While these questions are important to the overall survey, we did not use them in our research. They were included to make the respondent more comfortable answering additional questions. People are accustom to seeing such questions at the beginning of a questionnaire, so even if the information obtained from such questions will not be used for research, it is still important they be included.

Later questions inquired about the computers CyberCycle's past donors are using. Since these companies already give to CyberCycle, it is important to understand what kind of computers they currently employ. Knowing what kinds of computers companies who already give to CyberCycle are using allows CyberCycle to anticipate future donations.

The next section of questions targets one of our main aspects of research, what disposal methods do companies have in place and how they chose these methods. We needed to know how many computers past donors are donating and what else they were doing with computers. From our discussions with Mindshare and East-West Foundation, we determined several possible alternative methods of disposal.

Once we knew what companies were doing with computers, we needed to understand why they chose those methods, so we asked them. Since we could not effectively list all the possible decision making processes, we left the question open and allowed our respondents to tell us how they made the decision.

The last section of the questionnaire focused on CyberCycle and their relationship with the donor. We asked the respondent to grade their overall relationship with CyberCycle and rate the importance of several concerns we had learned about during our research. This quantitative data would allow us to confirm the importance of certain factors which effect companies desires to donate computers to CyberCycle.

We also asked companies for ideas and suggestions, hoping to learn about the problems donors perceived in the CyberCycle project. Since such problems might inhibit a company from contributing to CyberCycle in the future, CyberCycle needs to be aware of these problems, and possible solutions.

Finally, we suggested that CyberCycle might provide its donors with a publication. Mindshare and East-West Foundations told us they send newsletters to their major contributors, and we wanted to find out if CyberCycle's donors would be interested in one as well. To help CyberCycle design such a newsletter, we provided a list of possible information CyberCycle could include and asked which of them would interest our respondent donors.

Once we designed the original questionnaire, George Cook helped us edit it. He changed the wording of several questions. We had no previous experience with the British Corporate world, and most of his suggestions revolved around altering the wording to match British standards.

After we made the corrections Mr. Cook offered, we faxed the questionnaire to all of CyberCycle's prior corporate donors. CyberCycle provided us with a list of their prior donors, and we separated the corporate donors from the individual donors. We elected to deal only with the corporate donors, since they are the major contributors to the CyberCycle project. To obtain our sample from this list of corporate donors, we took a census, selecting all of the companies that had donated to CyberCycle. We did not want to take a smaller sample because we anticipated a low response rate because of the short response time we required. We hoped to receive fifty percent of the questionnaires back by reminding our contacts about our research and informing them of some of the possible benefits of improving the CyberCycle project.

We used questionnaires for this aspect of our research because we are looking for raw data as opposed to attitudes and beliefs. We felt a questionnaire served to collect the needed data since we could collect more questionnaires than interviews. Questionnaires also leave the respondent free to fill the survey out at his leisure, minimizing the costs involved in answering the survey. The responses to the survey will be analyzed by three methods: 1) simple statistical

percentages for yes/no or multiple choice questions; 2) arithmetic mean, median and mode calculation for numeric response questions; and 3) qualitative analysis for open ended responses.

3.0: Trial Implementation

After we transmitted the questionnaire to the donors, we began implementing the software solutions for both the Year 2000 compliance and data security problems. While the implementation phase took a great deal less time than expected, the requested changes to the program required more time than originally anticipated. Once we finished the program, we wrote a users' manual to show future personnel how to operate the program. We also explained the program's function to CyberCycle's management so they can inform CyberCycle's donors of the advantages of the new processes. After a brief evaluation period, we spoke with the IT manager who had been using the program to identify any problems. During this trial run, we had anticipated encountering only minor problems. Although the software worked perfectly, CyberCycle requested a new version of program. The development of this new version required a significant time investment.

4.0 Software Programming and Development

To help CyberCycle address a few of the donor concerns, we decided to assemble a software package that incorporated a Year 2000 Compliance fix and a data security program. Since there is no commercially available data security program that meets CyberCycle's needs, we wrote a new program. The following sections detail the development of that program, as well as the other components of our software package.

4.1 Year 2000 Fix

In order to address the Year 2000 BIOS problems, we looked at multiple hardware and software solutions. The solution that we decided to use is a program called *Holmesfx - The Year*

2000 PC Correction Program. Written by Lester C. Holmes, it is a public domain, software program. Holmesfx corrected the problems on all of the computers that we tested both at CyberCycle and at WPI.

4.2 *Secure Wipe Lite* - MS-DOS ™ Version

When CyberCycle told us the specifications for the computer systems they had, we initially thought an MS-DOS™ program would be the optimal solution to the disk security problem. We realized that a program could test and correct the Year 2000 compliance problem, and secure the hard drive, all with little or no user interface.

Secure Wipe Lite, the MS-DOS™ version of the program, is the result of our thought process. Controlled from a main batch file, the program first asks if the user wishes to abort the process. After a short pause, if the user has not aborted, the batch file calls a program named deltree, which deletes everything on the drive. After this, the batch file calls the clear program we wrote, and then beeps to inform the user when the program is finished.

4.3 *Secure Wipe* - Windows 95™ Version

Shortly after we arrived at CyberCycle, its personnel tried the software we provided. They asked us to change several items in the program. First, the disk security program was very slow, and cleans only one drive at a time. Second, the Year 2000 detection program was not detecting all of the non-compliance problems. Third, we were unaware of how CyberCycle currently cleans the drive. We designed the program run on multiple computers at the same time. CyberCycle, however, employs an ***open architecture system***, which allows them to install one drive after another, cleaning all hard drives on a dedicated machine.

Therefore, we redesigned the data security program to operate on a Windows 95™ environment. This operating system allowed the program to secure multiple hard drives at the

same time. The Windows 95™ version also decreased the amount of time needed to secure a drive.

We first designed version 1.0 of the software, which allowed for up to three drives to be cleaned at once. We were able to perform time trials of the program before a virus lost the program. Since we could not recover the first version of the program, we wrote version 2.0 of *Secure Wipe*. Version 2.0 can clean up to 23 drives simultaneously. We also improved the overall speed and user interface of the program. It allows the user to reduce the number of passes for a certain drive. This will increase the speed the operation of high capacity drives or for those donors who are less concerned about data security.

4.4 Anti-Virus Software

During our day to day operations within CyberCycle, we encountered many problems with viruses. Although we did not usually record how many times we removed viruses from computers at CyberCycle, over a period of two days in the middle of the project, we removed seven separate viruses from the CyberCycle computers. A virus corrupted one of our hard drives, destroying several days worth of work in the process. Similarly, CyberCycle employees were concerned about similar problems occurring on the computers they use for their daily work.

Since we had not expected viruses to be a problem, we looked into several different anti-virus companies to see if they would provide a discounted rate for charities. We then proceeded to provide CyberCycle with the discounted contracts as we received them. Once CyberCycle obtained a license for an anti-virus program, we proceeded to integrate its operation into our *Secure Wipe* software package. After we did so, CyberCycle informed us that they did not want us include the anti-virus software in the disk security package. In case CyberCycle decides later

that they wish to re-enable the anti-virus software, the users' manual describes the proper procedure.

5.0: Corporate interviews and Surveys

While editing the program and receiving donor questionnaire responses, we interviewed various companies in London. These interviews had two main purposes. First, to identify reasons why some companies donate to the CyberCycle project and other companies do not. Second, to look at the attitudes and beliefs of those people making the decisions about the disposal of used computers. Since this latter type of information is more difficult to obtain, it was important that we conducted face-to-face, semi-structured, funnel shaped interviews (e.g., a loosely designed protocol to guide the subject toward the questions to reduce risks and increase the benefits of the interview) with corporate decision-makers. Since we did not know all of the companies in London, we confirmed an interview time with one company that donated to CyberCycle. We had then planned to use a method called reference sampling, allowing this company to direct us to other companies for interviews (Berg, 1998). This method failed because companies were unwilling to direct us to others. When this failed, we decided to call companies found in the London Business listings to ask about an interview. When companies refused to interview with us, we requested their fax numbers and sent questionnaires by fax. Unfortunately, many of the companies who gave us their fax numbers did not respond to the survey, and in calling these companies, we learned that their corporate policies prohibit such activities.

Through our interviews and fax surveys, we attempted to identify more clearly what concerns companies have, and how they decide what methods of computer disposal to use. Conducting interviews and correlating the data collected from them and our questionnaires have been the most time consuming aspects of our research.

Finally, we consolidated our research into a marketing strategy, which will attract more donors to the CyberCycle project. This strategy includes the improvement several current procedures, the expansion of existing marketing, and the implementation of new forms of marketing.

6.0: Secondary Methods

Expecting that some of our methods might fail, we had several secondary methods to obtain the required information. When we received a slow the response rate from the donor questionnaire, we called those companies who had not responded. We asked to speak with our contact or fax another questionnaire.

When we experienced problems with our corporate interviews, we asked companies for their fax numbers so we could send them a questionnaire that we had prepared specifically for this purpose. Unfortunately, only one company was willing to fill out a survey and return it to us.

7.0: Unexpected Research

During our research in London, we came to realize there were some aspects of marketing we did not originally expect to research. When we spoke with companies, they offered suggestions we had not come across in our research, and we felt it was important to look into them further to best recommend how CyberCycle use these suggestions. Since we had not planned to research these aspects, we needed to devise a methodology to gain insight into these aspects. We decided that it was important for us to look into Information Technology Journals and Corporate Donation Proposal Letters and Anti-Virus software.

7.1: Information Technology Journals

While speaking with IT managers at various companies in and around London, we found that these managers read certain types of journals. Since these are the people CyberCycle must target in their marketing strategy, we decided it was important to identify which journals would be most effective in reaching them. Once we began identifying these journals, we decided it was important to contact them regarding their advertising procedures and requirements for news articles so we could compile this information for Charity Logistics.

The process of gaining the information we needed required making two telephone calls to each journal. First, we needed to speak to the manager of advertising to learn about the process of purchasing an advertisement. Since advertising is part of their business, the advertising managers were more than happy to speak with us and send us the information we needed. Second, we needed to contact the editor about the process of getting an article written. Again, we encountered very little resistance.

7.2 Alternative Non-Donors Survey

Since we experienced difficulties with our non-donor interviews and back-up surveys, we had to devise yet another method of obtaining data from these companies. We decided to prepare a slightly streamlined version of our questionnaire, leaving out questions specifically regarding CyberCycle, and the importance of concerns regarding computer donation. Since these companies did not donate to CyberCycle, they would not be able to offer much insight into the CyberCycle project and we needed to make the survey as short as possible to minimize the cost to our respondents.

Once we designed the survey, we assembled a small sample of companies by flipping through the yellow pages. We called these companies and ask them for a few moments of their

time. We needed to gather more information about how companies in London dispose of computer equipment. (For a copy of the questionnaire, see Appendix F).

7.3: Corporate Donation Request Letters

Contacting companies about proposal letters has proved more difficult than our survey. It is not enough that we suggest CyberCycle send donation proposal letters to companies; we have to advise them what information to include. Since we did not know what companies look in such letters, we needed to contact the people who receive donation proposal letters at several companies to decide what CyberCycle should include in such a letter. To gain a sample, we decided to start with the 25 largest charitable contributors for the 1998 fiscal year. Since these companies donate billions of pounds to charities each year, we felt CyberCycle should include at least the information these companies look for from a donation request letter.

From this frame of 25 companies, we constructed a random sub-sample by tossing a coin for each company. If the coin landed with the image of Queen Elizabeth II up, we called that company, if it landed with her image down, we did not call that company. In this way, we would not have to contact all 25 companies, but would generate an unbiased sample of specific frame we had chosen. Our final sample included nine of the top 25 donors from 1998. To gain access to the community involvement personnel who read these letters, we identified ourselves as students from King's College researching corporate donation policies. We found that by identifying ourselves as students, rather then Charity Logistics personnel, our contacts were less likely to believe we were soliciting donations and more willing to provide us with the information we required.

8.0: SUMMARY

For our research in London, we prepared a donor and non-donor questionnaire, personally interviewed several decision-makers at companies in the London area, edited and integrated our software solution programs into the CyberCycle procedures. We completed most of our research with a week of preparation time before our presentation. This allowed us sometime to analyze the data we had collected and follow up several avenues of unexpected research before presenting our conclusions and recommendations to Charity Logistics and CyberCycle.

DATA

1.0: SURVEY OF DONORS

As mentioned in the methodology chapter, one of the aspects of our research has involved surveying those companies that have donated to CyberCycle in the past. Since these companies have experience with the CyberCycle project, they can offer first their insight and then their suggestions regarding the project.

CyberCycle provided us with a list of 158 past donors. We identified 97 companies and 71 individuals. We did not try to contact the individual donors because the EPA report published in United States showed individuals tend to donate older, less usable equipment. We tried to send of all 97 corporate donors a questionnaire (see Appendix C for a copy of the questionnaire). Of these 97 companies, 32 were unreachable. Some of these companies were out of business or had changed their telephone numbers, so we could not contact them. Other companies told us our contact no longer worked for them, no one there knew anything about CyberCycle, and they were not interested in being involved with our research. At one company, our contact was on maternity leave, and no one else there knew about CyberCycle, or the company's computer disposal methods. Of the remaining 65 questionnaires, we received 36 responses. Two of these 36 were recipients that CyberCycle had listed as donors.

We called every company that did not respond twice. The companies we spoke to cited over-worked staff as a major reason for a lack of response. Many told us that the questionnaire was low on their priority and they had not had the time to look at it yet. Several of the donors also cited a lack of knowledge about the project, and expressed an interest in knowing what was happening at CyberCycle or even who CyberCycle was.

The surveys indicate that most of CyberCycle's donors are replacing computers every three to four years. When asked, "How often does your company replace old computers with new ones?" 68 percent indicated that they replace computers every three to four years. Twenty-one percent of respondents indicated slower replacement rates. Six percent of the respondents said they replace computers every year, while the remaining three percent were unsure of the rate of computer replacement at their company.

Many of the donors use International Business Machines (IBM) or IBM-compatible Personal Computers (PCs). Sixty-eight percent of those companies said they use only IBM PCs, while nine percent use only Macintosh computers and fifteen percent use both IBM compatible PCs and Macintosh systems. Three companies, the remaining nine percent, said they use other computer manufacturers including Apple and Atari.

Most of these computers are new models, including Pentium™, Pentium II™, Power Mac™, and I-Mac™. Only 27 percent of the companies surveyed reported using older models such as 80486 or their Macintosh equivalents. Many companies use multiple models of computers, pairing Pentiums™ with Pentium IIs™ or Model 7100/8100 Macintoshes with Power Macs™ and I-Macs™.

When asked what percentage of replaced computers they donate to charities, 29 percent claimed to donate all their old computers to CyberCycle. Another 26 percent said they donate less then a quarter of their old computers. Fifteen percent of those companies surveyed told us they donated less than half, but more then a quarter of their computers and another 15 percent donated between 50 and 90 percent of their used computers. Six percent told us they donated more than 90 percent of their used computers, but not all of them and six percent were unsure of how many computers they donated to CyberCycle.

Since many companies do not donate all their old computers, we asked them what other methods were being used. Of those companies who do not donate all their used computers, 71 percent said they give or sell some of the old computers to their employees and 50 percent recycle old equipment. Twenty-one percent send the equipment to landfill, 21 percent sell some computers for reuse, and 13 percent sell used computers as scrap. Most companies use multiple methods of disposal, estimating the value of equipment and then deciding where to send it.

When we asked how companies decided which methods of disposal to use, the answers ranged from "Common Sense" to "No one wanted them". The most frequent response was an internal discussion among the employees. Of the companies questioned, 32 percent said the employees are involved in the decision and 15 percent misunderstood the question.

Sixty-two percent of the donors had heard about CyberCycle through other organizations. Referrals include word of mouth, the Hackney Council, one of the local government councils, Friend of the Earth, an environmental awareness charity, and a recycling network. CyberCycle's website, an ad CyberCycle took in the Yellow pages and a recent radio broadcast about the project each generated six percent of our responses. Other, non-repeated responses included a New Deal news article in Globe Magazine, an article in an unnamed magazine and an article in an unnamed journal. One company told us that CyberCycle called them to request a donation.

The factors involved in the donation of computers were as varied as the companies responding, but 35 percent claimed environmental conservation played a role in their decision to donate while 38 percent cited convenience as a major factor. About 32 percent of respondents told us that charity, or a desire for the computers to go to a good home, played an important role in their decision to donate used computers.

Table 1.1 Summarizes of the importance CyberCycle's past donors gave to several factors involved with the donation of computers. We asked each company to rate the importance of the concern with a number from one to ten. One being the most negative or least important and ten being the most positive or important.

Title	Mean	Median	Mode
Year 2000 Compliance	8.03	8.49	2.79
Data Security	8.26	8.52	2.12
Pick-Up Arrangements	6.80	7.09	2.01
Final Designation of Equipment	5.63	6.27	2.82
Legal Liability	7.46	7.89	2.59
Donor's Relationship with CyberCycle	6.19	6.59	2.28

Table 1.1 – Scale and determinants of donation.

The graphs on the two following pages show more clearly the distribution of the responses. Not every company provided a response to each concern, so the charts on the next two pages so how many respondents provided each response.

Each chart shows the importance corporate decision-makers place on one of the factors involved in donating computer equipment.

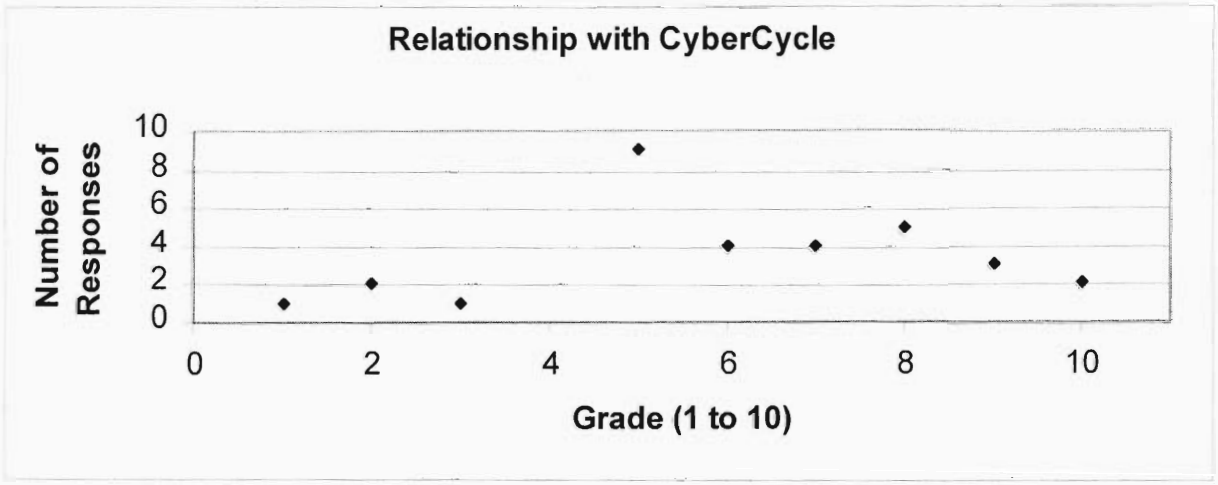

Figure 1.1 – Donors' Grading of Their Relationship with CyberCycle

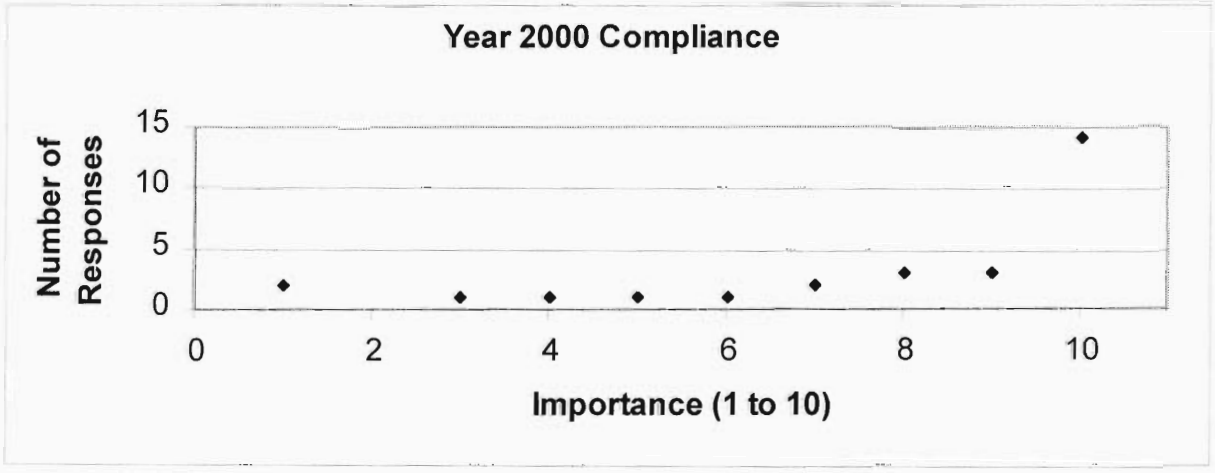

Figure 1.2 – Importance of Year 2000 Compliance

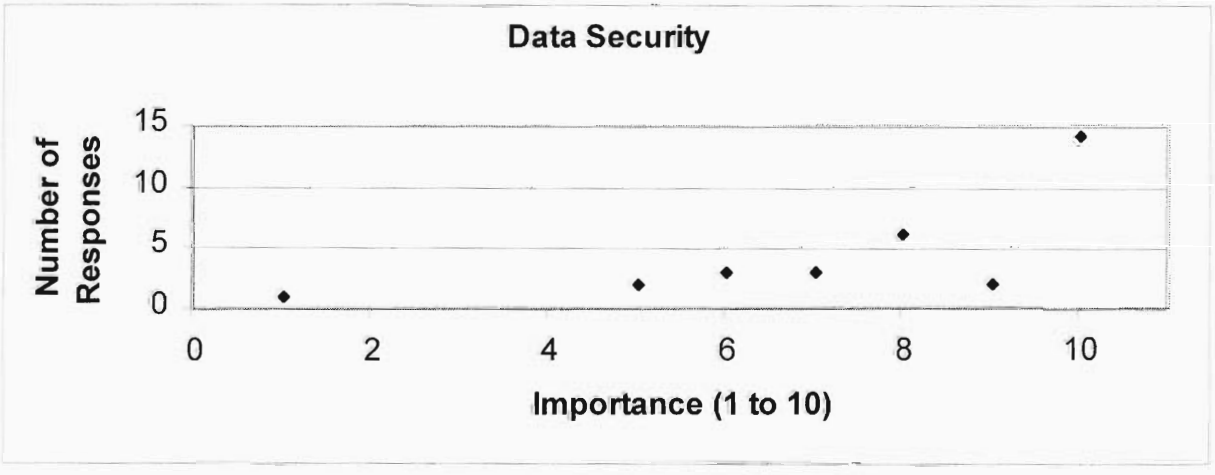

Figure 1.3 – Importance of Data Security

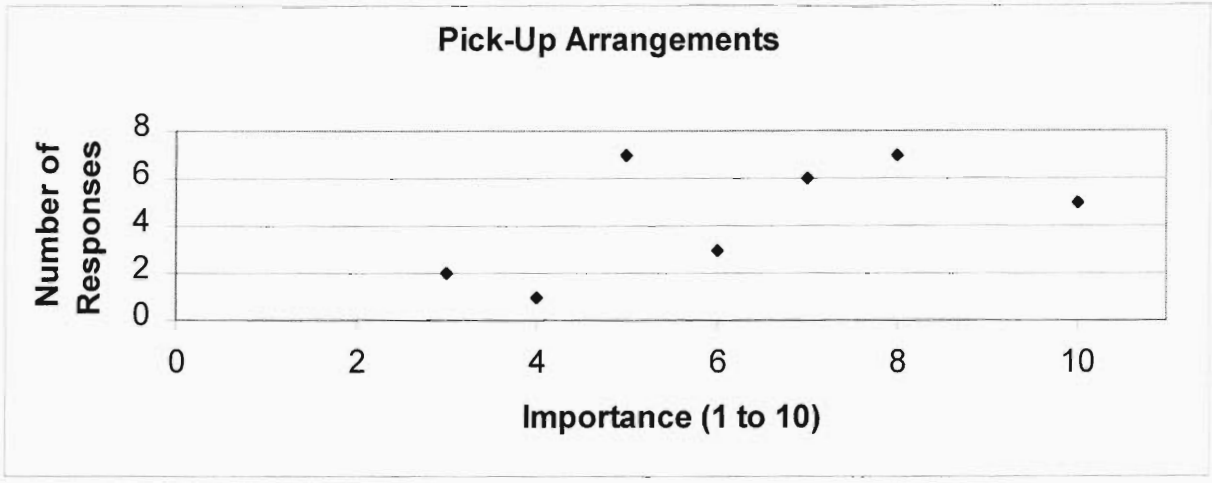

Figure 1.4 Importance of Pick-Up Arrangements

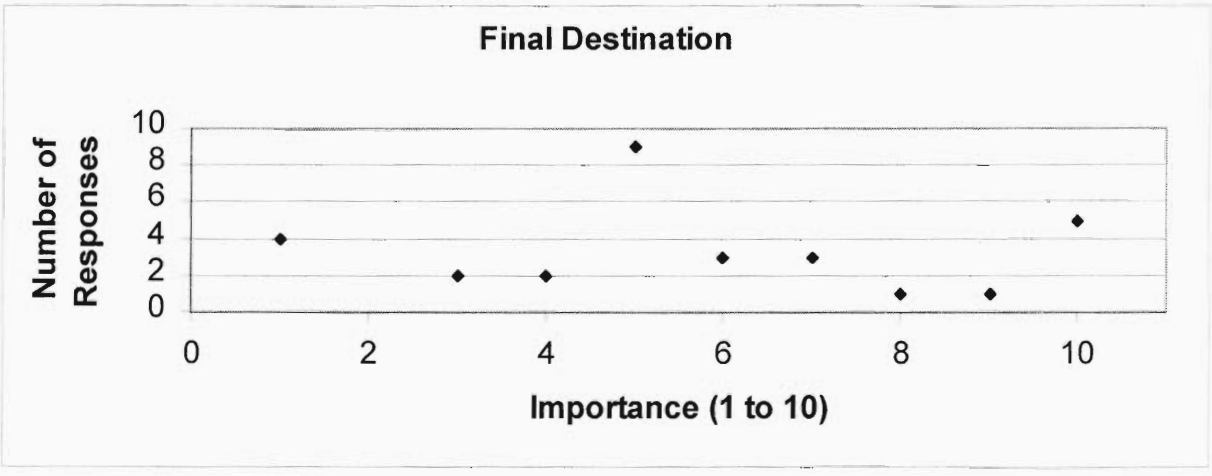

Figure 1.5 – Importance of Final Destination of Equipemnt

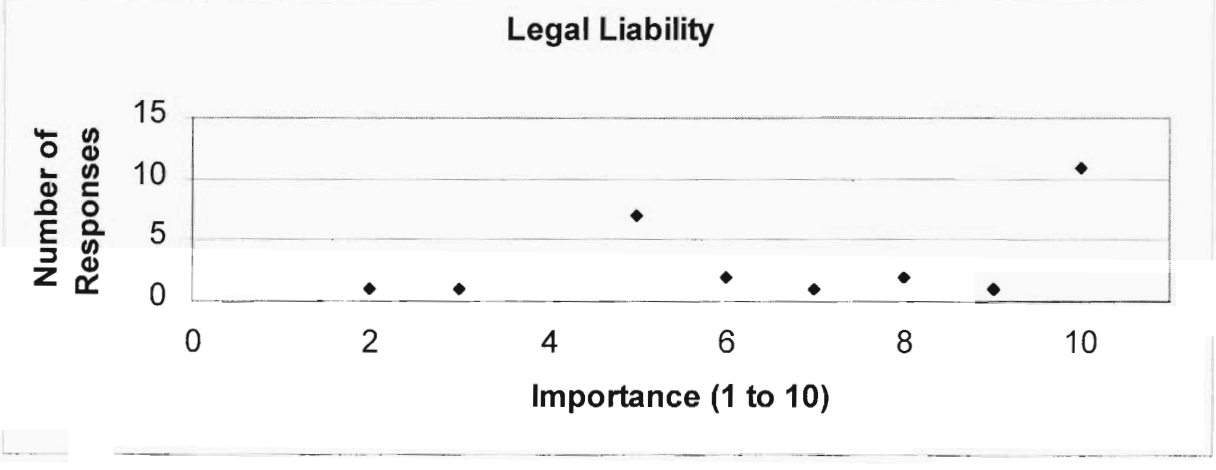

Figure 1.6 – Importance of Legal Liability

When asked if they had any additional concerns regarding future donations to the CyberCycle project, only twelve percent of respondents answered in the affirmative and 21 percent failed to respond to the question. Below, we have listed several concerns that companies have indicated:

- We are unsure whether CyberCycle is a registered charity.
- CyberCycle appears to be poorly administrated, we are unsure if it is properly managed
- They have inconsistent policies regarding collection, and lack employee knowledge regarding their collection and charging policies.
- It took ages for CyberCycle to come and collect the equipment we donated.

When we suggested the idea of sending a publication to the past donors, 65 percent of our respondents informed us yes, they would be interested in something from CyberCycle. Twenty-six percent of our respondents said no, they would not be interested in a publication from CyberCycle and nine percent failed to respond. Sixty-five percent of the respondents to the questionnaire indicated a desire to see who was receiving the donated computers. Responses also showed strong interest in knowing about recent donors and quantities of equipment processed, with 50 percent of the respondents indicating they would be interested in each of those items.

CyberCycle's past donors offered several suggestions to improve the project, though they repeated only four responses. Twelve percent asked specifically for a quarterly report from the organization while eight percent suggested that having someone to answer the telephone during normal business hours would be helpful. Six percent of respondents said sticking to pick-up arrangements and improving communications within CyberCycle might discourage donation

less. Many of the suggestions offered centered on improved communication either between CyberCycle and its donors or within CyberCycle itself.

2.0: Non-Donor Surveys

We have received only one of the sixteen non-donor surveys we sent. We have called the companies to remind them to fill out the surveys. Although we had obtained the fax numbers from these companies specifically to send them a survey, several companies told us that corporate policy prevents them from taking part in research and surveys and refused to speak with us further.

The only company that responded is a consulting and engineering firm. The company has about 100 employees and 100 computers. They update the computers every 2 years. The company uses mostly IBM/PC type computers such as, 486s and Pentiums. The company's current methods of disposals include recycling some computers and dumping others in landfill. The respondent had not heard of CyberCycle before our contact with him and asked that we not contact him further regarding our research.

Table 2.1 shows the importance scores this single respondent provided for us. As with the donor survey, each is on a scale from one to ten, one being the least important and ten being the most important.

Reuse of disposed equipment	8
Security of proprietary data	8
Ease of pick-up arrangements	2
Speed of pick-up arrangements	2
Final destination of equipment	2
Legal liability for disposal of components	5
Legal liability for software licensing	10
Environmental impact of the method chosen	10

Table 2.1 Relative importance of disposal concerns.

3.0: Alternative Non-donor Survey

We contacted 44 companies we found in the London Yellow Pages to expand our research into non-donors. Of these 44 companies, 32 have corporate policies prohibiting their employees from taking part in any research or surveys. We spoke with the remaining nine companies and assembled the data below.

3.1: Computer Cabling Installation Company

This company is a rather small one, having only four computers in the office. They do not replace computers very often, and when they decide to substitute the old computers with newer ones, they throw the old computers in the skip. The company chose this method of disposal because they the lack storage space to keep the computers in their office. According to the person we spoke, if a charity would like to receive the companies' used IT equipment, the charity should either call or make a request in writing.

3.2: Computer Maintenance Company

This corporation has about 15 computers in its office. The company replaces the computers every three years. When replacing the computers, it sells the old ones and gives the money to charity. If for some reason it can not sell the computers, they are given them to schools. The representative we spoke with said that charities do not approach him and ask for donations, but he approaches charities when he wishes to contribute.

3.3: Bank

The representative that we spoke with was reluctant to cooperate. However, he mentioned that the company has many computers in the office, without specifying how many. He said that

a charity should send a written request to the head of their IT department if it wishes to receive the company's used computer equipment.

3.4: Marketing Company

This company has about 30 computers in the office. It replaces old computers every three years. When replacing computers, it either sells them, giving the money to charity or gives them to schools. The company's main priority is speed when disposing of used equipment. The contact stated he would prefer to give the computers to charity to going through the trouble of selling them. He told us that charities should contact their office if they want the company to donate used equipment.

3.5: Manufacturing Company

This company has more than 2,500 computers in the office. It offers used computers to the staff and then salvages any others for parts. Again, the company's representative felt that charities should contact them if they wish the company to consider donation.

3.6: Car Manufacturing Company

The representative we spoke with did not specify how many computers are in use at the company. Anyhow, it replaces used computers whenever there is a major change in technology. Currently, its methods of disposal include selling the computers to employees and giving them to schools and charities. The company's standard policy regarding donations begins with the charity sending it a request for donation.

3.7: Sport Company

The contact we spoke with told us there are four computers in the branch that he is working at. The company replaces computers every 4 years, and it usually donates used

equipment to local schools. A charity should contact its office if interested in receiving the used computers.

3.8: Manufacturing Company

This company has more than 3,000 computers in its offices. When replacing the old computers, the company sells some to employees, recycles many of them, and gives the rest to charities. The representative we spoke with suggested a charity should write a request letter to the IT manager if it wants the company to consider donating computers.

3.9: Bakery Company

The bakery we contacted has about eight computers. They update old computers about every five years. It usually gives the old computer to other branches that have less need for up-to-date technology. However, if a charity should contact their head office if it wants the company to consider donation

3.10: Gas Company

This company has more than 2,000 computers in its offices. The company replaces the computers about every four years. It usually gives some of the used computers to local schools and sells the rest, giving the money to charities. However, the company is open to other options and CyberCycle should contact the company's communications department about possible donation.

3.11: Publishing Company

This corporation use more than 2,000 computers in its office. The representative who we spoke to indicated that the company replaces old computers every three years. The company does not dispose of its own used computers, but another company, which it leases the computers

from, disposes of them. A charity should contact the leasing company about possible donation, since it owns the computers.

3.12: Insurance Company

This firm has more than 500 computers. They replace of these computers every three years. The company currently gives some of the used computers directly to charities, and sells the rest, donating the money they receive to charity. Our contact said CyberCycle should contact the head office if it desires the used computer equipment.

4.0: Corporate Interviews

We conducted ten interviews with various companies around London. Eight of these were with past donors to the CyberCycle project, and two were with companies who had not heard of CyberCycle before we called them to set up an interview appointment. When interviewing organizations that had donated to CyberCycle, we looked for explanations of how these companies felt about donating, their methods of disposing of computers and their attitude toward charity in general. This section is the information that we have gathered during our interviews thus far.

4.1: Management Consulting Firm (Donor)

This past donor was delighted by the idea of recycling computers, and pleased by the goals of the CyberCycle project. While employees receive most of their used computers, the companies donates between 30 and 40 percent of them to CyberCycle. The company does this because it is conscious of the environment and is taking steps to protect it.

The IT manager learned about CyberCycle from an article about the project in The Daily News. She showed great interest in knowing more about what happens at CyberCycle and would appreciate a quarterly report. She suggested that CyberCycle need to place ads in the

newspapers and use the news media to increase the organization's exposure to the corporate sector.

She was concerned about the security of data previously stored on donated hard drives. Her department currently erases data from the computers prior to offering them to charities or employees. If the volume of donations were to increase, she may look into trusting CyberCycle to clear hard drives, but right now, the time requirement is not a problem.

4.2: Law Firm (Donor)

The person we spoke with from this law firm said the firm learned about CyberCycle from a friend, but had a great deal of difficulty contacting CyberCycle. This difficulty caused some stress between the firm and CyberCycle, but did not manage to prevent a donation.

Our contact with the law firm had several advertising suggestions to offer. She suggested working out contracts with larger companies and major computer users, opening communications with London Advice Services Alliance for marketing purposes and contacting the magazine Computer News.

4.3: Printing Company (Donor)

This donor offered no suggestions for advertising, but did express several concerns about CyberCycle. This organization found CyberCycle in the Yellow Pages when it became "bored with simply throwing used computers away". The company's management objected to CyberCycle charging a fee to dispose of non-working monitors and therefor may not donate in the future because dumping in the skip is free. Difficulty with pick-up arrangements and missed appointments may also prevent further donations. The representative we spoke with regarded CyberCycle as a method of disposing computers; he did not view CyberCycle as a worthy cause

that needs his help. Since this printing company does not store sensitive or proprietary information on computers, data security is not a concern.

4.4: Small Shop (Donor)

Our contact at this organization did not express any strong concern about data security, and even expressed appreciation regarding CyberCycle's distant relationship. He learned about CyberCycle from a CyberCycle employee. Previously the company sent used computers to the municipal dump, but the dump charged a fee to dispose of the used equipment and CyberCycle did not. For financial reasons, the company decided to donate to CyberCycle. While the contact described CyberCycle's relationship as distant, he also described that aspect as positive. He told us his company had a good relationship with CyberCycle because CyberCycle comes, picks up the computers, and then disappears.

4.5: Graphics Company (Donor)

The graphic arts representative we spoke with was not as satisfied with the distant relationship that the company had with CyberCycle. Our contact described their relationship as being "at arms length," and commented that this was not good. He suggested some form of regular contact between CyberCycle and its donors. He learned about CyberCycle from GreenNet, a recycling network, and suggested that CyberCycle contact the 33 city councils for more used computers and increased advertising. He also suggested CyberCycle purchase advertisements in IT Week and Information Weekly, strongly recommended that CyberCycle also subscribe to these magazines. He told us that sometimes there are articles written about IT managers having difficulty disposing of used computer equipment, and this might provide CyberCycle with new contacts.

Currently, data security is not a problem, though if it were to become a problem, he said the company would reformat computer hard drives before sending them to CyberCycle. While CyberCycle receives all of this company used computers, our contact told us that CyberCycle must improve its pick-up arrangements. He did not cite any specific examples of problems, but told us "The Skipman" (Municipal Waste Disposal) came every 24 hours and that this was CyberCycle's competition for the company's used computers.

4.6: Catalog Design Studio (Donor)

The person we spoke with from this catalog design studio was not aware of any strong competition. The studio learned about CyberCycle from one of the 33 city councils. Responding to a suggestion from the Hackney Council, the studio donated a number of old monitors to the CyberCycle project. Because the design studio does not use sensitive or proprietary data, they do not have any concerns regarding data security. Furthermore, they did not object to CyberCycle's lack of communication. Our contact suggested news articles as advertisements and recommended contacting Mac User and PC Magazine regarding such.

4.7: Computer Manufacturer (Donor)

Computer manufacturers have large quantities of IT equipment in its facilities, but the company updates computers more slowly then other companies. This computer manufacturer donated to CyberCycle in the past, and learned about the organization when Charity Logistics sent a letter of introduction to the community involvement department. The company uses other disposal methods, including giving computers to other charities, but our contact felt that CyberCycle was more organized than other charities. He liked working with a single charity rather then several smaller organizations. Though our contact was unsure of actual percentages,

he told us that CyberCycle receives most of their used computers through a contract they have signed with CyberCycle.

He was not concerned about data security since all sensitive information is stored on a corporate mainframe, and informed us their lack of supply may be the biggest obstacle to a future relationship with CyberCycle. He also mentioned that the major reason why his company donated the used equipment to CyberCycle is the cost effectiveness for his corporation. Throw the computers away would cost the company more then donating them.

4.8: Charity (Non-Donor)

Though we originally had not expected to find other charities among the possible donors to the CyberCycle project, our surveys showed us several charities have donated to CyberCycle in the past. Through random selection, we managed to contact a charity without knowing we were doing so.

The IT manager at the Charity told us that both charitable giving and the concern for the environment played a big role in the decision to donate used computers. She told us that while the charity buys new computers every year, her department cycles computers to less important workstations, so most donated computers are about three years old. The charity sells many of its used computers to employees, but is interested in donating any computers which are not sold.

Our contact told us that several of the charity's directors are also shareholders with large companies in the London area. So, if CyberCycle could provide more information about the project, that information could be passed on to the directors, and thus to those companies. She told us that the charity must protect donor information, so her department erases everything except the operating system before offering the computers to a charity or employees.

4.9: Telephone Conversations (Non-Donors)

Many of the companies we contacted that do not donate refused to have an interview with us. While they did not allow us to interview them, we were able to assemble some information about them through simple telephone conversations. Many of the companies we spoke with sell their used computer equipment to employees, making some profit for the company and providing a benefit to the employees. They also sell computers to smaller companies for a small profit. Many organizations did not wish to speak with us because they already had disposal methods in place.

Besides advertising, they recommended CyberCycle to send an information packet and donation proposal out to companies. Our contacts told us that this is how they normally handle donations, so CyberCycle should prepare such a package and send it to them if they want their companies to consider CyberCycle in their community action plans.

4.10 Summary of Corporate Telephone Interviews

Some of the companies we interviewed were not willing to offer many suggestions. One major reason is that they are consulting firms that make their business on offering suggestions for a fee. Therefore, the companies feel that CyberCycle should come to them and pay them for advice.

Furthermore, the other companies suggest that CyberCycle invest in advertising and building a stronger relationship with its current donors.

5.0 Software Solutions

When we arrived in London, CyberCycle's employees evaluated the computer programs we brought with us to ensure they worked. This evaluation also allowed CyberCycle's personnel to have some input into the design and operation of the programs. The following sections

contain details on the information we collected and the costs involved in initiating the use of the software programs.

5.1 Year 2000 Compliance

When we first began testing the software we brought with us from the United States, we found that the method for detecting non-compliant systems failed to determine if a system was compliant properly. Once we realized that our detection program did not work as planned, we investigated what would happen if we installed the program on a compliant system. Since the program does not interfere with the operation of Year 2000 compliant systems, we decided to remove the detection software we wrote, and just copy the fix to all computers. The result is that all of the computers will contain the holmesfx correction program. Copying the compliance software requires less than a second, and only a small amount of disk space. Thus, the costs involved in this solution are minimal, in regards to both time and hard drive space.

5.2 Data Security

The main cost involved in the *Secure Wipe* program is a significant amount of time. Initial estimates placed the amount of time required at several hours, though we have sped up the process considerably. Table 5.2.1 summarizes the time trial results for the various versions of the Secure-Wipe software.

Compute r	Hard Drive	Version of Program	Space On Drive (MB)	Overall Time It Took To Clean (H:MM:SS)	Megs / Minute
286	Unknown	MS-DOS™	4.26	0:50:11	.092
286	Unknown	MS-DOS™	23.7	2:28:58	.159
433	Unknown	MS-DOS™	33.6	2:56:39	.190
486	Unknown	MS-DOS™	2.2	0:02:21	.933
486	Unknown	MS-DOS™	21.3	0:26:18	.814
Pentium	Western Digital	Windows™ Version 1.0	202	0:17:00	11.9

Pentium	Quantum	Windows™ Version 1.0	254	0:25:40	9.76
486	Quantum	Windows™ Version 2.0	254	0:10:53	21.8
Pentium	Unknown	Windows™ Version 2.0	Unknown	Unknown	83.4

Figure 5.2.1

The last test was conducted by Jay Peterson-Shorey, an IT-Manager at CyberCycle, and we were unable to obtain the specs on the system he used.

In response to the program that we wrote, Jay Peterson-Shorey wrote a letter explaining his opinions on the program. His overall comment was that the team "produced an extremely useful piece of software, and we [CyberCycle] will continue to use it well into the future."

5.3 Anti-Virus Software

While at CyberCycle, we encountered several problems with computer viruses. To assist CyberCycle in dealing with this problem, we contacted ten software companies that publish anti-virus programs to ask them about discounts for charities. We received four responses. SOPHOS Plc offers a 20 percent discount for charities. They quoted us the price of £550.00 per year for a 25-user site license with 24-hour technical support. Network Associates offers a 40% discount for charities, and quoted us the price of £304 per year for a 9-user site license with 24-hour technical support. PSPL offered a discount rate of 66 percent, quoting us the price of eight U.S. dollars per license for their program. Cat Computer Services Ltd. offered to provide a site license for their Windows 95/98™ program Quick Heal™ without charge.

After we have conducted our initial research, CyberCycle's personnel worked out a contract with SOPHOS™, and CyberCycle now maintains a site license for their SOPHOS Sweep™ for Windows 95™ anti-virus software.

6.0 Information Technology Journals

Besides contacting software companies, we contacted several Information Technology journals. As we identified the journals IT managers read for work, we contacted their publishers to find out more about the journals and identify the possibility of having articles about CyberCycle published. Most of the editors were pleased to speak with us, several asked us to send them more information so they could write articles about the CyberCycle project. These editors informed us that many companies would be interested in knowing about alternative methods of disposal, and they would like to publish articles on that subject. The following sections contain detailed descriptions of the information about each of the journals that we contacted.

6.1: Computer Weekly

An editor at Computer Weekly mailed us an advertising package quoting the cost of advertising in Computer Weekly, and also said that he is currently looking for information about computer recycling. If CyberCycle sends him information about the project, he will include this information in the article he is writing.

A subscription to Computer Weekly costs £96 per year, and the journal does not offer a discount for charity subscribers.

6.2: IT Week

IT Week offers free subscriptions. To receive one, CyberCycle can go to their web site (http://www.itweek.co.uk). IT Week's editor sent us some advertising information, including the costs involved in placing an ad in IT Week. At the time we spoke with the editor, he was currently writing an article about disposing of computers and recycling. The editor would be glad

to include CyberCycle in his article if CyberCycle will send him some information about their operations.

6.3: Information Week

The editors at Information Week would also like to know more about the CyberCycle project, but did not offer to write an article about the project. Instead, he requested that CyberCycle send a letter with more information about the project. He would decide if Information Week would publish an article about CyberCycle when he knows what the project is about, what the people there do, and why they are doing it. He told us CyberCycle should send a letter to the journal via the post or e-mail it to letters@iweek.co.uk.

Unlike Computer Weekly, Information Week does offer charities a discounted subscription rate. A one-year subscription normally costs £60 per year, but they offer a 50 percent discount, reducing the price to £30 per year.

6.4: Networking Plus

Networking Plus does not offer discounted charity subscriptions and costs £65 per year. When we spoke with the editor, he informed us that the journal is mainly for advertising available IT related job openings, so writing an article about CyberCycle would not interest him. Also, he suggested CyberCycle not advertise with the journal because computer recycling is not within the journal's focus.

7.0 Communication with CyberCycle Personnel

During our time working along side CyberCycle, we spoke with George Cook, the Chief Executive of Charity Logistics on several occasions. We also spoke with many of the employees of the CyberCycle project including, Stan Spinks, the new manager, Andy Tidmen, the production supervisor, Otto Wilkinson, the trainer. From these conversations as well as informal

discussions, we learned how CyberCycle operates and some problems perceived by the employees.

We learned that CyberCycle plans to expand, but they need to increase the project's donor base before expansion is possible. We also learned that CyberCycle has no history of marketing, and they would like to see some marketing in the future. They also indicated some concerns involving the communication within th

ANALYSIS

After collecting the data in our project, we needed to organize and analyze the information that we collected. For some aspects of the project, the organization was not difficult. A simple spreadsheet in Microsoft Excel™ transformed our questionnaire into a table with the information ready for analysis. However, examining the data collected in the interviews was much more complex.

1.0: Statistical Analysis

Many of the questions in the survey lend to statistical analysis quite easily. We divided the questions into three sections: donation expectations, donors concerns, and success of past advertising.

1.1: Expectations for Future Donations

Since the companies we spoke with donate computers to CyberCycle, analyzing the kinds of computers they are using allows us to decide what types of systems CyberCycle can expect to receive in the future. Many of the computers CyberCycle currently receives are older 80486 computers, or their Macintosh equivalents. The number of companies no longer using such computers tells us that CyberCycle must prepare to take in newer Pentiums™ and Model 8100 Macintoshes. These computers, released three to four years ago, are reaching the age that most companies replace used IT equipment, and therefore will be headed for CyberCycle soon.

If most companies replace computers every three to four years, one might think that CyberCycle should expect a periodic inflow of computers. Our conversations with IT managers tend to indicate that computers were purchased over time, resulting in smaller one-time quantities but a more steady flow of donations.

We found that most companies do not donate all of their computers, but rather only a portion of them. Several of these companies give or sell some of their systems to employees, but the percentage of companies landfilling their used computers is alarming, and CyberCycle needs to target these companies.

1.2: Donors Concerns

Our research in London validated each of the concerns we identified before coming to London. Companies are obviously concerned with Year 2000 Compliance and the security of data stored on computers. Our data also served to show that many companies are not aware of the possible legal issues involved with disposing of computer equipment. The research showed that companies do not consider the final destination of computers highly while deciding how to dispose of them, but they would still appreciate knowing where the computers are ending up.

Despite the strong support of our research regarding what donors are concerned about, CyberCycle's overall relationship with its donors does not look very good. While several companies gave CyberCycle high marks, a few very low marks hurt the overall score incredibly. The results from our surveys indicate that there is a lack of communication between CyberCycle and its donors. This lack of communication between CyberCycle and its donors has caused some concerns. Due to the nature of that data, we could not analyze the problem with statistical analysis, but we will examine it later in Section 2.0 using content analysis.

1.3: Past Marketing

One of the important pieces of information that we analyzed with statistical analysis was the effectiveness of past marketing. We found word of mouth to be the most effective. This reveals two important facts: one, companies that know about CyberCycle talk to other

companies, passing along the knowledge of the organization, and two, CyberCycle has not been very effective at marketing itself in the past.

We could even classify some of the "other" responses, which were referrals, as "word of mouth." While the first result gleamed from the raw data is important to know; the second is also very practical. The questionnaire responses support the belief of CyberCycle's employees and the data we collected from the CyberCycle Marketing records. CyberCycle has not had much past marketing.

2.0: Content Analysis

In developing a marketing strategy, statistical analysis has its limitations. Content analysis is much more useful to devise a proper marketing strategy for any organization. Since we are devising a marketing strategy, we focused the majority of our efforts on determining our conversations with CyberCycle personnel, interviews with the companies of London and our two questionnaires really convey.

2.1: Problems and Concerns

Several companies we spoke with cited a lack of communication as a problem; being in CyberCycle's offices also demonstrated this fact. How much this affected CyberCycle was not apparent until we spoke with CyberCycle's donors. Our contacts found contacting us difficult at times because calls and faxes were lost within CyberCycle.

Companies described their relationship with CyberCycle as "at arms length." We had to introduce ourselves to the past donors, and explain what CyberCycle does. Some could not recall donating to CyberCycle although we have records of their donation. These kinds of problems do not attract new donors and inhibit future donations from past donors. Companies do

not feel they are included in society by donating to CyberCycle, to them CyberCycle is just another way to get rid of worthless equipment, not a useful charity that deserves support.

Even companies that knew about CyberCycle and understood that donated computers were going to charities that need them seemed dismayed by the lack of organization and professionalism of the organization. Missed pick-up appointments and lost telephone messages made donations a hassle for a few past donors. One past donor told us that sometimes when he tried to call CyberCycle, no one is there to answer the telephone.

Even when donors contact CyberCycle, the lack of communication between CyberCycle and its donors inhibits the desire to give again. Companies that do not remember donating to CyberCycle will have to restart the process of looking for a method of disposal and may not find CyberCycle again. Other charities may contact one of CyberCycle's donors and take the donor from CyberCycle because the donor lacks a connection to the CyberCycle project. Because CyberCycle lacks contact with its donors, the donors do not have the sense of inclusion in the community created by CyberCycle, which is important in altruism.

2.2: Donors' Suggestions and Recommendations

Beyond increased contact, if companies feel they have some assistance in the development of a charity that they donate to, they are more likely to feel a part of the community created by the charity. We asked the companies that we contacted for suggestions, and recommendations on how to improve the CyberCycle project. Few companies repeated suggestions, so we had to interpret the meaning of each recommendation, and attempt to identify the source of the problem it was trying to address.

A sense of the lack of communication, and a desire to improve communications between the donors and CyberCycle are obvious. While a few companies were content with

CyberCycle's lack of contact, most were displeased. They desired to know more about the organization and its activities. Several companies suggested that CyberCycle inform them about what was going on within the organization. Companies asked to know what was happening, and whom CyberCycle was helping. A few asked if CyberCycle or Charity Logistics could provide them with information packages for them to offer to corporate customers, or to give to board members who worked for larger companies.

Speaking with journal editors, we learned that they would be interested in learning more about CyberCycle also. They would be willing to publish an article about CyberCycle's operation in their respective journals, if they knew more about the project. This strengthens our belief that many companies simply are not aware of CyberCycle's existence. These companies have not decided not to donate to CyberCycle, but lack the knowledge to make the choice.

2.3: Donation Proposal Letters

Most of the non-donors we spoke with do not go looking for charities to donate too, instead they let charities come to them. They suggest that CyberCycle send them an information package and donation request. The fact that almost every company we contacted suggested that CyberCycle send them a donation proposal or both a proposal and an information package indicates that most charities use this method for soliciting donations.

These companies also agree about what needs to be in a proposal letter. They want to see the charity's history, it mission, goals and aspirations. The letter should tell the company whom the organization helps, and what the charity is requesting for donation.

CONCLUSIONS AND RECOMMENDATIONS

From the data we have collected, the analysis above, our personal discussions with the CyberCycle personnel, our interviews with corporate decision-makers, and the research we conducted before coming to London, we have formulated several recommendations for the CyberCycle project. First, some changes in CyberCycle's procedures are required. It is important for CyberCycle to improve the arrangements for picking up donated equipment, publish a quarterly report for the donors, and replace existing data security software with the new data security and anti-virus software. Second, CyberCycle should modify existing advertising methods. CyberCycle should update both its webpage and its advertising pamphlet. Third, CyberCycle should begin pursuing several new forms of advertising including contacting information technology magazines, establishing corporate contracts and opening relationships with the 33 Councils of London.

1.0: CHANGING CYBERCYCLE PROCEDURES

Since some of the concerns and suggestions revolve around problems stemming from CyberCycle's operating procedures, it is important for CyberCycle to examine and alter some of its procedures.

1.1: Pick-Up Arrangements

Since several of the companies we spoke with said they had concerns about pick-up arrangements, it is important that CyberCycle address this area of its operations. Companies told us that appointments were hard to make, and CyberCycle did not always keep appointment times. Companies and organizations readily see this aspect of CyberCycle, so it must be handled

in the most professional manner possible. Pick-up arrangements need to be easy to make, executed in a professional manner, and require minimal advance notice.

Companies we spoke with cited convenience as a major consideration when deciding whether to donate to CyberCycle. Companies will look for other methods of disposal in the future if companies find making pick-up arrangements difficult or have to make such arrangements twice because CyberCycle misses an appointment.

Also, many companies lack the facilities to store unused computers for a long period. It is important for these companies to dispose of the equipment quickly, therefor CyberCycle needs to be able to make arrangements quickly and professionally to insure donors will return to CyberCycle in the future.

Obviously, improving pick-up arrangements can be very expensive. Recently CyberCycle started using an outside trucking company, but this company is quickly growing and CyberCycle is falling behind several new corporate contracts in the company's priorities. To reduce the cost and increase the reliability of pick-up arrangements, CyberCycle is currently looking to purchase a truck. The ability to make flexible, convenient and reliable pick-up arrangements is necessary to CyberCycle's operation and expansion.

1.2: Quarterly Reports

Another procedure change that will ensure CyberCycle's donors do not look for other methods of disposal is increased awareness and communication. The companies we spoke with expressed a lack of knowledge about CyberCycle and its activities. These companies would be interested in knowing more about what CyberCycle is currently doing. Several organizations expressed an interest in a periodic report of the organization's activities.

To be effective in maintaining communication between CyberCycle and its donors, such a report needs to contain several essential pieces of information. These include recent recipients of computers, recent donors, and a summary of the quantities of computers processed. Our research shows that the companies are interested in knowing where the computers are going. While most companies place the final destination of computers low on their priority list, many asked to see such information in a publication from CyberCycle. Thanking recent donors will help to show CyberCycle's appreciation of past donations. CyberCycle's past donors also requested information regarding the quantities of processed computers. Such information not only provides insight into the good accomplished by the organization and but also demonstrates CyberCycle's progress.

We suggest a quarterly period for several different reasons. First, some of the companies that we contacted suggested it. Second, three months is a long enough time to collect and organize the relevant information. The time investment required to publish more frequently reports would place an excessive drag on CyberCycle's limited resources without generating much gain. The limited number of people working at CyberCycle would maintain a regular publication at a shorter interval without sacrificing quality or time devoted to other activities. Third, it is a standard corporate report interval. Many companies offer quarterly reports to their directors or shareholders. Timing the report with such corporate reports will reinforce the impression of professionalism, improving the inter-organization relations.

We realize that some donors may wish to remain anonymous, and CyberCycle must obtain each donor's permission before publishing its name in a report. The donor's packet should inform the donor of CyberCycle's desire to publish it name in a report sent to all past donors to the project. By providing a check box to allow the donor to withhold their name from

such a publication, CyberCycle can obtain the necessary permission from most of its donors. This last change will inform the donors they will be receiving a quarterly report from CyberCycle and that the report will contain the names of the projects recent donors.

1.3: Corporate Contracts

Several of the non-donating companies we contacted, lease computers and other IT equipment from major manufacturers. These companies are not concerned with the disposal of their used computers because the manufacturer takes the computer back after the lease is completed. CyberCycle should contact these manufacturers and establish disposal contracts for these computers once the lease is finished. CyberCycle has already established such a contract with IBM, but has had no contact with other leasing companies such as Dell, Gateway, or Compaq.

While requiring a significant investment of time, such contracts provide a steady flow of working computers with similar specifications and configurations. Once the leases are over, the leasing companies must dispose of the equipment. Reselling computers requires a significant investment of labor and resources to identify what components are valuable. However, donation can provide a simple way to dispose of all returned computers without such a serious investment. Although the cost of the solicitation for these returned computers might be high in terms of man-hours, the reward could be significant if even one contract is established.

1.4: Proposal Letter

Many of the non-donating companies that we have contacted suggested that CyberCycle personnel send them a request for donation in writing. They will review the donation request and will decide whether to donate according to the company's giving policy. After contacting

numerous companies, we have compiled our recommendations about what CyberCycle staff should put in a donation request.

The request should consist of the following: a description of Charity Logistics and all of its subdivisions, including CyberCycle; the goals of the CyberCycle project and the benefit of the project to the community and the environment. CyberCycle's officers should mention the importance of the project and the reasons why the existence of such a project is indispensable to the health of the community. Finally, the CyberCycle crew should specify what they are requesting from those companies.

Appropriate information including copies of the charity's annual report, accounts where available and any other pertinent information should support the written request. CyberCycle should be aware that some companies require a donation application form to accompany the request. These companies will provide the application form, so CyberCycle should contact companies before sending out the proposal.

From our background research, we found that companies that are already active in the field of giving are more likely to donate. Thus, we suggest that CyberCycle identify those companies and send out requests to several of them. CyberCycle should classify the major corporations that use computer equipment and send each of them a request if possible. Also we suggest that CyberCycle sign agreements with those corporations. This agreement should recognize CyberCycle as the major termination point of the company's used computer equipment.

1.5: Data Security and Anti-Virus Software

Data security is a major concern of past and future donors alike. Whether a large company storing valuable corporate information or a small charity merely maintaining a mailing

list, donors must be assured that the information previously stored on their used computers is secure. Beyond possible sensitive data, registered programs not removed from donated computers could cause possible software licensing violations and thus legal issues. CyberCycle must be able to ensure proprietary data stored on the hard drives of donated computers will not be accessed by second hand users, and software licenses will not be violated by leaving programs on donated computers.

To solve both of these problems, we developed a computer software package, which we will provide to CyberCycle. CyberCycle should run this package on all incoming hard drives. It over-writes all data on the drive, installs Microsoft DOS™ Version 6.22, and the Year 2000 compliance software on the hard drive. CyberCycle should begin using this software package as soon as possible. The software package addresses several concerns, and we automated the interface to minimize user interaction. The program does takes a long time to run, about 15 minutes per drive, reducing the ability of CyberCycle to process donated computers quickly. However, it can erase three hard-drives simultaneously and does not require constant attention, so the operator is free to perform other tasks while the program runs.

1.6: Donor and Recipient Stickers

While only one donor suggested the idea of sending stickers or decals out to the donors, but discussion of the costs and benefits of this practice brought about enough ideas for us to include this into our recommendations. When a company decides it is going to donate computers, CyberCycle should send the donor a package of stickers to mark computers that the company will donate to CyberCycle. Individual stickers would not cost much, and the stickers would remind companies where the computers are going. These stickers would also serve to increase the awareness of the organization among the employees of donor corporations.

The sticker should be unobtrusive, but contain CyberCycle's name and contact information. By providing companies with a method of contacting CyberCycle, these companies will be more aware the project, thus improving their relationship and making donating to CyberCycle more convenient.

These stickers would also serve to mark computers purchased from CyberCycle by charities. While not directly attracting donors, these stickers would increase the public awareness of the good caused by CyberCycle and thereby increasing the benefits to corporate donors.

2.0: Modifying Existing Advertising

CyberCycle must change not only some of its current procedures, but also past advertising. To attract more donors, CyberCycle needs to rethink past advertising and update both its webpage and information pamphlet. Advertising needs to focus on the good the project is accomplishing, the future goals of the organization and the benefits of its expansion.

2.1: Updating the CyberCycle Webpage

CyberCycle had a webpage developed sometime ago. The information contained in it is either out of date or irrelevant. The webpage does introduce the program to the public, but it needs to focus more on the public improvement generated by its cooperation with the New Deal program and the charities that use CyberCycle as a source for inexpensive computers. CyberCycle must maintain and update the webpage to keep current information available, including publishing the quarterly report suggested earlier.

Following a typical computer through the processes at CyberCycle would allow potential donors to see the procedures used and how trainees are gaining useful IT maintenance experience. Since CyberCycle designed several procedures to attract donors to the project, it is

important that companies can learn about these procedures. Making changes to the data security procedures alone will not accomplish anything; CyberCycle must make potential donors aware of the effects of these changes and how they will affect the donors concerns.

CyberCycle's personnel also need to consider the placement of information in their webpage. Since most search engines include the first few lines of the first body paragraph in the results of a search, CyberCycle should identify itself, its location, and its operations in the first lines of this file. Because of the massive amount of information available on the web, this summary is very important. It must clearly identify CyberCycle as a charity operating in the United Kingdom to provide charities with inexpensive computers and IT equipment. Companies will be more likely to visit the website if they know exactly what CyberCycle is.

After companies find the webpage, the information they receive from the page must convince them that the charity is a worthwhile cause. We suggest a list of major recipients of computers and explanation of the procedures used to determine who receives donated equipment, and the identities of the trainees. Since companies are motivated to donate by considering the impact of the donation, they will be more likely to donate if they can sees whom the project is helping.

CyberCycle could also use their webpage as an instructional tool. Since CyberCycle teaches computer skills, a possible project could be constructing the new CyberCycle webpage. This would minimize the cost of developing the webpage as well as offering the additional benefit of providing the trainee with valuable experience creating and editing Hyper Text Markup Language (HTML) files. Also, CyberCycle could use a curriculum vitae format for trainee information. Each trainee would spend some of his training time creating a biography

page about himself. This would provide HTML experience, demonstrate to potential donors who is benefiting from the project, and attract companies interested in hiring program graduates.

2.2: Updating the CyberCycle Pamphlet

Like the CyberCycle webpage, the advertising pamphlet CyberCycle currently has is out of date. A new pamphlet needs to be developed, focusing on the benefits of the project, how the project works, and why companies should donate. The pamphlet needs to stress the training, environmental, and charitable aspects of the project. Companies need to know whom the project is helping and how the project helps them. The pamphlet should state the charges for non-working monitors, as well as the conditions for waving the fee.

For financial and practical reasons, the pamphlet needs to be brief and precise. Interested parties might be willing to read a long information packet, but providing a concise, and informative brochure will be more appealing to the corporations. Many of the people who make the decisions regarding computer disposal are very busy and lack the time to read a long package of information. A shorter pamphlet however may capture their attention.

Developing a new pamphlet may require a large amount of time, but CyberCycle could use the existing one as a guide. This would require less time then developing a new one, and would still achieve the same results. In either method, printing will be expensive, but CyberCycle should start by contacting its donors. A printing company that donates to CyberCycle has already offered reduced prices for CyberCycle.

Once CyberCycle has designed the new pamphlet, it is important to expose the public to it. CyberCycle should ask its donors if they would display the pamphlet in their offices. By displaying information about charities that the donor supports, they can improve their public image while exposing customers and clients to the CyberCycle project. CyberCycle should also

send the pamphlet to potential donors as part of CyberCycle's information package. As a short summary of the project, its goals and services, the pamphlet is a great way to give a potential donor a brief overview of the CyberCycle project. Since companies are very busy and consider their time extremely precious, it is important to provide potential donors with a method of learning about CyberCycle without require a great time investment.

3.0: Starting New Advertising

To attract new donors, CyberCycle may have to invest in some advertising methods they have not explored before. This new advertising must focus on reaching specific people and address the same points that the project previously mentioned under Section 2.0 "Modifying Existing Advertising". The avenues in which we suggest CyberCycle invest are information technology magazine articles, corporate proposals, corporate contracts, and contacting the Councils of the City of London.

3.1: IT Magazine Articles

During our research, we spoke with a number of Information Technology department managers. We identified IT Week, Information Week, Computer Weekly, and Networking Plus as magazines these people read for work. Since CyberCycle could advertise in these magazines to increase awareness of the project, we contacted the editors at a number of IT journals to inquire about possible advertising. When we spoke with them, we suggested that their journals publish articles about CyberCycle. The editors seemed excited about the idea.

CyberCycle should prepare an informative article about the organization, its history, activities, goals, and future. CyberCycle should then send this article to the editors of these journals. The editors told us they would be happy to publish an article about the organization in their journal, but needed to know more about the organization before publishing such articles.

As with all other forms of advertising, the article must focus on the charities and people helped by the project as well as the benefits to the donating company. Finally, the articles need to contain contact information to allow interested companies to find out more about CyberCycle and Charity Logistics. The CyberCycle website URL, telephone and fax numbers, and postal address will provide companies with multiple ways of learning more about the organization as to attract the broadest spectrum of potential donors.

3.2: Councils of the City of London

Besides donating their own old computers, the 33 Councils of the City of London can provide valuable word of mouth advertising for Charity Logistics and CyberCycle. A few of the past donors we spoke with told us they heard about CyberCycle from the Hackney Council, which is where CyberCycle started. We found that some companies contacted the Hackney Council when looking for methods to dispose of used computers. Since this has already worked in the past, CyberCycle should expand on this practice by contacting the other 32 Councils. This will spread awareness of the program and increase word of mouth advertising. Again, such contact may require a sizable time investment, but the councils could expose a much larger group of companies to CyberCycle than it could alone.

Contact with the councils should begin with an information package proposal, as explained in Section 1.4. Like a standard charity request, this must tell the council who the charity is, a little about its history, what the organization's goals and aspirations are and how the donation will help the charity and the community. Again, both the training and charitable aspects need to be stressed, focusing on the good the project is doing and how these would improve with increased donations.

4.0: Summary of Recommendation

To attract more donors and keep past donors from looking for alternative methods of disposal, CyberCycle must: one, make some changes to its current procedures and policies; two, edit, revise, and rethink its past advertising and explore several new avenues of advertising. CyberCycle must improve internal and external communications. It must keep the donors informed about the activities of the organization and its plans for the future. CyberCycle must make pick-up arrangements more professional easier to make. The CyberCycle personnel need to edit the existing information pamphlet and webpage to provide up-to-date, relevant information about the CyberCycle project. Advertising needs to focus on who the organization is helping, both with the computers for charities and the training programs, how more donations can improve the project and what benefits the donors will receive from the project. CyberCycle also needs to look into previously unexplored avenues of advertising including submitting articles to popular IT magazines, establishing corporate contracts and contacting the Councils of London.

Through these various forms of marketing, CyberCycle will improve its relationships with past donors, improve knowledge of the project, and attract more donors. By attracting more donors, CyberCycle can expand to help better serve the community through its inexpensive computers and maintenance training programs. Finally, by implementing these changes, CyberCycle will be able to strengthen its position with the corporate community, better serving both the needs of the charities it provides for and the companies that provide for it.

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APPENDIX A: CHARITY LOGISTICS

Charity Logistics is a London based charity managing company that provides other not-for-profit organizations in and around London with various services designed to help charities work efficiently, effectively, and economically. Charity Logistics was founded in 1996 with the idea of becoming a central point for charitable services. In order to act more effectively, separate charities could work together, thus allowing them to purchase items they might need in bulk. Such purchases would provide better prices than if the charities acted independently. In addition, the knowledge and experience of a number of charities can become available to other less experienced charities so the mistakes of one organization can teach lessons to others.

Charity Logistics provides these other organizations with the means to operate through several of its projects. These projects include Charity Insurance, Charity Vehicles, Charity Supplies, CyberCycle, and The Advisors. Charity Insurance is a project that provides insurance and loss management services to charities, schools, and other not-for-profit organizations. Charity Vehicles is a project that provides inexpensive vehicles and fuel to organizations that require them. Charity Supplies is a project that provides office supplies and other materials at low cost to not-for-profit organizations. Charity Properties is a project that can provide charities with office or storage space. CyberCycle is a project that provides charities with inexpensive refurbished computers and trains the unemployed youth in basic computer repair. The Advisors is a project that provides expert advice to all kinds of charities.

CyberCycle started as a small, one-man operation in 1990, and remained as such until Charity Logistics took it on in March 1997. Today, CyberCycle is working with the government sponsored New Deal program, employs a manager, office director and two trainers. The

majority of their work force is comprised of volunteers, who receive some computer maintenance training for their services, and unemployed trainees whom the New Deal program refers to CyberCycle for training.

CyberCycle is committed to helping the communities around it, by providing inexpensive computers for local charities, insuring ecologically sound disposal of non-working computers, and training the long-term unemployed. When possible, CyberCycle reuses the components of donated computers while non-working components are recycled if possible, or disposed of in the most environmentally friendly manner available. The unemployed work force at CyberCycle receives IT maintenance training in exchange for their services.

To contact CyberCycle, call Stan Spinks at 44 11 (171) 582-8800

To contact Charity Logistics, call George Cook or Olga Michael at 44 11 (171) 793-0500, or send a fax to 44 11 (171) 793-0600. If these methods of contact are impractical, send them information directly to their offices at Charity Logistics, 87-89 Albert Embankment, Camelford House, London, England SE1-7TP. Both George Cook and Olga Michael can be reached via electronic mail at CharityLog@aol.com

APPENDIX B: GLOSSARY OF TERMS

Addressable Location – A portion of media where data can be stored to or read from.

ASCII (American Standard Code for Information Interchange) - A system of assigning a number to a character. (Shiflet, 1996)

Binary – A counting method using base 2. For instance, binary represents one as 001, two as 010, and three as 011. The reason why two is represented as 010 is that the one's place cannot hold a value larger than 1, so you need to carry the bit to the two's place.

Complement – In *binary*, the character is *NOTed.* For instance, the character 001 would be 110.

Degauss - To apply a magnetic field to remove all magnetic induction. Also called "demagnetizing."" (National Computer Security Center, 1988)

High Grade Breakage – [In Text] A collection of expensive thermal set polymer and magnetic alloys used in manufacturing computer equipment, especially hard drives and power supplies.

Laboratory Attack – A data scavenging process which uses precise or elaborate equipment to recover data off of a hard drive (National Computer Security Center, 1991).

Low-level Format – A process that reorganizes the sectors on the disk (PC Mechanics, October 17, 1998)

Media – An object where information can be stored.

Non-removable rigid disk – A mounted digital media commonly referred to as a hard drive.

NOT – A binary logical operator were all zero bits are changed to ones and all one bits are changed to zeros

OEM Reseller – (Original Equipment Manufacture Reseller) A company who buys software from an authorized distributor who then in turn installs the software on the new computer.

Overwriting – A process to destroy data recorded on media by recording patterns of unclassified data over the data stored on the media. (National Computer Security Center, 1988)

Remanence – "The residual information that remains on storage media after erasure." (National Computer Security Center, 1988)

Roll over – To go from the last possible binary bit (1111) to the first possible binary bit (0000). To roll over correctly in regards to the Year 2000 problem is to go from the year 1999 to 2000.

Sanitize – Any process of removing previously stored data.

Verify – To read a addressable location to check that its contents have been changed.

APPENDIX C: DONOR QUESTIONNAIRE

1. What business would you consider your company to be in? (Check all that apply)

   [ ] Manufacturing
   [ ] Publishing
   [ ] Consulting
   [ ] Engineering
   [ ] Marketing
   [ ] Other (please specify) _____

2. How many people does your company employ in London? (Check only 1 selection)

   [ ] 1 - 25
   [ ] 26 - 50
   [ ] 51 - 100
   [ ] 101 - 250
   [ ] Over 250

3. How many computers does your company have in your London Facilities? (Check only one)

   [ ] 1 - 10
   [ ] 11 - 25
   [ ] 26 - 50
   [ ] 51 - 100
   [ ] Over 100

4. How often does your company upgrade old computers to new ones? (Check the one which most often applies)

   [ ] Every year
   [ ] 1 - 2 years
   [ ] 3 - 4 years
   [ ] 5 - 6 years
   [ ] Less than every 6 years

5. What kind of computers are currently being used by your company? (Check all that apply)

   [ ] MAC
   [ ] IBM/PC
   [ ] SUN SYSTEMS
   [ ] DEC

[ ] Other (Please Specify) _____

6. What models of computers are currently being used by your company? (Such as Pentium, 486 etc.)

7. What percentage of your company's used computers are donated to charities? (Check the one which most often applies)

[ ] All of them
[ ] More then 90%
[ ] More then 50%
[ ] More then 25%
[ ] Less then 25%

8. If computers are not donated, what is done with them? (Check all that apply)

[ ] Dumped or Landfilled
[ ] Given to Employees
[ ] Sold for Profit
[ ] Sold as Scrap
[ ] Recycled
[ ] Other (Please Specify) _____

9. How were the methods your company employs chosen?

10. How did your company come to know about the CyberCycle program? (Please check all that apply)

[ ] Word of Mouth
[ ] Webpage
[ ] CyberCycle Pamphlet
[ ] Charity Logistics
[ ] Other (Please Specify) _____

11. What factors caused your company to donate to CyberCycle? (Please list all known

considerations)

12. On a scale from 1 to 10, where 1 is most negative and 10 is most possitive, how would you rate your relationship with CyberCycle?

_____

13. On a scale of 1 to 10, where 1 is least important and 10 is most important, how important are the following items to you?

Year 2000 Compliance _____

Security of Data _____

Pick-Up Arrangements _____

Final Destination of Equipment _____

Legal Liability _____

14. Are there any other concerns your company has in dealing with the CyberCycle Program?

[ ] Yes
[ ] No

15. If yes, what are these concerns?

16. Would your company be interested in a publication from CyberCycle?

[ ] Yes
[ ] No

17. What kind of information would you like to see in such a publication? (Check all that apply)

[ ] Recent Donors
[ ] Quantity of Processed computers
[ ] Major recipients of donations

[ ] Year to Date quantities
[ ] Other (Please Specify) _____

18. Are there any changes or improvements Charity Logistics could make in its CyberCycle program which would improve your relationship with them?

19. What are the magazines and newspapers do you read regularly?

Thank you Very much for your time and input. We appreciate your assistance in this matter.
Please return this questionnaire by February 5, 1999 to:

Zachary Zebrowski
C/O Charity Logistics
87-89 Albert Embankment
Camelford House
London, England SE1-7TP

Fax: 0171 793-0600

If you have any questions, please call Peter Miller, Sakis Decossard or Zachary Zebrowski at
Tel: 0171 793-0500 X 101

APPENDIX D: NON-DONOR QUESTIONNAIRE

First, we need some contact information. This will not be connected to your responses but merely used to help us in contacting you regarding further research for this project. If you would not like to be contacted, please indicate so below.

Name _____ Title: _____

Company: _____ Dept: _____

Tele: _____ Fax: _____

To continue you our research, we feel that it is important for us to speak with you in person. If you would be available to meet with one of our researchers in the next couple of weeks, please check below and one of our researchers will contact you as soon as possible to make an appointment to speak with you.

[ ] Yes, please call me to set up an appointment so we can speak in person.

[ ] Please do not contact me further regarding this research

As before stated, the information collected in this survey will be used to help the CyberCycle project improve its relationships with its donors and attract new donors. As a research team, your confidentiality is one of our biggest concerns. In no way will the contact information gathered be presented to Charity Logistics or any of its projects except this research team. The information will not be used to solicit donations. If you are interested in the CyberCycle project, and would like to know more about the project or Charity Logistic please call:

Charity Logistics: 0171 793 0500

Cyber Cycle: 0171 582 8800

Second, for demographic purposes, we need a little information about your company and its operations in London.

1. What business would you consider your company to be in? (Check all that apply)

   [ ] Manufacturing
   [ ] Publishing
   [ ] Consulting
   [ ] Engineering
   [ ] Marketing
   [ ] Other (please specify) _____

2. How many people does your company employ in London? (Check only 1 selection)

   [ ] 1 - 25
   [ ] 26 - 50
   [ ] 51 - 100
   [ ] 101 - 250
   [ ] Over 250

3. How many computers does your company have in your London Facilities? (Check only one)

   [ ] 1 - 10
   [ ] 11 - 25
   [ ] 26 - 50
   [ ] 51 - 100
   [ ] Over 100

4. How often does your company upgrade old computers to new ones? (Check the one which most often applies)

   [ ] Every year
   [ ] 1 - 2 years
   [ ] 3 - 4 years
   [ ] 5 - 6 years
   [ ] Less than every 6 years

5. What kind of computers are currently being used by your company? (Check all that apply)

   [ ] MAC
   [ ] IBM/PC
   [ ] SUN SYSTEMS
   [ ] DEC
   [ ] Other (Please Specify) _____

6. What models of computers are currently being used by your company? (Such as Pentium, 486 etc.)

7. When computers are replaced or upgraded, what is done with them? (Check all that apply)

   [ ] Donated to Charity
   [ ] Dumped or Landfilled
   [ ] Given or Sold to Employees
   [ ] Sold for Profit
   [ ] Sold as Scrap
   [ ] Recycled
   [ ] Other (Please Specify) _____

8. How were the methods your company employs chosen?

9. How did your company come to know about the methods of disposal you currently employ? (Please check all that apply)

   [ ] Word of Mouth
   [ ] Webpage
   [ ] Pamphlet or Private Publication
   [ ] Journal or Periodical (Please indicate which) _____
   [ ] Other (Please Specify) _____

10. On a scale of 1 to 10, where 1 is least important and 10 is most important, how important are the following items to your company when choosing a method of disposal?

   Reuse of Disposed Equipment _____

   Security of Proprietary Data _____

   Ease of Pick-Up Arrangements _____

   Speed of Pick-Up Arrangements _____

   Final Destination of Equipment _____

   Legal Liability for Disposal of Components _____

   Legal Liability for Software Licensing _____

   Environmental Impact of the Method Chosen _____

11. Are there any other concerns your company has regarding a method of disposal?

   [ ] Yes
   [ ] No

12. If yes, what are these concerns? And how strongly would you rate them.

13. Have you heard about Charity Logistics or the CyberCycle project prior to our contact with you?

[ ] Yes
[ ] No

14. The Charity Logistics' CyberCycle project is also a training programme, does your company employ an Information Technology maintenance department?

[ ] Yes
[ ] No

15. Could one of our researchers contact you about your hiring practices with regards to the CyberCycle Computer maintenance-training programme?

[ ] Yes
[ ] No

16. In order to continue our research, we need to contact other people in your field, could you please give us the names of a couple of people at other companies who we might contact to continue our research?

Name:	Company:	Tele:
_____	_____	_____
_____	_____	_____
_____	_____	_____

We will attempt to contact these people only for research purposes. No attempt will be made to solicit donations from the lists produced by this question.

We would like to thank you very much for your time and input. The research team appreciates your assistance in our research.

Please return this questionnaire by February 5, 1999 to:

Zachary Zebrowski
C/O Charity Logistics
87-89 Albert Embankment
Camelford House
London, England SE1-7TP

Fax: 0171 793-0600

If you have any questions, please call Peter Miller, Sakis Decossard or Zachary Zebrowski at
Tel: 0171 582-8800 X 101

APPENDIX E: INTERVIEW PROTOCOL

Interview protocol for the donors

Charity Logistics (CyberCycle)

Sakis Decossard

Peter James Miller

Zachary Zebrowski

Name:_____ Date:_____

Company:_____ Time:_____

1. Introduction: Introduce Yourself
2. Purpose of study: **Trying to learn more about the motives for donation---- Tell subject how the information gathered is going to be used.**
3. Information will be shared with Charity Logistics personnel
4. During interview I will be trying to get information about:
   - **Your reasons for joining the CyberCycle program**
   - **Your feelings regarding your relationship with CyberCycle**
   - **What can be done to improve that relationship**
5. Statement of consent and permission to tape record interview
6. Assurance of confidentiality.

1. I would like to begin by having you tell me a little about your background and also an overview of this corporation?
    - Tell me about its mission statement
2. Where do you see the company in five years?
    - How does the public currently see the company?
    - How would you like the company to be seen your client?
    - What are some of the strategies currently being used to reach that image? Tell me about them.
3. What are the equipments that are used in this corporation?
    - Computers→ How often do you update the computers?
    - When you are replacing the computer equipment, what do you usually do with the old ones?
    - Recycling→CyberCycle→How did you know about the CyberCycle program?
4. Have you considered any other programs before joining CyberCycle?
    - Tell me about them
    - For how long have you been working with CyberCycle?

- Why did you choose CyberCycle over the others?
- What fraction of your used computers would you say that CyberCycle receives?

5. How would you describe your company's relationship with CyberCycle?
   - What could have been better?
   - Do you have any suggestions on how CyberCycle could improve its relationship with your company?
6. Are there some things you have mentioned more important than others are?
7. Tell me about the issues that are involved in computer donations?
   - Data security→Tell me about it.
   - What process would you like to be used to erase the hard drive?
8. Are there any other not-for-profit organisations that could erase the hard drive through this process?
   - If yes, then why did you choose not to work with the others?
   - If no, why did you donate if data security is such a great concern?
9. Are there any other means that you could use to get rid of old computers without donating them to charity?

- Tell me about them
- What is the difference between CyberCycle and these other means?
- Which one would you say is more appealing to your company?

10. Where do you see the CyberCycle program five years from now?
    - Where do you see your relationship with CyberCycle five years from now?
    - What are your opinions about the CyberCycle program?
11. What do you feel is the biggest obstacle to the future of your relationship with CyberCycle?
12. What can you tell me about the government regulations regarding computer disposal in England?
13. When a company ask you for donation, what are you exactly looking for in a request?
14. What are the most popular magazines would you say that most IT managers read?

Schedule a follow-up interview if necessary. Ask for reference and company brochure.

Thank the subject and answer his/her questions.

APPENDIX F: NON-DONORS ALTERNATIVE QUESTIONNAIRE

Hi, my name is_____, I am a student at Kings College. I am currently looking into the methods that companies in London use to dispose of used computer equipment. I would like to ask you a few questions in regards to that matter. I do not want your name, and any information that I acquire during this dialogue will be kept strictly confidential. The result will be used to evaluate the effectiveness of the current disposal methods that companies in London employ.

May I please ask you a couple of questions?

1. Can you tell me of what nature your company is?
2. How many computers would you say you have in your IT department?
3. How often do you replace the computers with newer ones?
4. When you replace your old computers, how do you dispose of the old ones?
5. How did you come to choose this /these method (s)?
6. When you are making decisions regarding how to dispose of used equipment, what are your priorities?
7. Have any charities ever requested that you donate them your used computers?
8. If you had to choose between a charity and your current methods of disposal, which one would be your best pick?
9. Are there any reasons for that? Tell me about them
10. If a charity would like to receive your used computer equipment, how should they go about it?

Thank you very much for you time. Do you have any questions that you would like to ask?

APPENDIX G: DOCUMENTATION FOR SECURE-WIPE LITE

PROGRAM: ABORD.EXE

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	1.0
Project ID:	PRC3309
Programming Language:	Borland C++
OS/Hardware dependencies:	MS-DOS™
Problem Description:	This program acts as a "last chance" mechanism to ensure that the person wishes to securely delete all of the hard drives on the computer. The program creates a file if the key was pressed so that a batch file can identify that the person wishes to abort.
Overall Design:	
System structure	If the person presses a key before the counter reaches 0, the program creates a file c:\abort.#CL
Data representation	N/A
Algorithms	N/A
Program Assumptions and Restrictions:	N/A
Interfaces:	
User	Press a key to abort the process.
File/D-B	N/A
Program/Module	If the c:\abort.#CL the batch file exits.
Implementation Details:	
Data	N/A
Variables	output stream.
Algorithm	Although it would have been prettier to simply call a function with the current pass and then to quit out, my experience with Borland C++ is that it is a terrible compiler that does not necessarily return to the same position in the file where the function was called.
How to build the program:	Load the source code in Borland C++ and compile the program.

Program Source:

```
#include <dos.h>
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
void main (void)
{
  FILE *stream;
```

```
printf(" Press any key to abort... countdown: ");
sleep(1);
if (kbhit())
  {
  printf("ABORTED");
  stream=fopen("C:\\abort.#CL","w");
  fprintf(stream,"ABORT");
  fclose(stream);
  exit(0);
  }
printf("5");
sleep(1);
if (kbhit())
{
  printf("ABORTED");
  stream=fopen("C:\\abort.#CL","w");
  fprintf(stream,"ABORT");
  fclose(stream);
  exit(0);
  }
printf("4");
sleep(1);
if (kbhit())
  {
  printf("ABORTED");
  stream=fopen("C:\\abort.#CL","w");
  fprintf(stream,"ABORT");
  fclose(stream);
  exit(0);
  }
printf("3");
sleep(1);
if (kbhit())
  {
  printf("ABORTED");
  stream=fopen("C:\\abort.#CL","w");
  fprintf(stream,"ABORT");
  fclose(stream);
  exit(0);
  }
printf("2");
sleep(1);
if (kbhit())
  {
  printf("ABORTED");
  stream=fopen("C:\\abort.#CL","w");
```

```
    fprintf(stream,"ABORT");
    fclose(stream);
    exit(0);
    }
  printf("1");
  sleep(1);
  if (kbhit())
    {
    printf("ABORTED");
    stream=fopen("C:\\abort.#CL","w");
    fprintf(stream,"ABORT");
    fclose(stream);
    exit(0);
    }
  printf("\n Starting...");
}
```

Additional Files:	None
Results:	Success
Test Procedures:	Hit a key while it was running, and the file was created. Ran the program without hitting a key, the file wasn't created.
Test Data:	N/A
Performance Evaluation:	
Time/Space	N/A
User Interface	N/A
References:	N/A

PROGRAM: AUTOEXEC.BAT

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	1.5
Project ID:	PRC3309
Programming Language:	MS-DOS™ Batch File
OS/Hardware dependencies:	MS-DOS™
Problem Description:	This batch file controls the interaction of the DOS processes. Overall, the batch file deletes any previous abort file. It then waits five seconds for the user to abort. If the abort file is present it halts execution, otherwise, its starts deltreeing all hard drives present on the system. It then calls calclr, which clears all of the hard drives. Again, if the abort file is present, the system halts. Otherwise the system deltrees the drive again, and calls mebeep, which announces to the user that the process has finished.

Overall Design:

System structure	N/A
Data representation	N/A
Algorithms	See above

Program Assumptions and Restrictions: N/A

Interfaces:

User	See individual files
File/D-B	N/A
Program/Module	See above

Implementation Details:

Data	N/A
Variables	N/A
Algorithm	See above

How to build the program: No building required.

Program Source:

```
@ECHO OFF
cls
echo Secure Wipe Lite
echo Version 1.5
echo Authored by Worcester Polytechnic Institute Project
CyberCycle
echo Donors Team
echo Written for the CyberCycle Program
echo (C) 1999.
echo Conforms to the US DOD-2250.M
echo ***********************************************
```

```
echo ** You have 5 seconds to abort the program    **
echo ** before it securely deletes all hard drives **
echo ** on this system.                             **
echo ************************************************
IF EXIST C:\ABORT.#CL DEL C:\ABORT.#CL
ABORD.exe
IF EXIST C:\ABORT.#CL GOTO END
IF EXIST C:\STAT#CL.#CL GOTO CLLR
MD80.EXE
DELTREE /Y C:\*.*
DELTREE /Y D:\*.*
DELTREE /Y E:\*.*
DELTREE /Y F:\*.*
DELTREE /Y G:\*.*
DELTREE /Y H:\*.*
DELTREE /Y I:\*.*
DELTREE /Y J:\*.*
DELTREE /Y K:\*.*
DELTREE /Y L:\*.*
DELTREE /Y M:\*.*
DELTREE /Y N:\*.*
DELTREE /Y O:\*.*
DELTREE /Y P:\*.*
DELTREE /Y Q:\*.*
DELTREE /Y R:\*.*
DELTREE /Y S:\*.*
DELTREE /Y T:\*.*
DELTREE /Y U:\*.*
DELTREE /Y V:\*.*
DELTREE /Y W:\*.*
DELTREE /Y X:\*.*
DELTREE /Y Y:\*.*
DELTREE /Y Z:\*.*
REM
:CLLR
CALCLR.EXE
IF EXIST C:\ABORT.#CL GOTO END
DELTREE /Y C:\*.*
DELTREE /Y D:\*.*
DELTREE /Y E:\*.*
DELTREE /Y F:\*.*
DELTREE /Y G:\*.*
DELTREE /Y H:\*.*
DELTREE /Y I:\*.*
DELTREE /Y J:\*.*
DELTREE /Y K:\*.*
DELTREE /Y L:\*.*
```

```
DELTREE /Y M:\*.*
DELTREE /Y N:\*.*
DELTREE /Y O:\*.*
DELTREE /Y P:\*.*
DELTREE /Y Q:\*.*
DELTREE /Y R:\*.*
DELTREE /Y S:\*.*
DELTREE /Y T:\*.*
DELTREE /Y U:\*.*
DELTREE /Y V:\*.*
DELTREE /Y W:\*.*
DELTREE /Y X:\*.*
DELTREE /Y Y:\*.*
DELTREE /Y Z:\*.*
GOTO BEEP
:BEEP
MEBEEP.EXE
:END
ECHO **FINISHED**
```

Additional Files:	None
Results:	Works
Test Procedures:	Tried it on multiple computers, and it worked as expected.
Test Data:	N/A
Performance Evaluation:	
Time/Space	N/A
User Interface	N/A
References:	N/A

PROGRAM: CALCLR.EXE

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	1.0
Project ID:	PRC3309
Programming Language:	Borland C++
OS/Hardware dependencies:	MS-DOS™
Problem Description:	On some computers, when a batch file called a child process created with Borland C++, the child process receives incorrect arguments. Since the clear program needs to be called with correct arguments, this program handles this special case.
Overall Design:	
System structure	N/A
Data representation	N/A
Algorithms	This program has a for loop 'C' to 'Z' and this program calls clear with the corresponding letter.
Program Assumptions and Restrictions:	N/A
Interfaces:	
User	N/A
File/D-B	N/A
Program/Module	N/A
Implementation Details:	
Data	N/A
Variables	The integer result is the result of the process. The string path is the full path that is called. The character i is a loop variable.
Algorithm	N/A
How to build the program:	Load the source code in Borland C++ and compile the program.

Program Source:

```
#include <string.h>
#include <process.h>
#include <stdio.h>
#include <conio.h>

int main(void)
{
   int result;
   char *path="a";
   char i;
   clrscr();
   for (i='C';i<='Z';i++)
     {
```

```
        strset(path,i);
        result = spawnl(P_WAIT, "clear", path,path,NULL);
        if (result == -1)
       {
          perror("Error from spawnl");
          exit(1);
       }
      }
  return(0);
}
```

Additional Files: N/A

Results: Program calls the program correctly on all environments.

Test Procedures: I tried this on different computing environments and they all worked.
Test Data: None

Performance Evaluation:
Time/Space N/A
User Interface N/A

References: N/A

PROGRAM: CLEAR.EXE

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	1.5
Project ID:	PRC3309
Programming Language:	Borland C++
OS/Hardware dependencies:	MS-DOS™

Problem Description:

This program securely wipes the hard drive, according to the United States Department of Defense Document 2250-M. The program is called with an argument, the drive letter the program is supposed to clean. It then starts cleaning the drive. It cleans by writing a character three for three counts of writing the characters according to the Department of Defense algorithm. If the user wishes to abort, a file is left on the c drive informing that the program was paused, allowing for it to be continued later as necessary.

Overall Design:

System structure	N/A
Data representation	N/A
Algorithms	DOD-2250-M

Program Assumptions and Restrictions: N/A

Interfaces:

User	N/A
File/D-B	Appends a character to the file until it reaches the end of file, when it restarts. If it is the last count and last pass, it aborts.
Program/Module	N/A

Implementation Details:

Data	see program
Variables	see program
Algorithm	see above and United States Department of Defense document 2250-M.

How to build the program: Load the source code in Borland C++ and compile the program.

Program Source:

```
#include <process.h>
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <conio.h>
#include <dos.h>
#include <alloc.h>
#include <mem.h>
#define MAX_COUNT 1

int main (int argc, char *argv[])
```

```
{
  FILE *out;              // out file
  FILE *status;                // status file
  char *path;             // path
  char LETTER=argv[1][0];      // drive letter
  char aa;                     // temporary variable
  int flag;                    // flag
  int count=0;            // what count the program is at (1..3)
  int pass=0;             // what pass the program is at (1..3)
  int a;                  // temporary variable
  char let;                    // temporary character
  char ch='a',real='a';        // character to put / compare for
EOF.
  int wohoo=0;            // are we in the middle of this drive?

  count=0;                // initialize count / pass to zero.
  pass=0;
  real=ch;
  path="A";              // make the string to write to the
drive.
  strset(path,LETTER);
  strcat(path,":\\");
  strcat(path,"OUT#CL.#CL");

  for (count=count;count<=MAX_COUNT-1;count++)
    {
    for (pass=pass;pass<=2;pass++)
      {
     if (pass==0) // if pass one, let character = 85
       ch=85;
     else
       if (pass==1) // else, let character 170, for pass 3
         ch=170;       // is taken care of later on.

     if (wohoo)      // if file existed, append to it
       {
            if ((out=fopen(path,"a"))==NULL)
              {
                printf("The [%c] Drive is unavaialble for
writing.\n",LETTER);
                exit(0);
              }
        }
     else // else write to it.
          {
            if ((out=fopen(path,"w"))==NULL)
              {
```

```
              printf("The [%c] Drive is unavaialble for
writing.\n",LETTER);
              exit(0);
            }
          }
     flag=0;
     wohoo=0; // do the loop

     printf("Performing pass %i of 3 for count %i of %i.\n[
WORKING ]\n",pass+1,count+1,MAX_COUNT);

     if ((pass==0)||(pass==1))
       {
       real=ch;
       do
         {

           ch=fputc(ch,out);
           if (ch!=real)
          flag=1;
         }
      while (flag==0);
      }
     else // if pass 3
       {
       do
         {
         real=rand()%255;  // but with a pesudo random character
         ch=real;
         ch=fputc(ch,out);
         if (ch!=real)
           flag=1;
         }
       while (flag==0);
       }
    fclose(out);
    }
  }
  return(0);
}
```

Additional Files:	None
Results:	Program Works
Test Procedures:	Ran the program and interrupted it to make sure it was writing the file

correctly.

Test Data: N/A

Performance Evaluation:

Time/Space: Overall, the program performs the secure wipe at about 1 meg per minute. This varies slightly with the age of the hard drive.

User Interface: N/A

References: United States Department of Defense 2250-M, and Professor G. Hammel

PROGRAM: MD80.EXE

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	1.0
Project ID:	PRC3309
Programming Language:	Borland C++
OS/Hardware dependencies:	MS-DOS™
Problem Description:	This simple program resets the date to a nice anonymous date, specifically, Midnight, January 1st 1980.
Overall Design:	
System structure	N/A
Data representation	N/A
Algorithms	Resets the time via DOS set date and DOS set time.
Program Assumptions and Restrictions:	N/A
Interfaces:	
User	N/A
File/D-B	N/A
Program/Module	N/A
Implementation Details:	
Data	N/A
Variables	N/A
Algorithm	N/A
How to build the program:	Load the source code in Borland C++ and compile the program.

Program Source:

```
#include <stdio.h>
#include <process.h>
#include <dos.h>

int main(void)
{
   struct dosdate_t reset;
   struct time adj;

   reset.year = 1980;
   reset.day = 1;
   reset.month = 1;

   adj.ti_hour =  0;
   adj.ti_min  =  0;
   adj.ti_sec  =  0;
```

```
    adj.ti_hund =  0;
    _dos_setdate(&reset);
    settime(&adj);
}
```

Additional Files: N/A

Results: Sets the date to Jan 1st, 1980.

Test Procedures: Ran the program, it reset the date.
Test Data: N/A

Performance Evaluation:
Time/Space N/A
User Interface N/A

References: N/A

PROGRAM: MEBEEP.EXE

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	1.0
Project ID:	PRC3309
Programming Language:	Borland C++
OS/Hardware dependencies:	MS-DOS™
Problem Description:	This program beeps until a key is pressed.
Overall Design:	
System structure	N/A
Data representation	N/A
Algorithms	N/A
Program Assumptions and Restrictions:	N/A
Interfaces:	
User	Beeps until a key is pressed.
File/D-B	N/A
Program/Module	N/A
Implementation Details:	
Data	N/A
Variables	N/A
Algorithm	N/A
How to build the program:	Load the source code in Borland C++ and compile the program.

Program Source:

```
#include <stdio.h>
#include <dos.h>
#include <conio.h>
#include <process.h>
int main (void)
{
  while (1)
  {
  printf("Done!%c\n",7);
  sleep(1);
  if (kbhit())
    exit(0);
  }
}
```

Additional Files: N/A

Results:	Program beeps until a key is pressed
Test Procedures:	N/A
Test Data:	N/A
Performance Evaluation:	N/A
Time/Space	N/A
User Interface	N/A
References:	N/A

APPENDIX H: USERS' MANUAL FOR SECURE WIPE LITE (MS-DOS™)

By WPI CyberCycle Donor's Project Team (Sakis Decossard, Peter Miller, Zachary Zebrowski)
Version 1.5

March 17, 1999

1.0 INTRODUCTION

1.1 CyberCycle

The CyberCycle program trains unemployed persons through cooperation with the New Deal program in London, and provides inexpensive, used computers for other charities. CyberCycle is located at Camelford House, 87-89 Albert Embankment, 9th floor, London SE1 7TP with telephone number +44 0171-582-8800.

1.2 Program Package

While *no* program available can completely remove the possibility of someone recovering the information once stored on the hard drive, one would need to invest a large amount of time and money to recover data after using this program package. *Secure Wipe Lite*, a program which is more secure than a low-level format, is an automated program that overwrites all hard drives on a computer without user interface. While overwriting entire drives requires a significant amount of time, the program can be started and left running, minimizing the labor involved in securing data prior to donating a used hard drive to a charity.

For organizations with the abilities to remove hard drives and install them into Windows 95™ computers, there is a Windows 95™ version of *Secure Wipe* available. *Secure Wipe* for Windows 95™ runs faster than *Secure Wipe Lite*, but does not erase the C drive and also requires that the user has the technical knowledge to remove the hard disk from the donor computer and install the hard drive on a computer that already has Windows 95™ installed.

CyberCycle utilizes *Secure Wipe* for Windows 95™ in house to ensure the security of all hard

drives. If you would like a copy of *Secure Wipe* for Windows 95™, please contact CyberCycle. Or visit CyberCycle webpage at www.cybercycle.com

The reason why *Secure Wipe Lite* is "lite" is because the program does not install MS-DOS™ operating system after the program has successfully cleaned the drive.

1.3 Who Should Use This Program

Companies who should use this program are:

- Companies that wish to securely erase all data from their hard drives in house.
- Companies who are unable to remove the hard drive from the current system and install it on another computer so they could use the faster Windows 95™ version of the program.

2.0 Instructions

As part of its commitment to the convenience of its donors, CyberCycle has provided you with this automated data security program. Please follow the instructions below carefully, for CyberCycle nor its author assumes no responsibility for the misuse of this program, or data loss resulting from improper operation.

2.1 Creating a program boot disk (Required)

Secure Wipe Lite requires that you create a boot disk. The program must run on an MS DOS™ boot diskette and can not be operated from the hard drive of a computer.

Due to software licensing, CyberCycle can not include a version of MS DOS™ with this program.

To prepare a program boot diskette:

1. Format a 3.5-inch diskette as a system boot diskette.

2. Copy the file **deltree.exe** from the MS-DOS™ directory to the diskette.

3. Copy all of the files from the *Secure Wipe Lite* archive to the boot disk.

4. Mark the disk as "**Secure Wipe Lite Boot Disk**" and enable the write protect by opening the small window on the edge of the diskette. (This will prevent most viruses from being transferred to the diskette)

2.2 Running Secure Wipe Lite

Though not necessary for the operation of this program, you may wish to perform a low-level format on the hard drive before you start. To run a low-level format on the computer, follow your operating systems' standard procedures to perform a low-level format, if so desired.

Insert the Secure Wipe Lite program diskette into the A: drive and turn the computer you wish to donate on. **If for some reason this disk went into the wrong computer, you have 5 seconds once the computer boots to abort the process, or to turn off the computer.** After that pause, the program will then start deleting all of the files on all of the hard drives. The program may display error messages indicating "bad drive" or similar errors. Dutifully ignore this error, since the program is just reporting that it can not delete files off of drives that do not exist.

The computer will then spend the bulk of its time on the next section of the program. The computer will display "Pass 1 of 1, Count 1 of 1 [Working]". Eventually, the computer will beep, repeatedly, to indicate it is done. Hit any key to continue, then turn off the computer. The information on the hard drive has been over-written, and is ready for CyberCycle to pick up. **Please note that the day will be reset to midnight January 1st 1980, so reset the day if you**

will be using the computer again.

APPENDIX 1 – IS THE INFORMATION SECURE?

One question regarding the program we have written is "Is the data secure?" The answer is a tentative yes. If the hard drive is not destroyed there always remains a chance of recovering the data, regardless of what method used to delete it. There is a magnetic *remanence*, residual information that remains on the storage media even after erasure. Some government agencies and private corporations can, at a great expense, perform a *laboratory attack* to recover the information, even after overwriting (National Computer Security Center et al., 1991). However, this is a cost prohibitive process, especially for a charity or a non-profit organization and there is no guarantee that the recovered data will be the original data. The default value for the previously mentioned Pretty Good Privacy™ commercial program and various other disk security programs was ten "passes" (PGP Users Guide, 1998). However, from product to product, what the term "passes" means is inconsistent and the National Security Agency has no records available to the public to explain any further. (Personal Communication, December 18, 1998)

APPENDIX 2: TRADEMARK ACKNOWLEDGMENTS

Pretty Good Privacy™ is a registered trademark of Network Associates

Microsoft™, Microsoft DOS™, MS DOS™ and Windows 95™ are all registered trademarks of the Microsoft Corporation.

APPENDIX 3: WARRANTY INFORMATION

CyberCycle makes no warranty, stated or implied about the use of this program. CyberCycle offers it freely to its donors for use on computers prior to donation and takes no responsibility for damage or loss of data resulting from its misuse or improper operation.

APPENDIX I: DOCUMENTATION FOR SECURE-WIPE

PROGRAM: SECURE WIPE.EXE

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	2.0
Project ID:	PRC3309
Programming Language:	Visual Basic 4.0
OS/Hardware dependencies:	Microsoft Windows 95™

Problem Description: This program is the Windows 95™ version of the Secure Wipe program. This program secures up to 23 hard drives at once, working in a parallel, multitasking environment. This program also installs Microsoft DOS ™, and holmesfx.com, the Year 2000 bug fix. The program can be enabled to run an anti-virus program on the drive it is cleaning as well. It can also do single, double, and use the Department of Defense algorithm to clean drives at a single pass rate of 1.39 megs per minute.

Overall Design:

System structure	See above and documentation.
Data representation	See source code below
Algorithms	See DOD-2250-M.

Program Assumptions and Restrictions: N/A

Interfaces:

User	The user interface appears in the user manual. The user clicks on one of the letters to select which drive the user wishes to start. Then the user clicks on the Start Drive button to start the drive. When no errors occur, that should be all of the interface necessary to run the program. If for some reason an error occurs, such as a drive not being ready, the user can click on the drive's status, and then click on the Force Drive Reset button, which will reset the drive to the ready state. The user can use the DOD algorithm to clean the drive by clicking on the corresponding drive in the list above the Yes button and then clicking on the Yes button. The user can also change the number of passes it takes to clean the drive. The user can click on the corresponding drive in the list above the button and the user selects the number of passes on the drive via a pull down menu and the click on the Set Number of Passes button. The user can shutdown the program by clicking the standard Windows™ close button. The user can find out about the program by pressing the about button. The computer also beeps and displays a "Finished" form when the program has cleaned the drive.
File/D-B	A file "stat.#CL" is saved on the C drive every time the status list is updated, to allow for the power to be shut off randomly and the program can still recover.
Program/Module	The program uses file locks, and also batch files to control some aspects of the execution of the program. See each individual batch

file to see what it does.

Implementation Details:

Data	See source code.
Variables	See source code.
Algorithm	See DOD-2250-M, and attached flow chart.

How to build the program: Use Visual Basic to open the project file "securewipe.vbp" and then select make exe from the file menu. To install, run the setup program for the appropriate distribution.

Program Source:

```
Private Sub Command1_Click()
Form2.Visible = True
End Sub

Private Sub Command2_Click()
For i = 0 To 23
If List2.List(i) = "Drive Not Ready" Then List2.List(i) = "Ready"
Next i
End Sub

Private Sub Command3_Click()
If List2.List(List4.ListIndex) = "Ready" Then
List4.List(List4.ListIndex) = "Yes"
List3.List(List4.ListIndex) = 3
Else
Form4.Visible = True
Form4.Label2.Caption = "Cannot change algorithims in a middle of an operation."
End If
save_list
End Sub

Private Sub Command4_Click()
If List2.List(List4.ListIndex) = "Ready" Then
List4.List(List4.ListIndex) = "No"
Else
Form4.Visible = True
Form4.Label2.Caption = "Cannot change algorithims in a middle of an operation."
End If
save_list
End Sub

Private Sub Form_Load()

On Error GoTo blah:
Open "stat.#CL" For Input As #1
```

```
For i = 0 To 22
Input #1, blah
List2.AddItem (blah)
Next i
For i = 0 To 22
Input #1, blah
List3.AddItem (blah)
Next i
For i = 0 To 22
Input #1, blah
List4.AddItem (blah)
Next i
Close #1


For i = 0 To 22
List1.AddItem (Chr$(68 + i))
Next

Exit Sub

blah:
Close #1
List2.Clear
List1.Clear
Form4.Visible = True
Form1.Visible = False

For i = 0 To 22
List1.AddItem (Chr$(68 + i))
List2.AddItem ("Ready")
List3.AddItem ("1")
List4.AddItem ("No")
Next i
Exit Sub
finish:
Unload All

End Sub

Private Sub get_Click()
Form1.Caption = GetRandomString
End Sub

Private Sub Form_Unload(Cancel As Integer)
save_list
```

```
Unload Form2
Unload Form3
Unload Form4
Unload Form5
Unload Form6
End Sub

Private Sub List1_Click()
start.Enabled = True
End Sub

Private Sub List2_GotFocus()
Reset.Enabled = True
End Sub


Private Sub List3_Click()

If List2.List(i) = "Ready" Then setpass.Enabled = True Else setpass.Enabled = False

End Sub

Private Sub List3_LostFocus()
If List2.List(i) = "Ready" Then setpass.Enabled = True Else setpass.Enabled = False
End Sub

Private Sub List4_Click()
Command3.Enabled = True
Command4.Enabled = True
End Sub

Private Sub reset_Click()
Reset.Enabled = False
Form5.Visible = True
End Sub

Private Sub setpass_Click()
If List2.List(List3.ListIndex) = "Ready" Then
If passes(0).ListIndex = -1 Then
Form4.Label2.Caption = "You need to select a number of passes for the drive."
Form4.Visible = True
Else
List3.List(List3.ListIndex) = passes(0).ListIndex + 1
If List4.List(List3.ListIndex) = "Yes" Then List4.List(List3.ListIndex) = "No"
End If
Else
```

```
Form4.Visible = True
Form4.Label2.Caption = "Cannot set the number of passes after execution has started."
End If
save_list
End Sub

Private Sub start_Click()
Dim i As Integer
i = List1.ListIndex()
If List2.List(i) = "Ready" Then start.Enabled = False
If List2.List(i) = "Ready" Then List2.List(i) = "Starting Drive"
End Sub

Private Sub Timer1_Timer()
Timer1.Enabled = False

For i = 0 To 25

If List2.List(i) = "Starting Drive" Then GoTo start:
If List2.List(i) = "Initalizing" Then GoTo waitforfile:
If List2.List(i) = "Pass 1" Then GoTo pass1:
If List2.List(i) = "Pass 2 Next" Then GoTo pass2next:
If List2.List(i) = "Pass 2" Then GoTo pass2:
If List2.List(i) = "Pass 3 Next" Then GoTo pass3next:
If List2.List(i) = "Pass 3" Then GoTo pass3:
If List2.List(i) = "Finishing Task" Then GoTo finishingtask:
GoTo loophere:

start:
List2.List(i) = "Initalizing"
save_list
a = "strt.bat " & List1.List(i)
reval = Shell(a, 0)
Sleep (500)
GoTo loophere:

waitforfile:
On Error GoTo 0
On Error GoTo not_yet:
a = "loq" & List1.List(i)
Open a For Input As #1
Close #1
List2.List(i) = "Pass 1"
save_list
a = "clrloq.bat " & List1.List(i)
reval = Shell(a, 0)
```

```
On Error GoTo dnr:
a = List1.List(i) & ":\out.txt"
Open a For Output As #1
Write #1, "A"
Close #1
Kill a

start.Enabled = True
GoTo loophere:
dnr:
Close #1
List2.List(i) = "Drive Not Ready"
save_list
start.Enabled = True
GoTo loophere:

pass1:
On Error GoTo errorpass1:
Open List1.List(i) & ":\CyberCycle.txt" For Append As #1
If List4.List(i) = "Yes" Then
For j = 1 To 10000
Print #1, UString
Next j
Close #1
Else
For j = 1 To 100
Print #1, randomstring
Next j
Close #1
End If
GoTo loophere:

errorpass1:
Close #1
On Error GoTo 0
a = "batch2.bat " & List1.List(i)
retval = Shell(a, 0)
Sleep (500)
If List3.List(i) = "1" Then List2.List(i) = "Finishing Task" Else List2.List(i) = "Pass 2 Next"
save_list
GoTo loophere:

pass2next:
On Error GoTo not_yet:
a = "loq" & List1.List(i)
Open a For Input As #1
```

```
Close #1
On Error GoTo 0
a = "clrloq.bat " & List1.List(i)
reval = Shell(a, 0)
List2.List(i) = "Pass 2"
save_list
GoTo loophere:

pass2:
On Error GoTo errorpass2:
Open List1.List(i) & ":\CyberCycle.txt" For Append As #1
If List4.List(i) = "Yes" Then
For j = 1 To 10000
Print #1, SString
Next j
Close #1
Else
For j = 1 To 100
Print #1, randomstring
Next j
Close #1
End If

not_yet:
On Error GoTo 0
Close #1
GoTo loophere:

errorpass2:
Close #1
On Error GoTo 0
a = "batch2.bat " & List1.List(i)
retval = Shell(a, 0)
Sleep (500)
If List3.List(i) = "2" Then List2.List(i) = "Finishing Task" Else List2.List(i) = "Pass 3 Next"
save_list
GoTo loophere:

pass3next:
On Error GoTo not_yet:
a = "loq" & List1.List(i)
Open a For Input As #1
Close #1
a = "clrloq.bat " & List1.List(i)
reval = Shell(a, 0)
List2.List(i) = "Pass 3"
```

```
save_list
GoTo loophere:

pass3:
On Error GoTo errorpass3:
Open List1.List(i) & ":\CyberCycle.txt" For Append As #1
For j = 1 To 100
Print #1, randomstring3
Next j
Close #1

GoTo loophere:

errorpass3:
Close #1
On Error GoTo 0
List2.List(i) = "Finishing Task"
save_list
a = "finish.bat " & List1.List(i)
reval = Shell(a, 0)

GoTo loophere:

finishingtask:
On Error GoTo not_yet:
a = "loq" & List1.List(i)
Open a For Input As #1
Close #1
a = "clrloq.bat " & List1.List(i)
reval = Shell(a, 0)
List2.List(i) = "Ready"
save_list
Form3.Visible = True
GoTo loophere:

loophere:
Next i
Timer1.Enabled = True

End Sub

Private Sub Timer2_Timer()
statusbarinteger = statusbarinteger + 1
If statusbarinteger = 1 Then Label2.Caption = "PROGRAM ACTIVE...."
If statusbarinteger = 2 Then Label2.Caption = "PROGRAM ACTIVE..."
If statusbarinteger = 3 Then Label2.Caption = "PROGRAM ACTIVE.."
```

```
If statusbarinteger = 4 Then Label2.Caption = "PROGRAM ACTIVE."
If statusbarinteger = 5 Then Label2.Caption = "PROGRAM ACTIVE"
If statusbarinteger = 6 Then Label2.Caption = "PROGRAM ACTIVE."
If statusbarinteger = 7 Then Label2.Caption = "PROGRAM ACTIVE.."
If statusbarinteger = 8 Then Label2.Caption = "PROGRAM ACTIVE..."
If statusbarinteger = 8 Then statusbarinteger = 0

End Sub

Private Sub Form_Load()
Timer1.Enabled = True
For i = 1 To 50
Beep
Next i
End Sub

Private Sub Timer1_Timer()
Form3.Visible = fasle
Timer1.Enabled = fasle
Unload Me
End Sub


' are you sure you want to reset regardless of state form?
' command1 = Yes, command2= No
Private Sub Command1_Click()
Form1.List2.List(Form1.List2.ListIndex) = "Ready"
save_list
Unload Form5
End Sub

Private Sub Command2_Click()
Unload Form5
End Sub

' initalize form
Private Sub Timer1_Timer()
On Error GoTo fi:

Open "batch2.pif" For Input As #1
Input #1, asdf
Close #1
GoTo here:
fi:
reval = Shell("dep.com d archive", vbHide)
here:
```

```
Timer1.Enabled = False

UString = String(50000, "U")
SString = String(50000, "»")

randomstring = GetRandomString
randomstring2 = GetRandomString
randomstring3 = GetRandomString
Form1.Visible = True
Unload Me
End Sub

Declare Sub Sleep Lib "kernel32" (ByVal dwMilliseconds As Long)
Public statusbarinteger As Integer
Public randomstring As String
Public randomstring2 As String
Public randomstring3 As String
Public UString As String
Public SString As String

Function GetRandomString() As String
Dim a As String
Randomize
For i = 1 To 50000

Mychar = Chr((128 * Rnd) + 1)
a = a & Mychar
Next i
GetRandomString = a
End Function

Sub save_list()
whillywhillywhillyshabang:
On Error GoTo ne:
Open "stat.#CL" For Output As #5
For i = 0 To 22
Write #5, Form1.List2.List(i)
Next i
For i = 0 To 22
Write #5, Form1.List3.List(i)
Next i
For i = 0 To 22
Write #5, Form1.List4.List(i)
Next i
```

```
Exit Sub
ne:
Close #5
Sleep (500)
GoTo whillywhillywhillyshabang:
End Sub
```

Additional Files:	
Results:	Program works. - Time trials are included in the appendix.
Test Procedures:	Ran program, paused it in various states to ensure that the action was indeed happening, therefore we conclude that everything was all right. Also, we tested various error conditions (such as an invalid drive etc.) and the program responded properly.
Test Data:	N/A
Performance Evaluation:	
Time/Space	See Table in Preceding Conclusion Section
User Interface	See screen capture after this page.
References:	DOD-2250-M, Professor G. Hammel

PROGRAM: AUTOEXEC.BAT

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	1.0
Project ID:	PRC3309
Programming Language:	MS-DOS™ Bath File
OS/Hardware dependencies:	MS-DOS™
Problem Description:	This batch file is installed onto the cleaned hard drive and all it does is call the holmesfx.com program.
Overall Design:	
System structure	N/A
Data representation	N/A
Algorithms	N/A
Program Assumptions and Restrictions:	N/A
Interfaces:	
User	N/A
File/D-B	N/A
Program/Module	N/A
Implementation Details:	
Data	N/A
Variables	N/A
Algorithm	N/A
How to build the program:	No Building Required

Program Source:

holmesfx.com

Additional Files:	Holmesfx.com should be installed on the hard drive before running this program
Results:	Program works
Test Procedures:	N/A
Test Data:	N/A
Performance Evaluation:	N/A
Time/Space	N/A
User Interface	N/A
References:	N/A

PROGRAM: BATCH2.BAT

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	1.0
Project ID:	PRC3309
Programming Language:	MS-DOS™ Batch Language
OS/Hardware dependencies:	MS-DOS™
Problem Description:	This program simply deletes the temporary file by the program and when it has finished it calls the loq program to inform Visual Basic that it is done.
Overall Design:	
System structure	N/A
Data representation	N/A
Algorithms	See above
Program Assumptions and Restrictions:	N/A
Interfaces:	
User	N/A
File/D-B	Calls the loq program when the file has been deleted.
Program/Module	N/A
Implementation Details:	
Data	N/A
Variables	N/A
Algorithm	N/A
How to build the program:	N/A

Program Source:

```
del %1:\cyberc~1.txt
loq %1
exit
```

Additional Files:	N/A
Results:	Program works
Test Procedures:	N/A
Test Data:	N/A
Performance Evaluation:	N/A
Time/Space	N/A
User Interface	N/A
References:	N/A

PROGRAM: CLEARLOQ.BAT

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	1.0
Project ID:	PRC3309
Programming Language:	Borland C++
OS/Hardware dependencies:	MS-DOS™
Problem Description:	This program deletes the file created by loq.exe
Overall Design:	
System structure	N/A
Data representation	N/A
Algorithms	N/A
Program Assumptions and Restrictions:	N/A
Interfaces:	
User	N/A
File/D-B	N/A
Program/Module	N/A
Implementation Details:	
Data	N/A
Variables	N/A
Algorithm	N/A
How to build the program:	No building requried

Program Source:

```
del loq%1
```

Additional Files:	N/A
Results:	N/A
Test Procedures:	N/A
Test Data:	Program Works
Performance Evaluation:	N/A
Time/Space	N/A
User Interface	N/A
References:	N/A

PROGRAM: FINISH.BAT

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	1.0
Project ID:	PRC3309
Programming Language:	MS-DOS™ Batch File
OS/Hardware dependencies:	MS-DOS™
Problem Description:	This program deletes the temporary file, installs MS-DOS and the Year 2000 fix program, and then signals Visual Basic its done via the loq.exe program.
Overall Design:	
System structure	N/A
Data representation	N/A
Algorithms	N/A
Program Assumptions and Restrictions:	N/A
Interfaces:	
User	N/A
File/D-B	N/A
Program/Module	N/A
Implementation Details:	
Data	N/A
Variables	N/A
Algorithm	N/A
How to build the program:	N/A

Program Source:

```
del %1:\cyberc~1.txt
copy drvspace.bin %1:
copy io.sys %1:
copy msdos.sys %1:
copy command.com %1:
attrib +h +r +s %1:\drvspace.bin
attrib +h +r +s %1:\io.sys
attrib +h +r +s %1:\msdos.sys
copy holmesfx.txt %1:
copy holmesfx.com %1:
copy autoexec.bat %1:
loq %1
```

Additional Files: N/A

Results:	N/A
Test Procedures:	N/A
Test Data:	N/A
Performance Evaluation:	N/A
Time/Space	N/A
User Interface	N/A
References:	N/A

PROGRAM: LOQ.EXE

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	1.0
Project ID:	PRC3309
Programming Language:	Borland C++
OS/Hardware dependencies:	MS-DOS™
Problem Description:	This program creates a loq file that when created will signal visual basic that the batch file is done.
Overall Design:	
System structure	N/A
Data representation	N/A
Algorithms	N/A
Program Assumptions and Restrictions:	N/A
Interfaces:	
User	N/A
File/D-B	Creates a file loq[lettername] where lettername is the file name of the drive that is done.
Program/Module	N/A
Implementation Details:	
Data	N/A
Variables	N/A
Algorithm	N/A
How to build the program:	Load the source code in Borland C++ and compile the program.

Program Source:

```
#include <string.h>
#include <process.h>
#include <stdio.h>
#include <conio.h>
int main (int argc, char *argv[])
{
 FILE *test;
 char *temp;
 char *temp2;
 char *path;
 char LETTER=argv[1][0];
 int result;

 temp="A";
 path="loq";
```

```
  strset(temp,LETTER);
  strcat(path,temp);
  strcat(path,".LOQ");

  test=fopen(path,"w");
  fprintf(test,"0");
  fclose(test);
}
```

Additional Files: N/A

Results: Program creates the file correctly

Test Procedures: N/A
Test Data: N/A

Performance Evaluation: N/A
Time/Space N/A
User Interface N/A

References: N/A

PROGRAM: STRT.BAT

Author:	CyberCycle Donors IQP Group (Sakis Decossard, Peter James Miller, and Zachary Zebrowski)
Date:	March 17, 1999
Version:	1.0
Project ID:	PRC3309
Programming Language:	MS-DOS™ Batch File
OS/Hardware dependencies:	MS-DOS™
Problem Description:	This program renames the volume, deltrees the volume, and then signals the program it's done. To enable Sophus (or another) anti-virus program, just change the remarked line to the program you wish to execute.
Overall Design:	
System structure	N/A
Data representation	N/A
Algorithms	The renaming of the volume uses the DOD algorithm.
Program Assumptions and Restrictions:	N/A
Interfaces:	
User	N/A
File/D-B	N/A
Program/Module	N/A
Implementation Details:	
Data	N/A
Variables	N/A
Algorithm	N/A
How to build the program:	N/A

Program Source:

```
rem c:\progra~1\sophos~1\sweep.exe %1: -di -nk
c:\windows\command\deltree /y %1:\*.*
c:\windows\command\label.exe %1: UUUUUUUUUU
c:\windows\command\label.exe %1: aaaaaaaaa
c:\windows\command\label.exe %1: CyberCycle
loq.exe %1
exit
```

Additional Files:	N/A
Results:	The program works.
Test Procedures:	N/A
Test Data:	N/A

Performance Evaluation:	N/A
Time/Space	N/A
User Interface	N/A
References:	N/A

APPENDIX J: USERS MANUAL FOR SECURE WIPE (WINDOWS 95™ VERSION)

By WPI CyberCycle Donor's Project Team (Sakis Decossard, Peter Miller, Zachary Zebrowski)
Version 2.0

March 17, 1999

1.0 Introduction

1.1 CyberCycle

The CyberCycle program trains unemployed persons through cooperation with the New Deal program in London, and provides inexpensive, used computers for other charities. CyberCycle is located at Camelford Hourse, 87-89 Albert Embankment, 9th floor, London SE1 7TP with telephone number +44 0171-582-8800.

1.2 Program Package

While *no* program available can completely remove the possibility of someone recovering the information once stored on the hard drive, one would need to invest a large amount of time and money to recover data after using this program package. *Secure Wipe*, a program which is more secure than a low-level format, is a Windows 95 program that allows for multiple hard drives to be overwritten at the same time.

2.0 Instructions

Please follow the instructions below carefully, for CyberCycle nor the program's author assumes no responsibility for the misuse of this program, or data loss resulting from improper operation.

2.1 Installing the Program

The program will be distributed in a self extracting zip file. A password may be required for installation. The setup program should automatically run. Accept all of the default options to install the program correctly.

2.2 Running Secure Wipe Lite

2.2.1 Program Initialization

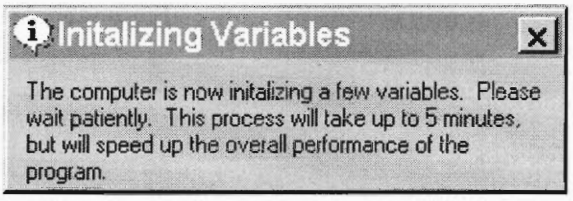

Figure 1 - Program Initialization Screen

To start the program, click on the Start™ button, then go to Program Files | Secure Wipe. The program will start and then display the screen in figure 1. Depending on the speed of the computer, this screen will remain up from 1 to 15 minutes. As soon as the variables are initialized, this message will disappear and the main program will start.

2.2.2 Procedure For a Typical Drive

1. Perform a low-level format first on another computer. This will ensure that the hard drive is good and any errors on the drive are fixed.

2. Connect the hard drive that needs to be cleaned to the computer with the *Secure Wipe* program installed.

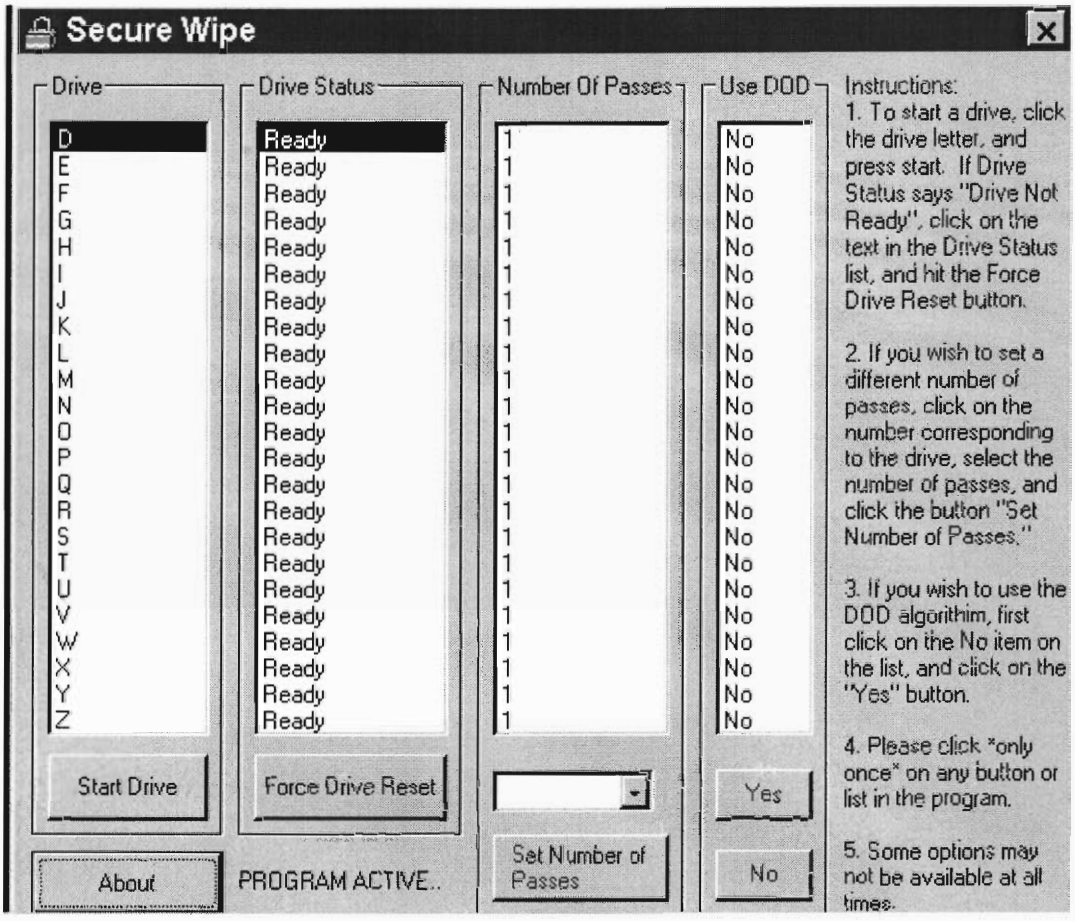

Figure 2- The Main Secure Wipe Screen

3. In the list labeled "Drive", select the drive you wish to clear by clicking on the drive letter.

4. Click on the button "Start Drive".

5. Wait until the computer beeps. The computer will briefly display on the screen "Drive Ready".

5. Remove the hard drive from the computer.

2.2.3 Advanced Features

2.2.3.1 Setting the number of passes

1. In order to set the number of passes that the program will use for an individual drive, in the list labeled "Number of Passes", click on the text that lines up horizontally with the drive you wish

to change.

2. Then use the pull down menu to select the number of passes you wish to use.

3. Finally, click on the button "Set Number of Passes".

Please note that if the United States Department of Defense (DOD) algorithm was set to Yes, and you select a fewer number of passes than three, the DOD algorithm will automatically be set to No. Also, you cannot set the number of passes while the drive is in any state other than the "Ready" state, for if this happens, an error box will be displayed. Similarly, if you do not select a number of passes that you wish the drive to have, an error box will be displayed.

2.2.3.2 Use DOD Option

1. To enable the United States Department of Defense algorithm, in the "Use DOD" list, click on the text that lines up horizontally with the drive you wish to use.

2. Click on the Yes button.

Please note that if you enable the DOD algorithm, and the number of passes is currently less than three, it will automatically be set to three. Also, you cannot enable the DOD algorithm while the drive is in any state other than the "Ready" state, for if this happens, an error box will be displayed.

2.2.3.3 Enable Anti-Virus Software

Currently, automatic anti-virus scanning of the hard drives is disabled. To enable anti-virus scanning:

1. Press the Start™ button.

2. Go to Start | Run

3. Type in the word "command" without quotations and hit enter.

4. Type in the string "edit c:\progra~1\secure~1\strt.bat" without quotations and hit enter.

5. There is a remarked line that will run the Sophus Anti-Virus™.

6. Either delete the rem command or type in a new line and hit enter.

7. Hit the alt button and the s button at the same time.

8. Hit the alt button and the x button at the same time.

9. Type in the word "exit" without quotations and hit enter.

2.2.3.4 Secure Wipe Internal Version Features

The internal version installs MS-DOS™ and also installs holmesfx.com, a public domain Year 2000 correction program.

2.2.4 Error Conditions

- If the power goes out, it is possible that the computer might not be able to recover where it left off. An error box on startup will indicate that the file stat.#CL file could not be opened, and all of the drives, regardless of their previous state will be reset to Ready.
- If you start a drive that is not ready for some reason, the computer will prompt you with the text "Drive Not Ready" in the "Drive Status" list. If possible, correct the problem that caused the drive to be not ready. Next, in the list "Drive Status" click on the text "Drive Not Ready" and hit the "Force Drive Reset" button. A dialogue box appears and asks are you sure you wish to do this. Click "Yes" to reset the drive status to Ready.

APPENDIX 1 – IS THE INFORMATION SECURE?

One question regarding the program we have written is "Is the data secure?" The answer is a tentative yes. If the hard drive is not destroyed there always remains a chance of recovering the data, regardless of what method used to delete it. There is a magnetic *remanence*, residual information that remains on the storage media even after erasure. Some government agencies and private corporations can, at a great expense, perform a *laboratory attack* to recover the information, even after overwriting (National Computer Security Center et al., 1991). However, this is a cost prohibitive process, especially for a charity or a non-profit organization and there is no guarantee that the recovered data will be the original data. The default value for the previously mentioned Pretty Good Privacy™ commercial program and various other disk security programs was ten "passes" (PGP Users Guide, 1998). However, from product to product, what the term "passes" means is inconsistent and the National Security Agency has no records available to the public to explain any further. (Personal Communication, December 18, 1998)

APPENDIX 2: TRADEMARK ACKNOWLEDGMENTS

Pretty Good Privacy™ is a registered trademark of Network Associates

Start™, Microsoft™, Microsoft DOS™, MS DOS™ and Windows 95™ are all registered trademarks of the Microsoft Corporation.

Sophus Anti-Virus™ is a registered trademark of the Sophus PCL.

APPENDIX 3: WARRANTY INFORMATION

CyberCycle makes no warranty, stated or implied about the use of this program. CyberCycle offers it freely to its donors for use on computers prior to donation and takes no responsibility for damage or loss of data resulting from its misuse or improper operation

APPENDIX K: TRADEMARK ACKNOWLEDGEMENTS

Microsoft™, Microsoft Windows™, Microsoft Windows 95™, Microsoft Windows 98™, Microsoft DOS™, Microsoft Office™ and Microsoft Excel™ are all registered trademarks of the Microsoft Corporation.

Pentium™ and Pentium II™ are registered trademarks of Intel Corporation.

Power Mac™ and Imac™ are registered trademarks of Apple Corporation

Pretty Good Privacy™ is a registered trademark of Network Associates

Quick Heal™ is a registered trademark of Cat Computer Services Limited