

IMS Final Report

By

Cory Opp

Submitted to Prof. Said
the Faculty of the Information Engineering Technology Program
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Engineering Technology

University of Cincinnati
College of Applied Science

May 2006

IMS Final Report

by

Cory Opp

Submitted to Prof. Said
the Faculty of the Information Engineering Technology Program
in Partial Fulfillment of the Requirements
for
the Degree of Bachelor of Science
in Information Engineering Technology

© Copyright 2006 Cory Opp

The author grants to the Information Technology Program permission
to reproduce and distribute copies of this document in whole or in part.

Cory opp
Cory Opp

5-31-06
Date

Robert E. Schlemmer
Prof. Schlemmer, Faculty Advisor

5-31-06
Date

Patrick C. Kumpf
Patrick C. Kumpf, Ed.D. Interim Department Head

June 7, 2006
Date

Acknowledgements

I would like to thank my technical advisor, Professor Schlemmer because has been able to help me anytime that I have been stuck. I would also like to thank the TAPIN organization for sponsoring my project.

Table of Contents

Table of Contents 4

List of Figures 5

Abstract 6

1. Project Description and Intened Use.....	7
1.1. Problem Statement.....	7
1.2. Description of the Solution.....	10
1.3. User Profile	12
2. Design Protocols 13	
2.1 Use Case Diagram	13
2.2 Class Diagram	16
2.3 - Database Design	16
2.4. User Interface	21
2.4.1 Interface Desing/Navigation	21
2.4.2 Icons/Graphical Symbols	21
2.4.3 Color Scheme	21
2.4.4 Help	22
3. Deliverables 22	
4. Design and Development 23	
4.1 Project Budget	23
4.2 Project Resources	24
4.3 Project Schedule	25
4.4 Project Software	27
4.5 Project Hardware	27
5. Proof of Concept 28	
6. Conclusions and Recomendations 35	
6.1 Testing 35	
7. References	38
8. Appendix A: Diagram	39

List of Figures

2. Design Protocols		
1	Use Case Diagram	15
2	Class Diagram	18
3	Database Diagram	20
3. Project Planning		
4	- Labor Cost	24
5	Project Plan	25
6	Modified Project Plan	26
4. Proof of Concept		
7	IMS Login Screen	28
8	IMS Main Menu	29
9	Receiving Screen	30
10	Item Maintenance Screen	31
11	Recipient Screen	32
12	Search Item	33
13	User Administration	34

Abstract

Inventory Management System

By

Cory Opp

Technology Assisting People In Need (TAPIN) is a non-profit organization that accepts donations of used computer hardware. The Inventory Management System (IMS) is a system that will track a donated item from the time the item is donated until the item is given to a family. The IMS system was developed for the TAPIN organization to resolve the following issues: 1) extensive reports are required by the IRS, 2) previously, the inventory was not searchable, and 3) an accurate inventory is critical. The IRS requires the TAPIN organization to develop an annual report containing information about its transactions and the items it has given out to families. Prior to IMS, creating this report was very time consuming because the TAPIN President had to look through all the transactions throughout the year and develop the report manually. TAPIN often serves customers with special needs; previously, the only way to find items that would meet the customers' needs was to look through all the documents that were created when items were received. After an item is received, it is placed in the warehouse, but TAPIN does not have the ability to perform a constant, active physical inventory. The IMS application provides a report that can be created with the click of a button that contains all of the information required by the IRS. The system also allows for quick searches through the inventory based on item type. The IMS application provides a tool to perform a physical inventory to ensure that the current inventory is accurate.

IMS was developed in Visual Basic 6.0, C#.NET, and Microsoft Access was used for the database management system. It provides an easily navigable user interface and a relational database background. The forms were all developed to represent the paper forms that are currently being filled out when an item is currently received by the TAPIN organization to add a feeling of familiarity to the users.

1 Project Description and Intended Use

1.1 Problem Statement

TAPIN is a non-profit organization that accepts donations in the form of computer hardware and then rebuilds computer systems to lend out to low income families. The TAPIN organization does not currently utilize a computer-based inventory system. It is currently utilizing a system that is mostly paper-based. This paper-based system has the following limitations: 1) amount of time that is required to put reports together that are required by the IRS, 2) it is very hard to find a computer system that will meet the needs of a user, and 3) there is no efficient way to know what is in stock or missing.

The current process lifecycle of a computer from the time the computer is received to the moment the computer is lent out is very time consuming. First the computer is donated to the TAPIN organization. Once the computer has reached the TAPIN organization, it is tested to make sure that it works and if it does work, a form is filled out with all of the specifications of the computer. If the computer does not work, it is either parted out or the technicians will fix it. If the technician fixes the computer, a form is filled out with all of the specifications of the computer. After the form is filled out, it is supposed to be entered into the database by either the President of the company

or his son. Since this is a small company and everyone is constantly busy, the information is not always entered into the database. After the form has been filled out, a barcode is printed and attached to the hardware. After the barcode has been attached to the computer, it is stored in the warehouse up until the time it is given to a customer.

The TAPIN organization does perform physical inventories, but not on a regular basis. The current process for the physical inventory is to put a computer on a cart and to go around the warehouse scanning all of the barcodes on the hardware. After all of the barcodes are scanned, there is a program that compares what was scanned to what is actually in the database. After the program has completed this comparison, it will display any discrepancies to the user. Since the hardware is not always entered into the database when they are received, this information is not very reliable.

The next phase of the lifecycle occurs when the TAPIN organization receives a request for a computer. After the request has been received, a worker has to go through all of the paperwork listing the company's current computer stock in order to find a computer that matches the needs of the family. Once a computer is found that matches the requirements, it is located and then lent out to the family.

The last step of a computer's lifecycle at the TAPIN organization is that the computer is lent out to a family. Once the computer has been lent out, a form is completed with information regarding the computer and the family. The approving agency is also tracked by this form, which is very important because this information is required by the IRS in an annual report. An agency could consist of someone that works for social services or someone who works within the community.

The IRS requires a report yearly that consists of the computers the TAPIN organization lent out during the past year. This report must also contain the agency that approved the family for a computer. Under the current system, this report is put together by gathering all of the paperwork that was filled out each time a computer was lent out. After all of the paper work is gathered, the President of the company will go through each document and generate a report that consists of who the computer was lent out to and who the approving agency is. According to the president of TAPIN, Dave Grosheim, "Gathering all of the information that is required for the IRS can take days" (1).

Under the current system, it is very hard to find a computer that matches a family's needs. The current process to find out the specifications of the computers in stock is to review every form that is filled out as soon as each computer is received until a computer is found that meets the request. Once a computer is found, a volunteer has to go back to the warehouse and get the computer. It is very time consuming to go through all of the paperwork just to find out the specifications of all the computers that are in stock.

Under the current system, there is not an efficient way to find out if a computer is in stock, and if it is in stock, where it is located. This problem is a direct result of the current system lacking the following two features:

- Reliable Physical Inventory
- Organized Warehouse

The physical inventory that is performed is very time consuming and does not happen on a regular basis. The other issue with the process of performing a physical inventory is that not all of the computers are entered into the database as soon as they are received which creates an unreliable inventory. The warehouse is not organized so it

makes it very hard to find a computer. After a computer is received it is put anywhere in the warehouse that has room for it.

1.2 Description of Solution

The solution to the inventory tracking problem TAPIN is experiencing is a system that will provide a user-friendly interface to effectively receive and enter inventory. This solution will eliminate all of the paper forms that are currently filled out whenever a computer is received or taken out of stock, which will lead to a more accurate inventory. The interface will be designed so that even computer illiterate users will be able to efficiently use the system. This ease of use will be accomplished by designing the interface to look much like the current forms the users are completing. The new Inventory Management System (IMS) will consist of the following components:

- Secure Login
- Receiving
- Inventory Maintenance
- Organize Warehouse
- Query Capabilities
- Transaction Tracking
- Reporting System
- Physical Inventory

The IMS solution will also provide a report containing all of the required information for the IRS. The yearly transaction report will contain the following information:

- Approval Agency
- Computer Manufacturer

- Computer Model
- Customer First Name
- Customer Last Name
- Transaction Date

IMS will provide a query interface that any person could utilize that looks up which computers are in stock based on several features. This query is needed because TAPIN often gets customers that have special needs that would need their computer system to have special features. The features that the user will be able to query on will include the following:

- Monitor Size
- Monitor Pitch
- Computer Processor Type
- Computer Processor Speed
- Computer Memory
- Video Card
- Network Card/Modem

The other element of the solution to this problem will also be to rearrange the warehouse and assign location IDs to each shelf. This location ID will also be stored in IMS. Once a user finds a computer that fits a customer's needs, the user will be able to easily find the computer system.

The IMS solution will provide an interface on a pocket PC that will allow the user to go throughout the warehouse and scan all of the computer systems that are currently in stock. After the user has completed scanning all of the computer systems that are in stock, the pocket PC will be hooked up to a workstation. There will be a utility in the IMS system that will compare all of the computers that were scanned to all of the computers that are actually supposed to be in stock. The physical inventory will also check the location ID of each piece of hardware scanned, and if there is a difference, the

location number that was scanned will become the location ID. After this utility has been run, it will generate a report that will show all of the computers that are currently missing.

The IMS application will be written in Visual Basic 6.0 to make it easy for the TAPIN organization to maintain the application because this is the language that is standard at TAPIN.

1.3 User Profile

There are three user profiles based on the requirements given by the TAPIN organization. The user profiles include: receivers, technicians, and operational users.

1.3.1 Receivers

The receiver is generally a volunteer who will receive the computer hardware that is donated. Once the computer has reached the back door, the receiver will need to be able to receive the computer through the receiving feature in the IMS solution

1.3.2 Technicians

The technician will need to be able to access and edit information regarding items after they have been received. After an item has been received, the item is fully tested and any parts that need to be replaced or added would need to be noted. The item maintenance feature will be the feature that the technicians interface with in order to keep track of this information.

1.3.3 Operational Users

The operational user will generally be the President of the company or his son. This person will work with low income families to find a computer that meets their needs, and he will be responsible for giving the computer out to the family. This group of users needs to be able to query the inventory to find a computer that meets the customer's needs. After a computer is found, the operational user will need to be able to give the computer out in IMS. The computer will need to be taken out of the current stock and the customer's information will need to be tracked along with the approving agency. The operational user is also in charge of printing up the report that is required by the IRS. The last duty that the operational user will need access to is the ability to perform physical inventory on the pocket PC and the workstation application.

2 Design Protocols

2.1 Use Case Diagram

The use case is divided into three main sections based on the user profiles discussed above. The IMS application will be accessed from one of three workstations that currently exist at TAPIN. When the user logs into the IMS system, they will be presented with the options that they should be able to access. The use case in Figure 1 shows the program flow for all three of the possible user profiles. All of the diagrams in

this document have been designed according the design standards in the Applying UML and Patterns. (2)

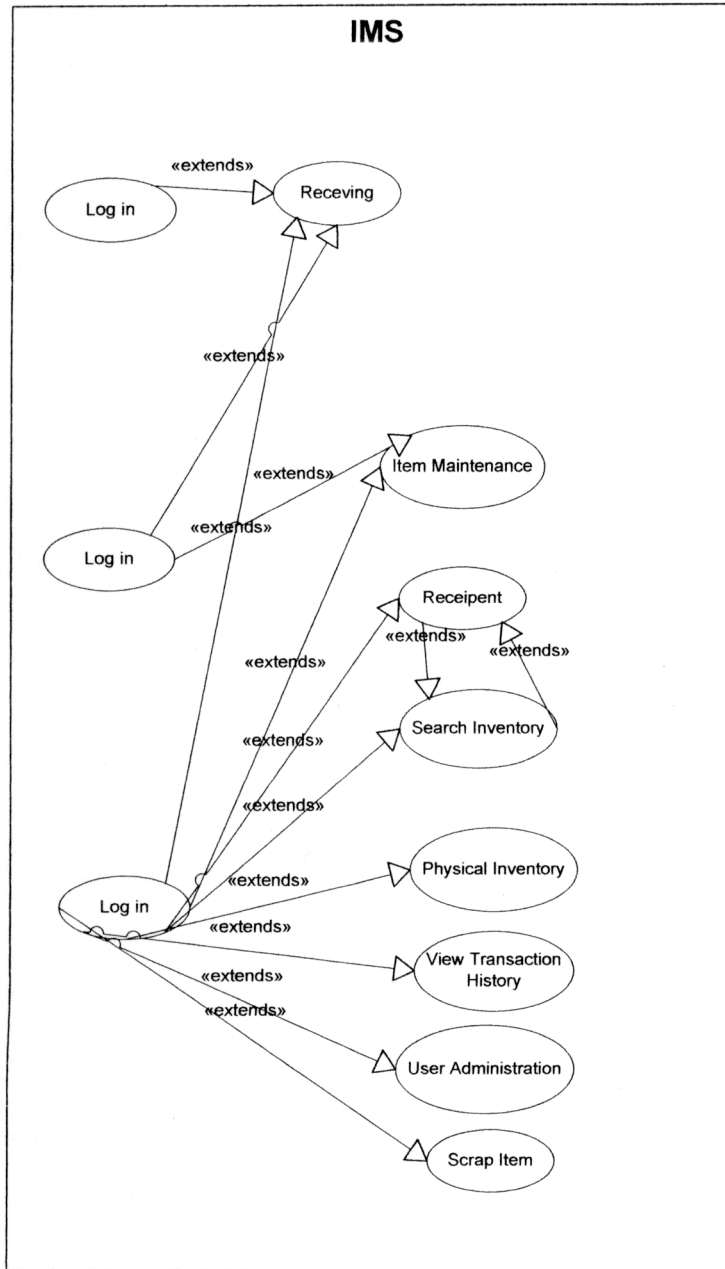
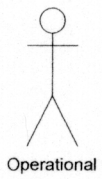
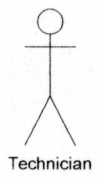


Figure 1: Use Case Diagram

2.2 Class Diagram

The IMS system will consist of seven main classes which include the following: item, computer, laptop, monitor, monitor type, scanner, and printer. These seven classes will perform all of the reading and writing to the IMS database. These classes were created to make the IMS system easier to maintain because if someone wants to modify the business logic, it would only need to be modified in one place. This also makes the application code easier to maintain because the person who is modifying the application would not even have to know how to work with ADO because all of the ADO logic is in the classes. The class diagram for the IMS application is shown in Figure 2.

2.3 Database Design

The database for this project is a rather large and complex database that is in the 4th normal form. There are two main tables that link all of the tables together. The first table is the transaction table which has foreign keys to the customer table, agency table, and transaction details table. The transaction table stores all of the information regarding a transaction that is unique. The customer table is a table containing all of the customers' demographic information. The agency table contains information regarding the agency that approved the transaction. The transaction details table is used to link the transaction to the items that were included in the transaction. The second main table is the item table which contains foreign keys for the computer, monitor, scanner, or printer table. The item

table stores all of the information that is the same for each item including an item type. Depending on the item type the detailed information such as processor type is stored in the computer, monitor, scanner, and printer table. The database design diagram is shown in Figure 3.

item
-itemID : Integer
-barcode : String
-status : String
-item_type : String
-inspect_date : Date
-location_ID : String
-serial_number : String
-brand : String
-model_number : String
-problems : String
-parts_replaced : String
-technicians : String
-repair_cost : Double
-notes : String
+findItemID() : Integer
+openConnection() : Integer
+addItem() : String
+closeConnection() : Integer
+saveItem() : String
+findItem() : String
+deleteItem() : String
+updateItem() : String
+cancelUpdate() : String

monitor
-itemID : Integer
-monitor_type_ID : Integer
-pitch : Double
-size : Integer
-pc : String
-mac : String
-unix : String
-other_os : String
-other_os_memo : String
-monitor_type_text : String
-monitor_type : String
+addMonitor() : Integer
+saveMonitor() : String
+closeConnection() : Integer
+openConnection() : Integer
+find() : Integer
+deleteMonitor() : String
+cancelUpdate() : String

monitor_type
-monitor_type_ID : Integer
-rowCount : Integer
-monitor_type : String
+closeConnection() : Integer
+getMonTypeArray() : String
+addMonitorType() : Integer
+saveMonitorType() : String
+openConnection() : Integer
+findMonType() : String

laptop
-itemID : Integer
-battery_type : String
-acAdapter : String
-pc : String
-mac : String
-unix : String
-other_os : String
-processor_type : String
-processor_memo : String
-processor_speed : Integer
-memory : Integer
-floppy_drive_A : String
-floppy_drive_B : String
-hard_drive_primary : Integer
-hard_drive_secondary : Integer
-videocard_type : String
-video_memory : Integer
-cd_rom : String
-cd_rom_speed : Integer
-cd_writer : String
-cd_writer_speed : Integer
-dvd_reader : String
-dvd_reader_speed : Integer
-dvd_writer : String
-dvd_writer_speed : Integer
-network_card_memo : String
-modem_memo : String
-pcmcia : String
-pcmcia_cards_memo : String
-other_cards : String
-mouse_type : String
-mouse_memo : String
-docking_station : String
-docking_station_memo : String
+find() : Integer
+addLaptop() : Integer
+openConnection() : Integer
+closeConnection() : Integer
+saveLaptop() : String
+cancelUpdate() : String
+deleteLaptop() : String

Agency
-agencyID : Integer
-first_name : String
-last_name : String
-company : String
-address : String
-city : String
-state : String
-zip : String
-position : String
+saveAgency() : String
+findAgency() : String
+firstAgency() : String
+addAgency() : String
+previousAgency() : String
+nextAgency() : String
+closeConnection() : String
+openConnection() : String

Computer
-itemID : Integer
-pc : String
-mac : String
-unix : String
-other_os : String
-processor_type : String
-processor_memo : String
-processor_speed : Integer
-ram : Integer
-videocard_type : String
-video_memory : Integer
-a_location : String
-floppy_drive_1 : String
-b_location : String
-floppy_drive_2 : String
-tape_drive : String
-hard_drive_1 : Integer
-hard_drive_2 : Integer
-cd_rom : String
-cd_rom_speed : Integer
-cd_writer : String
-cd_writer_speed : Integer
-dvd_reader : String
-dvd_reader_speed : Integer
-dvd_writer : String
-dvd_writer_speed : Integer
-soundcard_type : String
-modem_memo : String
-other_cards : String
+find() : Integer
+openConnection() : String
+addComputer() : String
+saveComputer() : String
+closeConnection() : Integer
+cancelUpdate() : String
+deleteComputer() : String

Customer
-customerID : Integer
-firstName : String
-lastName : String
-middle_initial : String
-email : String
-address : String
-city : String
-state : String
-zip : String
-home_phone : String
-work_phone : String
-cell_phon : String
+findCustomer() : String
+moveFirst() : String
+cancelUpdate() : String
+previousCustomer() : String
+nextCustomer() : String
+saveCustomer() : String
+addCustomer() : String
+closeConnection() : String
+openConnection() : String

Printer
-itemID : Integer
-dpi : Integer
-mac : String
-unix : String
-pc : String
-other_os : String
-printer : String
-fax : String
-copier : String
-color : String
-other_capabilities : String
-other_capabilities_memo : String
-printer_type : String
-other_mechanism_memo : String
-serial : String
-usb : String
-parallel : String
-network : String
-network_memo : String
-phone : String
-other_connection : String
-other_connection_memo : String
-plain_paper : String
-thermal_paper : String
-continues_feed_paper : String
-other_paper : String
-other_paper_memo : String
-cartridge_type : String
+savePrinter() : String
+addPrinter() : Integer
+closeConnection() : Integer
+openConnection() : Integer
+find() : Integer
+cancelUpdate() : String
+deletePrinter() : String

scanner
-itemID : Integer
-dpi : Integer
-pc : String
-mac : String
-unix : String
-other_os : String
-other_os_memo : String
-fax : String
-serial : String
-parallel : String
-network : String
-network_memo : String
-usb : String
-other_protocol : String
-other_protocol_memo : String
+saveScanner() : String
+addScanner() : Integer
+closeConnection() : Integer
+addConnection() : Integer
+find() : Integer
+cancelUpdate() : String
+deleteItem() : String

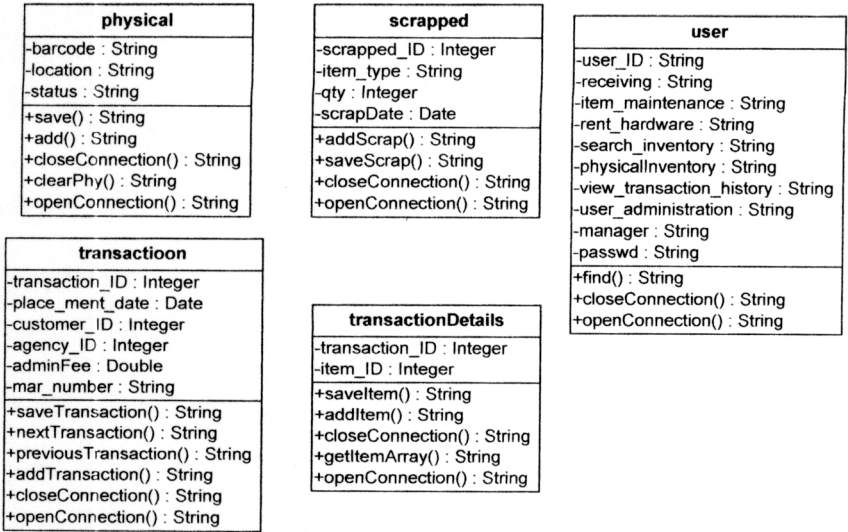


Figure 2: Class Diagram

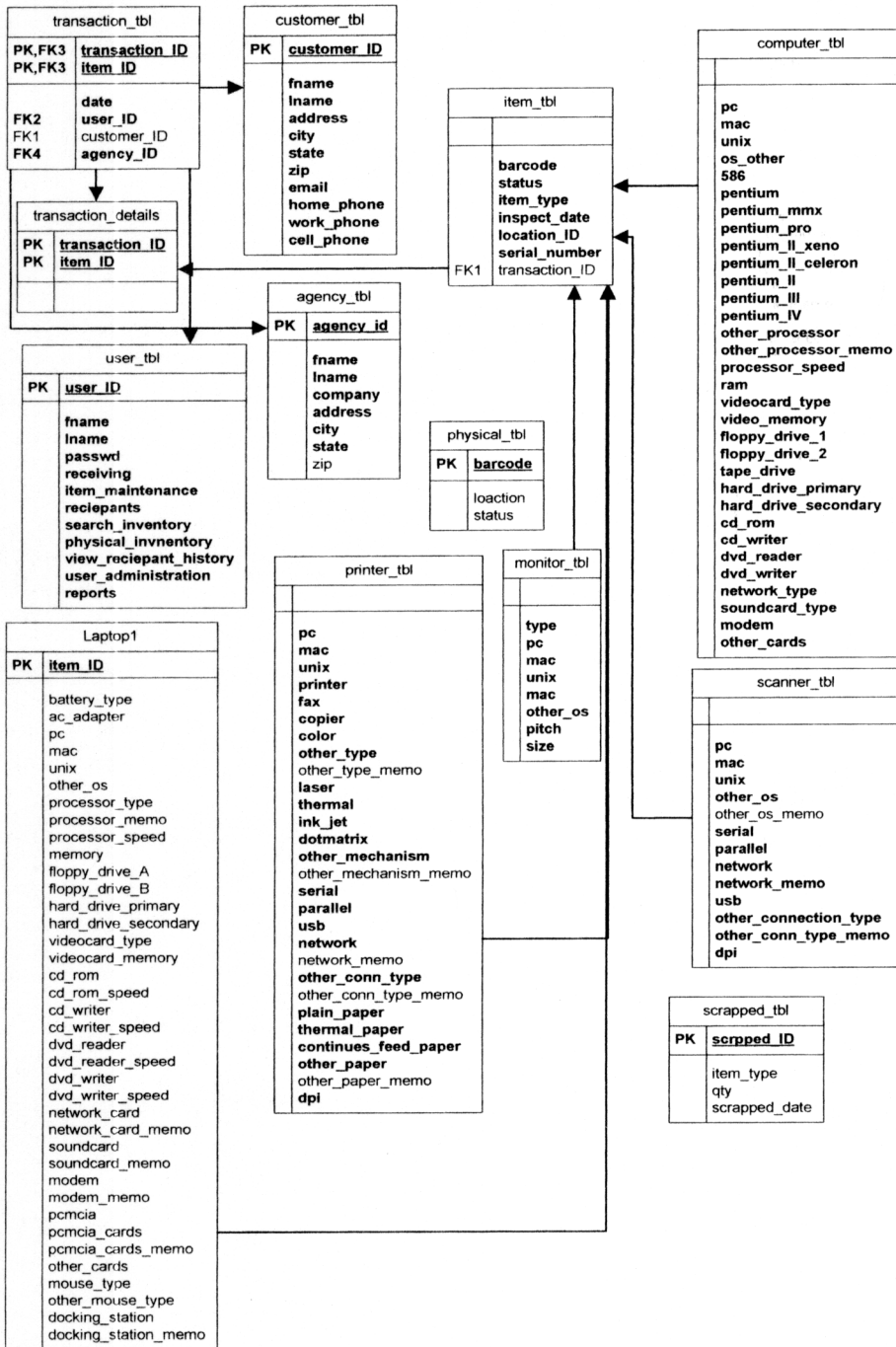


Figure 3: Database Diagram

2.4 User Interface

2.4.1 Interface Design/Navigation

The user will log into the IMS application by entering his/her user ID and password at the login screen. Once the user has logged in, he/she will be able to access all of the features that her/his ID has access to through the main menu. The main menu consists of buttons with descriptive use labels. For a complete navigational diagram, please see Appendix A.

2.4.2 Icons/Graphical Symbols

Two standard buttons that will be on every form in the IMS application are the help and exit button. All of the controls will use a font size of 10, which will also be bold.

2.4.3 Color Schema

All of the frames in the IMS application will be light gray with a blue lining. All of the caption on controls will be black and text boxes will be white with black text.

2.4.4 Help

There is either be a help section which will be accessible from every frame within the IMS application or tool tips. The help button will provide information that will give the user some direction.

3. Deliverables

The IMS solution will consist of the deliverables described below in order to solve the problem that the TAPIN organization is currently experiencing:

1. A back end database
2. Application interface to the database written in Visual Basic 6.0
3. Authentication of receivers, technicians, and operational users.
4. Receiving – This feature will allow the receiver to receive any kind of hardware that is donated to the TAPIN organization.
5. Item Maintenance – This feature will allow technicians to add technical notes after a piece of hardware has been received such as if any parts had to be replaced.
6. Rent Hardware – This feature will allow users to give hardware to a recipient and will track the hardware given, customer information, and the approving agency.

7. Search Inventory – This feature will allow the user to search through inventory that is in stock by picking an item type and then sorting the data grid by various hardware details.
8. Physical Inventory – This will allow for users to scan all of the hardware that is currently in stock and then a report will be generated that will tell the user what pieces of hardware are missing.
9. View Transaction History – This feature will allow the user to search through old transactions.
10. User Administration – This feature will allow administrators to add/modify users of the IMS application.
11. Reports – This feature will allow users to print a report that requested by the IRS yearly regarding information about the transactions that took place throughout the year.

4 Design and Development

4.1 Project Budget

The budget for this project is shown in Figure 6. The first part of the budget includes all of the costs for the resources that will be needed to complete this project. The second part of the budget includes all of the hardware or software that needed to be purchased in order to complete the development of the IMS application which is included in the total cost. Since the TAPIN organization already has all of the licenses and hardware that was needed to complete this project, there will be no cost.

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost
20	Implement Search Inventory	\$0.00	Prorated	\$1,600.00
1	Design Database	\$0.00	Prorated	\$1,400.00
2	Implement Database	\$0.00	Prorated	\$1,400.00
19	Implement Rent Hardware	\$0.00	Prorated	\$1,400.00
3	Design IMS Application	\$0.00	Prorated	\$1,000.00
8	Implement Computer Receiving	\$0.00	Prorated	\$800.00
5	Implement Monitor Receiving	\$0.00	Prorated	\$400.00
6	Implement Scanner Receiving	\$0.00	Prorated	\$400.00
7	Implement Printer Receiving	\$0.00	Prorated	\$400.00
9	Implement Misc Receiving	\$0.00	Prorated	\$400.00
10	Implement Laptop Receiving	\$0.00	Prorated	\$400.00
22	Implement Reports	\$0.00	Prorated	\$400.00
21	Implement Physical Inventory	\$0.00	Prorated	\$350.00
12	Implement Monitor Item Maintenance	\$0.00	Prorated	\$200.00
13	Implement Scanner Item Maintenance	\$0.00	Prorated	\$200.00
14	Implement Printer Maintenance	\$0.00	Prorated	\$200.00
15	Implement Computer Maintenance	\$0.00	Prorated	\$200.00
16	Implement Laptop Maintenance	\$0.00	Prorated	\$200.00
17	Implement Printer Maintenance	\$0.00	Prorated	\$200.00
18	Implement Misc Maintenance	\$0.00	Prorated	\$200.00
		<u>\$0.00</u>		<u>\$11,750.00</u>

Figure 4: Labor Cost

4.2 Project Resources

There are two main resources that are needed during the development phase of the IMS application. The first resource is the developer of the IMS application. He will also perform all of the requirements gathering. The other resource that will be used while creating the prototype for the IMS application will be Dave Grosheim from TAPIN. He will perform some testing and will also be involved in verifying that the IMS application meets all of TAPIN's needs.

4.3 Project Schedule

In order to complete the IMS application, there were several tasks that had to be completed. The milestone tasks included the following:

- Implement Database
- Design IMS Application
- Implement Receiving Use Case
- Implement Item maintenance Use Case
- Implement Rent Hardware Use Case
- Implement Search Inventory Use Case
- Implement Physical Inventory Use Case
- Implement Report Use Case

The baseline project plan is shown in the Figure 5.

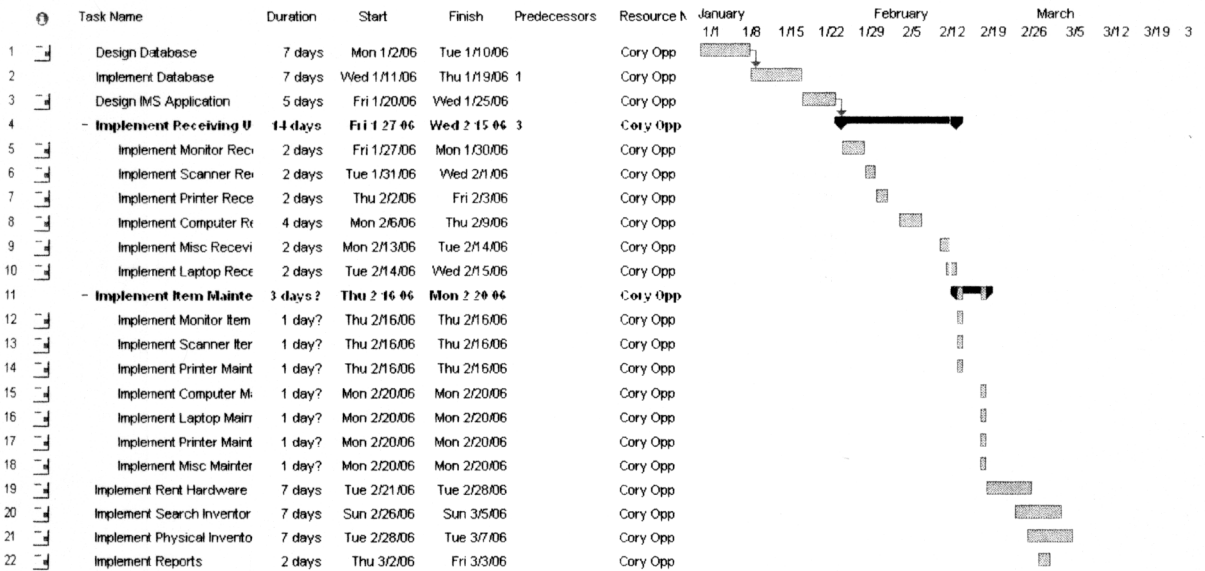


Figure 5: Project Plan

The development of the IMS application ran a little behind schedule because half way through the project we decided to utilize classes for all of the interaction with the database. All of the deliverables were completed. The modified project plan is shown below in Figure 6.

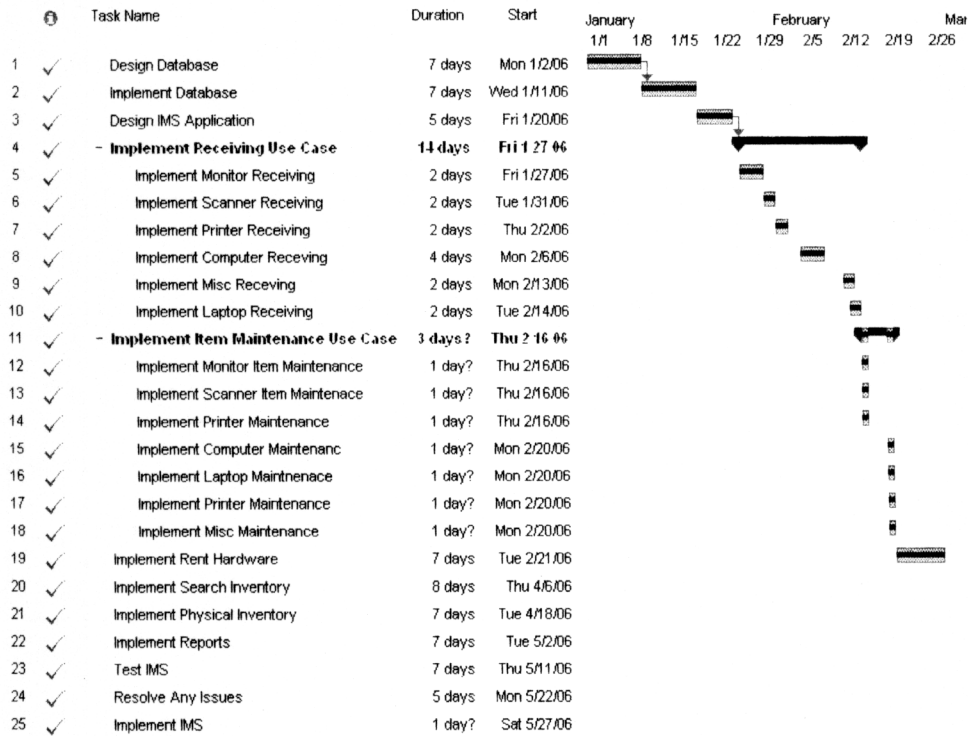


Figure 6: Modified Project Plan

4.4 Software

The IMS application that will be running on the workstations at the TAPIN organization was written in Visual Basic 6.0. Microsoft Access is the database management system utilized by the IMS application. The physical inventory application that was written for the pocket was written in C#. NET as a Smart Device application.

4.5 Hardware

The main IMS application will run on three workstations which already exist at the TAPIN organization. I have personally donated the pocket PC that will run the physical inventory application. I also had to donate a Bluetooth scanner which will be utilized while performing the physical inventory.

5. Proof of Concepts

The login screen for the IMS application is shown below in Figure 7. After the user has logged in, the IMS application will check to see what rights the user should be assigned access to.

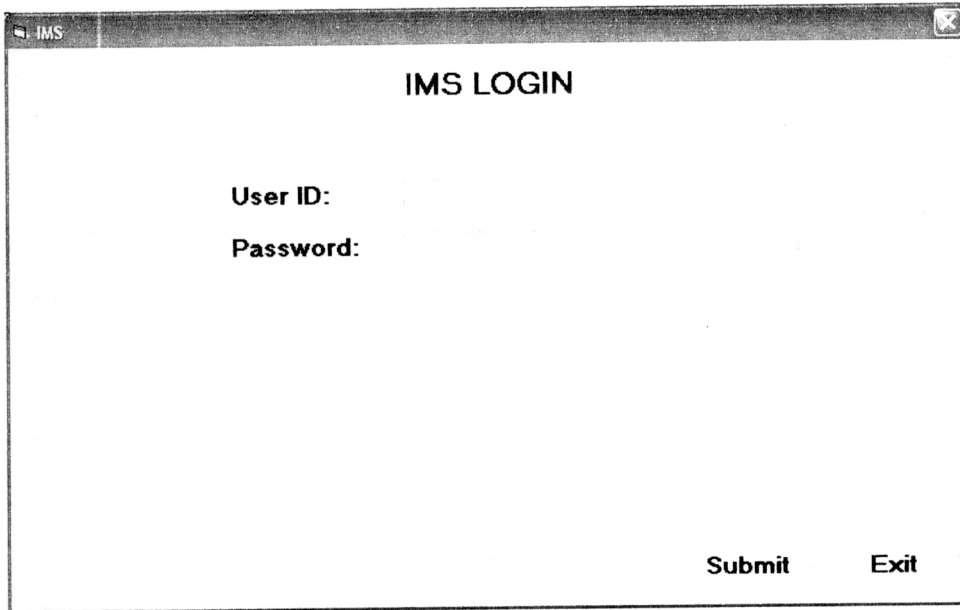
The image shows a screenshot of a web browser window titled "IMS LOGIN". The window has a dark title bar with the text "IMS" on the left and a close button on the right. The main content area is white and contains the following text: "IMS LOGIN" at the top center, "User ID:" followed by a text input field, "Password:" followed by a password input field, and two buttons labeled "Submit" and "Exit" at the bottom right.

Figure 7: IMS Login Screen

After the user has logged in and the appropriate rights have been assigned, the main menu will be displayed as shown in Figure 8. This menu will give the user access to any of the features that have been specified for that user. The options that the user does not have access to will be grayed out.

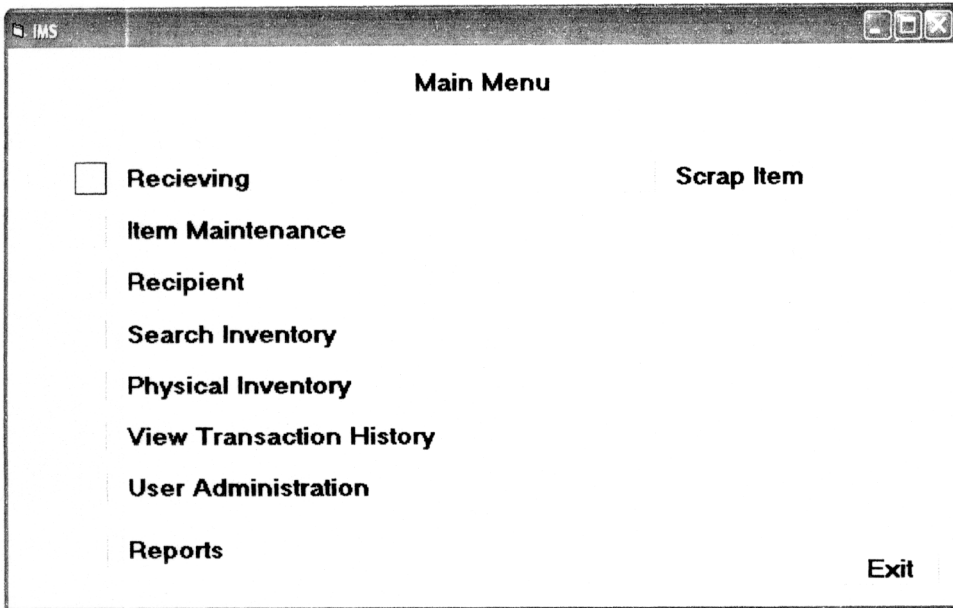


Figure 8: IMS Main Menu

The receivers have access to the following features:

- **Receiving** - This feature allows the receiver to receive the computer hardware that is donated. The receiving screen is shown in Figure 9 below.

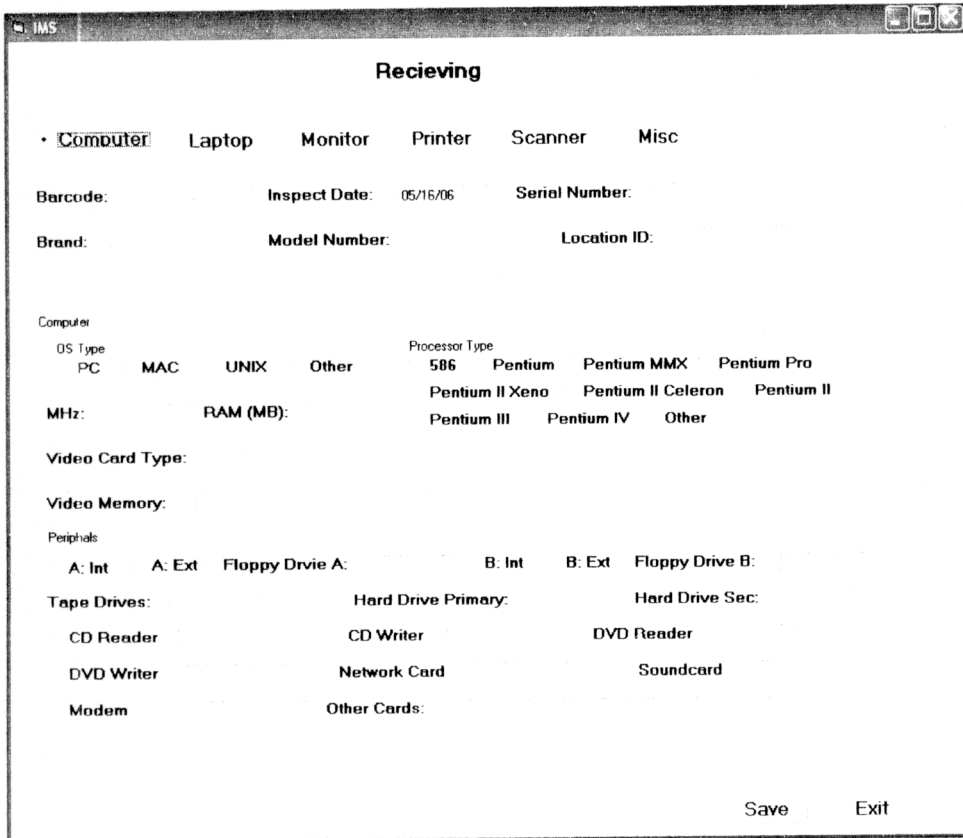


Figure 9: Receiving Screen

The technicians have access to the following features:

- **Item Maintenance** - The item maintenance feature allows technicians to add information regarding the item such as if any parts need to be replaced or added. The technician will also manage the item status by stating that the item has been fully tested and works fine. In the item maintenance feature the technician will scan the barcode of the item they wish to modify and the screen will display as in Figure 10 below.

is being distributed. The user can either scan in the barcode or perform a search which will link to the search inventory feature. The recipient screen is shown below in Figure 11.

Recipient

Customer Information

First Name Steve **Last Name** Mitchell **Email** smitchell@fuse.net

Address 1 promont ct **City** test **State** ▼ **Zip** 45245

Home Phone 513-576-1160 **Work Phone** 513-256-2551 **Cell Phone** 513-702-7309

Entity **MAR Number**

Previous **Next** **Search** **Add** **Edit**

Agency Information

First Name Opp **Last Name** Opp **Entity** Kroger

Address 4028 Wilma Ct **City** cincinnati **State** oh ▼ **Zip** 45245

Position Customer Service **Email** cory.opp@kroger.com

Home Phone 513-752-7170 **Work Phone** 513-762-4874 **Cell Phone** 513-256-2406

Previous **Next** **Save** **Cancel** **Search** **Add** **Edit**

Transaction Information

Placement Date **Admin Fee**

Barcode

barcode	brand	model number	item type
55588	hp	m50	Monitor

Search Inventory

Save **Exit**

Figure 11: Rent Hardware Screen

Search Inventory - This feature will allow the operational user to search the in-stock inventory based on item type. Once an item type has been selected, a table will be generated which can be sorted by any column. This feature makes it very easy to find

items that meet a family's needs. An example of a search by computer is shown below in Figure 12.

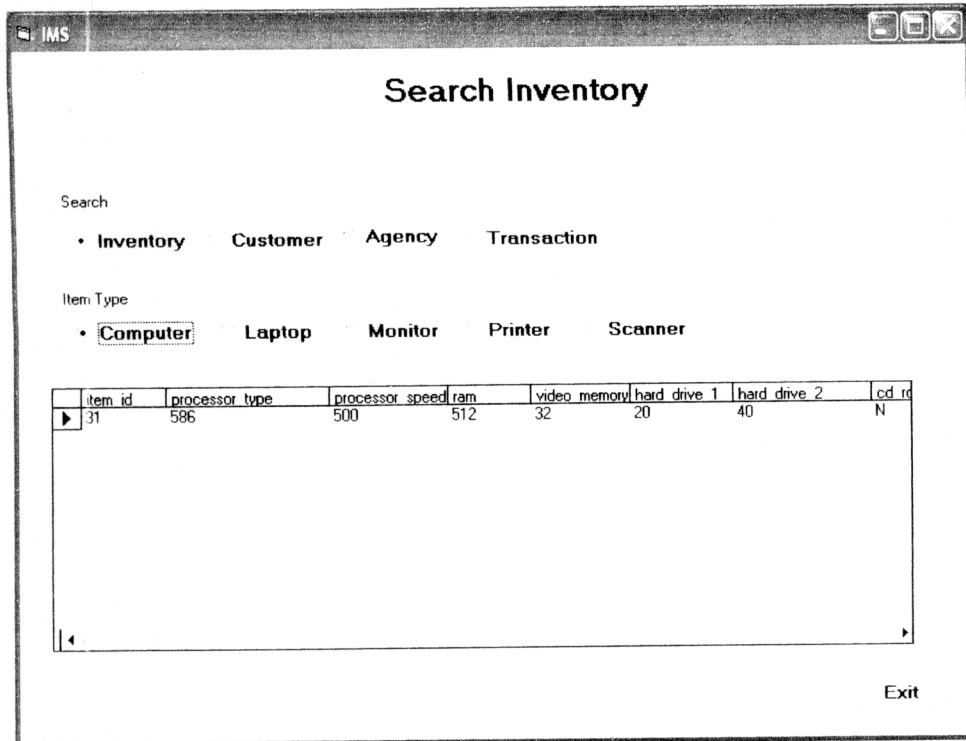


Figure 12: Search Item

- **Physical Inventory** - This feature will copy data off of the pocket PC which contains the barcode and location ID of all the items that were scanned in the warehouse. After the data has been copied, this feature will compare the items that were scanned to what is currently in the database, and then it will generate a report containing all of the items that were unaccounted for.
- **View Transaction History** – The view transaction history feature will allow the users to search transaction history based on customer information or agency information.

- **User Administration** - User administration is the feature that the operational user can use to create or edit users. In this screen, the operational user can define or edit the access permissions and reset the password for all users. The user administration screen is shown below in Figure 13.

The screenshot shows a window titled "IMS" with a main heading "User Administration". Below the heading, there are three input fields: "User ID:" with the value "bppcm", "First Name:" with the value "cory", and "Last Name:" with the value "opp". To the right of these fields are two buttons: "Add" and "Edit". Below these fields are two columns: "Available Permissions" and "Selected Permissions". At the bottom of the window, there are three buttons: "Previous", "Next", and "Exit".

Figure 13: User Administration

- **Reports** – There will be two reports that can be generated out of the IMS application. The first is the transaction history report which is required by the IRS on a yearly basis. This report will include the following information:
 - Placement date
 - Approving agency – full address, first name, last name, position, and company
 - Item – barcode, model number, serial number, and item type

- Recipient – first name and last name

The second report will be a scrapped item report which will contain information regarding the computers that were scrapped.

6. Conclusions and Recommendations

The development phase for the IMS application has been completed. After the IMS application was completely developed, the test plan described in section 6.1 was completed. I have learned a lot about project planning, requirements gathering, and software development throughout this project. The TAPIN organization has started to use the IMS application and as of right now they are very happy with it. I have also offered to continue to maintain the system even after I graduated. I will be starting to write a time tracking application for the TAPIN organization in a couple of months.

6.1 Testing

A test plan for each of the use cases described above has been developed to ensure that the IMS application fulfills all of the needs of the TAPIN organization. The test plans for each use case are described below.

Login:

Action	Expected Results	Actual Results
Type in a user name that has not been defined in the IMS application.	Receive a message stating that the user name you typed in is not a valid user.	
Type in a valid user ID but type in the wrong password.	Receive a message stating that the password was incorrect.	

Type in a valid user ID and password.	Main menu will display	
---------------------------------------	------------------------	--

Receiving:

Action	Expected Results	Actual Results
Select the receiving option from the main menu of the IMS application	The receiving screen will display with computer selected by default	
Enter in all of the appropriate information for the computer being received, but enter a letter for the primary hard drive space. Now press the save button	Should receive a message stating that the hard drive field should be numeric.	
Change the primary hard drive space to a number and press the save button.	N/A	

Item Maintenance:

Action	Expected Results	Actual Results
Select the item maintenance option from the main menu of the IMS application.	The item maintenance screen will display.	
Enter in the first barcode and then press the tab key.	The information regarding the item that you entered will display	
Now click the tech notes tab to enter in the technician notes.	The tab should give you text boxes to fill in regarding technical information such as problems and tech who worked on the product.	
Enter the tech notes and press the save button	N/A	

Recipient:

Action	Expected Results	Actual Results
Select the recipient option from the main menu of the IMS application.	The recipient screen should display.	
Click the next or previous button until you find the customer that you want to give a computer to.	The customer information should automatically fill in	
Click the next or previous button	The agency information should	

until you find the approving agency.	automatically fill in	
Scan in the items that you are giving to the customer	As you scan in the items the data grid should populate with information regarding the hardware that you are giving out.	
Press the save transaction Button		

View Transaction History

Action	Expected Results	Actual Results
Select the view transaction history option from the main menu of the IMS application.	The view transaction history screen should display.	
Double click the transaction that you wish to view	The transaction information should be displayed	

User Administration

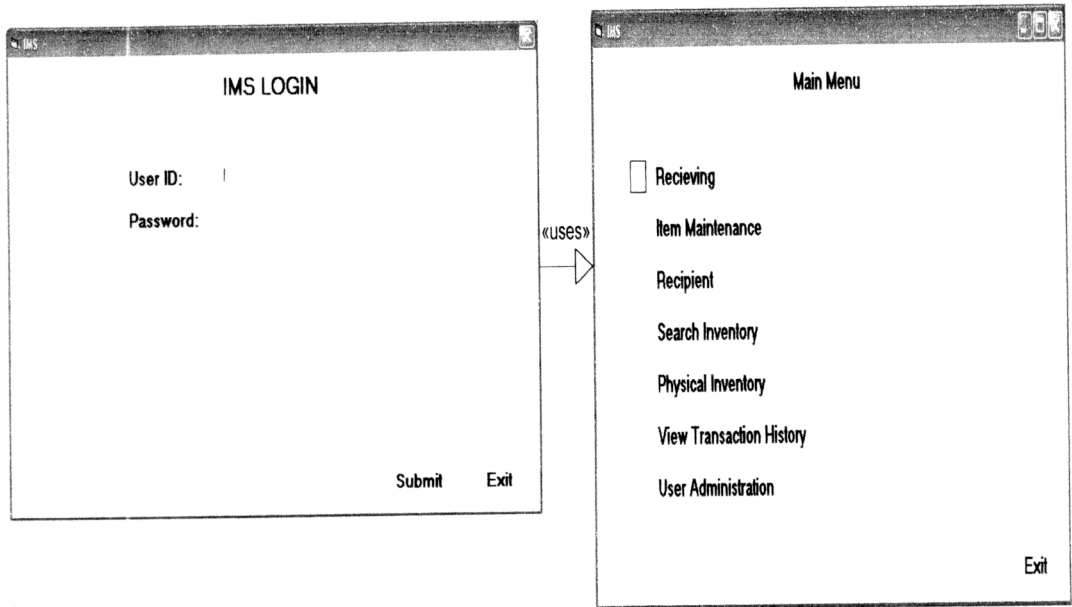
Action	Expected Results	Actual Results
Select the user administration option from the main menu of the IMS application.	The user administration should display with the first user displayed.	
Select the add option to add a new user	All of the text boxes should be blanked out and the all of the permissions should go back to available permissions.	
Type in the new users information and select the appropriate permissions and then click save.	N/A	
Press the exit button twice	You should exit out of the IMS application	
Log into the IMS application using the ID that you just created and use startup as your password	You should be prompted to change your password.	
Enter in your new password twice.	The main menu should display with appropriate features enabled.	

References

- 1) Grosheim, Dave. President, TAPIN.
Personal Interview. October 22, 2005.
- 2) Larman, Craig. Applying UML and Patterns. New Jersey: Pearson Education, 2005.

Appendix A

Login/Main Menu



Receiving- Accessed from the main menu.

Receiving

Computer Laptop **Monitor** Printer Scanner

Barcode: Inspect Date: Serial Number:

Brand: Model Number: Location ID:

Computer

OS Type: Processor Type: 586 Pentium MMX Pentium Pro

PC MAC UNIX Other Pentium II Xeon Pentium II Celeron Pentium II

MB: RAM (MB): Pentium III Pentium IV Other

Video Card Type:

Video Memory

Ports:

A: Int A: Ext Floppy Drive A: B: Int B: Ext Floppy Drive B:

Tape Drives: Hard Drive Primary: Hard Drive Sec:

CD Reader CD Writer DVD Reader

DVD Writer Network Card Soundcard

Modem

Other Cards:

Save Exit

extends

Receiving

Computer Laptop **Monitor** Printer Scanner

Barcode: Inspect Date: Serial Number:

Brand: Model Number: Location ID:

Laptop

Battery Type AC Adapter OS Type: PC MAC Unix Other

Processor Type: 286 486 586 Pentium MMX Pentium Pro Pentium MMX Pentium III Pentium III Xeon Pentium III Celeron Pentium III

Floppy Drive A: Floppy Drive B: RAM MB:

Hard Drive Primary: Hard Drive Secondary:

Video Card Type: Video Memory:

Other Processor:

Ports:

CD Floppy CD Writer DVD Reader Modem DVD Writer

Network Card Soundcard Other Cards:

Mouse Type: Mouse Stick Glide Track Ball None Other

Docking Station

Save Exit

extends

Receiving

Computer Laptop **Monitor** Printer Scanner

Barcode: Inspect Date: Serial Number:

Brand: Model Number: Location ID:

Monitor

Monitor Type:

PC MAC UNIX OTHER

Pitch: Size:

Save Exit

extends

Receiving

Computer Laptop **Monitor** Printer Scanner

Barcode: Inspect Date: Serial Number:

Brand: Model Number: Location ID:

Printer

Printer Type:

Compatible OS: PC MAC UNIX Other

Printer Capabilities: Printer Fax Copier Color Other

Printer Type: Laser Thermal Ink Jet Dye Sub Other Mechanism

Printer Connection Type: Serial Parallel USB Network Phone Other

Paper Type: Plain Paper Thermal Paper Continuous Feed Paper Other

DPI Cartridge Type:

Save Exit

Receiving

Computer Laptop Monitor Printer Scanner

Barcode: 469 Inspect Date: 1/30/2006 Serial Number: 888888

Brand: Clone Model Number: 564 Location ID: 44

Item Specification Technician Notes

Console

OS Type: PC Processor Type: 585 Pentium Pentium MMX Pentium Pro
 MAC UNDX Other Pentium II Xeon Pentium II Celeron Pentium II
 MHz: 2 RAM (MB): 768 Pentium III Pentium IV Other

Video Card Type: All

Video Memory: 32

Peripherals

A: Int A: Ext Floppy Drive A: TEAC D: Int D: Ext Floppy Drive B:

Tape Drives: N/A Hard Drive Primary: 20 Hard Drive Sec: 80

CD Reader: 52 CD Writer: 52 DVD Reader: 8

DVD Writer: 8 Network Card: 3.com Soundcard

Modem Other Cards

Save Exit

Receiving

Barcode: 469 Inspect Date: 1/30/2006 Serial Number: 888888

Brand: Clone Model Number: 564 Location ID: 44

Item Specification Technician Notes

Technician Note:

What Problem Does it have:

test

Parts Replaced/Used

Finished Scrapped Out

Cost of Repairs: 55

Save Exit

«extends»

Recipient- Accessed from the main menu

Recipient

Customer Information

First Name: Steve Last Name: Mitchell Email: smitchell@fuse.net

Address: 1 promont ct City: test State: Zip: 45245

Home Phone: 513-576-1160 Work Phone: 513-256-2551 Cell Phone: 513-702-7309

Previous Next Add Edit

Agency Information

First Name: Opp Last Name: Opp Company: Kroger

Address: 4028 Wilma Ct City: cincinnati State: oh Zip: 45245

Position: Customer Service

Previous Next Save Cancel Add Edit

Transaction Information

Placement Date Admin Fee

Barcode

barcode	brand	model number	item type
4458	Samsung	7805	Monitor
4459	Clone	564	Computer

Previous Next Save Exit

View Recipient- Accessed from main menu

Form1

Recipient

Customer Information

First Name Steve **Last Name** Mitchell **Email** smitchell@fuse.net

Address 1 promont ct **City** test **State** **Zip** 45245

Home Phone 513-575-1160 **Work Phone** 513-256-2551 **Cell Phone** 513-702-7309

Previous **Next** **Add** **Edit**

Agency Information

First Name Opp **Last Name** Opp **Company** Kroger

Address 4038 Wilma Ct **City** Cincinnati **State** oh **Zip** 45245

Position Customer Service

Previous **Next** **Save** **Cancel** **Add** **Edit**

Transaction Information

Placement Date **Admin Fee**

Barcode 4458

barcode	brand	model number	item type
4458	Samsung	700S	Monitor

Save **Exit**

User Administration- Accessed from the main menu

IMS

User Administration

User ID: jppcm **Add**

First Name: cogy **Edit**

Last Name: opp

Available Permissions **Selected Permissions**

Previous **Next** **Exit**