Painter's DataBase version 1

By

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Acknowledgements

I would like to state that I think this has been a great learning experience. I have utilized most all of the teachings that were covered here in my curriculum at OCAS in IET. Through the completion of this project I have refreshed, reinforced, and expanded on most all of my previously learned knowledge. All this effort has come together to form a truly impressive program. Thank you, IET faculty for giving me this opportunity.

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Abstract

The use of databases for tracking and analyzing data has been proven useful in all aspects of the business world. One particular aspect, the small or home based business, is in need of an all-inclusive straightforward application that is stable enough to depend on for every day business needs.

The solution application outlined here is called Painter's Database v1.0 (PDB1). PDB1 gives a novice user the ability to construct and maintain a databases through the use of Graphic User Interfaces.

Painter's DataBase version 1

1. Statement of the problem

When running a small or home-based business information about customers, jobs, materials, and employees need to be tracked and updated constantly. Combinations of this data must be compiled and formatted in a way that is meaningful to a manager. Everyday business tasks that entail a wide array of individual issues also containing multiple sub-issues could benefit from a database. Without the use of a database application details about the customer may have to be entered in several times just to complete one business transaction. On the backend, the same theory applies to employees, jobs and materials. This is an area of business where the implementation of a database driven application like the Bainter's Database version one(PDB1) can be useful.

While any small business can benefit from a database driven application. My efforts are directed towards a painting/remodeling business because I have experienced the lack of organization in this field firsthand.

2. Research

In order to better understand the need for PDB1 a survey was conducted of representatives from 21 local painting contractors to see what they were currently using in place of PDB1. The following charts express the findings of this survey.

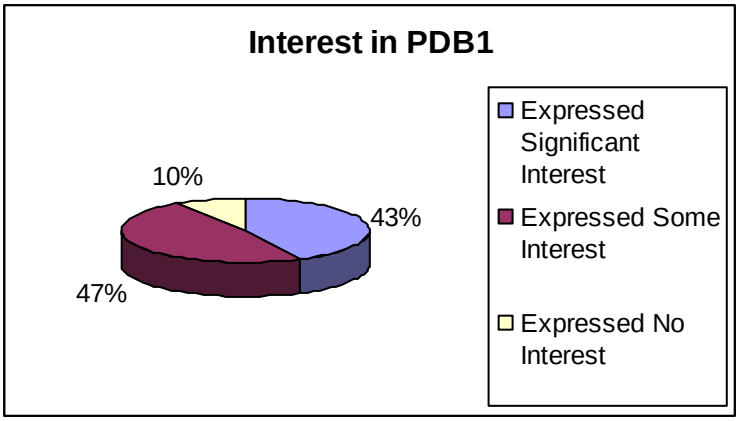

Figure 1. Results of the survey conducted for this project when asked about their interest in this type of program.

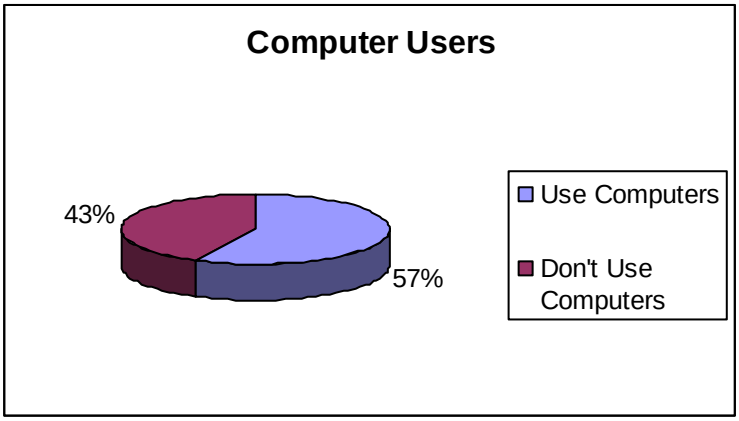

Figure 2. Expresses the overall amount of computer users in the survey.

There are several painting/remodeling businesses in the greater Cincinnati area that are currently operating without the benefits of any computer at all. Most companies use computers to aid in tedious data-related tasks and for composition of professional looking proposals and invoices. Several businesses use Microsoft Word only. Many small business owners are using Quicken software.

The survey illustrates dissatisfaction with the current software. The complaints range from installation problems to lack of user friendliness. The Web site Planet Feedback (17) supports these findings further. On a scale from A to F the users of Intuit's Quicken line of products rate them at a C- level. Sixty-six percent of the complaints deal with product quality while the other thirty-three percent is due to insufficient customer service.

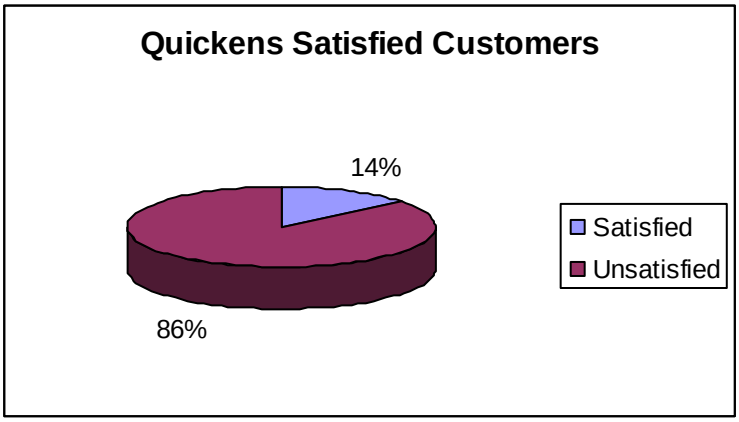

Figure 3. Results of the survey conducted for this project when asked about their satisfaction with Quicken.

3. Description of the Solution

PDB1 is an application that allows for users to track all aspects of data related to a small painting business. Once the data is entered into the database it can be searched on, sorted, formatted, related to other records and printed.

One area PDB1 handles is customers. All customer activity, past, present, and future, is traced by the application. Customer data, such as name, address, and phone number is stored and indexed in a database to allow for ease of tracking and modification.

Another area addressed by PDB1 is employees. Hours accumulated weekly, total hours, pay rate, schedule, address, name, and social security number are some of the things tracked in the employee area of the application.

Keeping track of jobs is also made easier with the use of PDB1. It tracks current job timelines and progress. When jobs are finished they are catalogued and their data is indexed. PDB1 also handles scheduling of future jobs. Materials and tools used on a job are tracked to ensure productivity and cut down on overhead from lost equipment.

An overall account of supplies is also accounted for by a section of the application. An updated list of leftover supplies can be useful, and knowing what equipment one has at their disposal also makes planning a job easier.

The application also generates printable reports. PDB1 enables it's user to generate reports dealing with all aspects of the job that pool information from one or more sections of the application at the touch of a button.

3.1 User Profile

There are two characteristics for user profiles : general computer skills and knowledge of databases. General computer skills represent a user's overall ability to interact with the computer, such as being able to use the mouse or keyboard, run a particular piece of software, and follow on screen prompts. Knowledge of databases is more complicated. It deals more with a user's understanding of database topics like tables, entries, or relationships. Extent of database knowledge is most easily related to a user's amount of experience dealing with a database.

The first implementation of PDB1 was conducted with the Tedesco Remodeling Company. Here there are two primary users who are both fairly proficient with computers. One user, Chris Tedesco, the owner/operator of the business, has a general knowledge of computers. On a scale of one to ten, one being a beginner and ten being professional, Chris rates around seven. The other user Jan, Chris's office assistant, would rate a five on that same scale.

Experience with databases, although helpful, is not a requirement for using PDB1. A user who has little experience with relational databases may find it more difficult to understand what is going on in the background of the software, but they are still be able to use it efficiently. This is due to the relationships that have been predetermined and presented to a user in a way that they do not have to understand all the actions taking place to effectively accomplish a task.

PDB1 is written so that anyone with an average level (four or better) of computer knowledge can use it. The more comfortable the user is with computers the more likely they are to find the software self-explanatory.

3.2 Design Protocol

3.2.1 Organizational Scheme

The organizational scheme behind this program has changed several times since the beginning of the project. The tables and relationships that the database is built on have came through several phases. These phases were triggered by entering new stages of development. When the project began it had seven tables and six relationships. The tables were Client, Job, Hours, JobDetails, Equipment, and Material. The Client table housed various information dealing with clients such as their name, address, and phone number. The Job table had only four fields at this time, Job ID, Client ID, StartDate and EndDate. This table served as the main intersection table connecting the Clients table to both the JobDetails and Hours table. The Hours table had two important fields that enabled it to connect the Job and Employee table. It also contained other fields pertaining to job specific employee data, for instance how many hours an employee worked on a certain day at a particular job. The Employee table held fields pertaining to the employee like name, address, social security number, and phone number There were also two other tables that dealt with equipment and materials that followed this same format. These two tables were connected to the job table via the JobDetails table. This was just a base to start with and was always expected to grow.

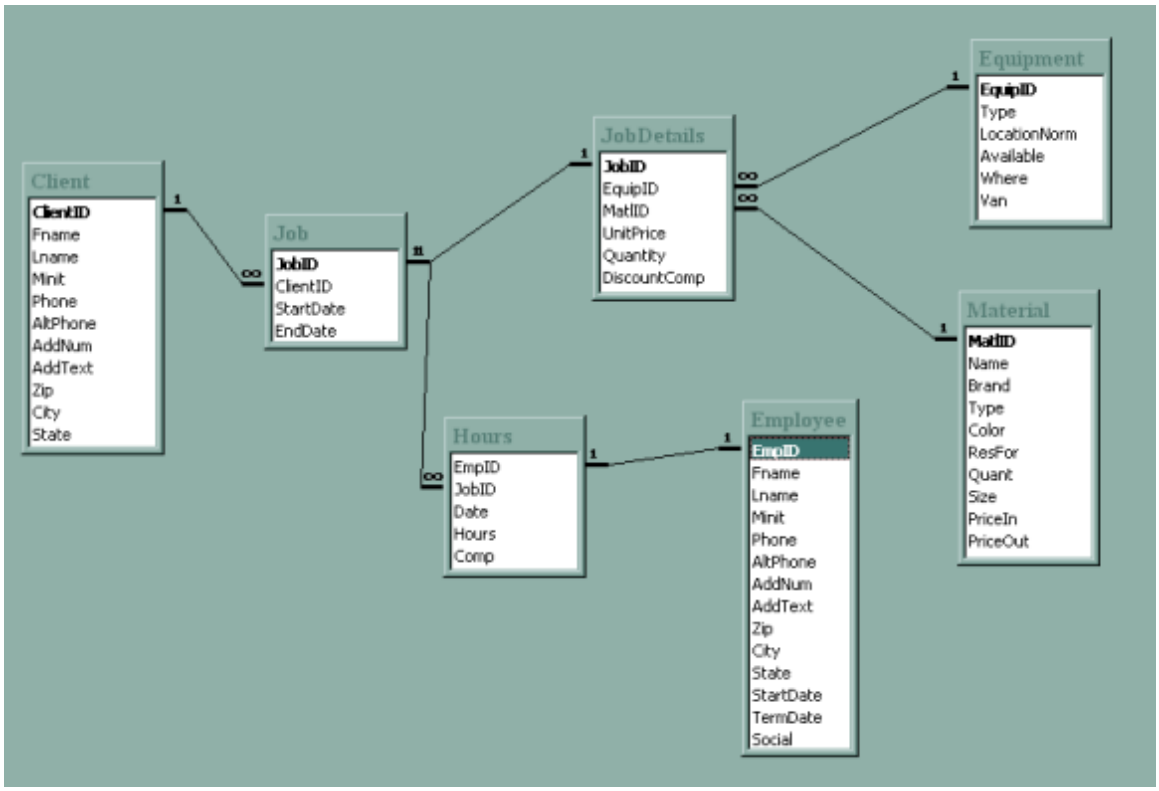

Figure 4. Relationship diagram st beginning of project.

Once the development of form layout was addressed the organizational scheme became a bit more complicated. As flow of the program began to come into focus some changes were needed to better match the layout and relationships of the tables to that of the forms. At this stage in development there were ten tables and nine relationships. The new layout, as before, had the Job table residing in the center serving as the main hub to which all other tables ultimately ended up relating. All the previously constructed tables gained more fields which further described their objects. The new tables were intersection tables that aided in linking everything else to the job table. An increase in relationships came from the increase of tables. At this point the evolution of the table configuration stopped.

This is what the tables and their relationships look like now. Once in the code writing stage of development, changes to the names of the fields used were made. Prefixes were added in order to simplify the code that handles their interactions.

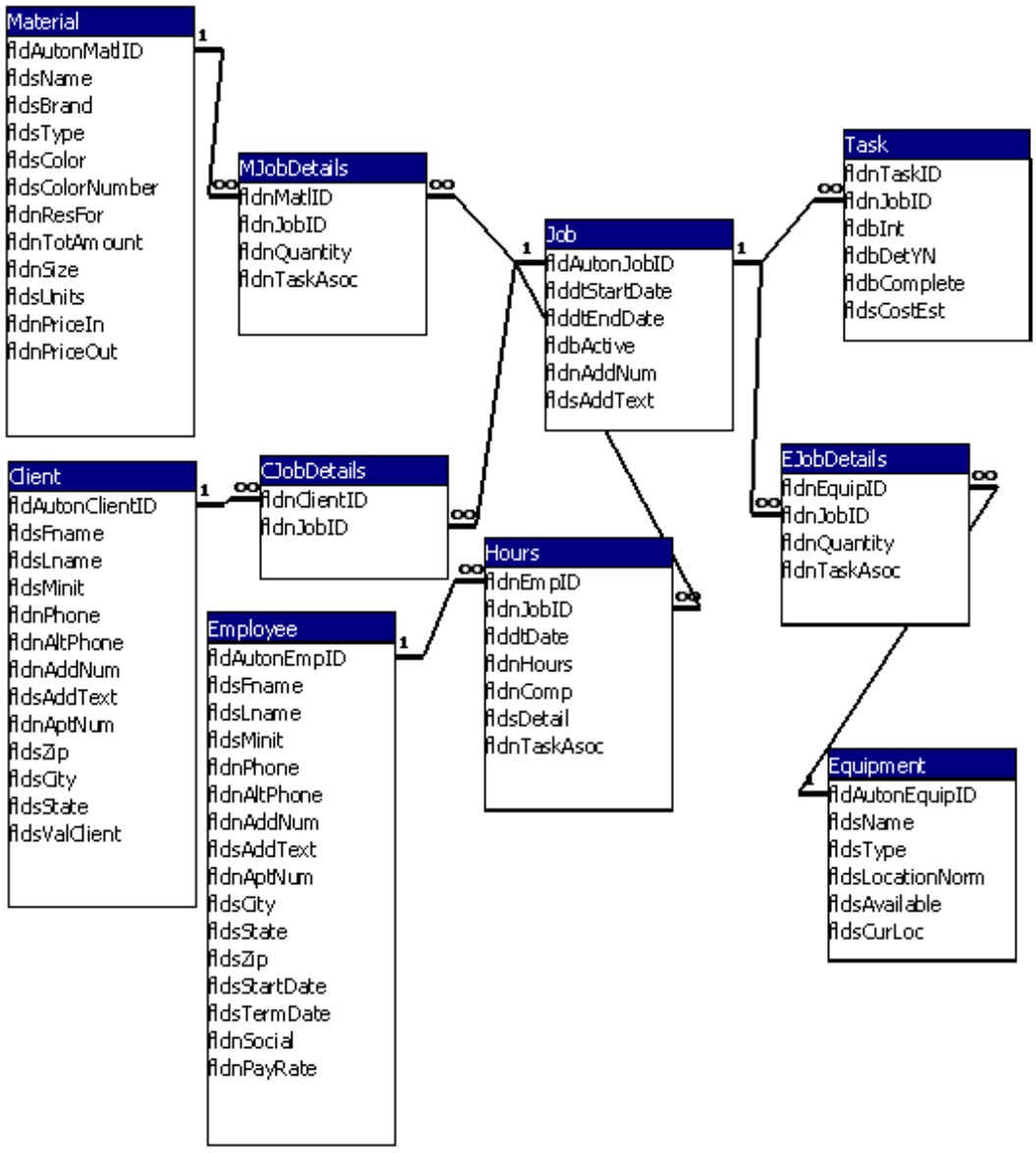

Figure 5. Final design of the Data Base.

The code behind the project also exhibited a few changes over the course of development. At first, the code was built on a, “make it work” philosophy. As things began to come together, concentration was shifted toward making the code more modular. Once a modular design was achieved the program became more efficient, and the code became easier to work with.

Modular Jet Database code is responsible for getting the data into the database. After that ActiveX Data Objects are used for the database interactions such as querying and the building of record sets. Data Grid controls are used to display the records. This control enables users to select the records for manipulation and to relate them. The relationships are built and maintained by Visual Basic code and rules set up in the Access database. Microsoft Access Objects are used to control the displaying and printing of the reports.

3.2.2 Interface Design

In the original design layout there were too many forms being used to accomplish what were essentially one step tasks. For example to enter a record and then edit it the user would have to open and shut separate forms. In the new form layout PDB1 does all this from the same form, without leaving in between. This one form now handles the entry, display, update, and delete commands dealing with the client related data.

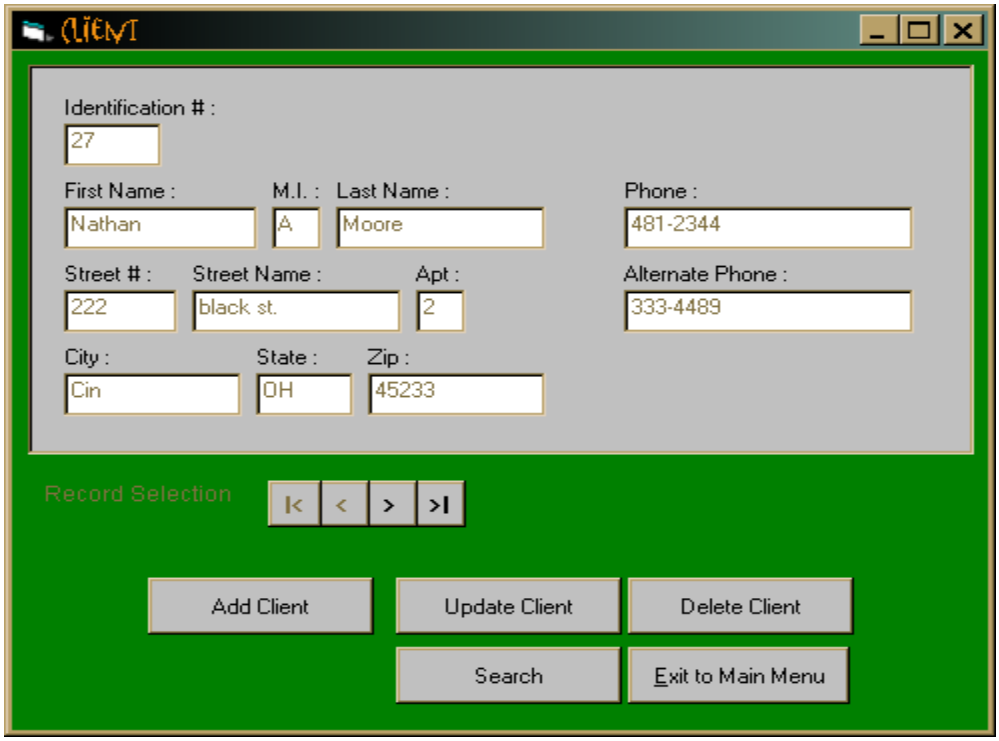

Figure 6. Multipurpose form in the program.

The other forms in the program; employees, equipment, and materials went through the same changes as this one.

3.2.3 Visual Aspects

Standard Visual Basic forms and icons have been utilized to keep a general 'windows environment' feel to the software. If the user feels that the software is somewhat related to other software they have previously used, they are more likely to be comfortable using the software. PDB1 also allows the user to customize the background graphic used on the start up page.

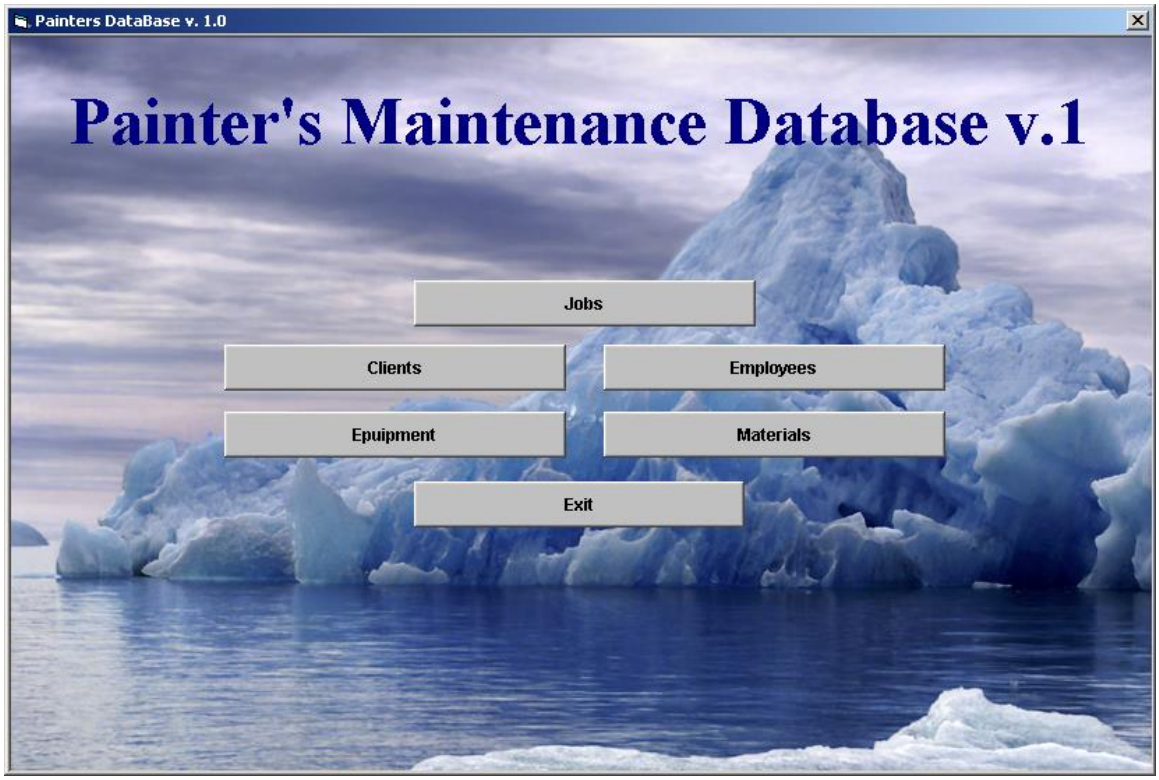

Figure 7. Main, or start up page in the program.

PDB1 is used primarily for the manipulation and display of data on a screen, the format of colors used reflects this. Background colors were chosen from the darker end

of the spectrum and are complemented by the lighter brighter text used in the foreground. This format is used in order to ease tension on the eyes of the user while examining the data on screen.

4. Objectives of this Project

With the use of PDB1 the user is able to manage all of the data dealing with employees, equipment, materials, and clients as they relate to a particular job. Records are displayed on the screen, for viewing or editing.

One is able to:

1. Enter
2. Modify
3. Delete
4. Sort

The software also allows the user to search for specific records by entering a piece of data common to that data set. All fields on the entry form are searchable.

Examples of these fields are:

1. Last Name
2. Social Security Number
3. Phone
4. City
5. State
6. Zip Code

Users also have options for generating reports which are previewed on the screen and then printed.

Examples of these reports are:

1. Task Lists
2. Employee Schedule
3. Equipment Lists
4. Materials Lists
5. Overall Job Report (encompassing all of the above)

5. Design and Development

5.1 Budget

SOFTWARE	
Microsoft Visual Basic 6.01	**$487.99**
Microsoft Access 2000	**$298.99**
HARDWARE	
Dell Dimension L Series	**$989.00**
TOTAL:	**$1776.00**

The University of Cincinnati provided the software used in the development of this project. Through an agreement with Microsoft the Developers Software Package containing MS Visual Basic and MS Office 2000 which includes Access was attained by signing a, 'rights of use' agreement and checking the disks out of the library.

I provided the hardware used for the development of this project. The system priced above is the most basic level computer one would want to use to build this program. The system used to develop PDB1 is one equivalent to this one that I purchased a year ago for just under two thousand dollars.

5.2 Timeline

1st Quarter: (Proposal)

First Three Weeks	Find a Topic
Next Four Weeks	Research
Next Two Weeks	Compose Proposal
Last Week of Quarter 1	Present Proposal

2nd Quarter: (Design Freeze)

Back end Design:	
Start Tables and Relationships	Jan. 18, 2001
Complete Tables and Relationships	Jan. 25, 2001
Front End Design:	
Start Pseudo-code/flow Development	Jan. 25, 2001
Complete Pseudo-code/flow Development	Feb. 8, 2001
Start Forms Development	Feb. 1, 2001
Start Coding to Connect to D.B.	Feb. 8, 2001
Complete Working Prototype (to predetermined extent for 2nd quarter design freeze)	Mar. 2, 2001
Other Related Tasks:	
Complete Progress Report #1	Jan. 25, 2001
Complete Progress Report #2	Mar 1, 2001
Start Design Freeze Composition	Feb. 8, 2001
Complete Design Freeze Document (Rough Draft)	Feb. 15, 2001
Complete Design Freeze Document (Final Draft)	Mar. 2, 2001

Start Presentation Composition	Mar. 2, 2001
Give Presentation	Mar. 15, 2001
Third Quarter: (Wrap Up)	
Tables, Form Structure, Flow (Finishing Touches)	Mar 26, 2001
Complete Tables, Form Structure, Flow	May 15, 2001
Start Development of Reports	May 15, 2001
Implementation	May. 17 – 19, 2001
Users Evaluation	May 20, 2001
Complete Working Application	May 30, 2001
Evaluation Completed	May 31, 2001

5.3 Hardware and Software

The hardware needed for the completion of this project was a basic computer. The specifications here represent a computer package from Dell (4) including a 40 GB hard drive and an 800 Megahertz Pentium III processor. The package includes Microsoft Windows 98 and Office 2000 software, including Access. The only other software needed is Visual Basic 6.0.

6. Proof of Design.

The software used in the development of this program is the best available on the market at this time. Microsoft Access 2000 is the newest innovation in database programming. The only other software that is even to be compared to it is Microsoft SQL Server. Access was used for this program because the size limitations are appropriate for the size of the database. Microsoft SQL Server has the ability to control 32,767 databases each having a maximum size of 1,048,516TB(26). This is way too much for PDB1. Access's maximum database size is limited to 2 gigabytes(24). This is more than enough for what this program is intended to be used for.

Visual Basic 6.0 is also the newest developer tool of it's kind. The Object Oriented Programming(OOP) structure used by Visual Basic is one of the most widely accepted methods of programming in use today. It allows the programmer to build objects that can be used over and over in other applications. This application was developed with the thought that it may go on to be used in an implementation other than the initial one at Tedesco Remodeling. The OOP capabilities offered by Visual Basic make it the perfect programming language for the development of PDB1.

7. Conclusions and Recommendations

The PDB1 program is a great success. It helps to solve the problems a small business owner would face when maintaining a home-based business. The friendly GUI interfaces and search capabilities make it an easy and efficient tool to use. "The familiar format and self explanatory layout make it a very powerful piece of software," states the company owner Chris Tedesco, "The way it walks you through step by step it makes data upkeep easy."

One recommendation for further improvement on the PDB1 program is Web functionality. At the beginning of the project, this was an aspect that was originally intended on being covered. There were several factors that impeded the completion of this task. One, a lack of knowledge in this area. HTML is not the most focused on language in the IET curriculum at this time, so classroom experience with it was minimal. Two, a lack of opportunity to use and hone this knowledge. Co-Op terms have given an opportunity to practice using Visual Basic and database managing skills in the work world, but not HTML. Finally three, the mismanagement of time. As the project due date drew near, a decision was made. For the sake of the rest of the functionality of the program the only choice left was to postpone the Web functionality until Painter's Database version 2.

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