Time and Project Management System

By

Paul Deffinger

Submitted to
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

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Paul Deffinger — 3-8-05
Paul Deffinger — Date

Hazem Said — 3/8/05
Dr. Hazem Said, Faculty Advisor — Date

James F. Sullivan — 9 March, 2005
James F. Sullivan, Department Head — Date

Acknowledgements

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Abstract

The Time and Project Management Solution is a desktop application designed to allow for easy tracking of employee time and project information for Brigger and Associates, Inc. The companies current method of tracking this information utilizes a paper medium along with multiple, static Microsoft Excel spreadsheets. This method consumes several man-hours and causes difficulties and inconsistencies. Brigger and Associates, Inc. requested that a solution be designed utilizing new programming capabilities and a relational database design. The GUI portion of the solution is written in VB.Net and is based on the existing paper format and incorporates design elements used in many Microsoft applications to provide users with a familiar visual design and navigation scheme. The database portion of the solution, designed in MS Access, allows for easy data storage, recall, and backup. Overall, the Time and Project Management Solution saves the company time and money and provides efficiency and consistency to time and project tracking and reporting.

1. Product Description and Intended Use

The Time and Project Management Application will combine several aspects of project management (budgeting, scheduling, reporting, time tracking, and others) and allow them to be easily updated and monitored in a central location. This location is an Access database that contains all employee information (name, pay rate, scheduled tasks, time entries, trip reports, and passwords) and project information (project schedule, company names, project budget, time logged against a project). The database will allow data to quickly be recalled and updated as needed by users at any time. The program can be used in a single-user environment but is intended for use in a network environment over a local intranet or over the Internet.

The two main elements of the application are the database back-end and the Graphical User Interface (GUI). The GUI allows users to view or enter specific information into the database depending upon their user level. Administrative personnel must enter project and employee information before employees can begin to log time and schedule tasks against projects.

1.1 Statement of Problem

At my current place of employment, Brigger & Associates, Inc., employees record their time (information about how much time was spent on certain parts of particular projects and what was done) by writing it down. These time sheets are then given to the secretary who enters them into two different Microsoft Excel spreadsheets (one is for payroll, the other is project related). After the secretary has entered the information into the spreadsheets, certain pieces of that information are transferred to another spreadsheet

used to track project budgets and print out daily and weekly reports. Some projects require extensive travel and, as a result, the employees are often working at locations other than the office for several days. When this happens, information may not be updated for some time and may not be remembered accurately when it is updated. This system is time consuming and inefficient.

1.2 Description of the Solution

The Time and Project Management Application is a VB.Net application using Microsoft Access database technology. This technology allows users to quickly record and monitor employee time and compare it to scheduled project and budgetary information. This allows a company to easily review efficiency and adjust schedules and plans as needed.

1.2.1 Central Access Point

By using relational database technologies and efficiently built table structures and user interfaces, this application provides one location at which employees can schedule, record, and monitor progress. It also consolidates administrative information into a single location allowing admins to easily keep vital company information up to date.

1.2.2 Familiar Application Model

The user interface screens in the application of this application will closely mimic those used throughout the Microsoft designed environment giving users a familiar look and feel along with a more widely accessible program. Because the application is being

developed at the company that will be using it, significant user testing can be done throughout the design process by the employees who will use the program.

1.3 User Profiles

Three types of users will use this application: General, Semi-Administrative, and Administrative.

1.3.1 General Users

These users include all employees who are required to fill out time sheets for given projects that they have been involved in. They are the primary users of this program because they will use it daily to enter time and task information against projects and to fill out trips reports when necessary. In most cases, Administrators and Semi-Administrators are General users with some additional rights.

1.3.2 Semi-Admin Users

These users are mid-level managers who must be able to enter and modify information specific to employees under their supervision or to project tasks in which their departments are actively involved. They must also be able to schedule tasks for employees within their department. These users also have all capabilities of General users.

1.3.3 Admin Users

These users are upper-level managers who must be able to enter new or modify existing employee, company, and project information. They must also be able to

generate reports for customer and internal use. Admin users are also given the ability to modify existing time sheet records and approve scheduled tasks. These users also have all capabilities of General users.

1.4 Project Design

This project will involve two major areas related to computer science: Programming, and Database.

1.4.1 Programming

The application will be written according to programming standards widely accepted throughout the industry and specifically accepted by the company for which I work. The program will be developed as a VB.Net desktop application. The classes developed for database communication and report generation in the desktop application will be designed in a manner that will allow them to be used in a future Web application as well. Since these classes make up 80% of the code, the transition to a Web application will consist primarily of navigational logic and graphical design.

1.4.2 Database

The backend of this application will consist of a relational database design using Microsoft Access. I have chosen an Access database for this project because the client is very familiar with this type of database and, because the application is intended for company use, the overall amount of data being stored will not be excessive. The

database design will utilize the concept of normalization insuring that redundant data storage is avoided in order to utilize the space provided.

2. Interface Design

The individual pages (forms) within this application have been designed to meet the needs of two user groups. The first group consists of general employees who need to log time against projects, view past entries, fill out and print trip reports, schedule tasks to be completed, and view schedules. The second group consists of administrative employees who are, in most cases, general employees as well. This group is divided into Semi-Administrators and Administrators. The only difference between these groups is the ability to reset passwords and log time for other employees. In general the administrative employees must be able to perform the same actions as general employees and must also be able to add, modify, and delete company, project, and employee information as well as print internal progress reports, client reports, and budgetary reports.

2.1 General Employee Pages (accessible by all administrators)

Pages accessible to general employees consist of the Login page, the Change Password page, the Time Entry page, the Schedule Task page, and the View Schedule page. These pages are necessary for completing the daily tasks necessary for accurately tracking employee time and computing project budget information.

2.1.1 Login Page

This page is used to authenticate users in order for them to gain access to the rest of the program according to their user-level. Users will be required to enter a user name and password (provided by an Administrator) in order to access the application. Once a user is authenticated, menu options will be enabled depending on their user-level.

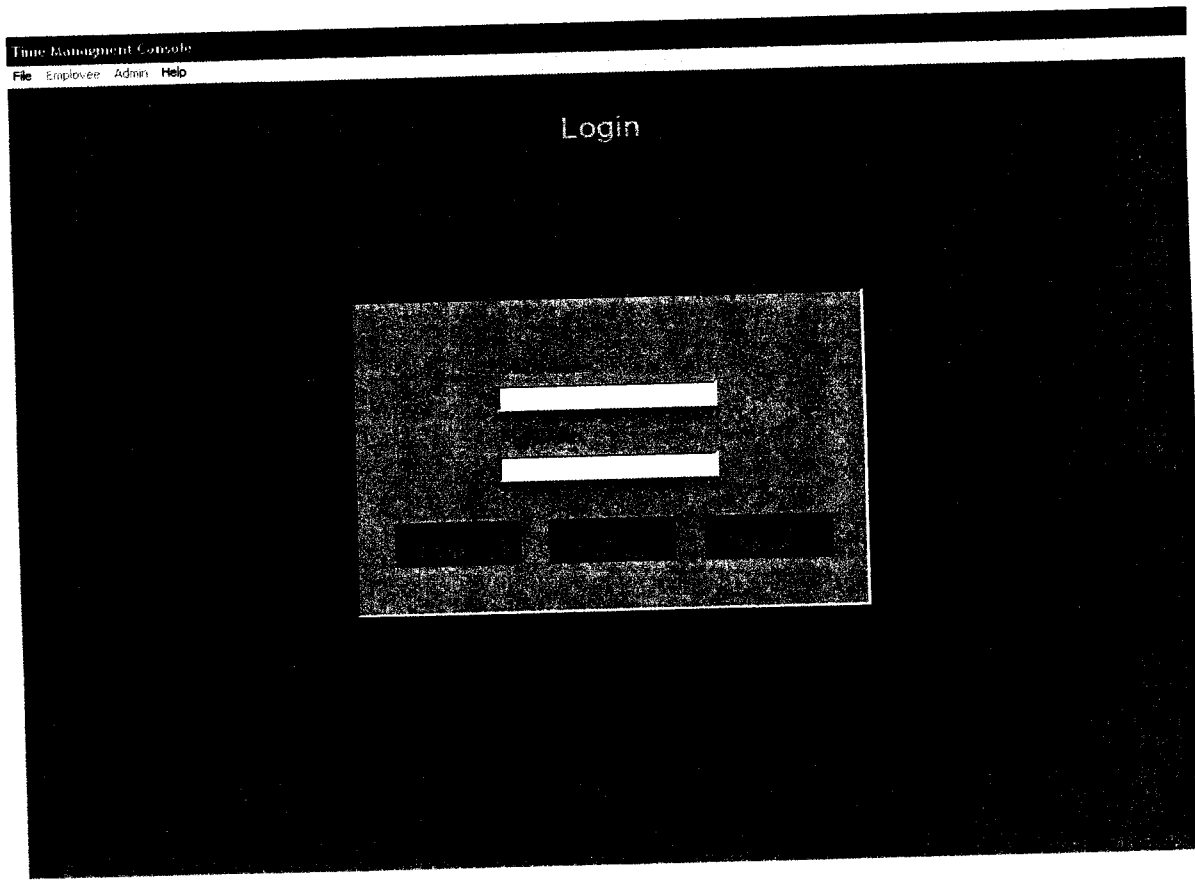

Figure 1. Login Page

2.1.2 Change Password Form

This pop-up form is used to change a users' password. The user must enter his or her current username and password and must enter their desired password twice.

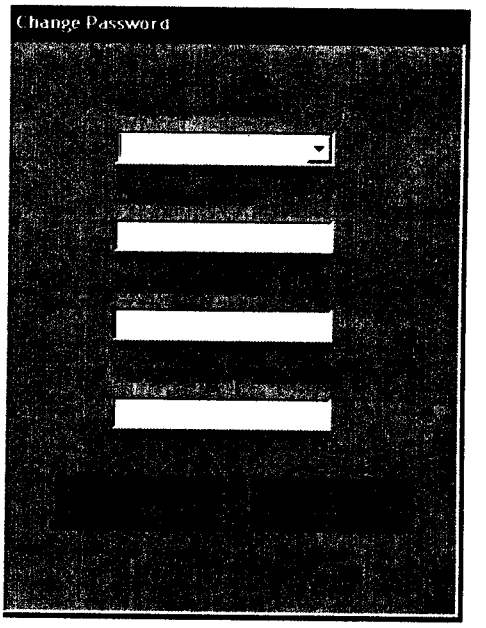

Figure 2. Change Password Page

2.1.4 Move Task Form

This pop-up form is used to move a scheduled task from one day to another.

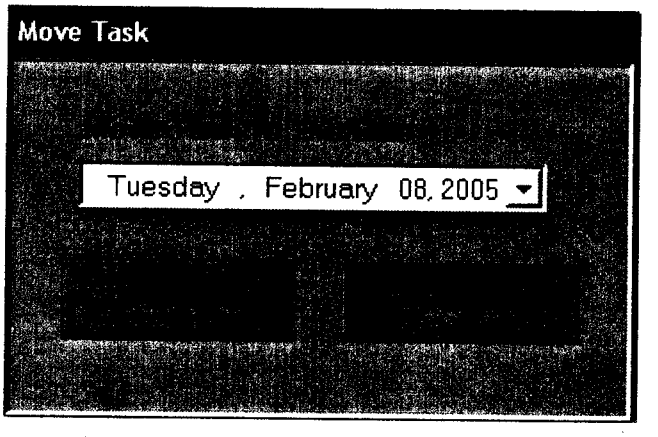

Figure 3. Move Task

2.1.4 Time Entry Page

This page is used by employees to enter time information against a specific project. Information required on this page is Employee Name, Date, Project and Project Task, Mileage (if applicable), Hours worked (regular, overtime, or comp time), Comments (if needed).

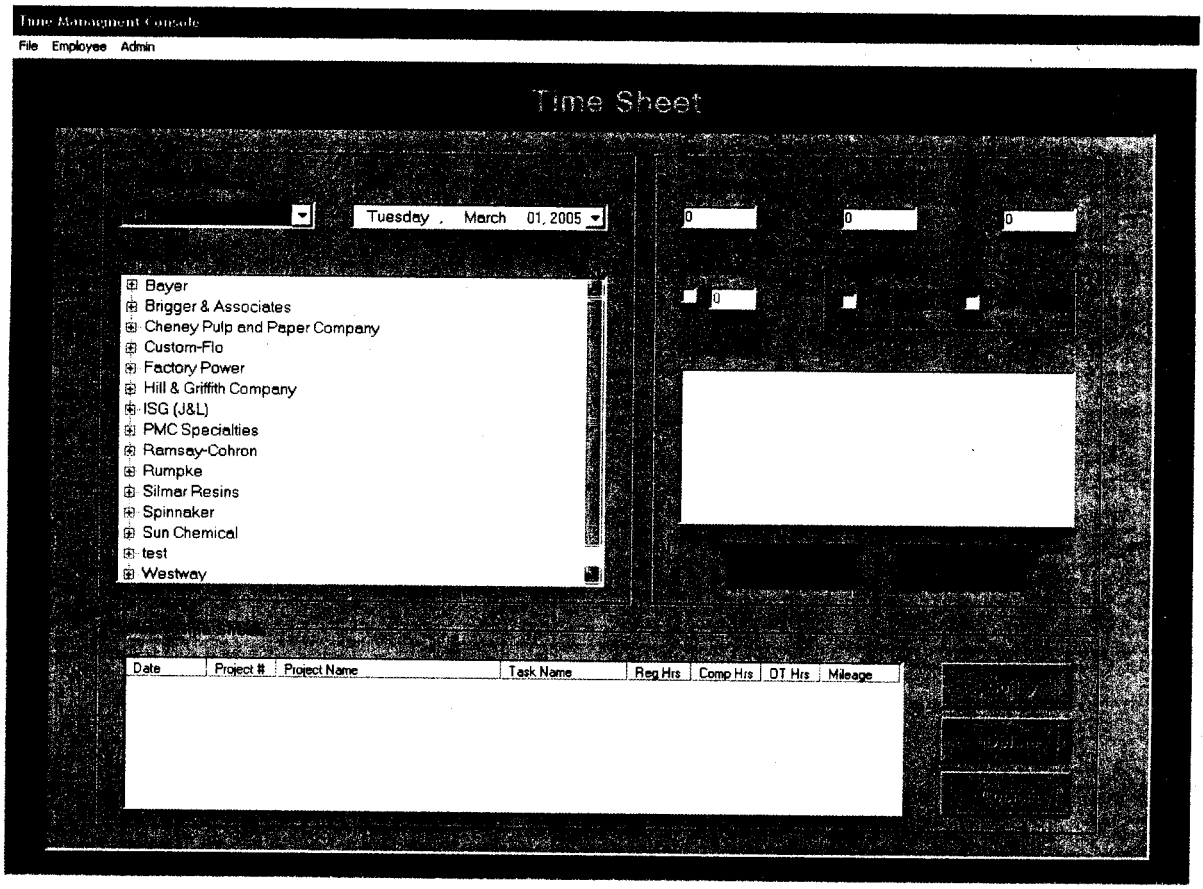

Figure 4. Time Entry Page

2.1.5 Schedule Employee Tasks Page

This page is used to schedule tasks to be completed by an employee against a certain project on a given date. Information required on this page includes Project and Project Task, Employee Name, Date, and Comment (if needed). It also provides a list of scheduled task (no details) for the selected employee over a two week period from the current date.

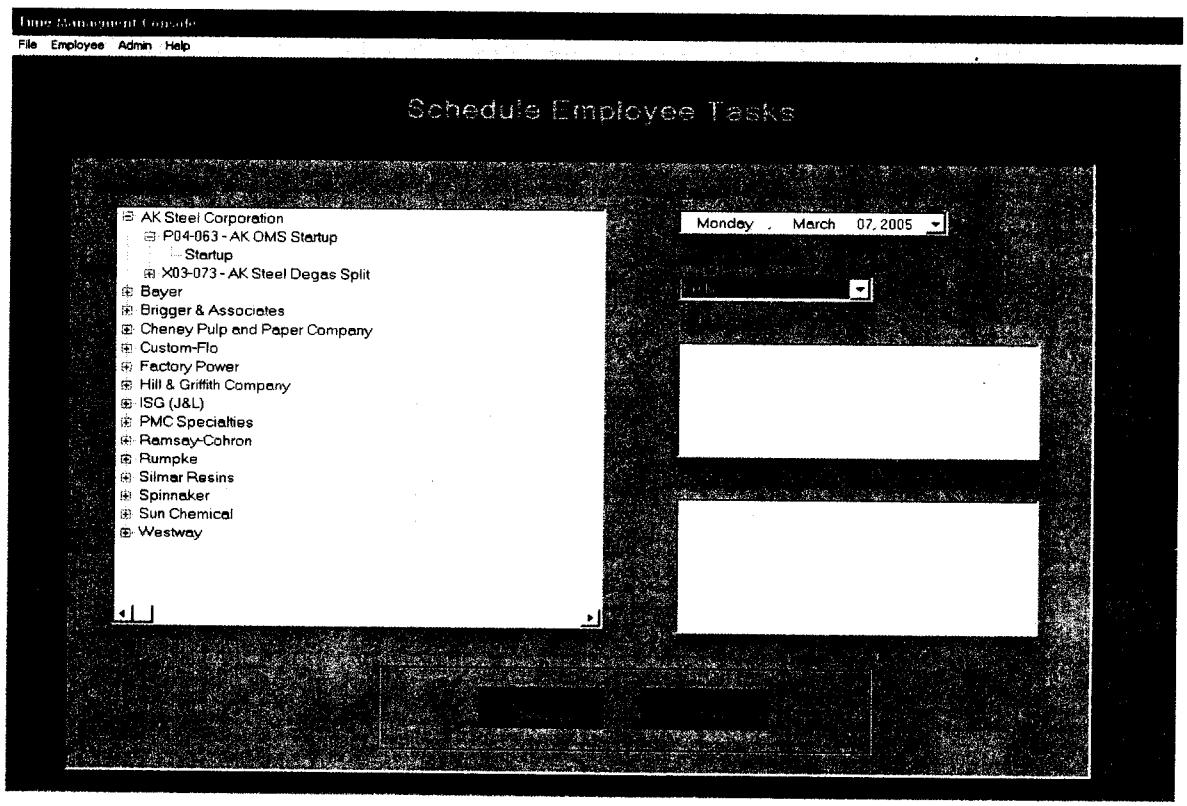

Figure 5. Schedule Employee Tasks Page

2.1.6 View/Modify Employee Schedule Page

This page is used to view tasks scheduled for employees. Once a date is selected, the tasks for all employees during that week are displayed in calendar-style format. If a certain scheduled task is selected, the details of the selection are shown in the lower part of the page. The task can then be moved or deleted.

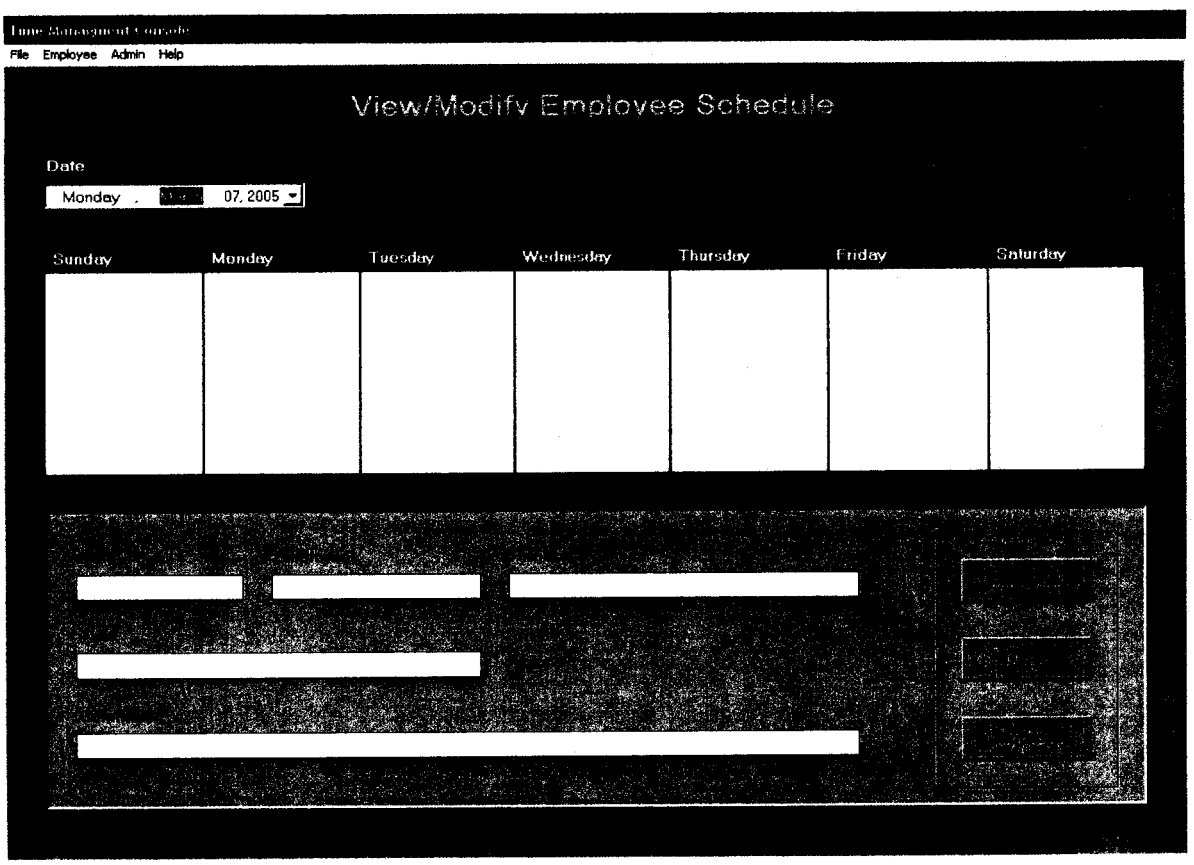

Figure 6. View/Modify Employee Schedule Page

2.2 Administrative Pages

Pages accessible to administrators include all pages accessible to general employees as well as the Company Information page, the Project Information Page, the Task Information page, the Employee Information page, the Link Task to Project page, the Report Builder page, the Archive Projects page, and the Report Viewer page.

2.2.1 Add/Edit Company Information Page

This page allows company information (company name and mileage information) to be entered, modified, or deleted. Once time has been logged against a company, the company cannot be deleted.

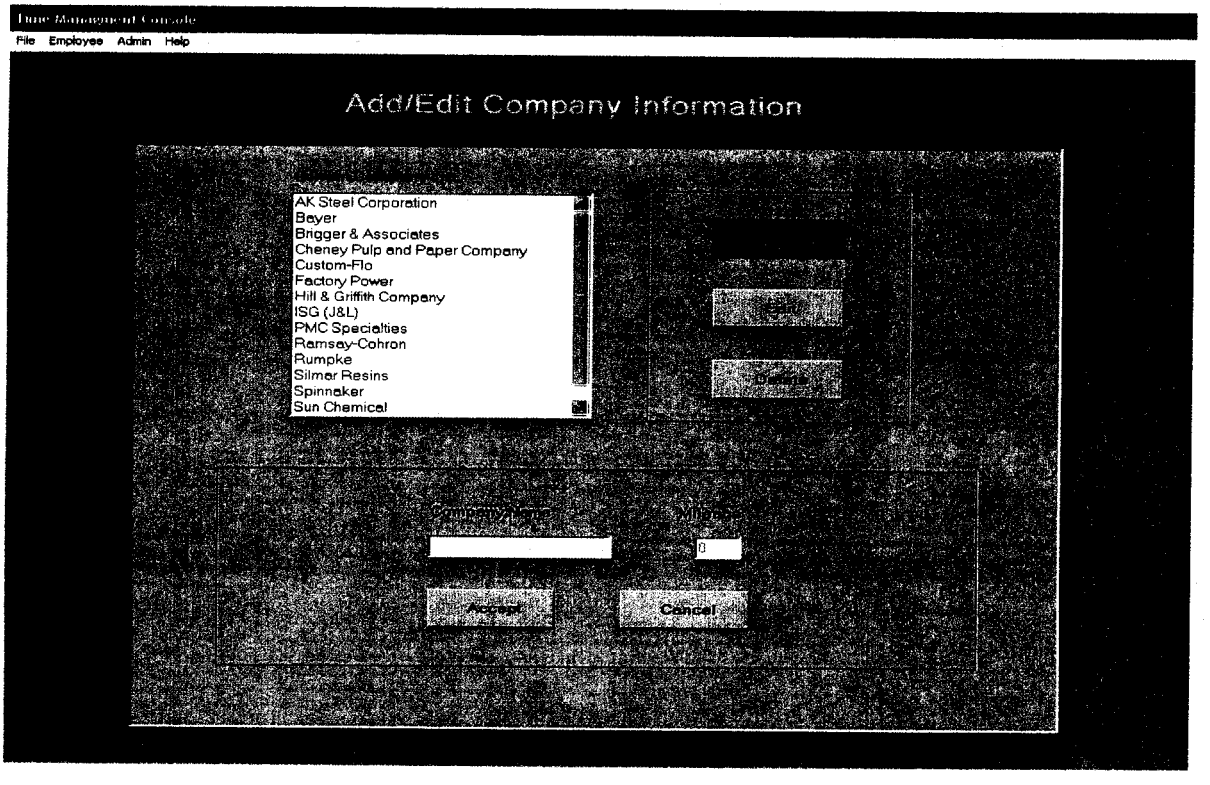

Figure 7. Add/Edit Company Information Page

2.2.2 Project Information Page

This page allows project information (project number, project name, status, company name) to be entered, modified, or deleted. Once time has been logged against a project, the project cannot be deleted. Features such as choosing which company's project lists are displayed and what types of projects are displayed make finding and editing current projects much easier.

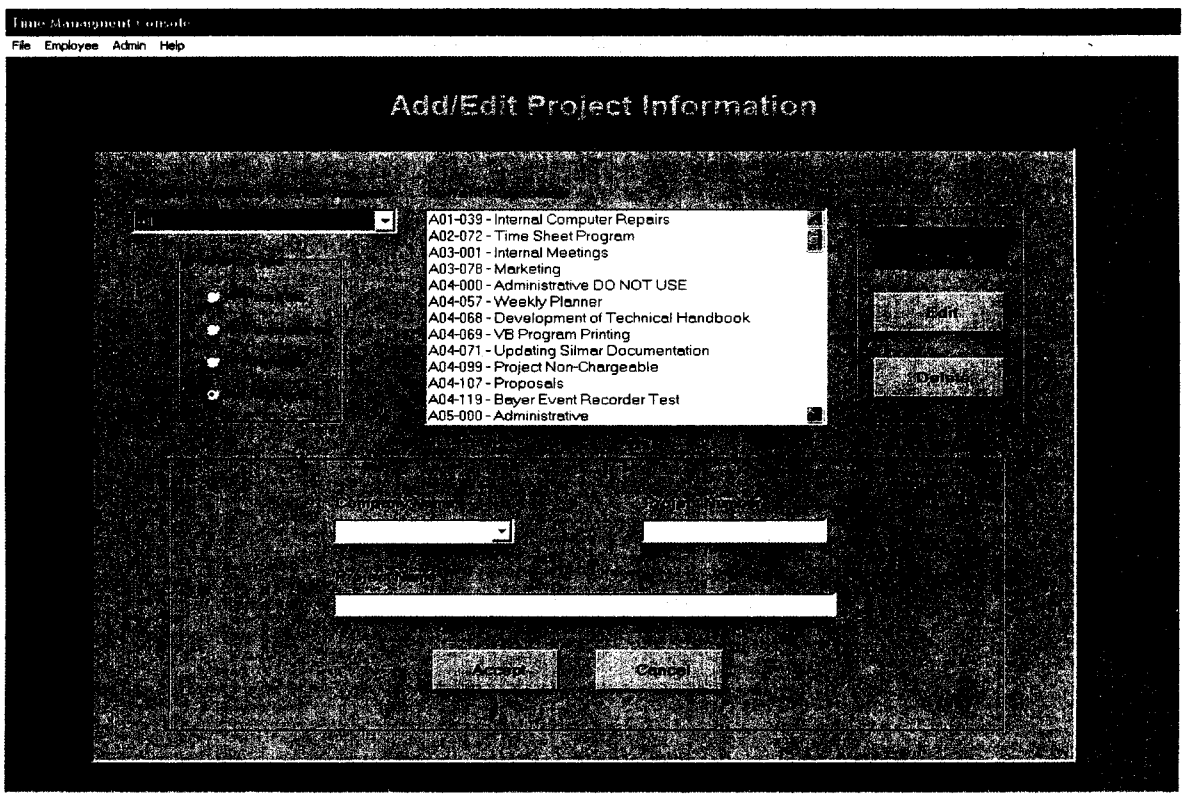

Figure 8. Project Information Page

2.2.3 Add/Edit Task Information Page

This page allows task information (task name, status) to be entered, modified, or deleted. Once time has been logged against a task, the task cannot be deleted unless all related data is deleted first.

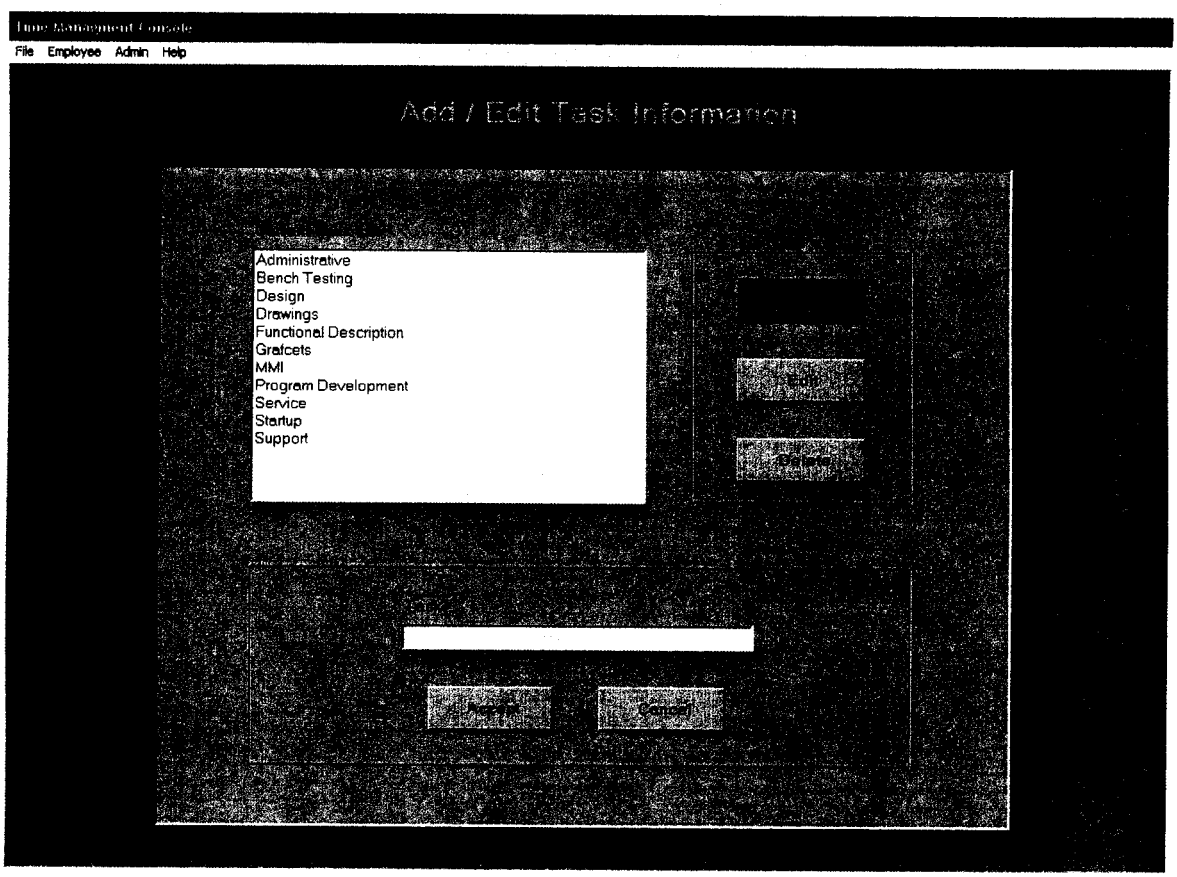

Figure 9. Add/Edit Task Information Page

2.2.4 Add/Edit Employee Information Page

This page allows employee information (name, charge rate, overtime rate, birth-date) to be entered, modified, or deleted. Once an employee has worked for the company, the employee cannot be deleted.

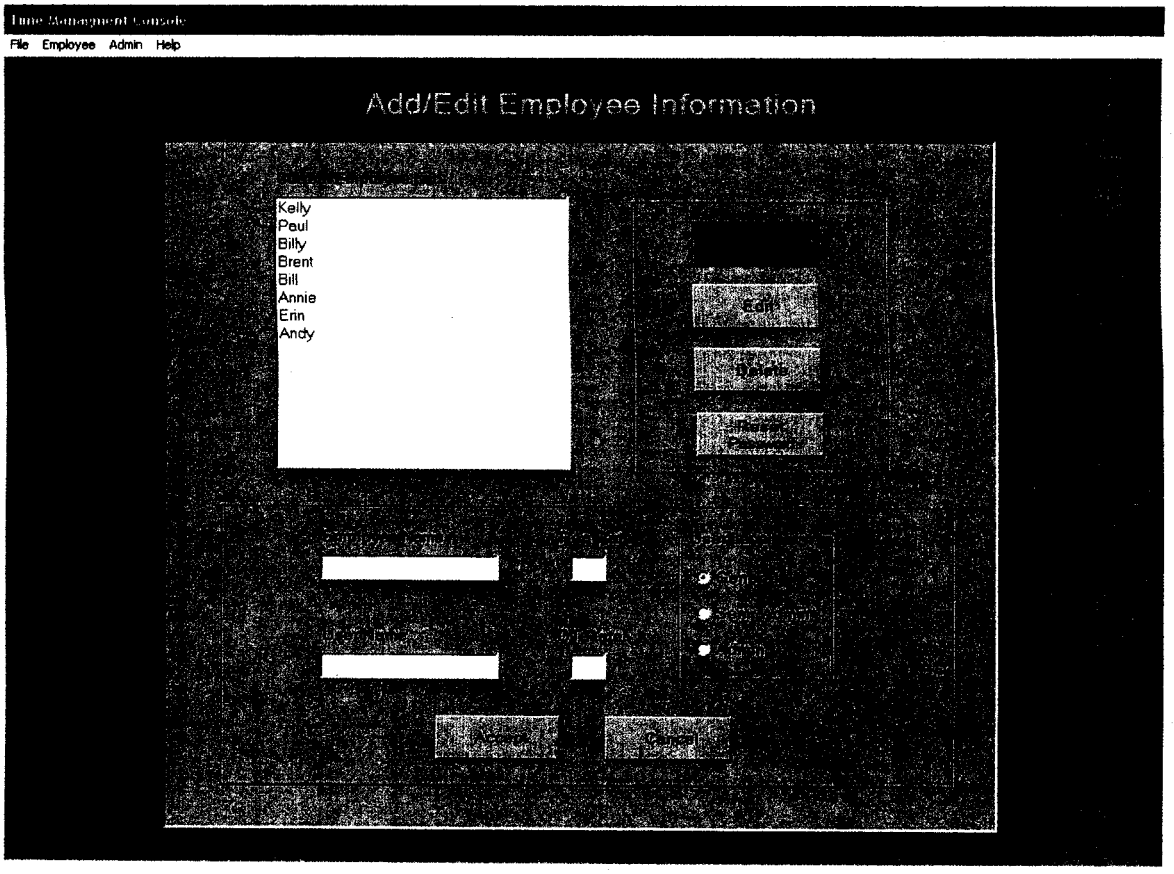

Figure 10. Employee Information Page

2.2.5 Link Task to Project Page

This page allows tasks to be linked to a specific project or be removed from a project task list. Features such as the ability to choose which company's projects are displayed in the project list and what type of projects are displayed make finding specific projects easier. Once time has been logged against a task, the task cannot be removed from that projects task list.

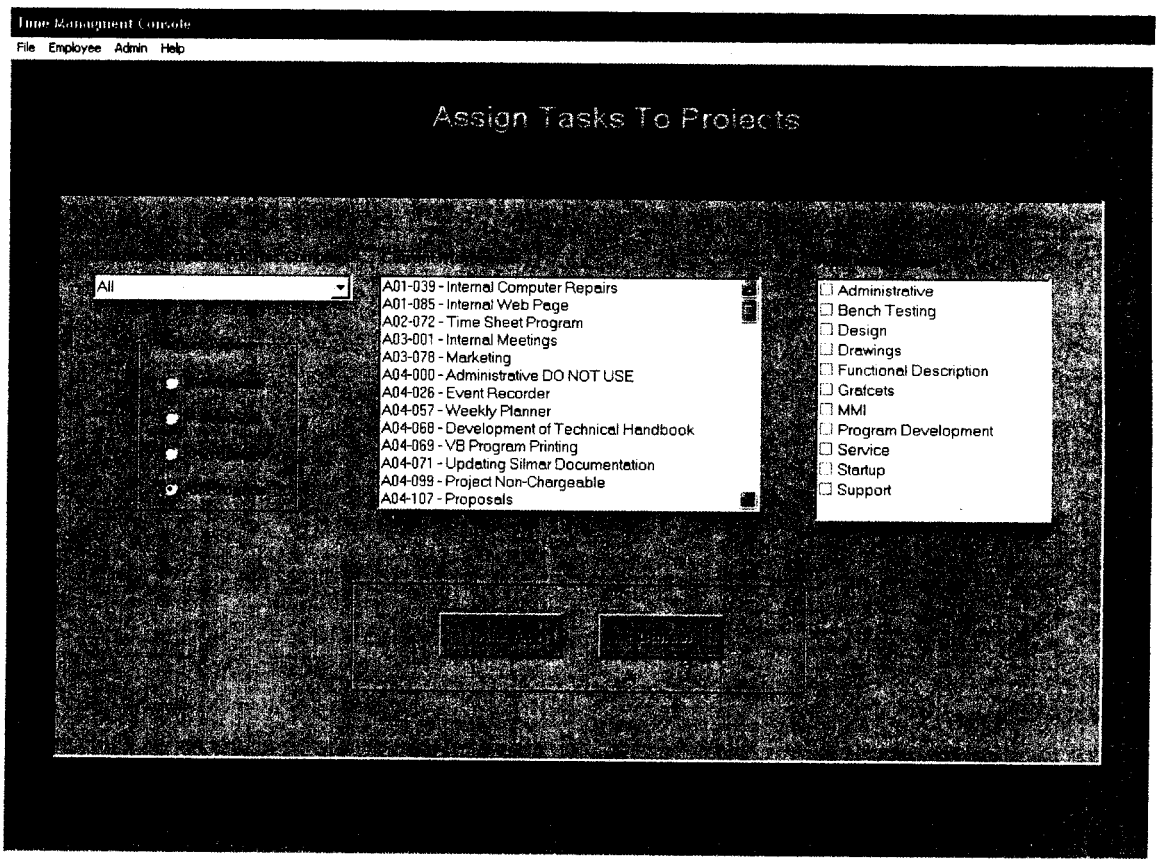

Figure 11. Link Task to Project Page

2.2.6 Report Builder Page

This page allows administrators to print internal and external reports in a pre-defined format using information previously entered into the database. The reports use Crystal Report templates created in VB.Net and linked to default tables or datasets. When the desired report information is selected by the user, a new data-set is generated based on the selected information. The data source of the appropriate report is then changed to the new dataset and the report is generated.

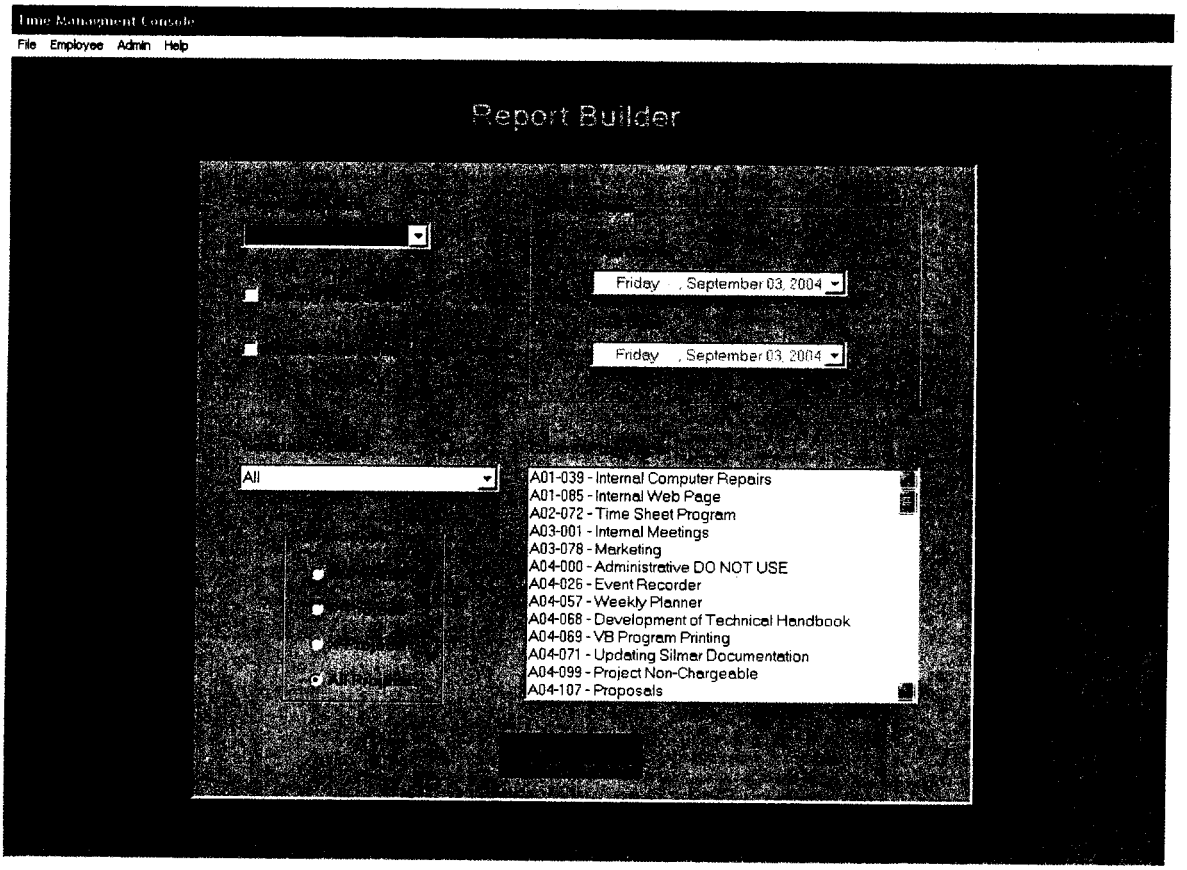

Figure 12. Report Builder Page

2.2.7 Archive Projects Page

This page allows administrators to 'archive' projects. These projects are not technically being archived. They are simply being marked in the database as inactive or completed in order to keep them from being displayed in project lists. This lessens confusion and reduces the amount of unnecessary information that is displayed on a given page. Features such as the ability to choose which company's projects are displayed in the project list and what type of projects are displayed make finding specific projects easier.

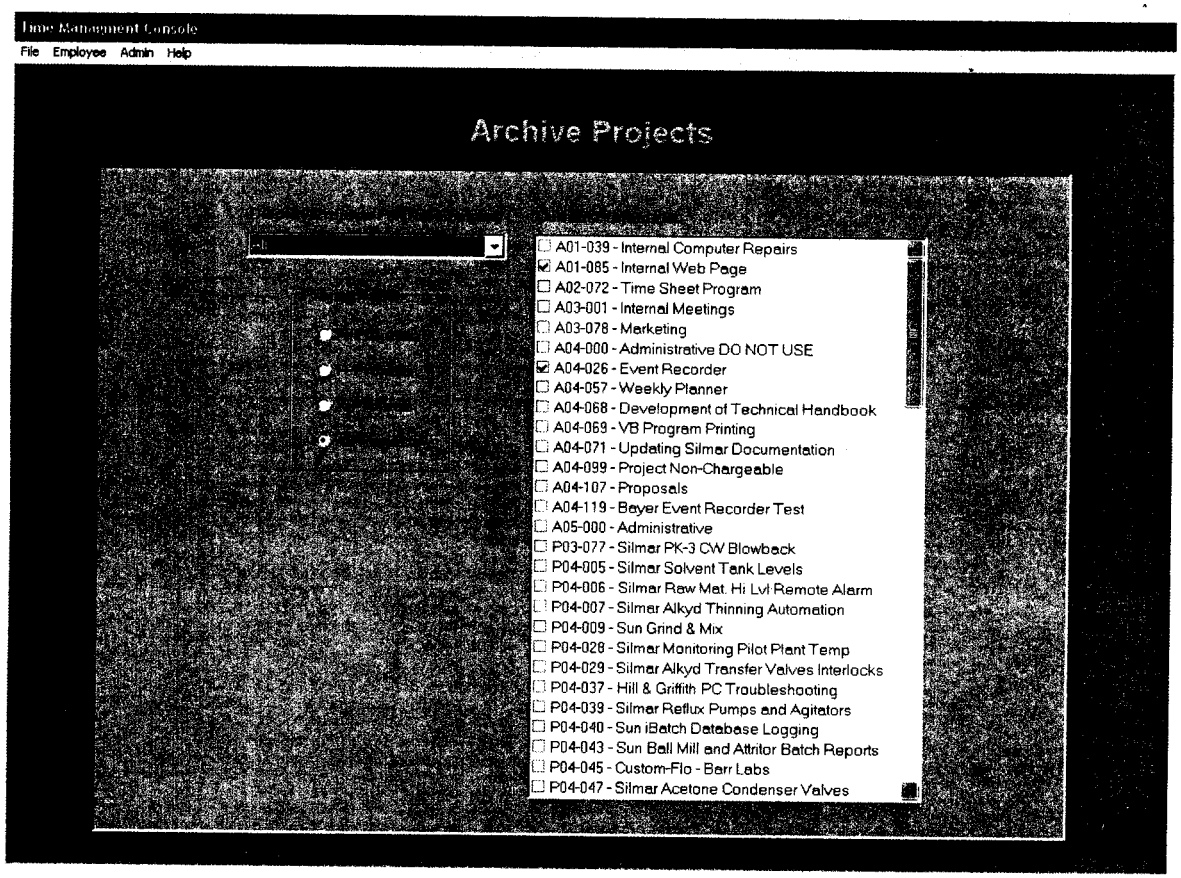

Figure 13. Archive Projects Page

2.2.8 Report Viewer Page

The Report Viewer page is used to display all reports whether they are selected from the menu or generated from the Report Builder page. There are currently 15 different reports available. These reports include budget reports and employee time reports. As described in section 2.2.6, this form uses a report viewer object to display specifically selected reports using templates created with Crystal Reports (the data source for the reports is set during run-time to a dataset created based on different user selections).

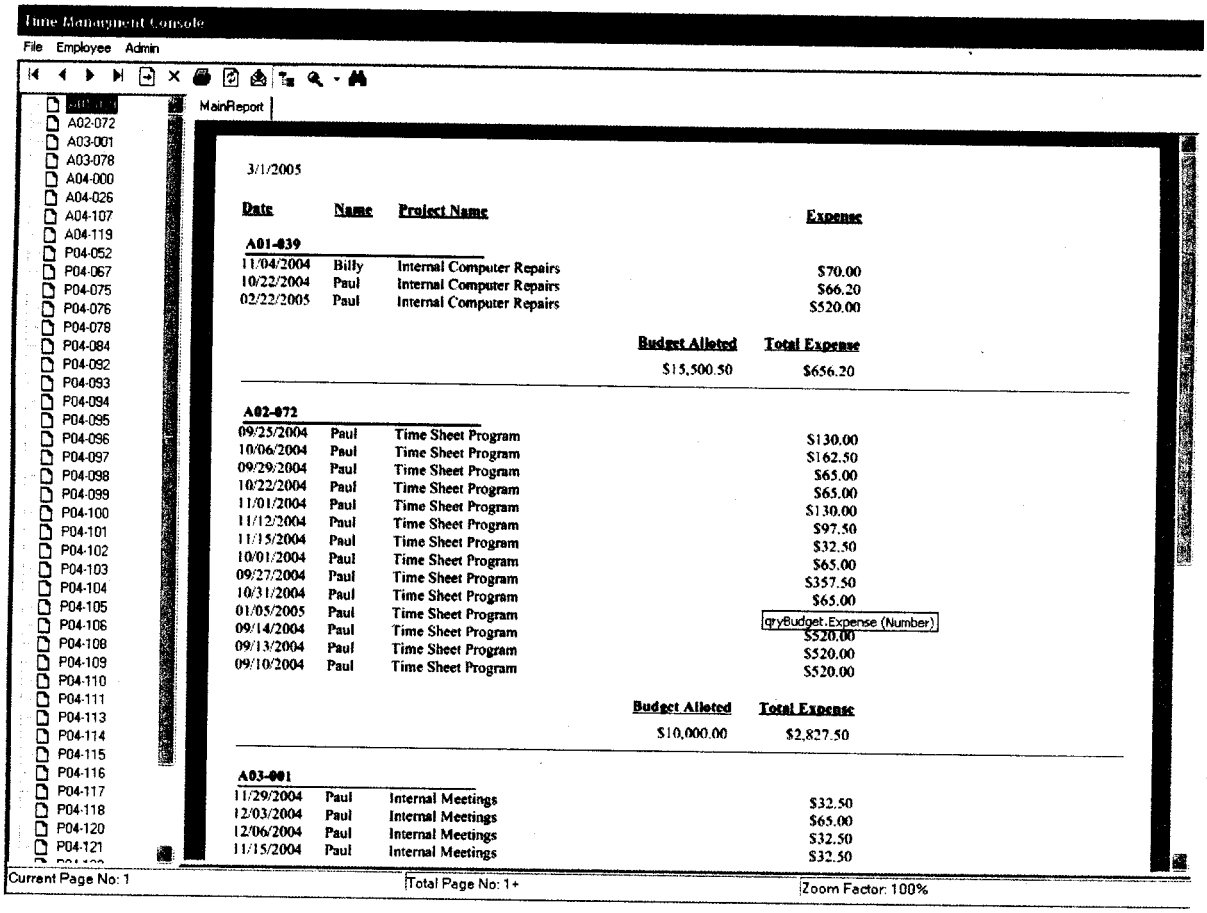

Figure 14. Report Viewer Page

3. Time Line

3.1 Senior Design I - Winter 2003-Spring 2004

- Gather Information – Jan. 15 - Feb. 15
- Develop Proposal – Feb. 15 - Mar. 15
- Present Proposal – Mar. 3
- Design/Test Database – Mar. 10 - May 10

3.2 Senior Design II - Summer 2004-Fall 2004

- Develop/Test Desktop Application – June 1 – Snr. Des. III
- Rework DB Design as Needed – Various dates as needed
- Present Design Freeze and Prototype – Aug. 23

3.3 Senior Design III – Winter 2005

- Continue Development/Testing of Desktop Application
- Design Users Manual – Jan.1 - Jan. 15
- Format Project Documentation – Jan. 16 – Feb. 16
- Present Completed Project – End of winter quarter 2005

4. Software and Hardware Requirements

4.1 Software

- Microsoft 2000 Server with IIS *
- Microsoft Office 2000

4.2 Hardware

- Server computer for MS 2000 Server and Office 2000 *

*This hardware was chosen because of plans to redesign the application as a Web-app in the future.

5. Budget

Server running Windows 2000 Server with IIS	Owned by Company	$1,800.00
Microsoft Visual Studio.Net 2003 Professional	Owned by Company	1,099.99[9]
Microsoft Office 2000 Professional	Owned by Company	279.99[8]

Figure 15. Budget

6. Deliverables

6.1 A time and project management system that will allow users to efficiently create projects and associated budgets, log time against those projects, and print reports based on logged information.

6.2 A GUI developed in VB.Net to allow future expansion.

6.3 Database communication using .Net technologies for efficiency and easy modification.

6.4 Secure logon for all users authenticated against information stored in the database.

6.5 Separate account functionality for General users and Administrative users.

6.6 General users will be able to:

- Enter time and view past entries
- Schedule tasks and view schedules
- Change their password

- Specify trip report requirements

6.7 Administrative users will be able to:

- Complete all General user tasks
- Add, modify, and delete company, project, task, and employee information
- Reset passwords
- Print internal and external reports

7. Testing

7.1 Phase I

The initial testing phase was done over a period of two months and was completed by the secretary. Time and project information were charted using the new desktop application and using the old method. We found several bugs during this phase and charted the bugs along with their status (fixed or not) in a log book monitored by the companies owner. The log is attached as Appendix A at the end of this document.

7.2 Phase II

The application has been in use by all employees for approximately 2 months as of the writing of this document. Two additional bugs have been found since this phase started (these bugs can also be found in Appendix A) and several suggestions have been made to add or remove forms from the application.

8. Conclusion and Recommendations

8.1 Conclusion

The Time and Project Management application was designed in response to Brigger and Associates' need to more efficiently track and manage employee time and project budget information. The application was developed with constant input and analysis by the company's owner and employees. It meets all deliverables required by the company (although the list of deliverables was constantly modified as the project progressed) and allows for easy expansion as has been demonstrated during the project life-cycle. The application was developed using Visual Studio .Net and MS Access database technologies.

8.2 Recommendations

This project presented several challenges. The first was the database design. It is very important to have a working knowledge of relational database implementation and theory in order to build a good database. I would also recommend an extensive knowledge of the SQL language and its format. When dealing with related tables in code, one must fully understand SQL in order to build statements correctly. The second, and probably most significant challenge, was in the area of planning. I found that the waterfall method used in the senior design sequence is not very easy to implement in the field of program design. Because of constantly changing user requirements, it is hard to develop an accurate 'design freeze'. It is also very frustrating to deal with customers who aren't really sure exactly what they want. This experience has taught me that I must be prepared to guide a client to some conclusions and therefore must have a strong understanding of what they need or think they need before trying to plan a solution.

Appendix A

The following is a partial list of bugs found during the first testing phase of the project lifecycle.

1. 9-28-04 – "Error while writing to tblCommittedTimeSheets. Field tblCommittedTimeSheets.Comment cannot be a zero-length string. Write to tblComittedTimeSheets failed."
    a. Changed requirements for this field in the database so that it was not a required field.
2. 10-04-04 – Selected project and task and then clicked Cancel. When task was selected again the entry boxes on the right side of the form remained disabled.
    a. Reworked tree-view selection method. Because of software limitations, I had to modify the way in which the controls interacted with each other. The right side of the form is no longer dependent on tree-view selections.
3. 10-05-04 – Committed time sheets are not being written to database.
    a. I could not duplicate this problem. Later discovered that the user was entering information for incorrect dates and therefore could not see the entries when reviewing the correct dates.
4. 10-12-04 – Non-committed task list should show all non-committed tasks for a particular employee rather than only the non-committed tasks for the selected day.
    a. Modified logic to allow this to happen.
5. 10-12-04 – User had not logged onto the server and this caused the time sheet program to crash on start-up.

a. Added logic to verify connection to database before attempting to start program.

6. 10-14-04 - After data is accepted on time sheet entry page, the treeview should not collapse to its original state.
    a. Modified form functionality to leave the treeview expanded to the user's last selection.
7. 10-14-04 – Display a 'Splash' screen while application is connecting/loading.
    a. Developed 'Splash' screen.
8. 10-15-04 – I get a job entry duplication error when trying to enter a new job.
    a. Found that error being generated was not accurate. The problem actually involved a field length in the database. Expanded allowable entry.
9. 11-24-04 – Cannot change employee after time has been logged.
    a. Modified SQL string to include previous Employee name.