

PROJECT TRACKER AND ORGANIZER

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Graduate School

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**Title**

PROJECT TRACKER AND ORGANIZER

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**By**

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The Supervisory Committee certifies that this *disquisition* complies with North Dakota State University's regulations and meets the accepted standards for the degree of

**MASTER OF SCIENCE**

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## **ABSTRACT**

A Project Tracking and Organizer is a software tool which is a simple, fast and an efficient way to assign modules of a project to employees and track the progress of a project. Using this software, project status can be tracked. Any number of module can be assigned to employees for each existing project using the Project Tracking and Organizer. In this software system, each schedule can be tracked from the start until the end of the project life cycle. The key functionalities of the software are, the developed software system is free and open source, module assignment of a project to employees, the software is web based and can be accessed from anywhere, start and end dates of each project are displayed, total number of hours spent towards the project is displayed both to the client and project scheduler, current status of the projects and frequent updates from employees.

## **ACKNOWLEDGMENTS**

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# 1. INTRODUCTION

## 1.1. Introduction to Project

A project schedule is a software system that communicates about the timeframes in which work needs to be performed, what work needs to be performed, and which department or organization will perform the work. The main goal of the project schedule is delivering the product on time. The project might fall behind schedule, might miss the deliverables for the project, and might under use or over use the resources without the project schedule.

In Project Management software scheduling plays a vital role. It lists project milestones, activities, deliverables, approaching deadlines, and intended start and finish date. Schedule usually falls in a project planning phase. Depending on the size of the project, a full time scheduler or a team of schedulers overlook the development and maintenance of the project.

## 1.2. Objectives of the System

The main objectives of the developed software are the following:

- a) To design a software for the project schedulers or project managers for assigning the modules of the project to the employees. To get the project updates, milestones achieved or problems faced during the life of the project
- b) To design a system where employees will be able see the assigned project. Employees will also be able to update their work progress or raise flag for any issues.
- c) Support clients who are the major stakeholders of a project and are interested to know the updates of the project. To design pages where clients will be able to check on the progress of the projects.

### **1.3. Documentation**

Chapter 2 provides a brief discussion about the need for a project scheduler. Also talks about similar programs currently available in the market.

Chapter 3 describes the methodology used for developing the system. It also provides details regarding the how the system was implemented.

Chapter 4 presents the results from the development of the software

Chapter 5 focuses on conclusions drawn from the project, and experiences gained. The framework within which the project functions and future work is provided.

## 2. RELATED WORK

Scheduling plays an important role in managing a project. Scheduling lays out a pathway for a project to run. It defines deliverables and milestones that are needed to achieve successful completion of project. Scheduling not only helps with providing an idea of the current problems in the project but also provides feedback about the status of the project. Effective scheduling of projects plays a vital role in ensuring the success of the project. It helps with keeping the projects on track and assign and manage resources efficiently. This reduces the overall costs and improves customer satisfaction.

Schedulers or project managers conduct regular meetings for the status updates from their team members. Problems faced or milestones crossed during the project life cycle will assist the managers to better understand the project and timeline. Managers can assign the modules to the team members accordingly (based on time remaining for project completion or depending on the staff availability etc.).

There are many project scheduling software systems in the market. The next section describes commonly or popularly used software.

### 2.1. Microsoft Project

One of the most commonly used and the probably biggest name in project management software world is Microsoft Project (MSProject). This management software can literally do almost everything expected of management software. It comes in three different versions: *Standard*, *Professional* and *Web Access*. Project Standard is a desktop application. The program must be installed on each computer that requires the software. Professional and Web Access are geared towards a distributed and collaborative environment. This collaboration, however, requires another program called Project Server. Project Web Access is a client used to access data from

Project Server. Project Web Access does not work as a standalone system. Project Professional incorporates features from both Project Standard and Project Web Access. It can operate as an independent application and does not necessarily need to connect to Project Server.

The advantages of MS Project Server are wide. It can integrate well with MS Office and supports import and export from/to MS Office. Resource management utility, task scheduling and budget planner are some of the features. Look and feel are of high value to the Project Server.

MS Project Server however comes with a few disadvantages. The software is expensive. Project Standard costs around \$600 and Professional costs \$1160, plus the purchase of Project Server. This expense might not fit tight budgets. The application might be too big to run in small environments.

## **2.2. Project KickStart**

KickStart (KickStart) is similarly popular to MS Project. It is a windows based application. It comes in two variants: *Standard* and *Professional*. The distinction between the two is not too far from being obvious. The standard version is designed more for small and simple projects and the Professional version is tailored towards advanced features of the software.

Project KickStart is a user friendly program and is easy to use even for the beginners with little to no training. However, the program is a desktop application and fails to address the complexities of medium to large projects.

## **2.3. Trello**

This project management system was developed by former Toyota Vice President, Taiichi Ohno (Trello). This program allows users to move cards. Each card represents a task. This will

help create visual representation of the status of the project. Trello is highly intuitive project management system.

Each card represents a task. The back of the card could be used for filling the information such as what task, who is working on that task, due date and a checklist. The front of the card has a task label, which gives how far the project is from deadlines.

The software offers free sign up and unlimited users and projects. However, file upload for free users, is limited to only 10MB for free users. Trello Gold or Business Class members can get up to 250Mb of file upload limit. It cannot provide detailed report of the status of the project or its break down.

#### **2.4. Asana**

The co-founder of Facebook, Dustin Moskovitz also designed Asana (Asana). Just as the social networking site Facebook is simple and easy to sign up and use, Asana also stands for its simplicity and ease of use. The project management software system is a free to use program for up to 15 users. Asana allows users to assign priority to the task in hand, visualize their goals and track the time. The program cannot be taken offline and is not as intuitive as other software in the market.

#### **2.5. Producteev**

This project management software (Producteev) allows unlimited users and projects for free. Small projects and/or business can profit from this free software. It allows integration with MS Outlook, visual customization. Upgraded is recommended for large projects and/or businesses. One of the salient feature is real-time communication amongst users. These communications and emails can be converted into task list seamlessly. Filtering tasks by people, project, and status or

due date is a handy search feature. However like any other software, it suffers from few noticeable drawbacks. The program lacks integrated billing software, which is essential for the management. There is no time tracking feature.

### **3. METHODOLOGY**

The Project Tracker and Organizer software tool is designed and developed keeping in mind the ease of use and simple one click interface. The software is an online tool that can be accessed from anywhere. The program relies on a centralized database and hence the need of separate databases is eliminated.

This tool is designed for unlimited users and projects. Any number of projects can be added by the project management at any time. There is no limit on the space. The only limit is the size of the database itself. Project or module assignment can be done as desired. The goal of the project to visually convey, who is working on a particular task, deadlines for the project and reports. Due to restricting its simplicity, Project Tracking and Organizer is geared towards small to medium businesses.

#### **3.1. Scope of the Project**

Design and develop software that would serve as a tool to the project management to schedule modules of each project or projects to employees efficiently. The tool should be capable of handling multiple projects at the same time.

#### **3.2. Software Engineering Methodologies, a brief Background**

Software engineering methodology or principles is a framework in software engineering that is used to plan, structure and control the process of software development. It falls under the category of software development life cycle. Some of the common methodologies include but not limited to

- Waterfall model
- Iterative and Incremental development

- Prototyping
- Spiral development
- Agile methodology
- Scrum
- Extreme Programming
- Rapid Application Development etc.

### **3.2.1. Waterfall Model**

This model is a popular model for software engineering (Waterfall model). This model is classic or sequential in design and development. It's linear in fashion. The requirements and/or goals are distinct in each phase. The main advantage of this model is better department and management control on the project.

The current project has been developed using modified waterfall. This model has been chosen as the requirements and goals are distinct and remain unchanged throughout the life of software development.

The following are the phases of the waterfall model

- Requirements
- Design
- Implementation
- Testing
- Maintenance

Here the linear ordering of these activities is critical. End of each phase is the output of another. The output of each phase needs to be consistent with the overall requirements of the system.

The following figure points out the phases of Classic Waterfall model

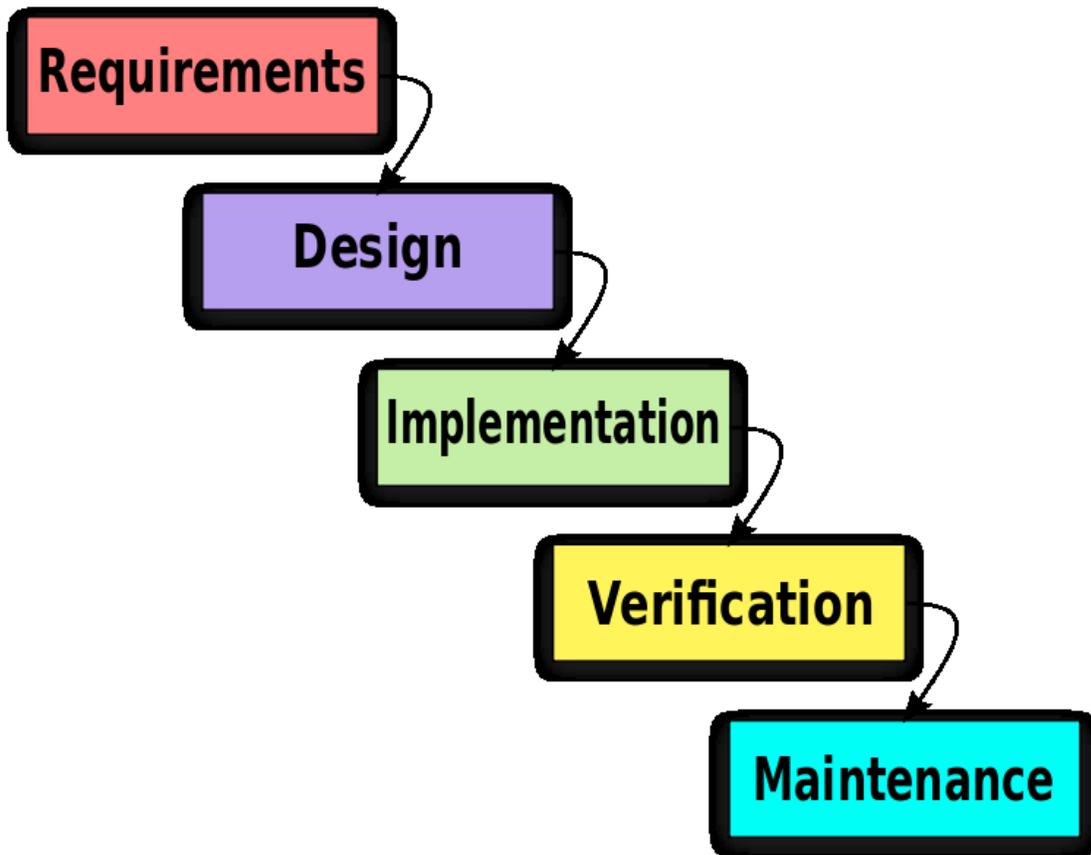


Figure 1. Waterfall Model

### 3.3. Methodology Followed

Project Tracker and Organizer (PTO) has been developed using the modified version of Waterfall model (Sommerville). Modified Waterfall model uses the feedback mechanism as compared to linear waterfall model (Waterfall + Hybrid). It is useful for management purposes to consider the phases of software development life cycle to be linear in nature. However, in reality the phases overlap and feed information to each other. During the design phase, the team might

realize problem(s) with requirements; during the development phase, there might a design problem and so on.

In view of the above problems, iteration in waterfall model has been adopted to circumvent the problems of classic waterfall model. Another reason worth emphasizing is, the requirements of the software are well-defined and are not bound to changes.

The following diagram portrays the modified waterfall model.

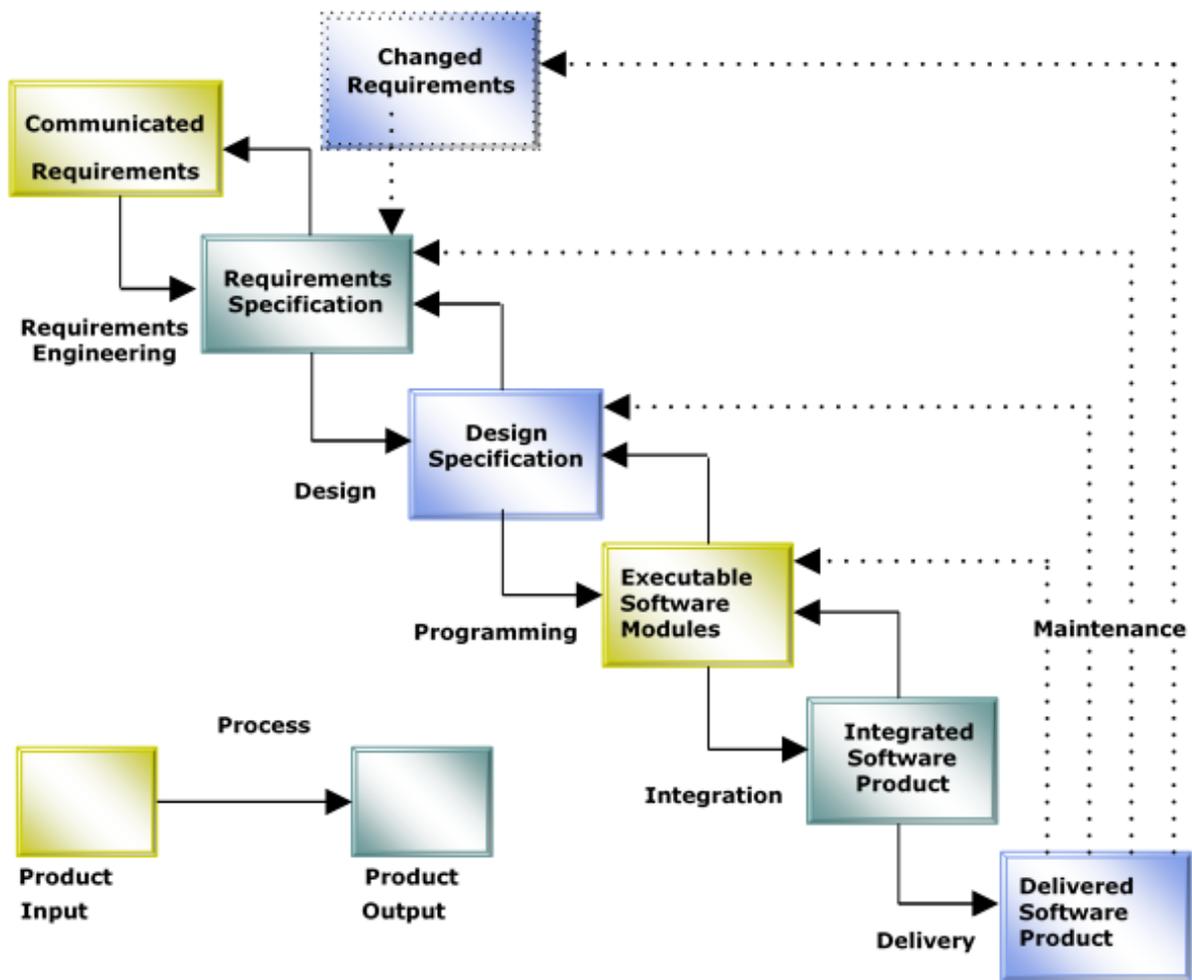


Figure 2. Modified Waterfall Model

The modified waterfall model at first glance looks very similar to the classic waterfall model. The phases in software development life cycle are the same. The flow from one phase down to another is the same as well. However, the modified waterfall model differs in the reverse flow. Any phase can be revisited from any phase. For instance, if there is design error found while in construction phase, the design phase can be revisited. After the necessary changes in design, construction phase is visited. Another instance where modified waterfall model differs from the classic model is visiting from testing phase back to any of the previous phases is a possibility. While in the classic waterfall, only the previous phase can be visited.

### **3.4. Software Requirements Specifications**

Software requirements specification (SRS) (Zhu) (Pressman) is a comprehensive description of the software system to be developed. It lays out functional and non-functional requirements. SRS describes the functionality of the software and its behavior.

The following are the requirements laid for the development of the software.

#### **3.4.1. Requirements**

For ease of readability and understanding the requirements have been classified into three categories.

- Scheduler or Administrator or Project Manager Module
- Team Member Module
- Client Module

The following figure suggests the requirements of each module.

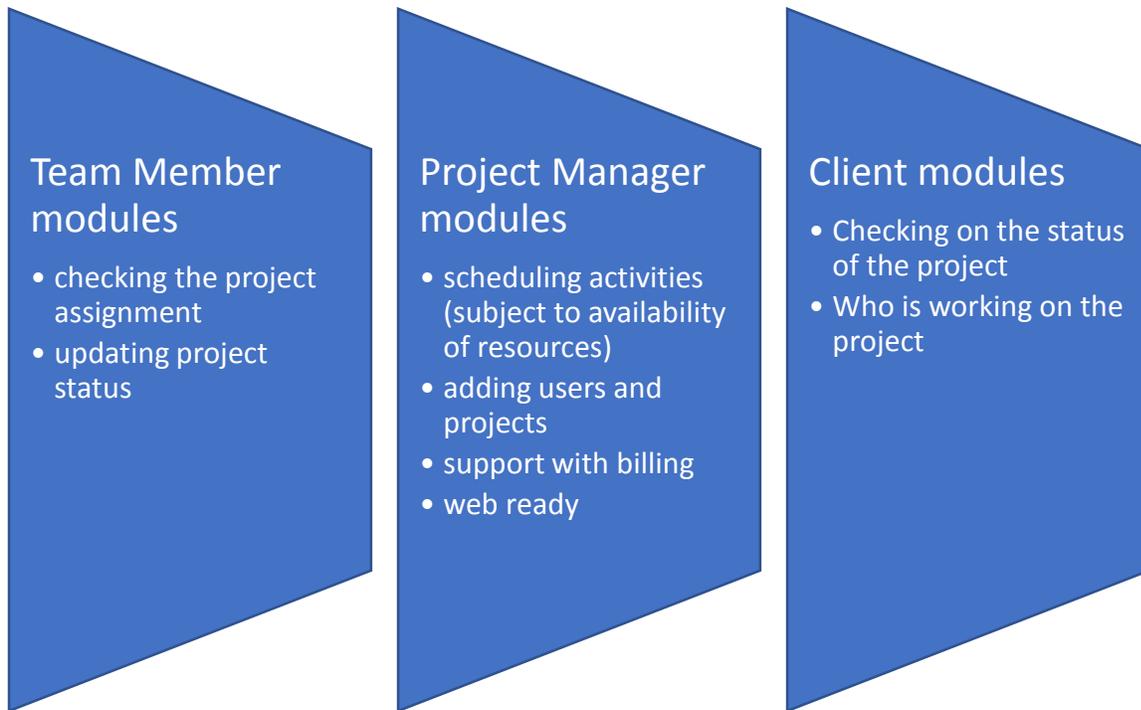


Figure 3. Requirements Classification

The figure 3 classifies the requirements of the project into three modules- Team member's module; Project Manager's module and Client module.

### 3.4.2. Team Members Module

- i. Employees should be able to login to the system.
- ii. Project Tracker and Organizer should have the capability of handling multiple employees and projects
- iii. Employees should be able to update their personal information and password
- iv. Employees should be able to view the project specification
- v. Employees should be able to update the project report

### **3.4.3. Schedulers or Administrators or Project Managers Module**

- i. Scheduler or Administrator should be able to assign module(s) to employee(s)
- ii. Project Tracker and Organizer should allow upload of project specifications
- iii. Project Tracker and Organizer should allow update, addition and deletion of the following
  - Employees
  - Projects
  - Clients
- iv. Project Tracker and Organizer should allow report generation
- v. Project Tracker and Organizer should show in tabular form the following
  - Start date and End date of the project
  - Project taken date
  - Project delivery date

### **3.4.4. Clients Module**

- i. Project Tracker and Organizer should handle single to multiple clients login to the system
- ii. Clients should be able to modify their personal information such as name, address, telephone number and password.
- iii. Clients should be able to view the project assignment. That is who is working on the project.

### **3.5. Study of the System**

The Graphical User Interface (GUI) has been designed keeping the user in mind. At the coarse level granularity, the GUI has been categorized into

### **3.5.1. Administrative Level Interface**

The administrative level user interface concentrates on the consistent information that is part of the organizational activities and which needs proper authentication. The interfaces help the administrations with all the transactional states like Data insertion, Data deletion and Date update along with the extensive data search capabilities.

### **3.5.2. The User Level Interface**

The user level interface helps the users of the system to log into the system and manage their personal information.

## **3.6. Modules of the Software**

The system has the following modules.

### **3.6.1. Administrator**

The administrator is the super user of the application. Administrator has the ability to create new user accounts or delete user accounts, has the information about the users and the projects. There are two-sub modules of administrator module

#### **3.6.1.1. Projects**

This module contains the information about the projects i.e. the list of projects, starting date and completion date etc.

#### **3.6.1.2. Users**

This module contains the information about the users and their roles.

#### **3.6.1.3. Time Period**

The full time schedulers or Administrators will add the details of the project such as timings about the project start date, completion date, and delivery date. Based on the time constraints, the schedulers or administrators will assign the modules to the employees.

#### **3.6.1.4. Rate / Hours**

In this module, administrator or scheduler(s) decide the charges for the project. According to this, hours will be assigned in between employees.

#### **3.6.2. Employee**

This module is workplace for a member's or employees who are authorized users. In this module after login, users can check the project assignment. The project specifications can be downloaded for better understanding. They however will not be able to modify them and upload to the system. Employees can also update their daily reports about the project they are working on. Updates could range from, what has been accomplished, problems faced, milestones etc.

#### **3.6.3. Client**

In this module, clients will be able to log in to the system. They can track the progress of the project. This would get them an overall understanding of how far is project from completion.

#### **3.6.4. Report**

This module contains the information about the reports generated by the employees and status report.

### **3.7. Hardware Requirements**

The following are the hardware requirements for the development of the software system:

- 2.8 GHz Processor or above
- RAM 2GB or above
- Hard Disk Drive 40 GB or above

### **3.8. Software Development Requirements**

The following are the software requirements for the development of the Project Tracker and Organizer:

- Windows operating system (XP/7/8/10)
- Visual Studio .Net 2012 Enterprise Edition
- Internet Information Server 5.0 (IIS)
- Visual Studio .Net Framework (3.0 or above)
- SQL Server 2010 Enterprise Edition

### **3.9. Software Design**

Software design is a process of creating a specification to software artifact like use case diagrams, class diagrams etc. Design is the first step in the development phase for any engineered product or system. The designer's goal is to produce a model or representation of an entity that will later be built. Once system requirement has been specified and analyzed, system design is the first of the three technical activities -design, code and test that is required to build and verify software.

The importance can be stated with a single word "Quality". Design is the place where quality is fostered in software development. Design provides us with representations of software that can assess for quality. Design is the only way that we can accurately translate a customer's view into a finished software product or system. Software design serves as a foundation for all the software engineering steps that follow. Without a strong design we risk building an unstable system, one that will be difficult to test, whose quality cannot be assessed until the last stage.

During design, progressive refinement of data structure, program structure, and procedural details are developed reviewed and documented. System design can be viewed from either technical or project management perspective. From the technical point of view, design is comprised of four activities

- Architectural design
- Data structure design
- Interface design and
- Procedural design

### **3.10. Unified Modeling Language**

UML is a modeling language in software engineering. It stands for Unified Modeling Language. This approach combines Object-Oriented Design, Object Modeling Technique and Object Oriented Software Engineering. UML provides a standard way to visualize the design of the system.

UML is a standard for visualizing modeling language. It's a common language for business analysts, software architects and developers to be used for designing and documenting business processes.

### 3.10.1. Use Case Diagrams of Project Tracking and Organizer Interface

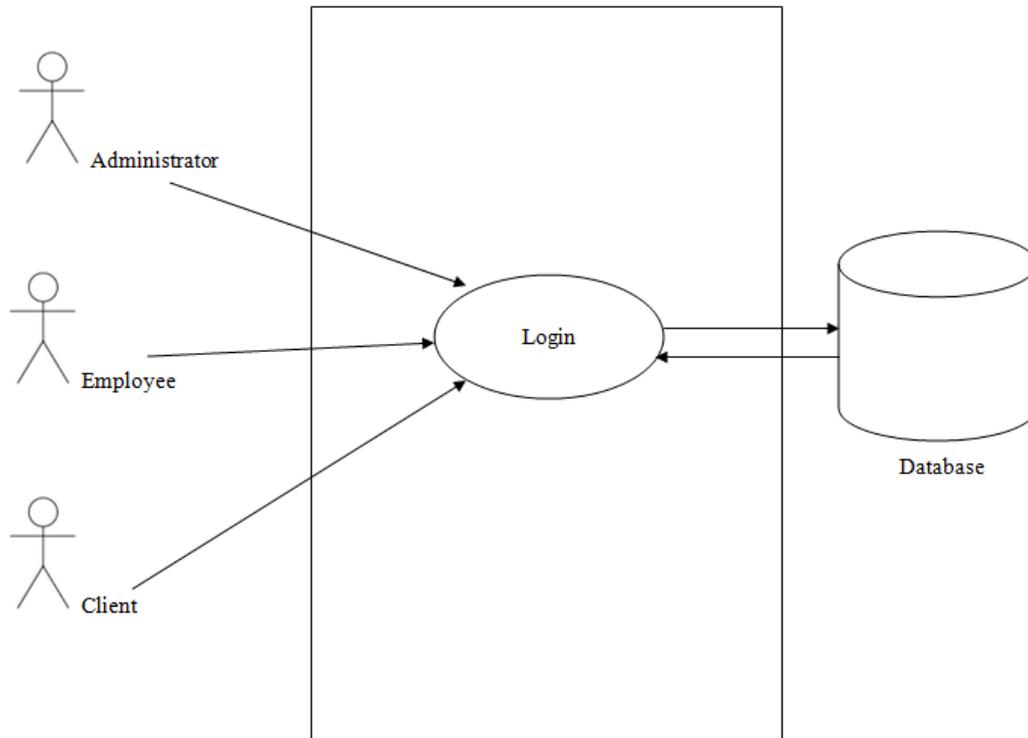


Figure 4. Login Process

The above figure points out the three users of the system, namely Administrator, Employee and Client. The users log into the system after validation succeeds.



Figure 5. Administrator's Role in the System

Administrator or Schedulers are one of the key users of the system. These users have the highest roles to play in the system. They can do the following

- Addition or deletion
  - Employee(s)
  - Project(s)
  - Client(s)
- Update the following information
  - Project

- Employee
- Client

### 3.10.2. Sequence Diagrams

Sequence diagrams model the flow of logic in a visual manner pertinent to the system.

Sequence diagrams are commonly used during analysis and design phases.

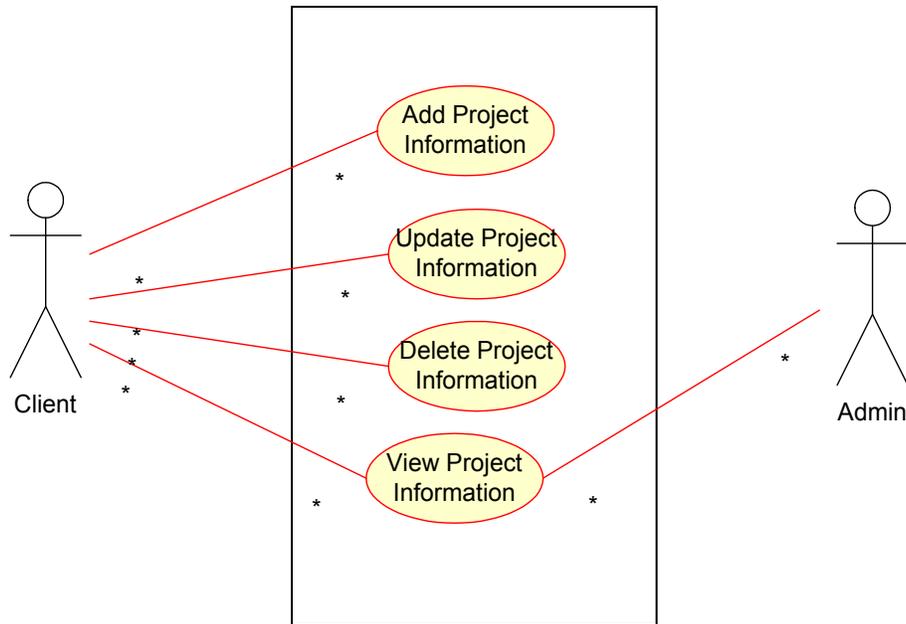


Figure 6. Client's Role in the System

The figure depicts the role of client in the system. Client can add or delete project information and view who is currently working on the project and its status.

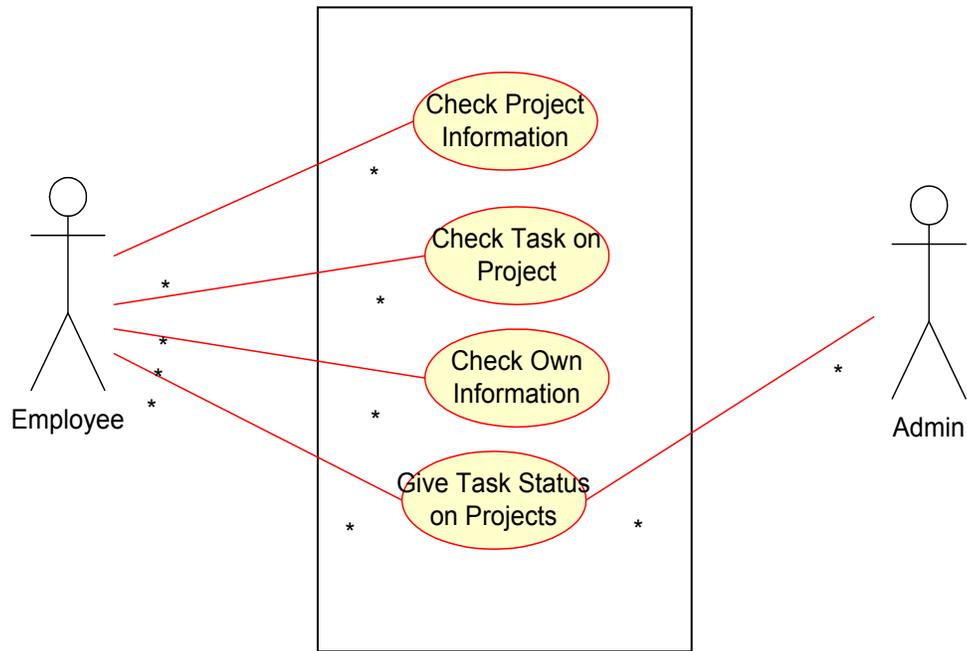


Figure 7. Employee’s Role in the System

The figure depicts the role of employee in the software system. Employee will be able to check project information, which task or module of a project has been assigned, change or update personal information such as contact information, name etc. and update project status on regular basis. These updates could be milestones achieved, hurdles faced etc.

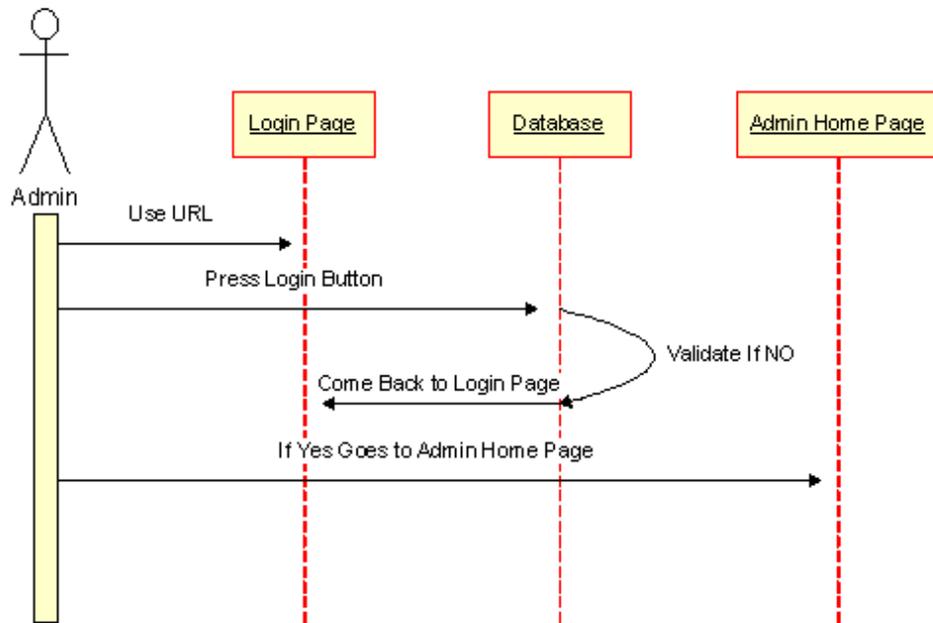


Figure 8. Sequence Diagram for Administrator Login

Administrator or Schedulers, click on the log in page. After entering the credential information, the information is validated in the backend. If the provided credentials are valid, scheduler's home page with their name is displayed. If the credentials are invalid, error message is displayed and redirected to login page.

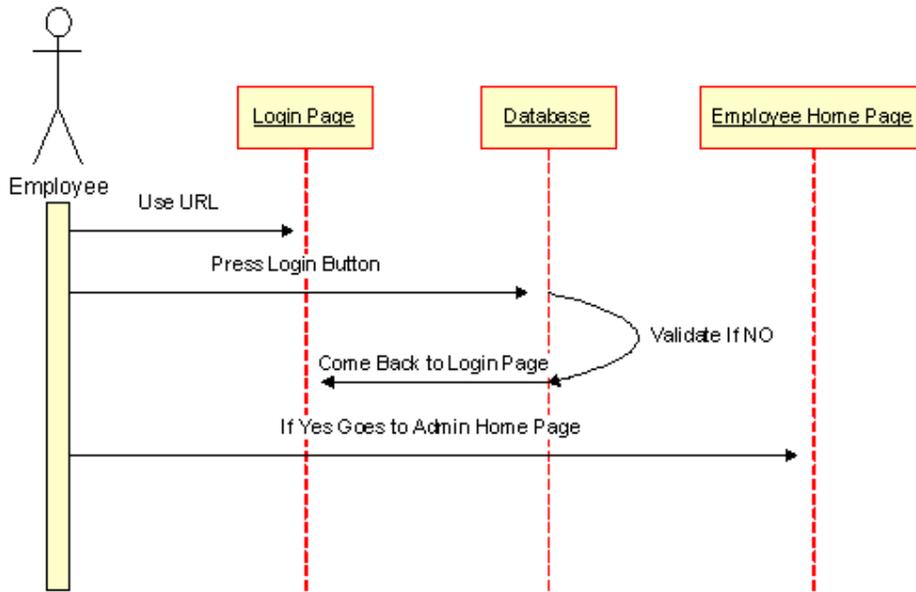


Figure 9. Sequence Diagram for Employee Login

Employee’s login to the system is very similar to the scheduler’s login. After entering the credential information, the information is validated. If the provided credentials are valid, employee’s home page is displayed with the employee name. If the credentials are invalid, error message is displayed and redirected to login page.

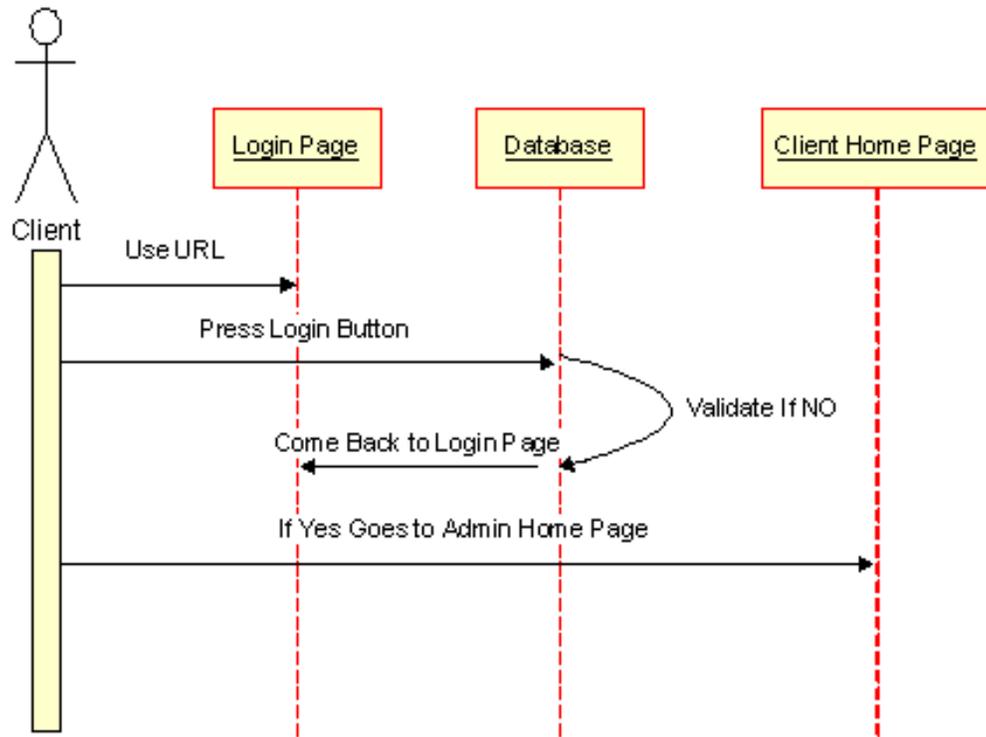


Figure 10. Sequence Diagram for Client Login

Client's login to the system is similar to the scheduler's or employee login. After entering the credential information, the information is validated. If the provided credentials are valid, client's home page is displayed with their name. If the credentials are invalid, error message is displayed and redirected to login page.

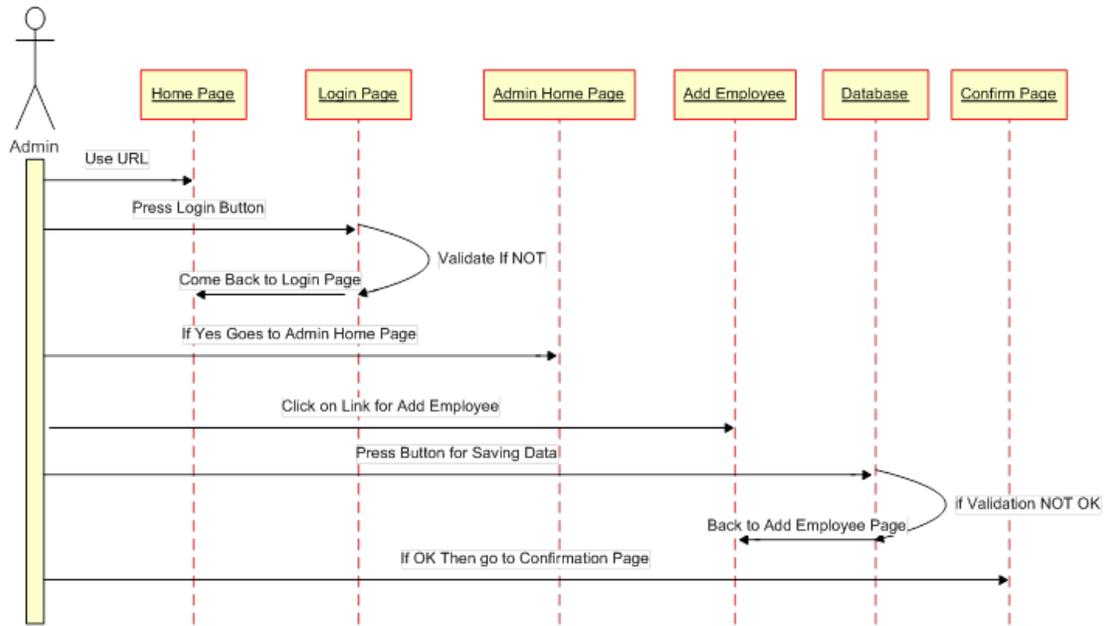


Figure 11. Sequence Diagram for Adding Employee

The above diagram portrays how an administrator or scheduler can add an employee to the system. Firstly, the administrator needs to login to the system with their credentials. After logging into the system, administrator is redirected to their home page. From the home page, administrator needs to click on the add employee option from employee menu. The employee information needs to be entered and click on submit. This information gets validated at the back end. If there are no anomalies, the information gets accepted and the new employee is added. In case of any anomalies, the scheduler is advised to correct or make changes to the field(s) necessary.

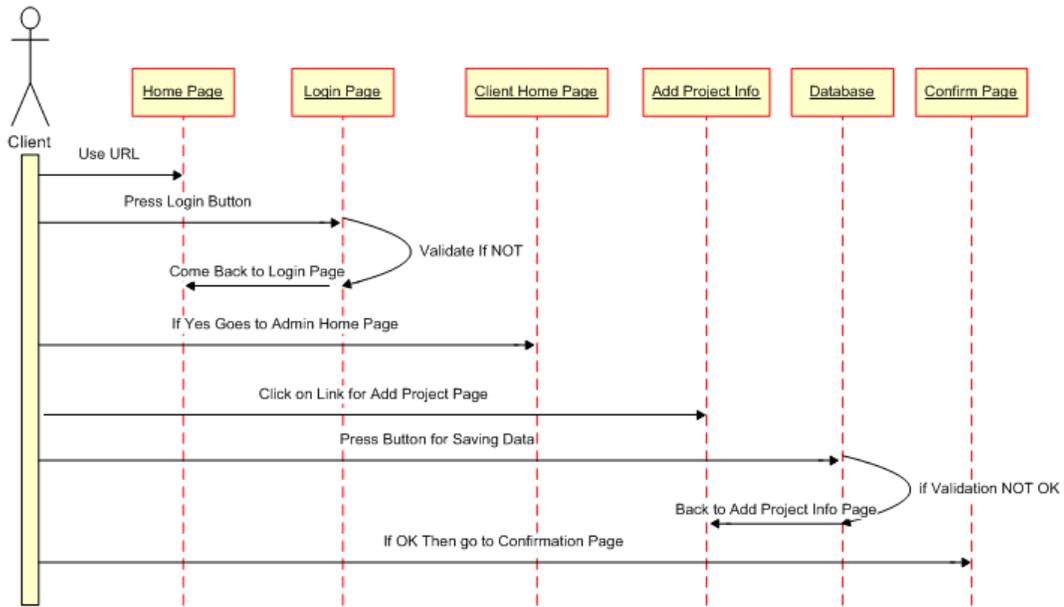


Figure 12. Sequence Diagram for Adding Project

The above diagram portrays how an administrator or scheduler can add a project to the system. Adding a project to the system is very similar to the module of adding employee to the system. The administrator needs to login to the system with their credentials. After logging into the system, administrator is redirected to their home page. From the home page, administrator needs to click on the add project option from Project menu. The project information needs to be entered and click on submit. This information gets validated at the back end. If there are no anomalies, the information gets accepted and the new project is added. In case of any anomalies, the scheduler is advised to correct or make changes to the field(s) necessary.

### 3.11. Data Flow Diagrams

A data flow diagram is graphical tool used to describe and analyze movement of data through a system. These are the central tool and the basis from which the other components are developed. The transformation of data from input to output, through processed, may be described logically

and independently of physical components associated with the system. These are known as the logical data flow diagrams. The physical data flow diagrams show the actual implements and movement of data between people, departments and workstations.

### 3.11.1. System Context Diagrams

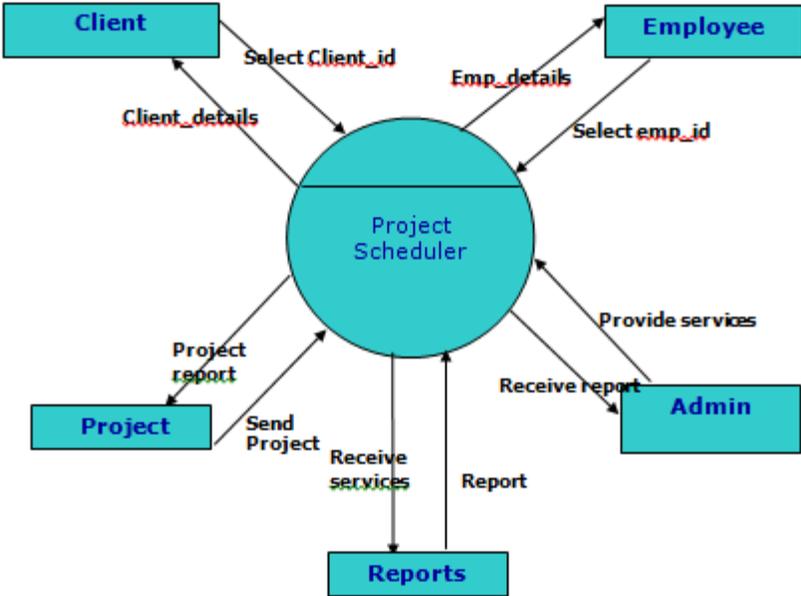


Figure 13. Level 0 Context Diagram

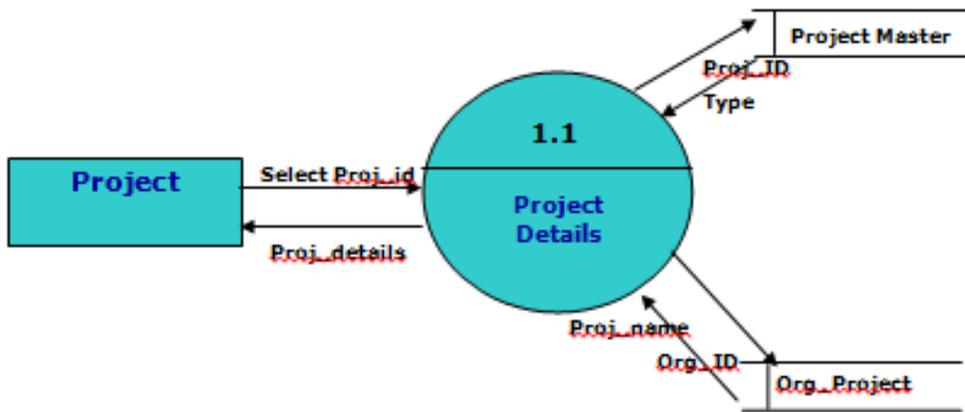


Figure 14. Level 1 Project Details

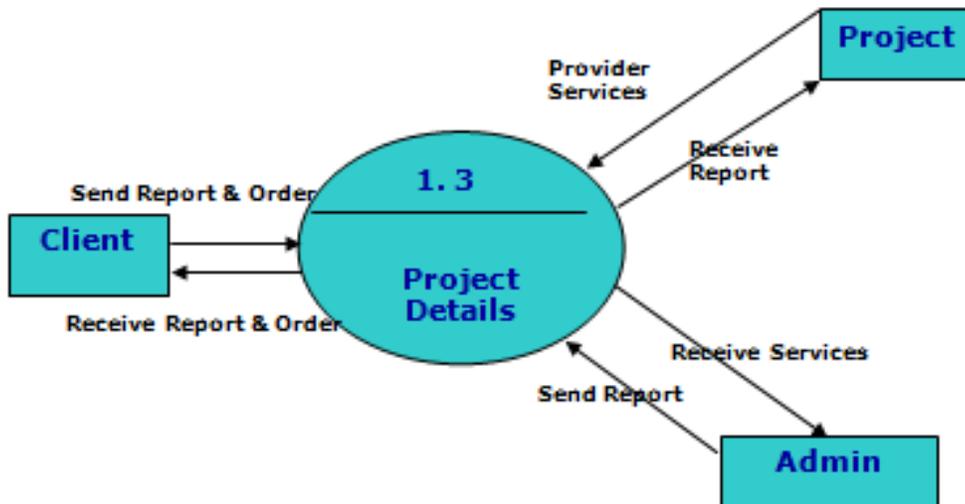


Figure 15. Level 1 Client Details

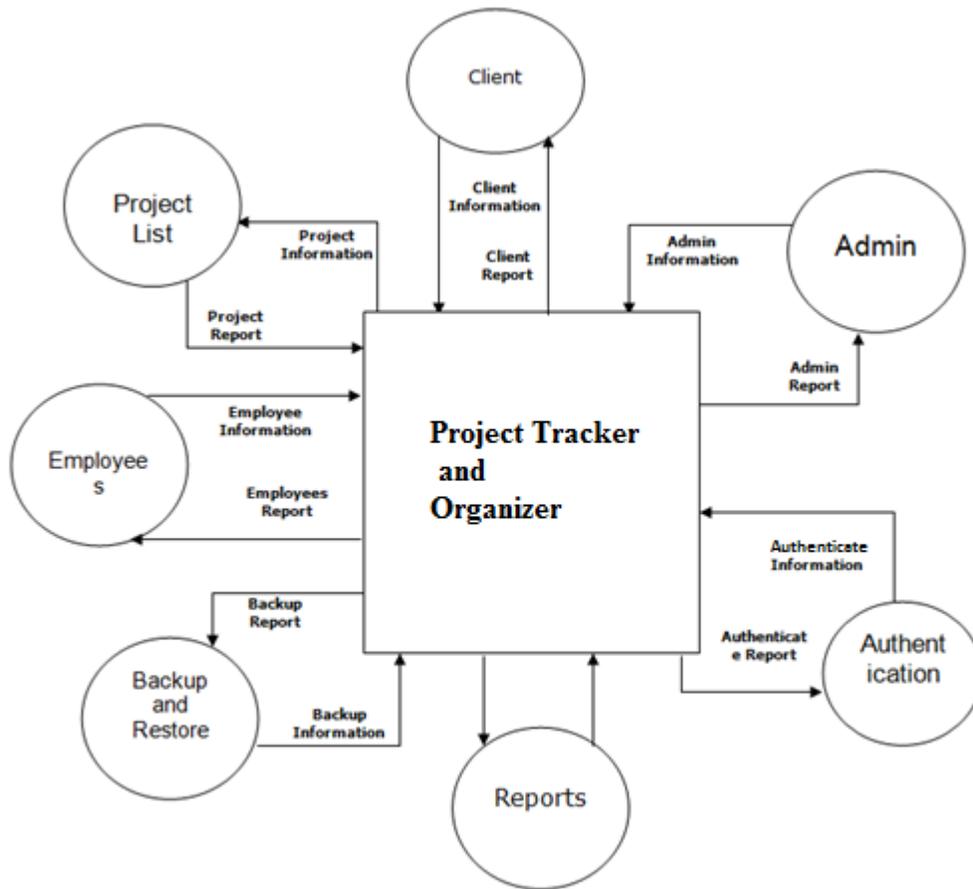


Figure 16. System Context Diagram

### 3.12. Data Dictionary

After carefully understanding the requirements of the client the entire data storage requirements are divided into tables. The below tables are normalized to avoid any anomalies.

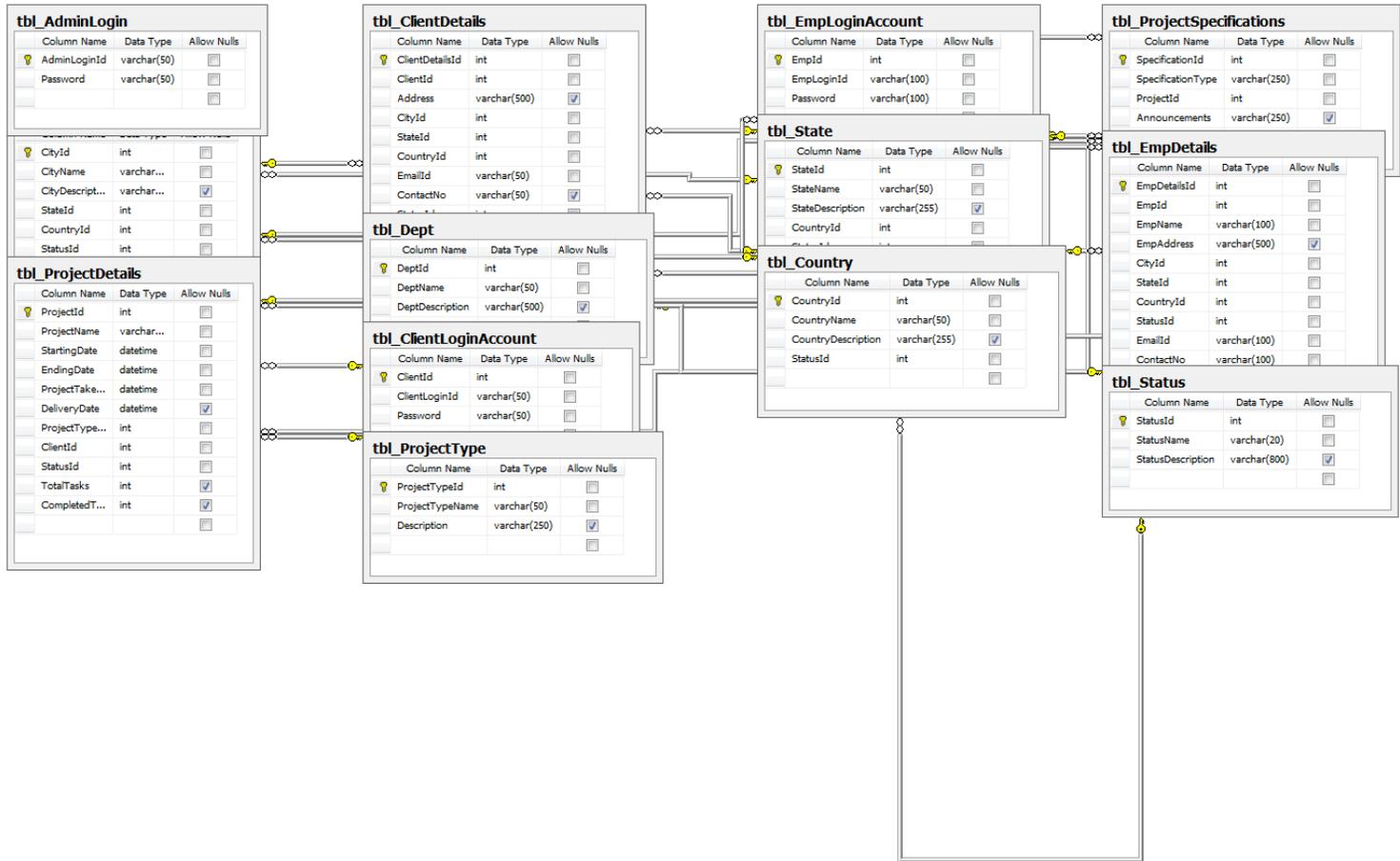


Figure 17. Database Tables

### **3.13. Development Framework**

Visual Studio.Net 2012 (Microsoft) is used for development of the product. C# (Evjen) was used as programming language with ASP.NET (Spaanjaars) was used for server-side web application framework. The chosen backend is MS SQL Server 2010 (SQL Sever 2008 R2).

### **3.14. Testing Phase**

Project Tracker and Organizer has been tested extensively. The following are the testing methods used to test the software.

#### **3.14.1. Equivalence Partitioning**

Divides input domain of a program into classes of data. An ideal test case single handled uncovers a class of errors.

Some of the test cases are: Employee login creation, client login creation, Deleting Employee, Deleting Client etc.

#### **3.14.2. Boundary Value Testing**

Boundary value testing compliments the equivalence testing. It selects the elements that are on the edges. Boundary value testing not only focuses on input conditions, but also on the output domain. A greater number of errors occur at the boundaries of the input domain rather than in the center.

Some of the test cases generated are: Checking incorrect user logins at different login pages; Deleting all employees and clients and check for the system errors.

### **3.14.3. Acceptance Testing**

Acceptance Testing is a testing to confirm that software is ready for delivery. Usually performed by team leaders, subject experts, test managers, delivery heads, end-users. Acceptance Tests are derived from the user stories that have been implemented as part of the software release

Acceptance Testing is classified into the following

- Alpha testing- performed at the organization before releasing the software.
- Beta testing- performed at the customers place by the end-users

Test case scenarios for the acceptance tests are: Project assignment to idle employee; Deleting or adding employees; adding or deleting projects; adding or deleting clients; updating project information etc.

### **3.14.4. Integration Testing**

In this phase of testing, individual modules are combined and tested as a group. Data transfer between the modules is tested thoroughly. Integration testing is carried out by testers.

Incremental approach: Top to down or bottom to up approach can also be used in case of partial development.

Integration testing has been done during partial development.

### **3.14.5. Regression Testing**

Regression testing comes into play after change in software patches or when new modules are added. Regression testing re-executes some subsets of tests that have been conducted. Testing was done as new modules were added to the project to confirm the validity of the project.

### **3.14.6. Unit Testing**

Testing of software in its smallest testable parts called units is unit testing. Each unit is independently tested for proper operation. In this project, unit testing was done manually.

## 4. RESULTS

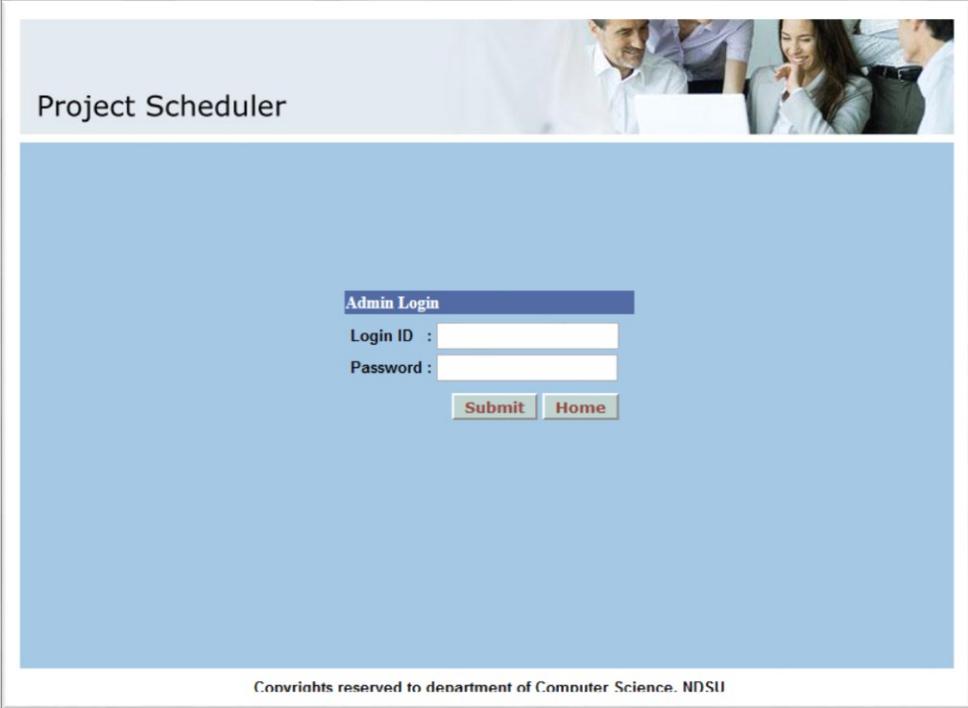
Project Tracker and Organizer has been tested using white box and black box testing strategies. The program has been debugged and tests have been run again. The program has passed the applied testing methodologies.

The following figures are the output of the project. The outputs have been divided according to the user roles.

### 4.1. Administrator or Scheduler

Administrator has the full access to the system. They can add, delete or update any information. Only administrator gets to upload project specification.

The following is the administrator's log in page. Scheduler or administrator provides the credentials and they are validated in the backend.



The screenshot shows a web page titled "Project Scheduler" with a header image of people working. The main content area is light blue and contains an "Admin Login" section. This section includes a blue header, a "Login ID" field, a "Password" field, and two buttons: "Submit" and "Home". At the bottom of the page, there is a copyright notice: "Convrihts reserved to department of Computer Science. NDSU".

Figure 18. Administrator Login Page

The following is the Administrator's home page. Once the credentials have been validated at the back end, administrator's home page is displayed. As the administrator has a wide role to play, the menu options are also wide. Administrator can update, delete or add projects or employees or clients. Each menu options 'Client', 'Employee', 'Projects' is where these changes are made.

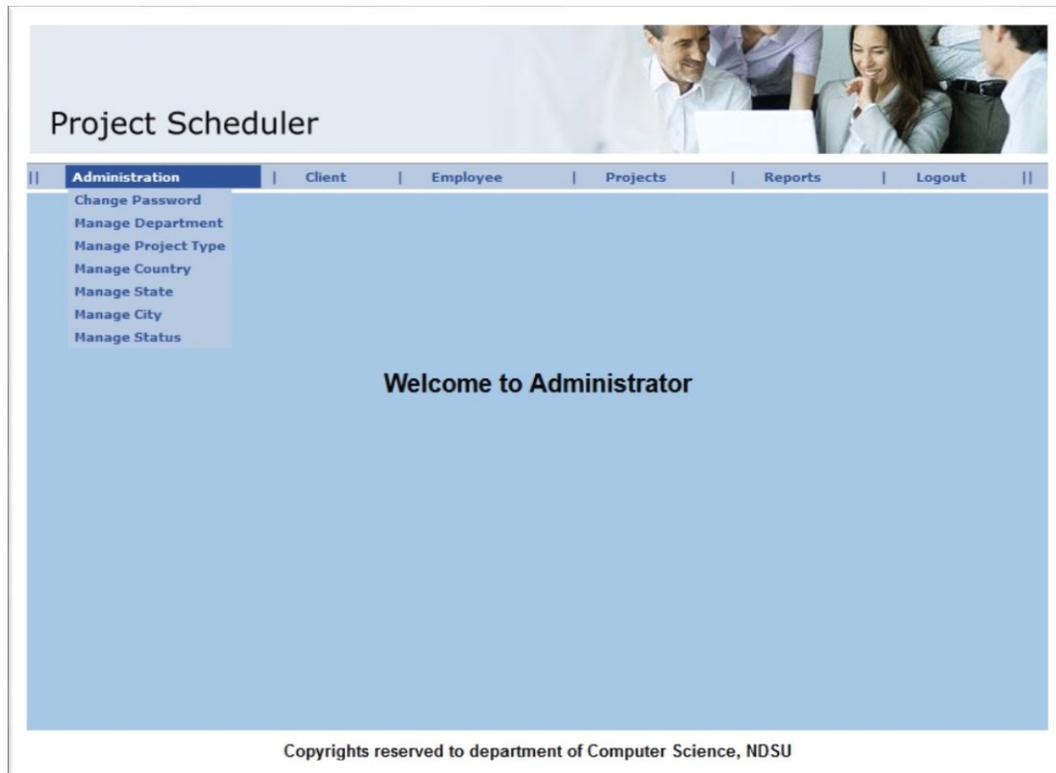


Figure 19. Administrator's Menu Options

Employees fall into one or more departments. For instance, an employee could be wholly part of a development department or could also belong to server department etc. Depending on the size of the project(s), departments might needed to be added or modified. Administrator can make the necessary modifications to the departments. New departments can be added, existing departments can be modified or deleted as well.

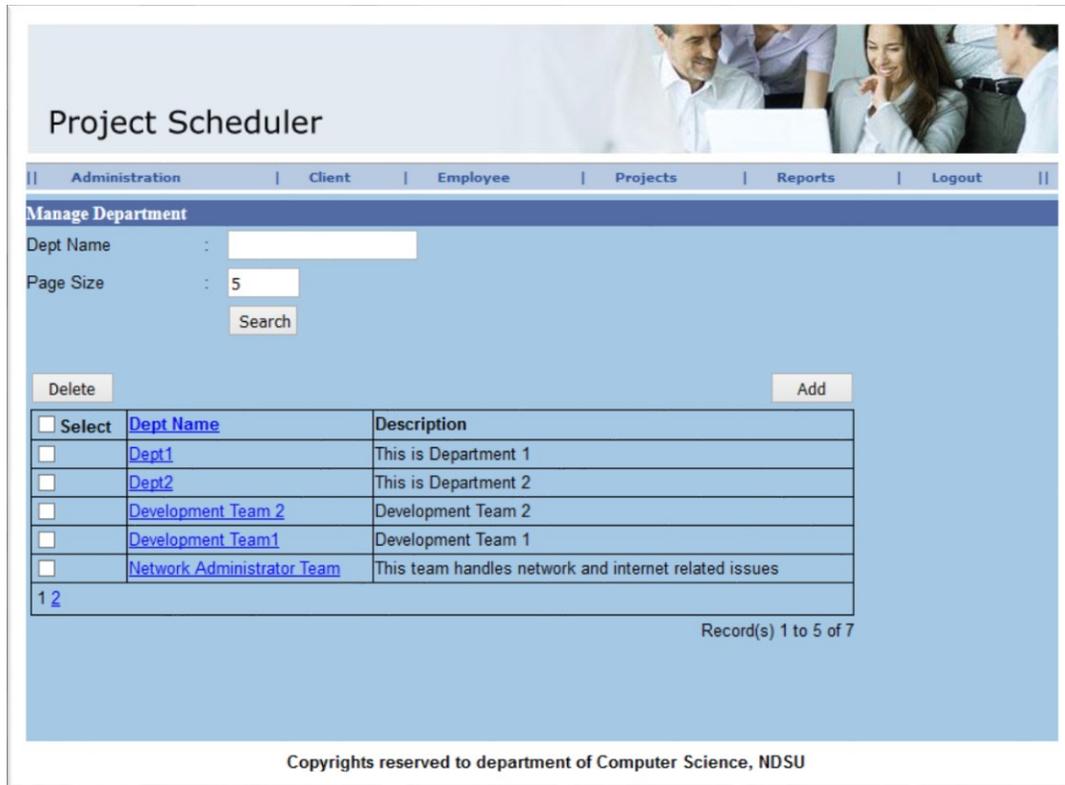


Figure 20. Managing Department

In an organization or a department, employees are either transferred from one department to another depending on the requirement. New employees might be joining or leaving the organization. These changes need to be handled by the administrator or scheduler. The following figure portrays the page where employees are added or deleted as needed.

In case, if all employees need to be deleted or removed, *Select All*, lets select all the employees. The selected employees can be deleted by clicking on *Delete* button. The individual check boxes by the employee name can be checked if that specific employee needs to be deleted.

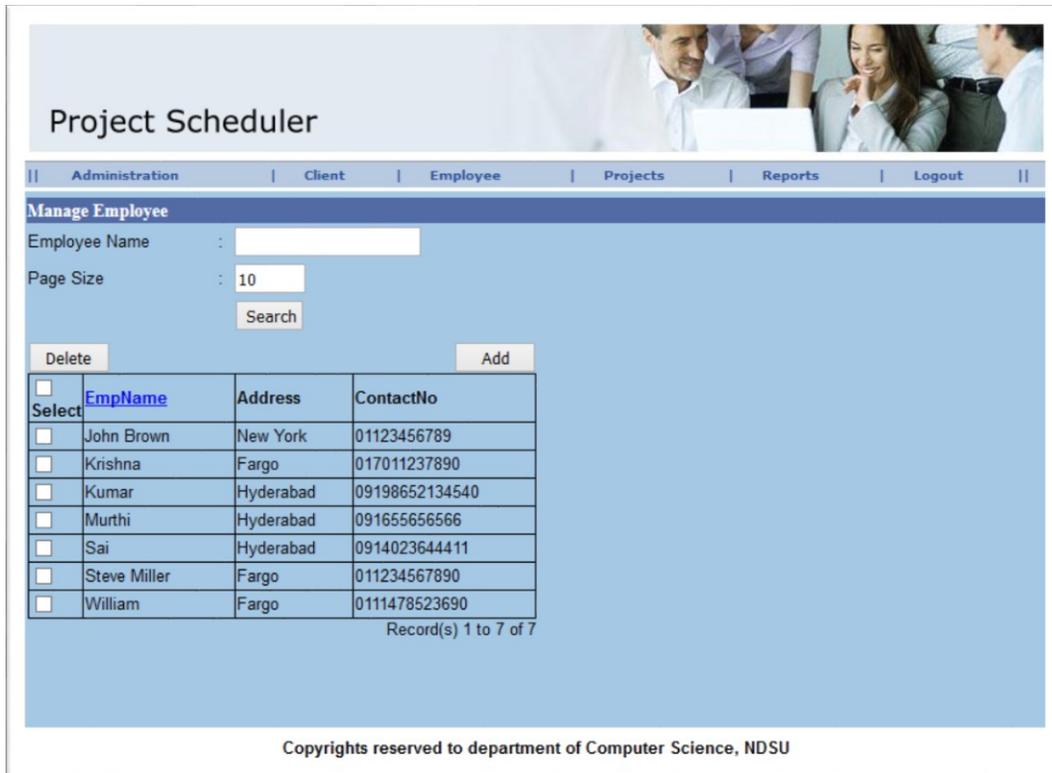


Figure 21. Managing Employees

As the organization grows, so are the number of projects. Projects need to be added or deleted or updated accordingly. Modifications to the projects are done only by the schedulers or administrators.

The following figure displays the project management page. Adding or deleting are done by clicking on the respective buttons. Project modifications to the existing projects can be done by clicking on the project title. This will redirect to modifications page, where the necessary changes can be done. The check boxes make it easy to delete all the projects at once instead of deleting them individually. Also, if only a particular project needs to be deleted, the checkbox next to the project that's needs to be deleted, is checked and deleted by clicking on *delete* button.

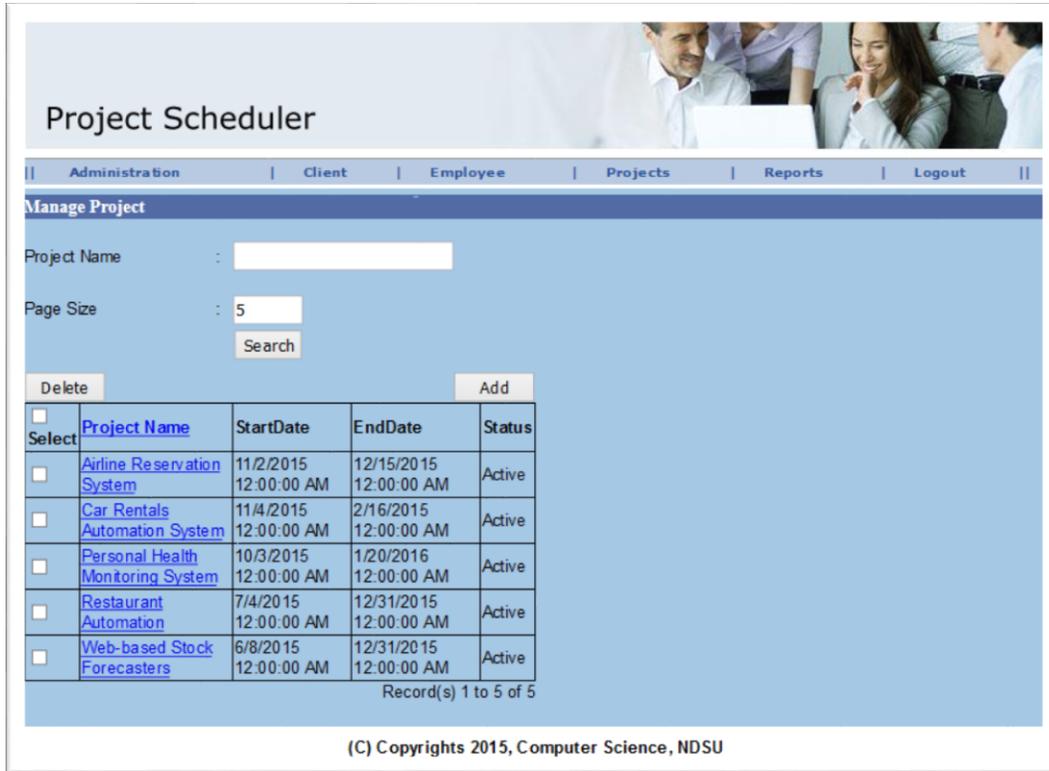


Figure 22. Managing Projects

#### 4.2. Employee

Employee is one of the key users of the system. They will be able to log into the system and see if they have been assigned any project(s). The following is the login page of an employee. They need to provide their credentials in the following page.

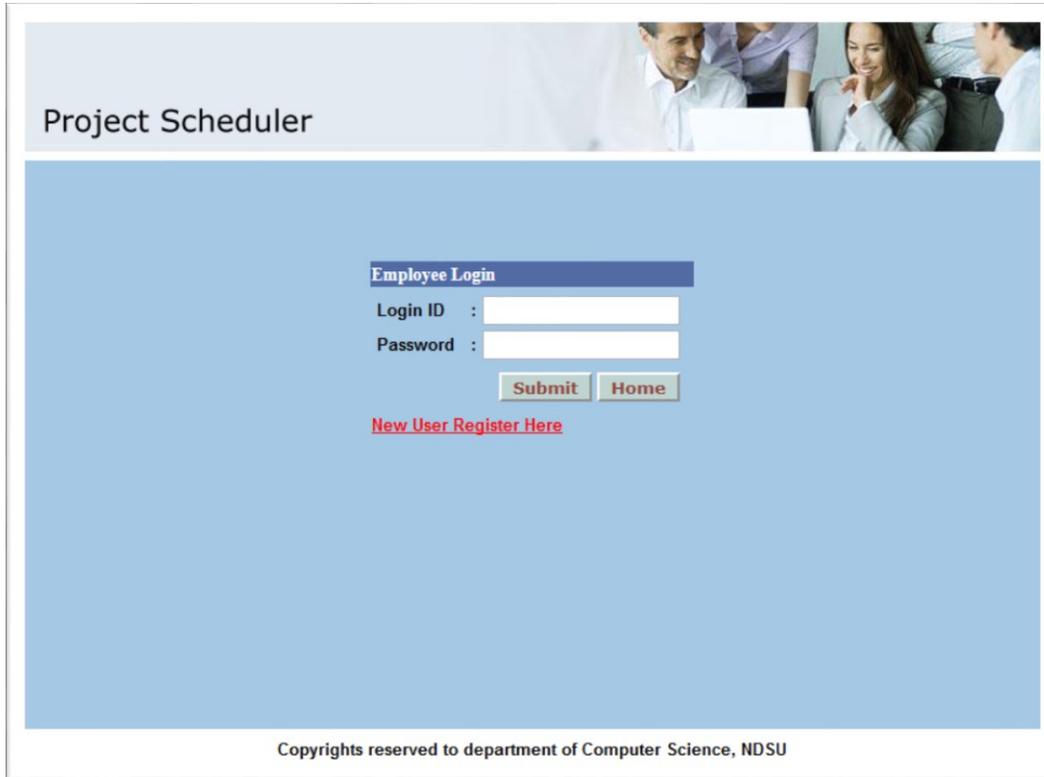


Figure 23. Employee's Login Page

Employees in the Project Tracker and Organizer will be able to make changes to their personal information. Information such as, their name (in case of name changes), address, phone number etc. and click on *update*. If at some point during updating their information, employee decides to abort the changes, they can click on *back* button. Any changes are aborted.

**Project Scheduler**

|| Check Details | Chage PassWord | Projects | Reports | Logout ||

**Update Employee Registration**

\*- Mandatory fields

Employee Name\* : Krishna

Address : Fargo

Country Name\* : US

State Name\* : North Dakot

City Name\* : Fargo

Status\* : Active

EmailId : krishna@gmail.com

ContactNo : 017011237890

Dept Name : Development Team 2

Update Back

Copyrights reserved to department of Computer Science, NDSU

Figure 24. Employee's Personal Details

One of the important goals of the Project Tracker and Organizer is to obtain project status. Status updates like who is working on a particular project, what milestones have been accomplished or issues faced by the employee(s) etc. In the employee module, employees will be able to update the tasks of the assigned project. The following page allows the user(s) to update their work progress. They also have an option to enter how many tasks have been completed. This number will provide the percentage of the project completion.

The screenshot displays a web application titled "Project Scheduler". At the top, there is a navigation bar with links for "Check Details", "Change Password", "Projects", "Reports", and "Logout". Below the navigation bar, the main content area is titled "Project Report (Employee Daily status)". This area contains a form with the following fields and controls:

- CompletedTask**: A large text input field.
- ReportingDate**: A date input field showing "10/22/2015" with a calendar icon.
- Completed Tasks**: A text input field.
- Working Hours**: A text input field.
- Submit**: A button located below the "Working Hours" field.

At the bottom of the page, there is a copyright notice: "Copyrights reserved to department of Computer Science. NDSU".

Figure 25. Daily Status Update Page

### 4.3. Client

Clients are important stakeholders of a project(s). They would be interested to know about the progress of the project, who is working on the project etc. They need to log in to the system and get the updates about the project. After login, it gives them an overview of the phase of the project and how far it's from completion. The following is the client login page.

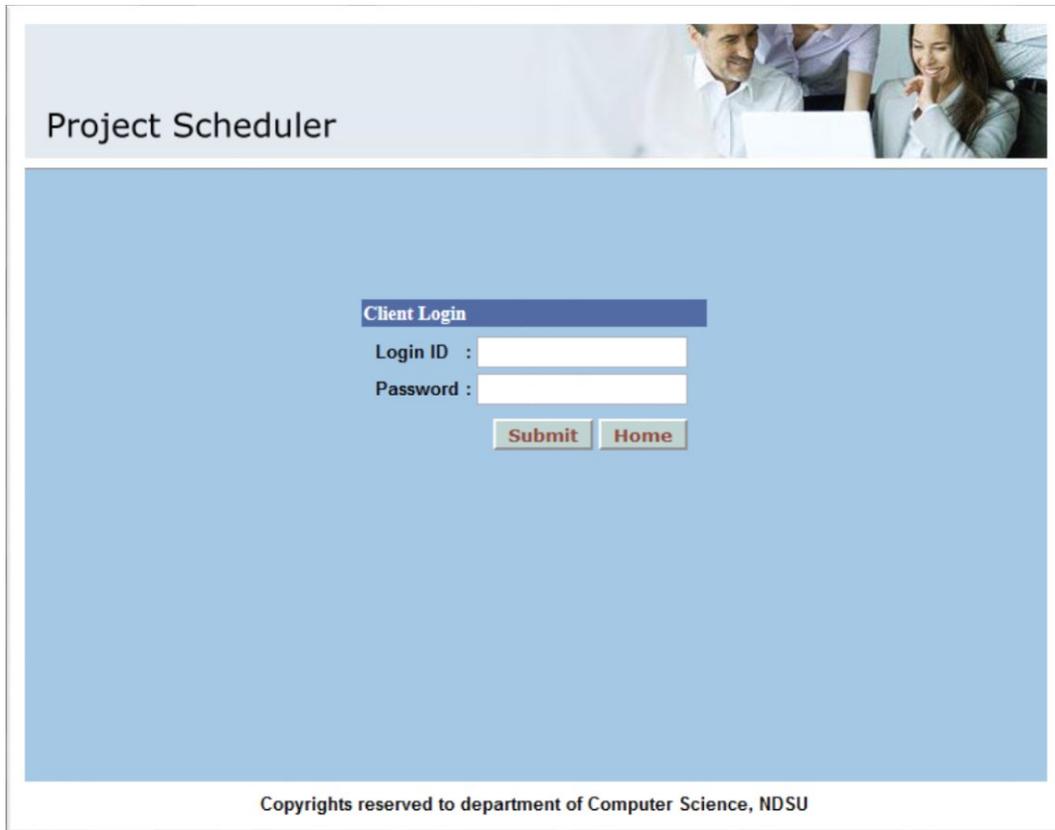


Figure 26. Client Login Page

Once the credentials have been validated for a client, they are directed to their home page. On this page, they have the option of getting the project status of their project(s). They can also get information about the company under *About Us* menu. The project development organization can be contacted clicking on *Contact Us*. *Logout* option logs out the client.

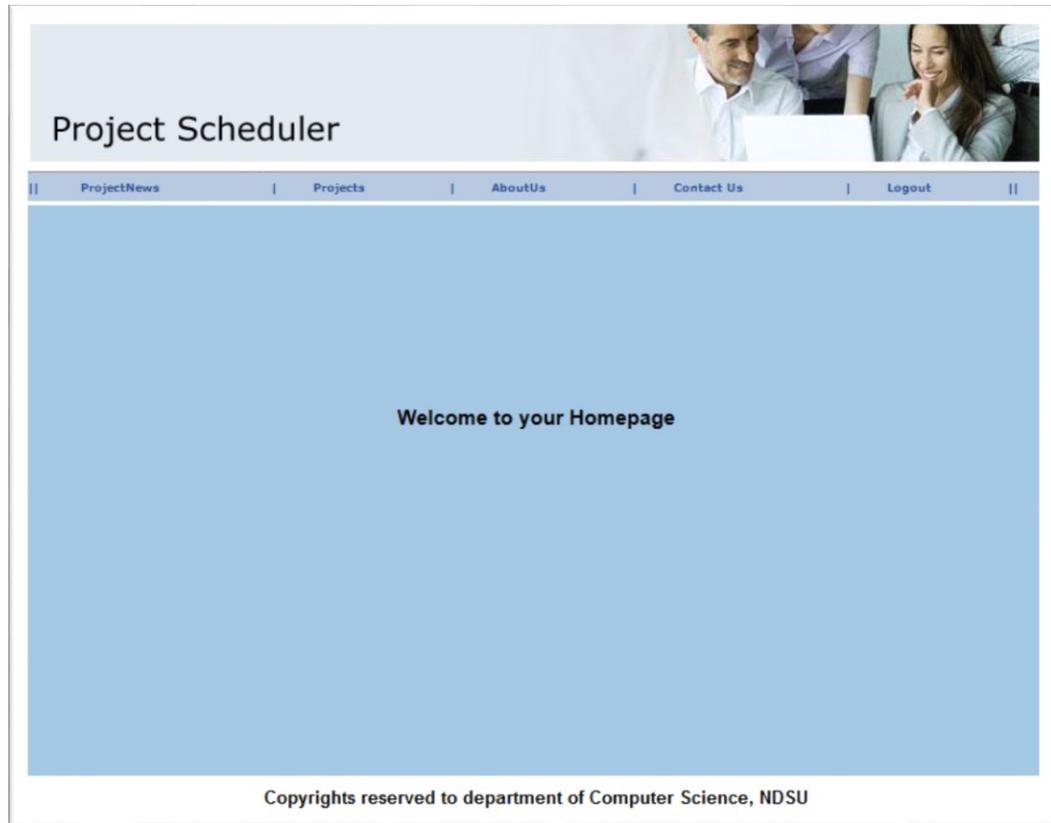


Figure 27. Client's Home Page

The following page provides the status information of projects to clients. The information presented is the start date of the project, planned end date of the project. It also provides information about when the project was originally taken up, what type or kind of project it is and the percentage of completion. This information will give an overall understanding of where the project stands in the software life cycle.

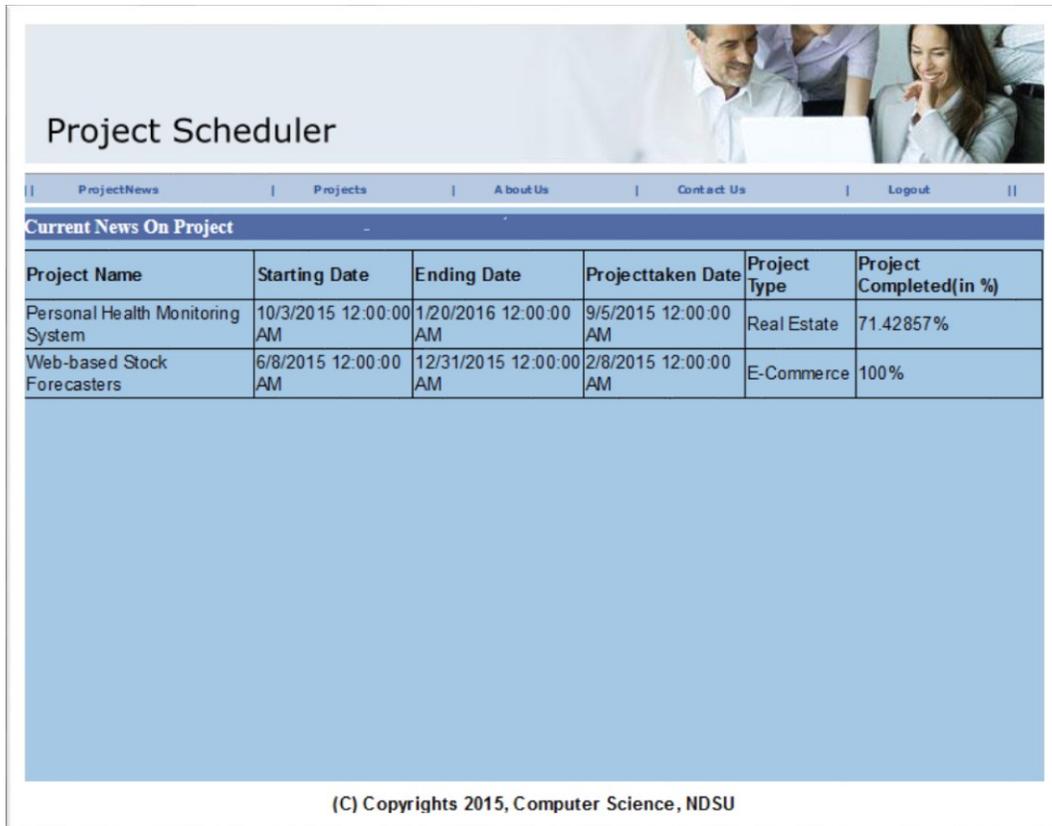


Figure 28. Status Report of Project(s)

## 5. CONCLUSION AND FUTURE WORK

### 5.1. Conclusion

Project Tracking and Organizer was developed according to the requirements laid out in the requirements phase. This project offers users to enter the data through simple and interactive forms. Sometimes users need to update the data they have entered. This is provisioned in the software. However, some of the primary data cannot be altered. Only administrators or schedulers have the access modify this information. This keeps the validity and integrity of the data. Navigation from one page to another is made easy.

The performance of the system is reliable and efficient. Page load takes less than few seconds. This of course is contingent with the internet or data speed.

Centralized database has been used. This helps in faster retrieval of data when compared to distributed database designs. Data retrieval is fast and quick. Data update, deletion and addition have been fast. Anomalies are checked every time data has been modified. If any errors or anomalies are found, user is given a warning to change and/or correct them. Users can always abort any changes if required.

Report generation can be viewed both by client and administrators. This page contains the projects being dealt, who is working on the project and the percentage of completion. This automatic report generation eases the job of project management eliminating manual/paper process.

The Project Tracker and Organizer has been resource efficient. With minimal hardware specifications, the project can run fast. It does not need too much system memory and resources. With a .Net framework and a web browser, the project can be accessed from anywhere.

## 5.2. Future Work

Picture describes more eloquently than words. Project Tracking and Organizer could use some graphical representation. Some of the GUI areas to focus on for future work are

- Project Tracking and Organizer is mainly designed for small to medium projects and businesses. This project can be scaled to address larger projects and teams.
- Progress bar could be used along with percentage of completion of project. This will give a better understanding the project status.
- Email notification system can be added to this system. As and when a project is assigned to an employee, an email will be sent with the project details and team members.
- Project Tracking and Organizer could benefit from an intelligent heuristic algorithm (Pyle). The usage of algorithm aids the schedulers during the project assignment.

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