VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Integrating Gantt Chart with Workload Management

J Component Report

Submitted by

Team Members:

NAME	REG. No.
Mihir Gupta	19BCE0619
Shivansh Gupta	19BCE0661
Shashwat Sinha	19BCE0684

in partial fulfillment for the award of the degree of

B.Tech

In

COMPUTER SCIENCE ENGINEERING

Under the Guidance

Of

Faculty: Prof. Swathi J.N

School of Computer Science and Engineering

JUNE 2021

DECLARATION

I hereby declare that the J Component report entitled "**INTEGRATING GANTT CHART WITH WORKLOAD MANAGEMENT"** submitted by me to *Vellore Institute of Technology, Vellore-14* in partial fulfilment of the requirement for the award of the degree of **B.Tech** in **Computer Science and Engineering** is a record of bonafide undertaken by me under the supervision of **Dr. Swathi JN.** I further declare that the work reported in this report has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

DATE: 04-06-2021

Name: MIHIR GUPTA
Reg. No. : 19BCE0619

Name: SHIVANSH GUPTA
Reg. No. : 19BCE0661

Name: SHASHWAT SINHA
Reg. No. : 19BCE0684

ACKNOWLEDGEMENT

The completion of this project would not have been possible without the kind support and help of many individuals. We would like to extend our sincere thanks to all of them.

We would like to express our profound gratitude and deep regards to our teacher Prof. Swathi J.N for her guidance and constant supervision throughout the semester as well as for providing necessary information regarding the project and also for their support in completing the project.

We would like to express our gratitude towards our parents for their kind co-operation and encouragement and also providing us the means for proper completion of the project.

Our thanks and appreciations also go to fellow members of the group in developing the project and people who have willingly helped us out with their abilities.

EXECUTIVE SUMMARY

Project management includes defining, planning, managing and controlling the workload between various people in the development team for the proper completion of any project or task. It is important to recognize that all projects need some level of project management. The larger and more complex the project, the more there is a need for a formal, standard, structured process. Smaller projects still need a structured process, but it does not need to be as elaborate or as complex. Obviously, there is a cost to the effort associated with project management, but there are many benefits that are obtained as well.

Our software **Gantt ProX** is designed to provide the fundamental structure you need to develop a successful project, including a step-by-step approach, starting with the basics and getting as sophisticated as you need for your particular project. **Gantt ProX** is a flexible and scalable software for managing the workload as a project manager. The basic philosophy is "large workload distribution for large projects and small workload distribution for small projects". **Gantt ProX** shows you what you need to know to manage projects of all size, ranging from the basic task scheduling to the complex gantt chart.

The software **Gantt ProX** contains two major views. One view is based on the Project Manager module which incorporates showing important tasks, setting up the workload, managing the team and most importantly viewing the progress of the project. Each process is described from beginning to end with all the start and end dates. The second view is based on the Project Team module where the same content is mapped into the assigned tasks and status of each task to administer the progress of individuals by the manager.

TABLE OF CONTENTS

Title **Pg. No**

LIST OF FIGURES

INTRODUCTION

1.1. ***Objectives:*** Numerous project management software are rapidly improving due to business globalization and advancement in information technology (IT) which support distributed and virtual project teams. The aim of this project is to develop an efficient and flexible project management system with special focus on scheduling, workload management, gantt chart and progress tracking. The software developed during the course of this project should provide the complete solution to some of the major problems of planning and tracking small or big projects faced by various teams including the project manager. Due to the nature of this software, it is necessary for it to be platform independent and scalable. At last, we tried to give at most preference to the user interface we design so that it is easy to use for all category of users.

1.2. ***Motivation:*** Project management, work collaboration and progress tracking consume a significant amount of project managers' and workers' time. As more companies and industries move toward electronic commerce and digital business a large percentage of projects involve software development. Statistics of some big industries show that, up to *70%* of the developers' time on a large project is spent on planning and other pre-project management activities, which could easily be solved with the use of management software like ours. This type of software will also be beneficial to conclude a project in a cost-effective way, as some other stats show that *approx. 80%* of the project cost is spent on the project management, progress tracking and scheduling post development maintenance activities. Considering these statistical figures, we derived the objective for this project. In which a web based software named ***Gantt ProX*** will be developed to reduce the excess time and money spent due to all pre development activities during a project.

1.3. ***Background:*** Most of the project management software present till date provide a detailed view of all the necessary administration features, so we tried to implement a significant part of one such software which provides features like – sighting the assigned task and updating individual status, creating new project, editing the team members, workload distribution among the team with due date, previewing gantt chart and current progress of the project as per task completed. All this with a simple front-end interface where user will be able to input project details in various tables according to the need and scheduling algorithm working in the back-end connected to the database.

PROJECT DESCRIPTION

The software ***"Gantt ProX"*** developed during course of the project titled, ***"Integrating Gantt Chart and Workload Management"***, aims at providing a Project Management tool that not only showcases the ability to display Gantt Chart for the respective data entered by the user, but will also devise a workload management system that thoroughly tracks the working and time/effort management of each individual activity. The project aims at providing an activity tracer which monitors the respective workload divided among the task force available. Also, the processes can be looked upon on a daily basis to monitor proper and timely ongoing of the project.

1.4. ***Stakeholders (assumed userbase for the software):***

i. **Companies:** any software company which develops applications and software's have dedicated project management teams, they can use our software to generate Gantt Charts and activity manager for their respective project. The interface will allow two different logins:

   a. PROJECT MANAGER: the project manager is responsible for generating the Gantt Chart and activity model for the project and also is responsible for the division of work amongst his subordinates. He has control over the data that is presented to all the team members and can manage different tasks accordingly.
   b. DEVELOPERS/ TESTERS / OTHER TEAM MEMBERS: they are the subordinates who are made available with their own login accounts. They can view the data and timelines set by the project manager and also add individual comments/ views on the work assigned to them.

ii. **Students/Entrepreneurs:** students and entrepreneurs can also use this software on an individual level if they want a detailed division of tasks and timeline while preparing some product. They can login individually and work on the timelines they set for themselves.

iii. **Professors/Teachers:** people working on some work of document or research paper can also use this software to schedule their tasks and workload division.

iv. **Other Individuals:** the software is not limited to people who want to develop software products. Any person who want to schedule a task for themselves and need a visual representation of the work and time scale can use this software to their benefit.

TECHNICAL SPECIFICATIONS

This project is created to facilitate easy development of an important aspect of Software Project Development i.e., Gantt Charts. Proper project development requires proper project scheduling and timely work completion. With our website, we aim at providing the users a simple and easy to use web application to facilitate this process of Workload Management successfully.

Every journey begins with a single step, and surely the first and the most important step in any Software Project is proper scheduling of tasks so that the work done can be tracked and no unnecessary time is wasted. With our website in working, Users can join as a group or even as individual entrepreneurs and can schedule their tasks properly. We also aim at providing a progress bar with which the users can easily track their progress and can feel happy about the time and effort they put in.

With the idea to help people easily schedule tasks for their projects and for groups to come together and work as a team, we aim at providing a simple GUI such that users can easily interact and work in a simple to use cluster free environment.

1.5. ***Software Process Model:***

We have chosen **Throw Away Prototyping** as our software process model due to the following reasons:

- Throw away prototyping is used when the requirements are not clear in the beginning and changes need to be made at regular intervals until agreed upon by the client. Our project incorporates Gantt Chart Creation based on user filled information. Requirements regarding the details to be included along with the basic Gantt Chart functionalities are not clear at this time.

- Throw away prototyping is also useful as the model provides the ability to take client feedback at regular intervals in order to improve upon the existing outcome.

- With throw away prototyping (unlike exploratory development model) , we don't have to work on the actual project from the beginning, instead we work to create a prototype(GUI) which visually represents what the final outcome will look like. As we are not working on the actual project instead just creating a prototype, necessary changes can be made without sacrificing the integrity and structure of our code. This will help save both time and effort.

1.6. ***Software Requirements:***

- Based on the userbase for the software, we have derived the following requirements.

Shall Requirement
The user SHALL be able to create a new account or log into their existing accounts.
The users SHALL be able to view tasks and update status for each task assigned to them.
The user SHALL be able to create a new project or join an existing project.
The user SHALL be able to generate code and share with other people who can join the team later.
The user SHALL be able to enter project description and enter workload distribution
The user SHALL be able to view the Gantt chart and progress bar based on the data inputted.
The user SHALL be permitted to delete completed projects and tasks.

1.7. *System Features (Module Wise):*

LOGIN PAGE AND SIGN-UP PAGE:

This page follows the user authentication and authorization functionality. Here the user is supposed to enter valid credentials and log into the website.

Functional Requirements:

1. The system should present the user with a login page that also contains information about the website.
2. The system shall allow first time users to 'sign-up' and already existing users to 'sign-in'. Thus, two options need to be provided to help with the user authentication and authorization process.
3. For first time users, the system shall allow a sign-up option.
4. For first time user, the system shall allow user to enter their details such as their Full name, email address and password and secure a free account.
5. If the user already has an account, they must be able to log-in the website using their verified credentials.
6. The system should be able to recognize between valid and invalid login attempts. An invalid login attempt should be met with an error message.

HOME PAGE:

This is the main screen corresponding to the user. From here the user can view of list of available tasks that he needs to complete and can also navigate to his list of projects.

Functional Requirements:

1. Once the user has successfully logged into the website, they must be presented with a home page.
2. The system should display the user information to the user.
3. The user should be given options whether to join an existing team or to create their own new project.
4. The system should provide a 'Join Team' option to the users. The user should be able to enter a valid project code to join a pre-existing project team as a member.
5. The system should provide a 'Your Projects' button. When the user clicks on this button, they should be directed to a new page where they should be able to see a list of all their projects.
6. On the home screen, the system shall display the various tasks the user needs to complete in order to contribute to the projects they are a part in. These tasks can be a part of both their individual projects or team projects that they are a part of.
7. Each task will have the 'Project Name' (to distinguish between tasks of different projects) and the 'Task Title' mentioned for easy recognition of the tasks and to distinguish between them.
8. The system should provide a 'Update Status' button. Selecting this, the user can set the task status to 'In Progress' or 'Completed'. Once the user selects one of the two options, the 'Update Status' button will change to the desired set value.
9. The system shall present 'In-progress' option with Yellow color and the 'Completed' option in green color.
10. The system should allow the user to remove completed tasks form there 'Assigned Tasks' list for easy understanding of remaining tasks.

YOUR PROJECTS:

This screen functions as the menu for the list of all the different projects that the user is currently affiliated with. From here the user can access all of his projects at once. He can also join an existing project or create a new project from scratch as he goes along the way.

Functional Requirements:

1. The system should allow the user to view their projects under the 'Your Projects' menu.
2. If the user has no project, the system should display a message indicating that.
3. The system should present the user with a 'Add' button. Clicking this the user should be able to add a new project to the list of projects.
4. Each new project created should be presented with three options/ tabs for the user – 'Edit Team', 'Manage Projects' and 'View Progress'.
5. The system should direct the user to the 'Edit Team' page if the user clicks on the 'Edit team' tab for that respective project.
6. The system should direct the user to the 'Manage Project' page if the user clicks on the 'Manage Project' tab for that respective project.
7. The system should direct the user to the 'View Progress' page if the user clicks on the 'View Progress' tab for that respective project.
8. The user should be presented with a 'Assigned Tasks' tab. The system should take the user to the Home page where the different tasks of the user are mentioned if the user clicks on this tab.

EDIT TEAM:

The user can work on a particular project and if he is the head of any project, he can manage his team and his team members form here. This screen displays all the team's members currently working on the project. Here the user can make use of the project code and distribute among piers to add them to the team.

Functional Requirements:

1. The system should provide the user the option to Edit Team for their projects.
2. The user should be able to see a list of all the members who are a part of their Project. Initially there will be no member except the user themself, so the user can copy the 'Project Code' and send to the respective members. When the other users will use this code in the 'Join Team' option provided on their home page, then they will be directly added to the Project.
3. The system should provide the user with a 'Copy Code' button to facilitate easy access to the Project Code.
4. The system should display a list of all the members that are part of the project under the 'Your Team Members' menu.
5. The system should allow the user to enter the project description.
6. The system should make sure that the user who creates the project should be given the 'Manager' rights. He should be able to alter the data and details related to the project. Other users who join using the 'Project Code' will be given the 'Member' access only. They can view the data but should not be given access to change the data.
7. The system should provide the user with a 'Proceed' button. This will take the user to the 'Your Projects' tab.
8. Once the user has successfully created a new project, the same should be visible under the 'Your Projects' menu.

MANAGE PROJECTS:

This screen manages the workload distribution and progress management of the project. With tasks and their timelines entered by the user, the user can generate a Gantt Chart and Progress bar that aims at providing a graphical and easy to understand method of work distribution.

Functional Requirements:

1. The system should provide the user with an option to enter data for the workload distribution.
2. The system should provide an 'Add' button for the user to create new processes.
3. The user should be able to enter the 'Process Name', 'Process Duration', 'Start Date', and 'Employee Assigned' for each process.
4. For the 'Employee Assigned' tab, the system should provide the user with a dropdown menu consisting of all the team members including the user (with manager rights himself). This way the 'Manager' can assign work to one or more team members.
5. Once the manager assigns work, the same task should be made available under the tasks section of each individual team member.
6. The system should display a progress bar. Based on the percentage of work completed, the progress bar should keep changing its progress value.
7. The amount of work completed should be directly connected to the 'Update Status' tab of individual users. The system should be able to keep track of the assigned work and the amount of work completed.
8. Under the 'Workload Distribution' tab, the system should showcase 'Status' section that displays whether a task/ process has been completed, is in progress or due.
9. The system should provide the user with a 'Proceed' button that will direct the user to the main Home Screen.

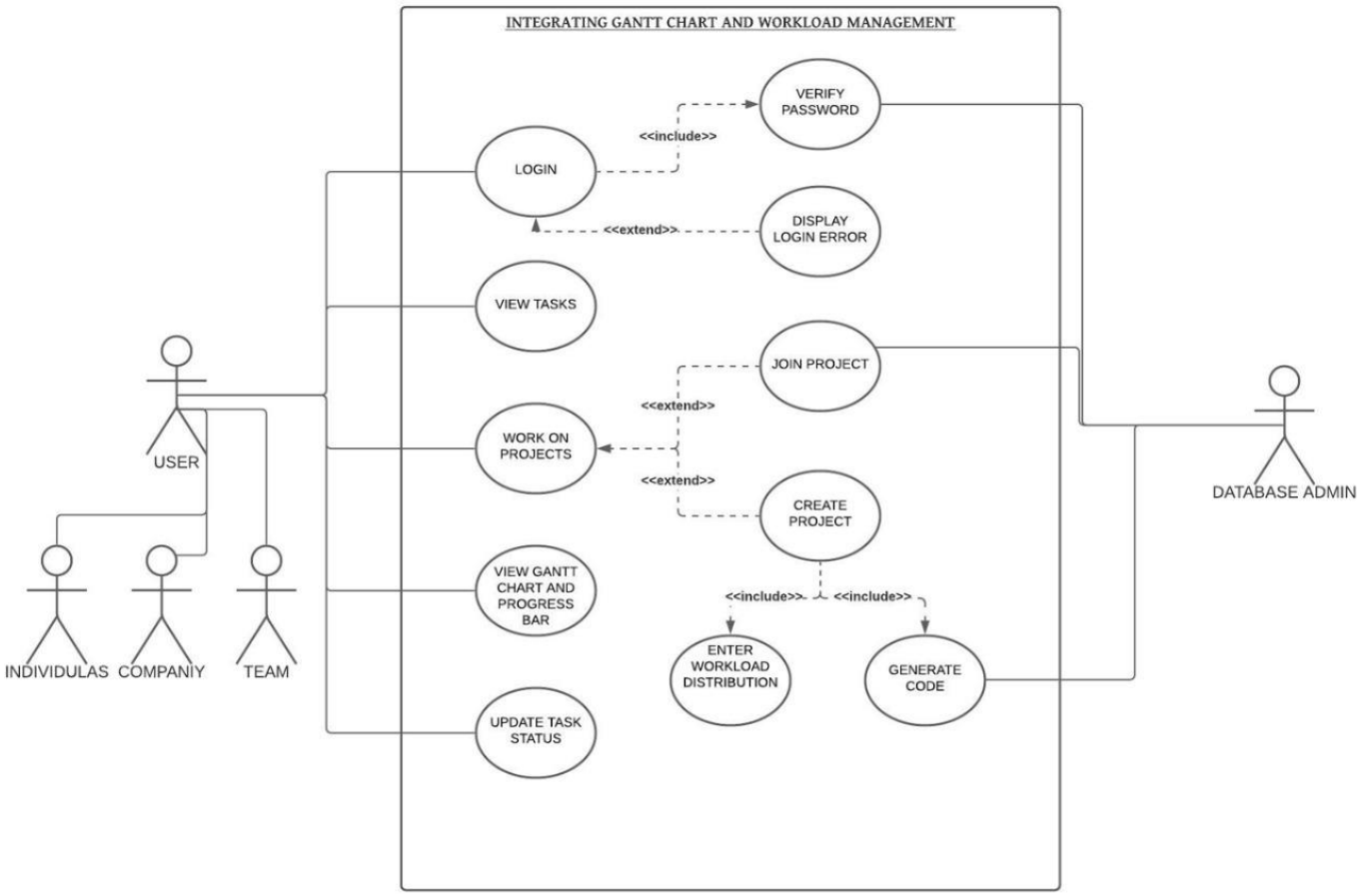
VIEW PROGRESS:

This screen displays the Gantt Chart and the progress bar and easily tells how long the project has been going and what all activities have been completed.

Functional Requirements:

1. The system should display the user with a 'Gantt Chart' based on the workload distribution entered by the user.
2. The right to change the content of the Workload Distribution that in turn affects the Gantt Chart should only be given to the user with managerial rights. All other team members should only have 'Read-only' access.
3. The system should also display the 'Progress Bar' that shows the progress of the project based on the number of tasks completed by the users.
4. The system should display the Project description for such as Project-Name and other details entered by the manager.
5. The system should provide the user with a 'Proceed' button that will direct the user to the main Home Screen.

1.8. ***Use Case Diagram –***



DESIGN APPROACH AND DETAILS

1.9. ***Module Decomposition:***

The web application **"Gantt ProX"** has been decomposed into the following modules –

i. ***The Sign-In Sign-Up Module:*** This module helps existing users or even first-time users to enter their details, secure a free account and enter into the software for further work.

ii. ***The Home Page Module:*** Here the user can take a look at all their remaining tasks corresponding to the respective projects they are a part of.

iii. ***The Your Projects Module:*** This module provides a comprehensive look into all the projects that a user is a part of. This contains all the projects including the one's that the user has developed.

iv. ***Edit Team Module:*** Here the user can copy the team code so that it can be transferred to all other team members for joining the team. The user can view a list of all the team members who have already joined the project.

v. ***Manage project Module:*** This module allows the user who has created the Project to enter the workload details and generate a Gantt Chart and a Progress Bar.

vi. ***View Progress Module:*** This module displays the Gantt Chart and the Progress bar relating to that project.

1.10. ***Data Dependencies:***

The following Data Flow Diagram shows the data dependencies of each module.

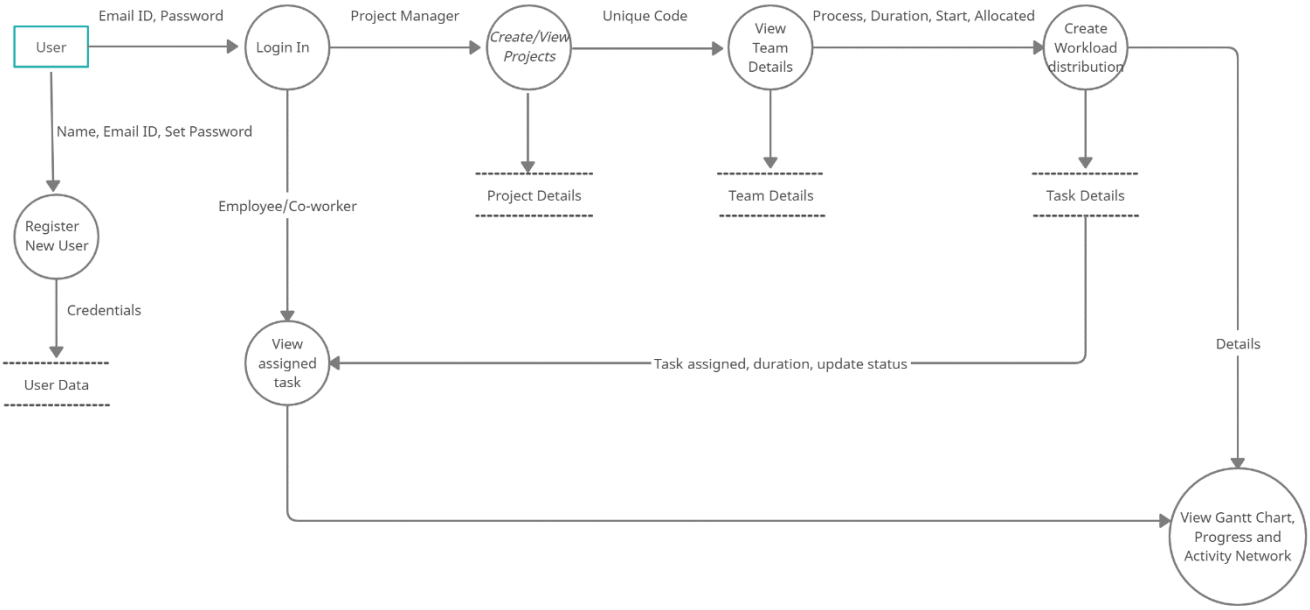


Fig. 4.2.1: DFD

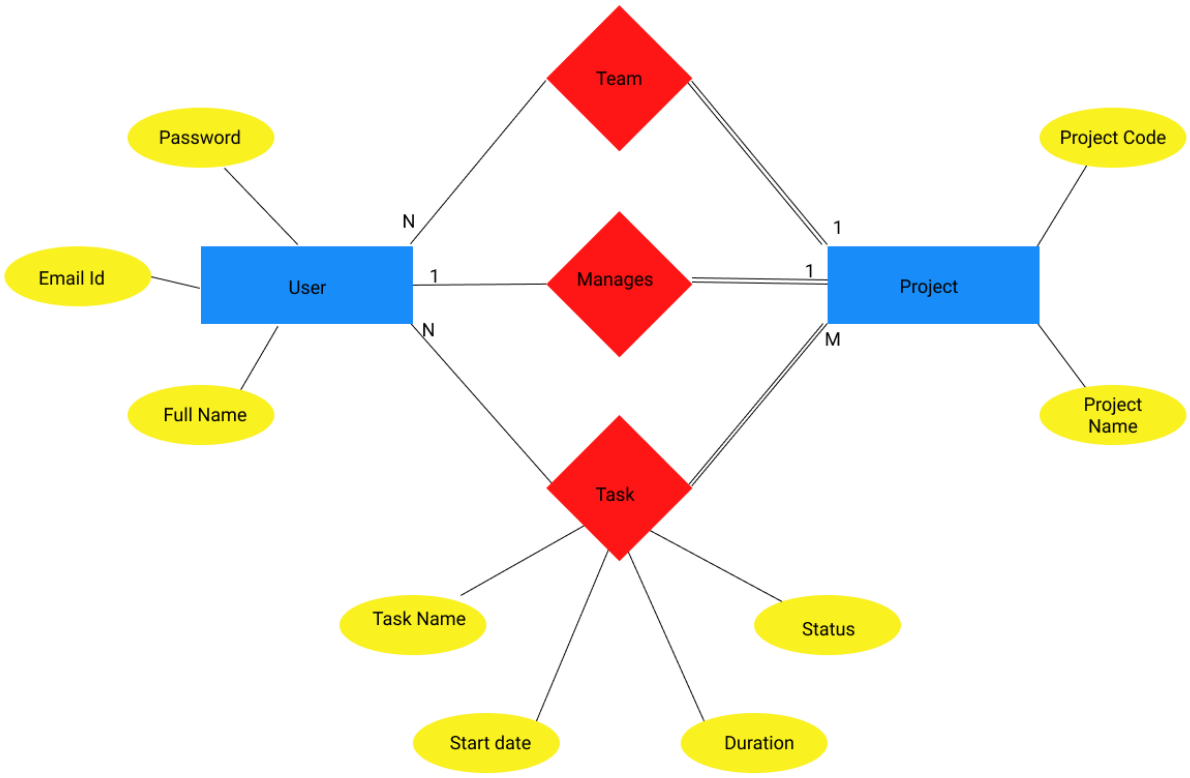


Fig: 4.2.2: ER Diagram

1.11. ***Detailed Design:***

i. Authentication Module –

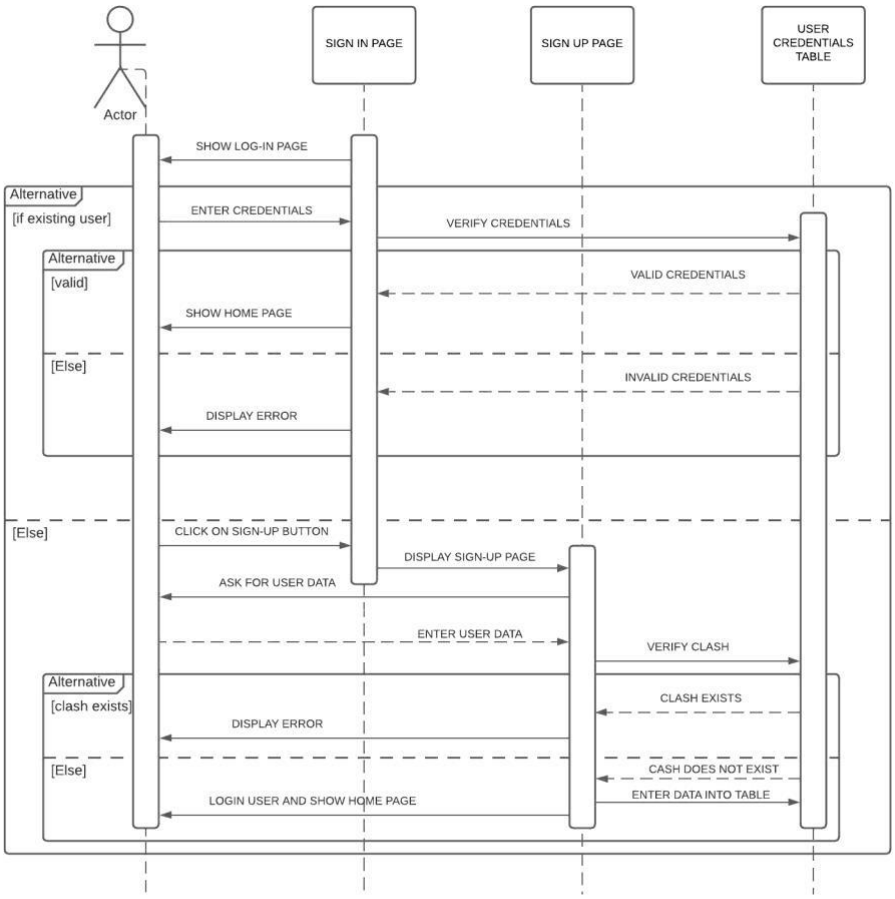


Fig 4.3.1: Sequence Diagram of Authentication Module

ii. Home Module –

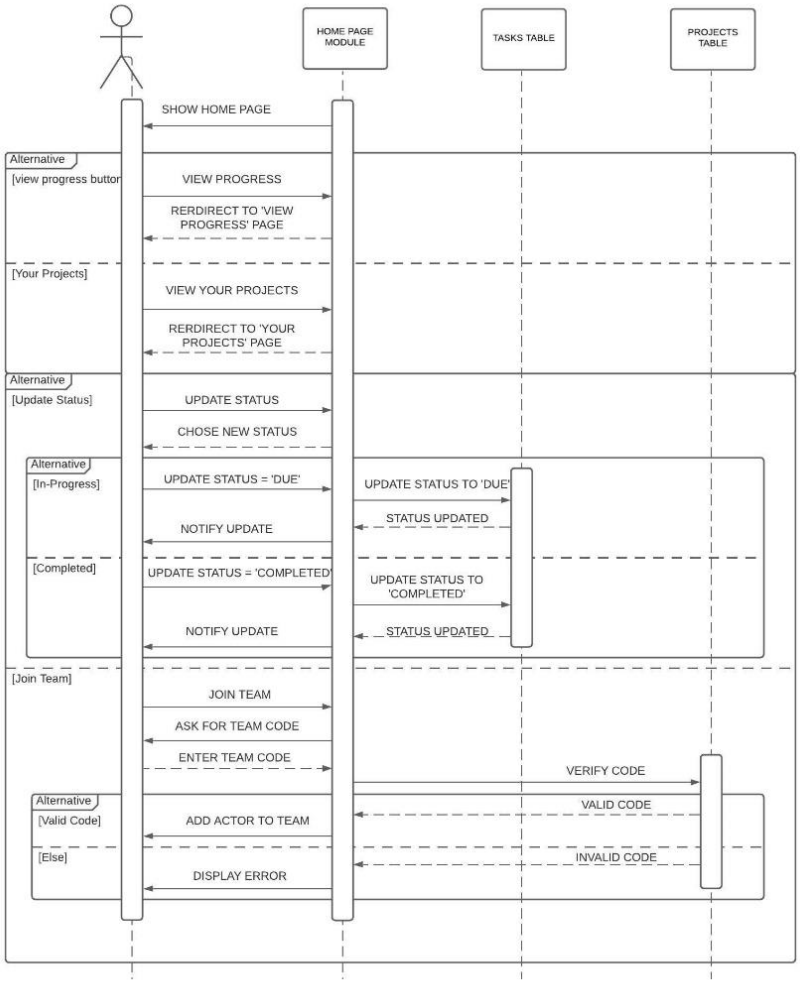
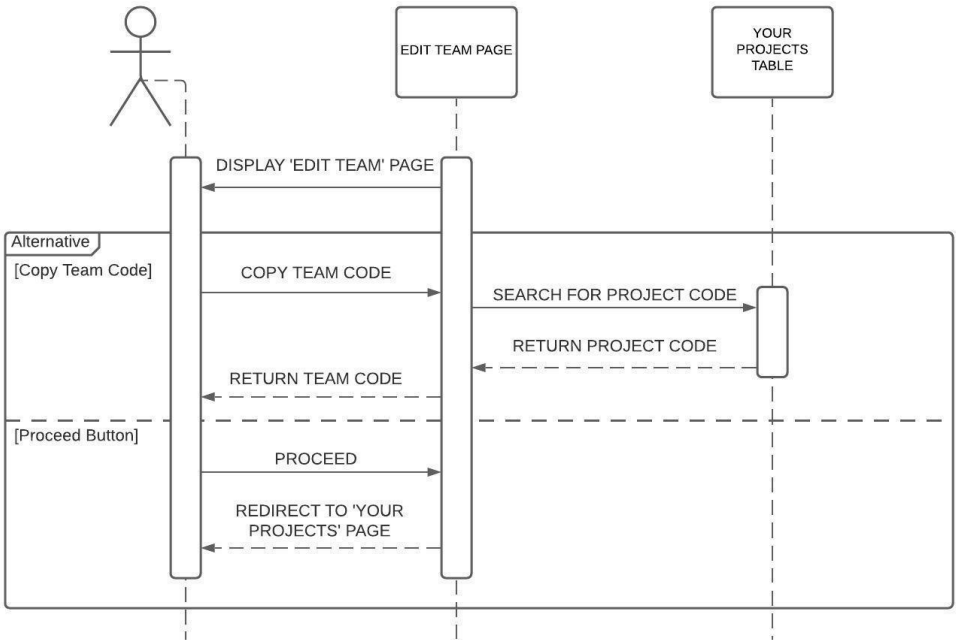
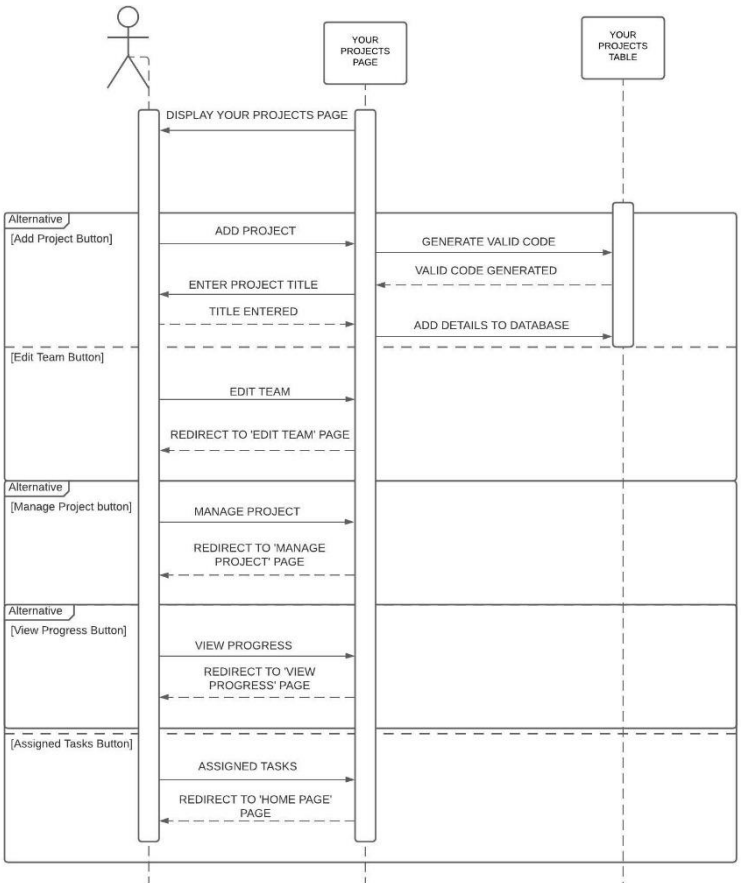


Fig 4.3.2: Sequence diagram home module

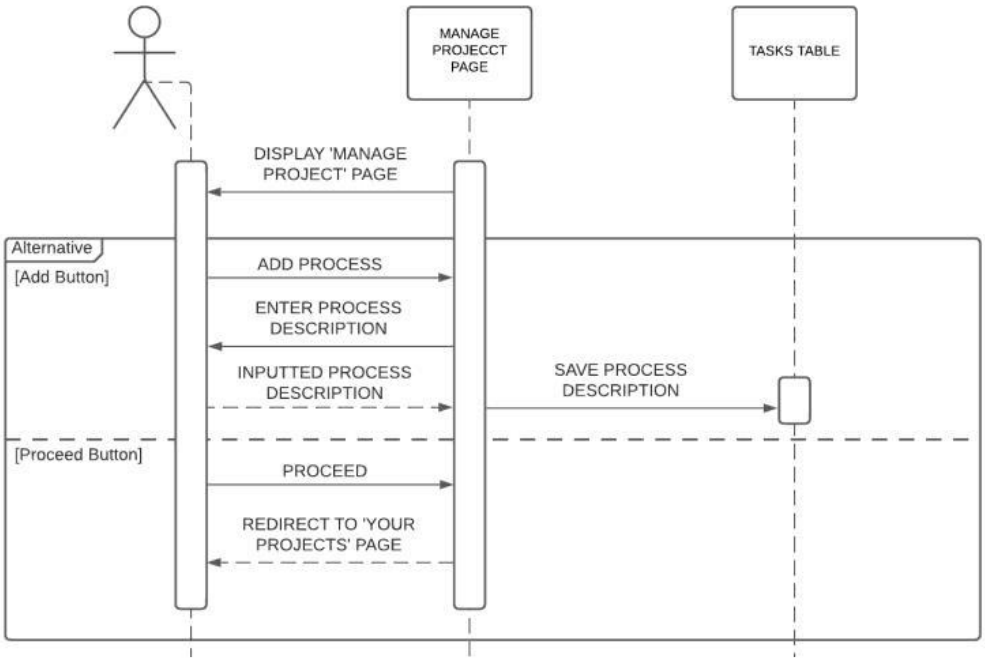
iii. Edit Team Module –



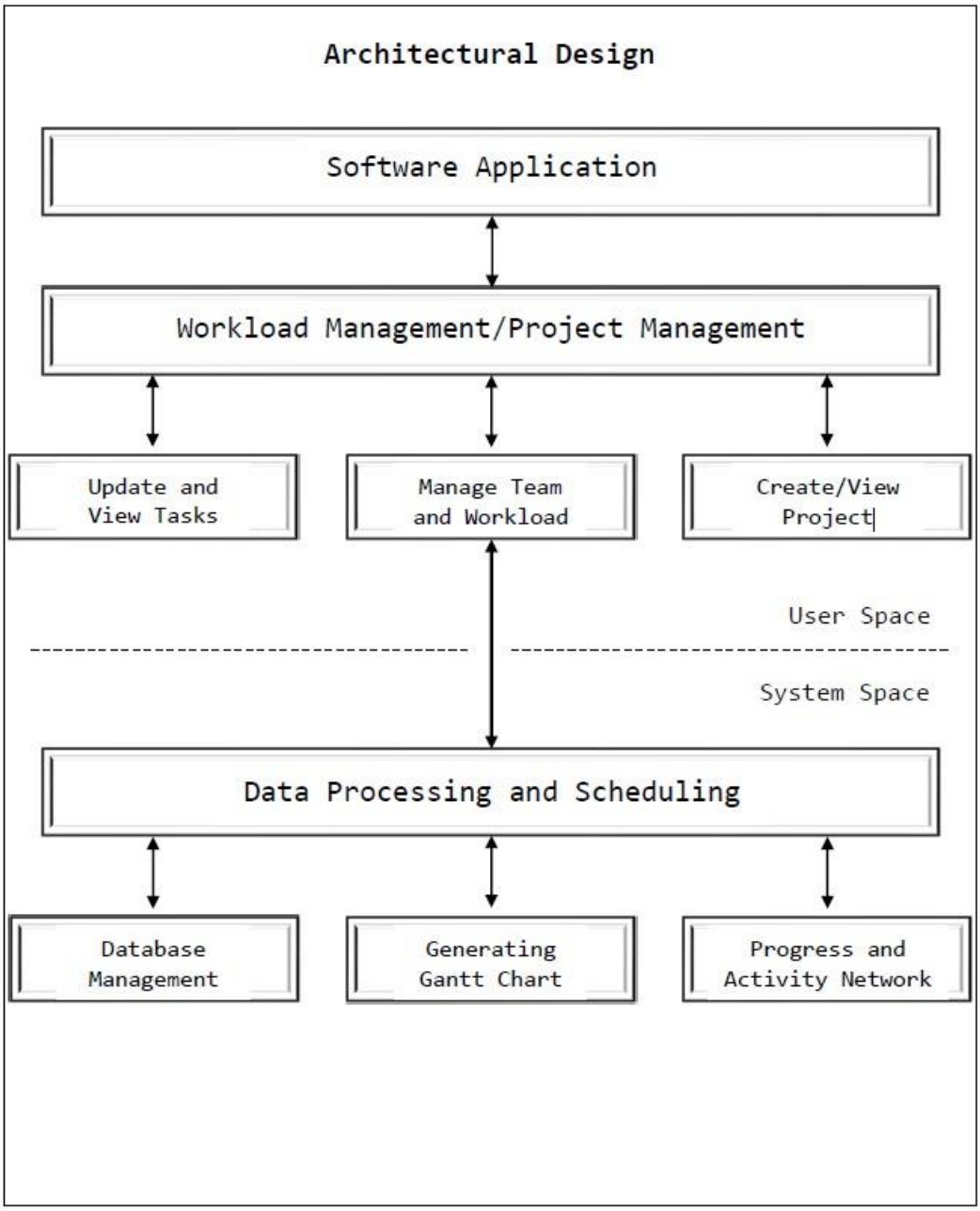
iv. Your Projects Module –



v. Manage Projects Module –

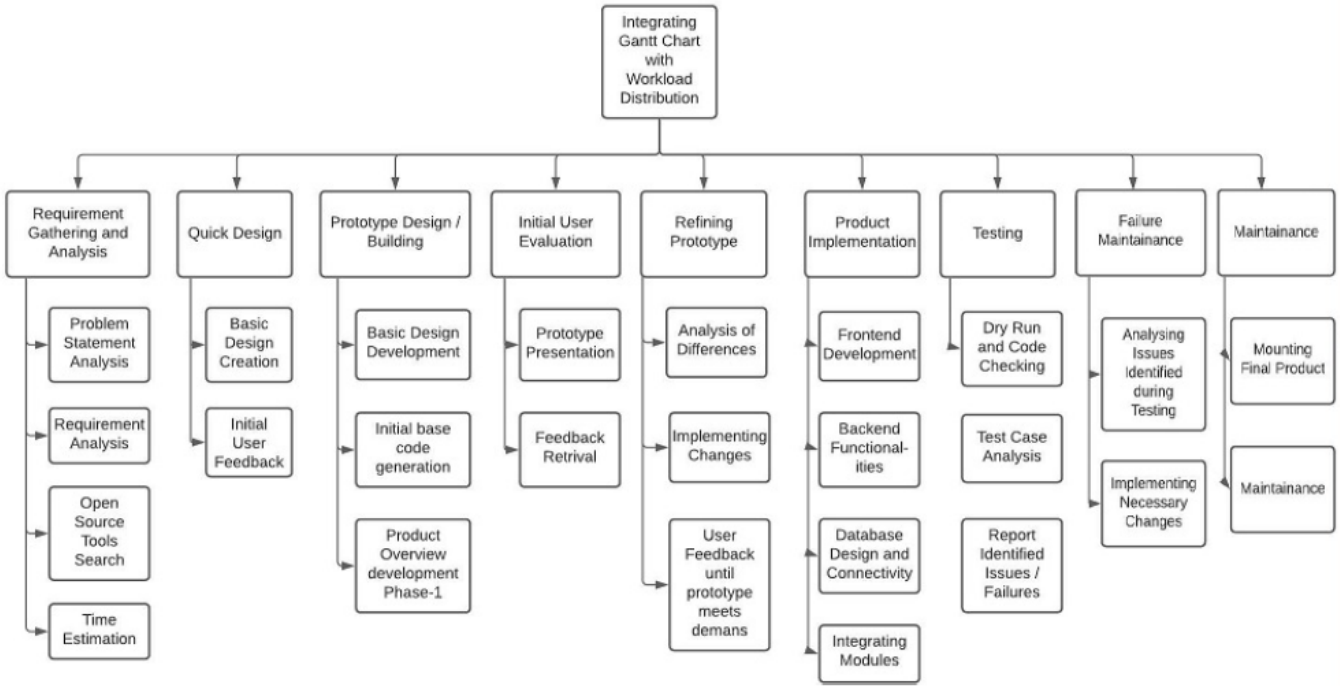


ARCHITECTURAL DESIGN



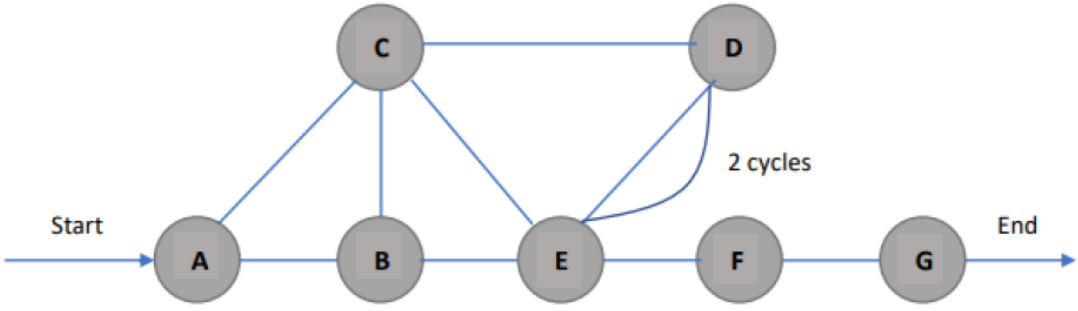
SCHEDULE TASKS AND MILESTONES

1.12. *Work Breakdown Structure:*

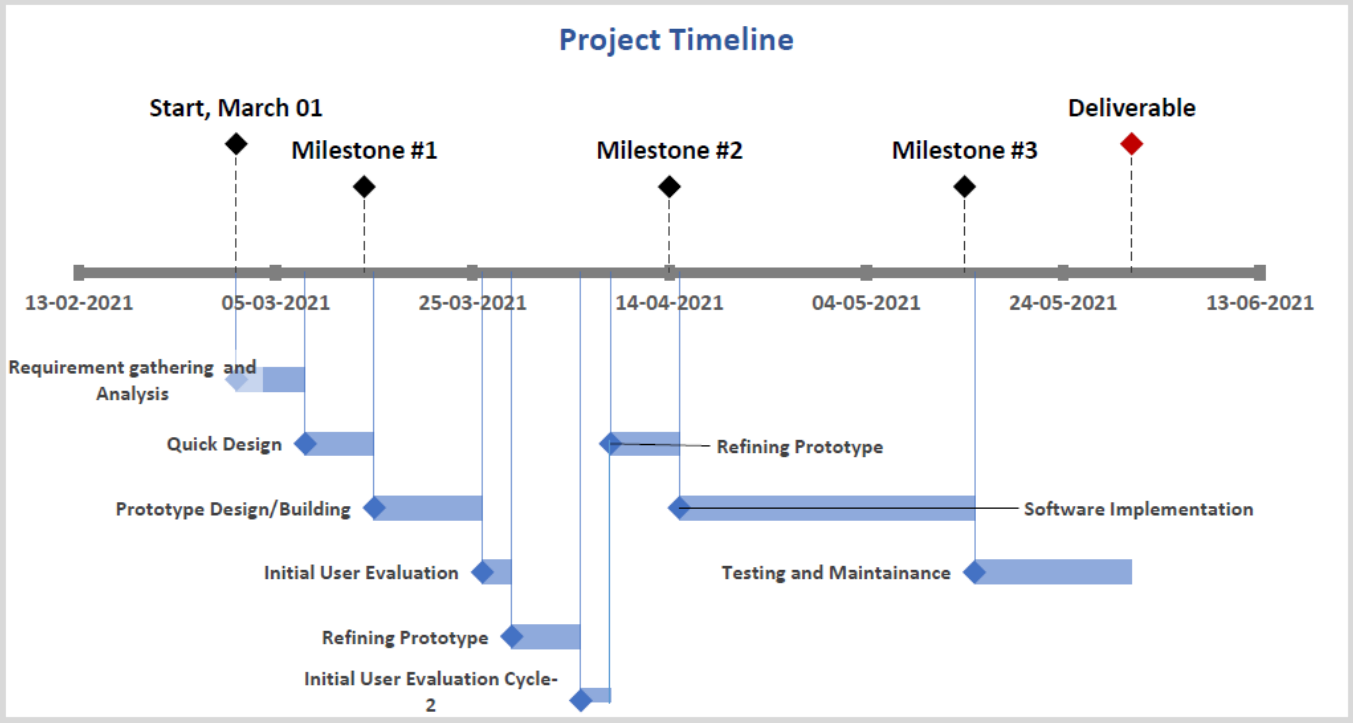


1.13. *Activity Network:*

Task	Label	Predecessor	Members Required	Duration
Requirement gathering and Analysis	A	-	3	7
Quick Design	B	A	3	7
Prototype Design/Building	C	A, B	3	11
Initial User Evaluation	D	C	1	3
Refining Prototype	E	B, C, D	3	7
Software Implementation	F	E	3	30
Testing and Maintenance	G	F	3	16



1.14. ***Project Timeline:***



Start	End	Duration	Label
01-03-2021	07-03-2021	7	Requirement gathering and Analysis
08-03-2021	14-03-2021	7	Quick Design
15-03-2021	25-03-2021	11	Prototype Design/Building
26-03-2021	28-03-2021	3	Initial User Evaluation
29-03-2021	04-04-2021	7	Refining Prototype
05-04-2021	07-04-2021	3	Initial User Evaluation Cycle-2
08-04-2021	14-04-2021	7	Refining Prototype
15-04-2021	14-05-2021	30	Software Implementation
15-05-2021	30-05-2021	16	Testing and Maintainance
			Insert new rows above this one

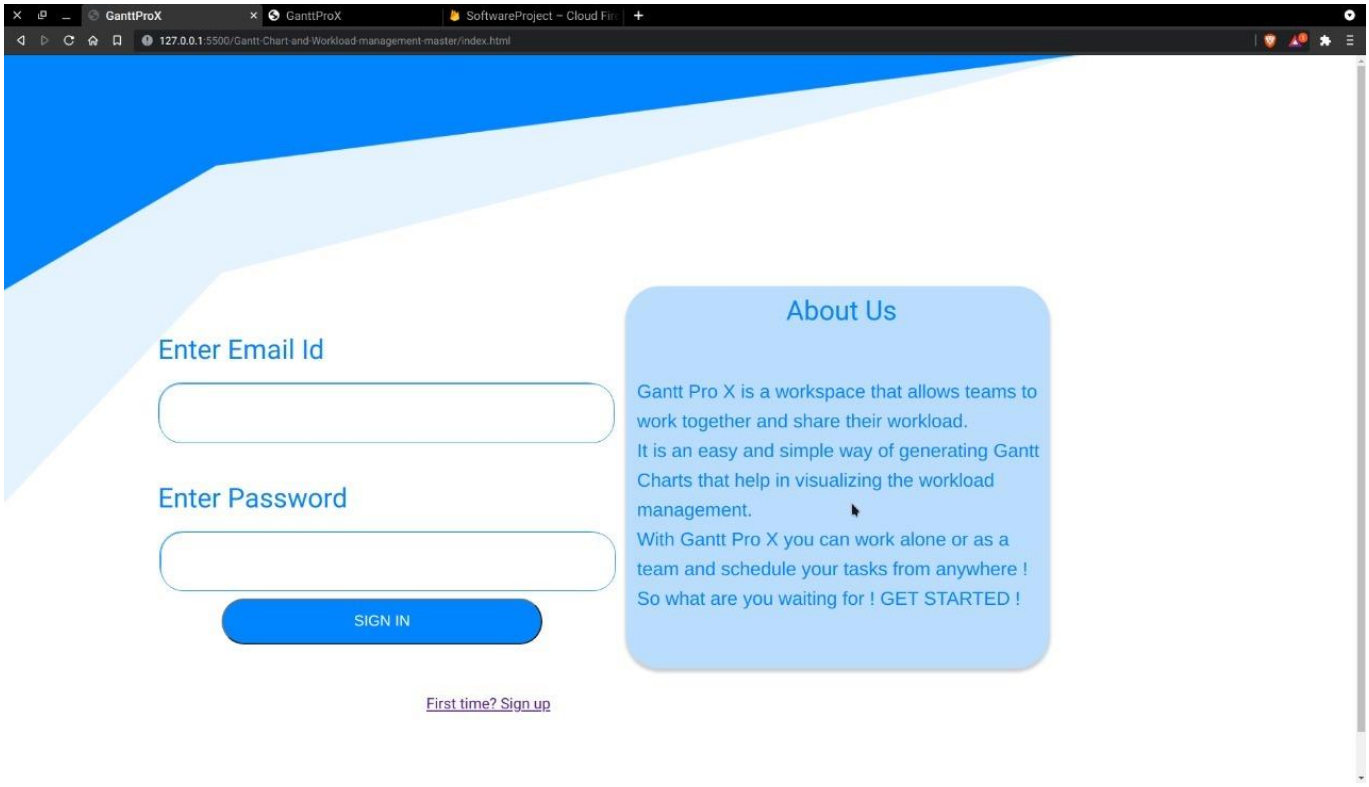
Milestones

Date	Label
01-03-2021	Start, March 01
14-03-2021	Milestone #1
14-04-2021	Milestone #2
14-05-2021	Milestone #3
31-05-2021	Deliverable
	Insert new rows above this one

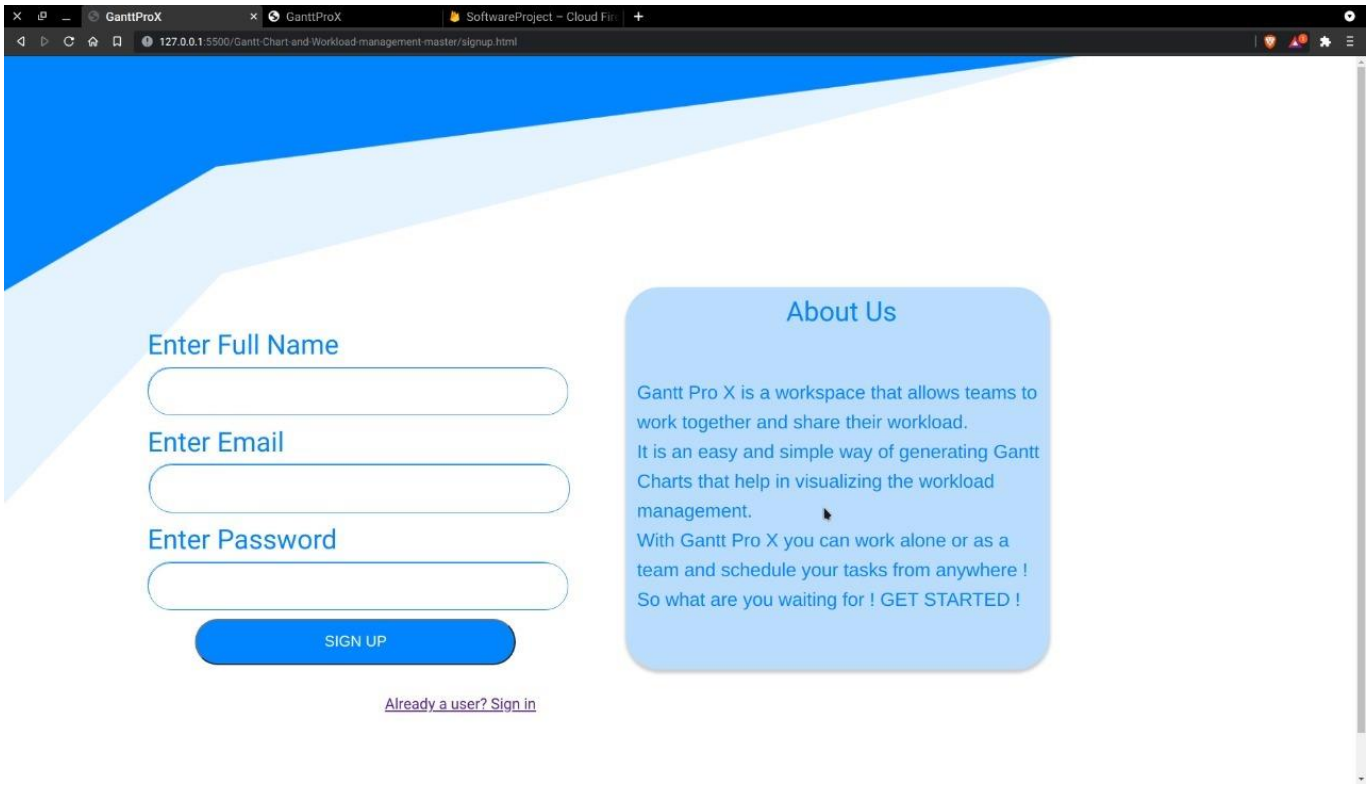
PROJECT DEMONSTRATION

Landing Page

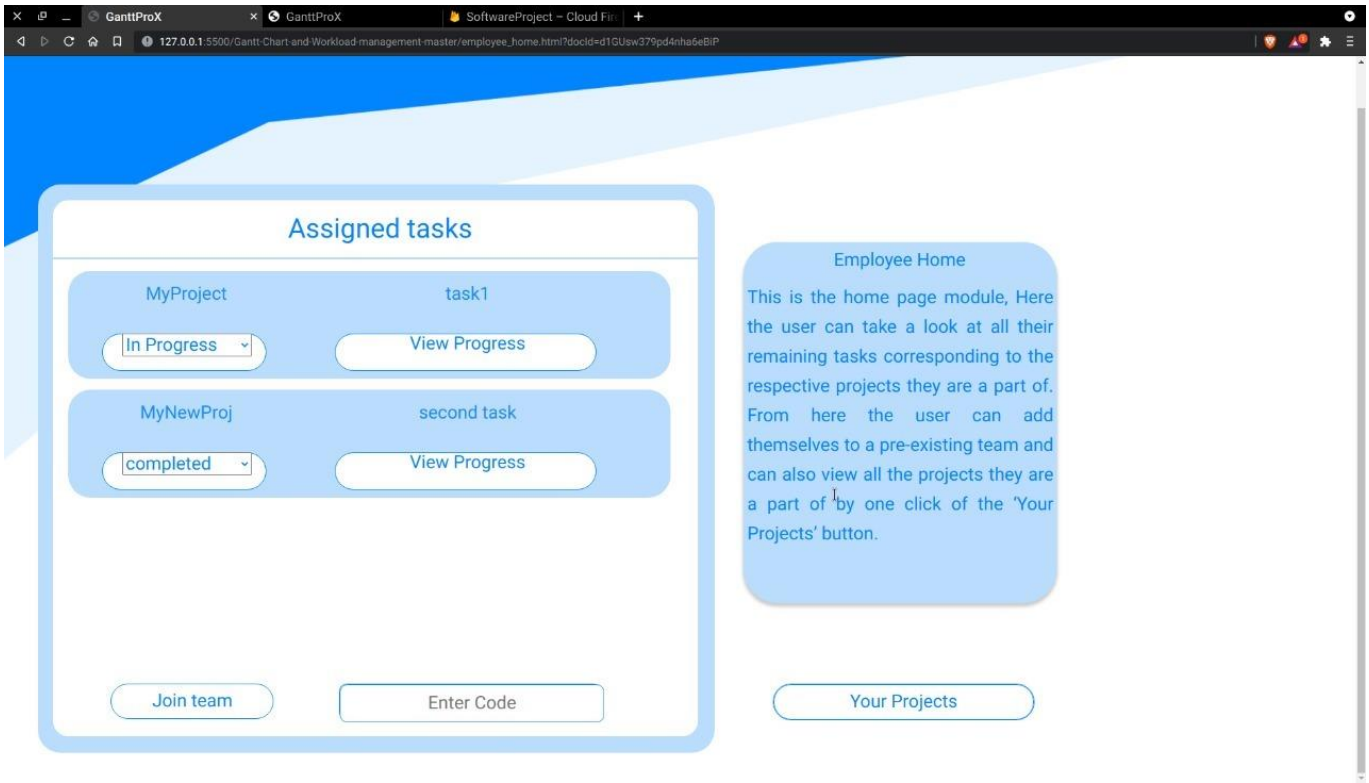
Login Page



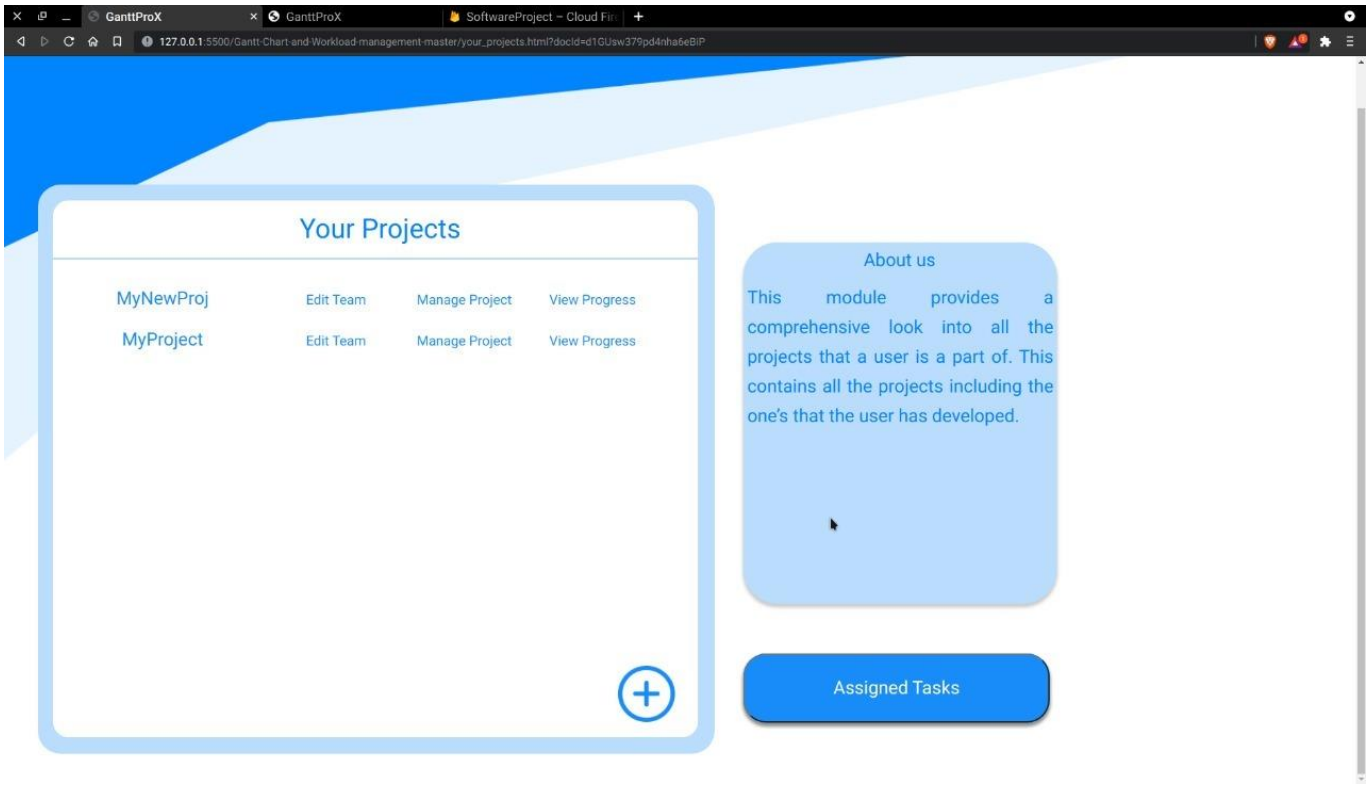
Sign Up Page



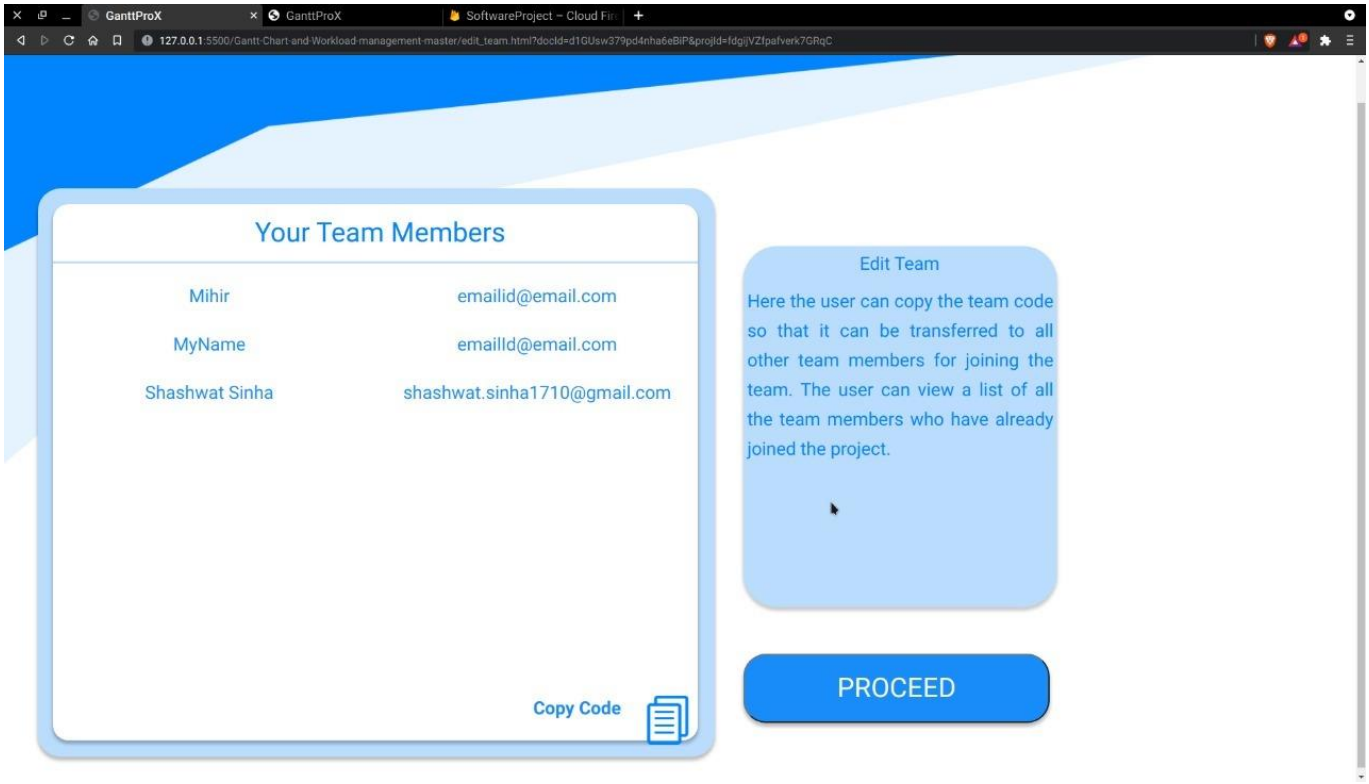
Employee Home Page



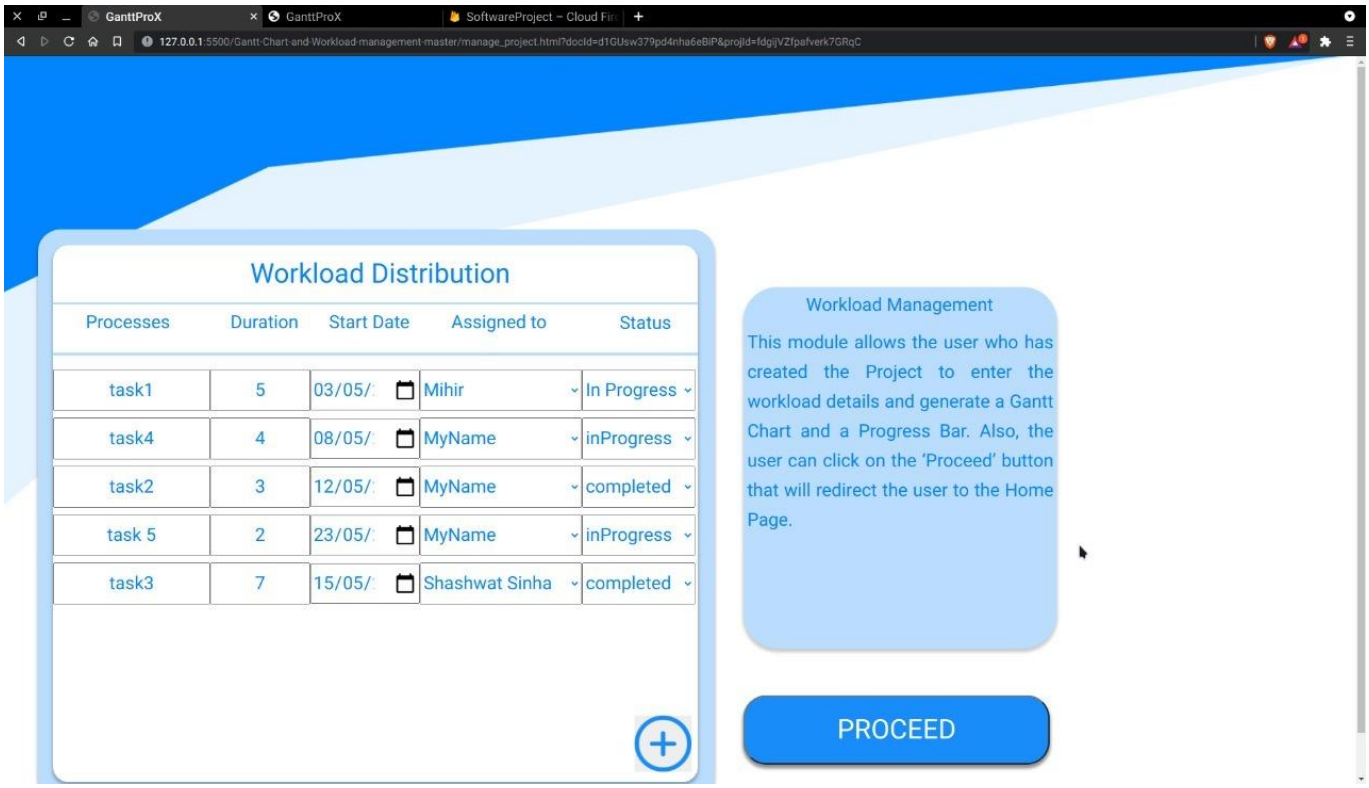
Your Projects Page



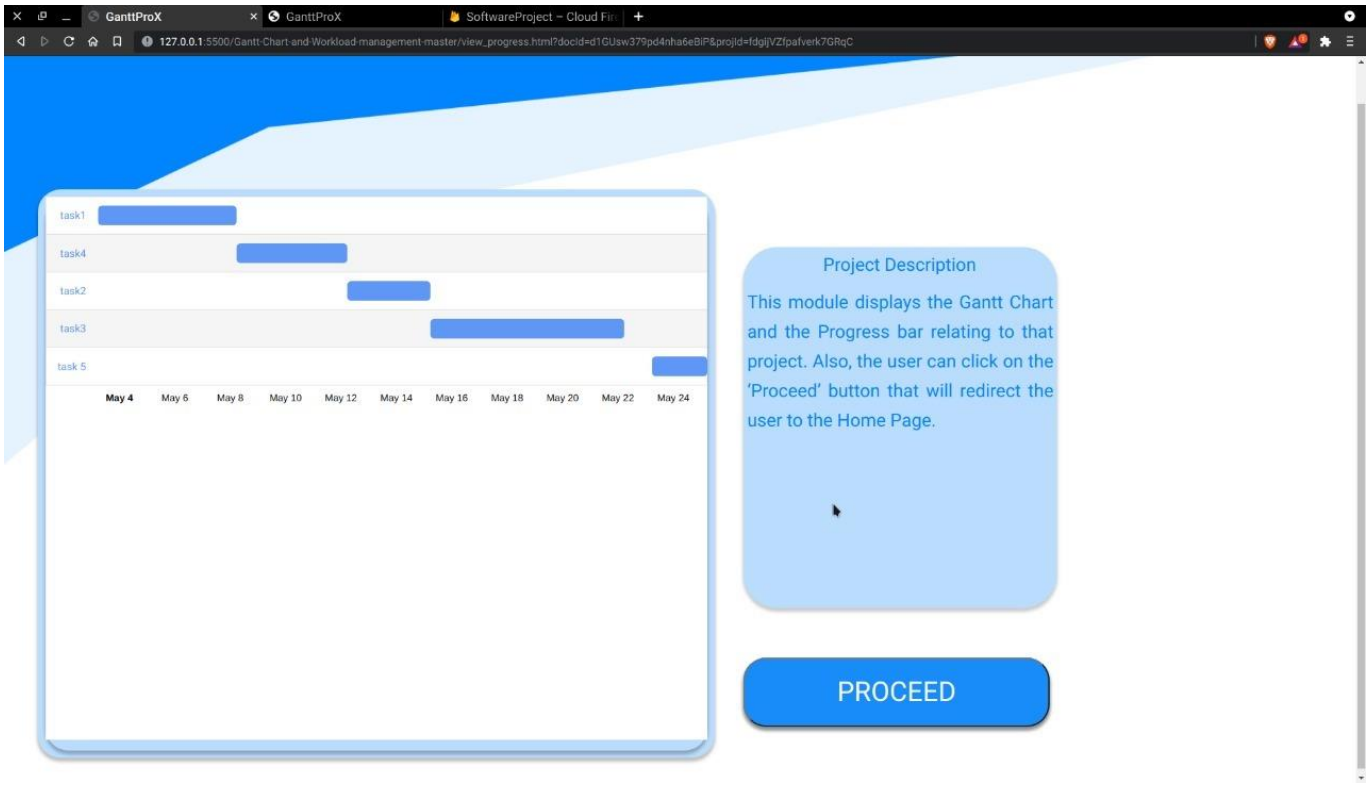
Edit Team Members Page



Workload Distribution Page



Gantt Chart View and Progress



TEST CASE REPORT

TEST REPORT		
EXECUTED	Passed	9
	Failed	0
	Total Test Executed (Passed + Failed)	9
Pending		0
Blocked		0

Module	Test Case ID	Test Objective	Test Data	Expected Results	Actual Results	Status
Authentication	LOG1001	Check if new user can create account.	Name: Shashwat Sinha Email ID: shashwat.sinha1710@gmail.com Password: System@123 Click: Sign-up button	Account Created & directed to Log-In pg	Account Created & directed to Log-In pg	PASS
	LOG1002	Check if user can Sign-In into account.	Email ID: shashwat.sinha1710@gmail.com Password: System@123 Click: Sign-In button	Login Successful and directed to home pg	Login Successful and directed to home pg	PASS
Home Dashboard	HMP1001	Check if the user can join a Team.	Code: fdgijVZfpafverk7GRqC Click: Join Teams button	New Project Team joined	New Project Team joined	PASS
	HMP1002	Check if team member can update status.	Workload Distribution Click: Update Status button	Status Updated.	Status Updated	PASS
	HMP1003	Check if team member can view progress.	Workload Distribution Click: View Progress button	Able to see progress	Able to see progress	PASS
Projects	PRJ1001	Check if Manager can create new Project.	Project Name: Software Engineering Click: Add Project button	Project Created & Code generated.	Project Created & Code generated.	PASS
	PRJ1002	Edit team members of a project.	Team Member's Name: Shivansh Gupta Email ID: shivansh2200@gamil.com Click: Edit Team button	Team members add/delete	Team members add/delete	PASS
Workload Distribution	WLD1001	Create a Workload Distribution.	Processes: Software Design and Arch Duration: 10 days Start Date: 18-04-2021 Assigned to: Shivansh Gupta Status: Finished	Workload Distribution created	Workload Distribution not created	PASS
Project Progress	PRG1001	Check if the user can see Progress and Gantt Chart	Workload Distribution Click: View Progress button	Gantt Chart and Progress Bar	Gantt Chart and Progress Bar	PASS

RESULTS AND CONCLUSION

Project Management Software is a crucial tool for defining, scheduling, project tracking for most of the small as well as large projects. Due to the growth of the IT industry, hundreds of new projects are pitched everyday within a company and this varies with the market of an industry over a period. So, project managers also need to take advantage of the effectiveness of project management software to ensure that the project they are carrying out become successful. The employees and other stakeholders who are assigned so tasks should also utilize the software in order to complete their tasks on or before the set deadlines.

Catering these problems, we have successfully developed a coherent and flexible software ***Gantt ProX*** during the course of this project entitled ***"Integrating Gantt Chart with Workload Management"*** which is brings the core features of any project management software available at the present time. With ***Gantt ProX*** the user can see the full roadmap for the project and also track it efficiently based on the individual work done by the team. This software focuses on generating a Gantt Chart automatically from the given Workload Distribution by the project manager. ***Gantt ProX*** also provides a detailed view of the assigned tasks, which makes it useful for the other team workers of same project to interact. This web application ensures a step-by-step development for any kind of project or even a general sequential task which could reduce both time and cost needed to maintain a project sync. Summarizing all the characteristic features we can conclude that ***Gantt ProX*** helps to streamline your pre-project development processes.