JVMBEK Project Management System

Software Requirement Specification
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Revision History

Date	Version	Author(s)	Comments
20/01/2015	Version 1.0.1	Tsang Chi Kit	Focused on specification structure.
26/01/2015	Version 1.0.2	Tsang Chi Kit	Focused on functional requirements.
27/01/2015	Version 1.0.3	Karim Atwa	Focused on user stories.
02/02/2015	Version 1.0.4	Karim Atwa	Focused on user stories.
04/02/2015	Version 1.1.0	Tsang Chi Kit	Finishing all remaining IT1 requirements.

Contents

1 Introduction

1.1 Purpose

This document is intended to provide a comprehensive description on the JVMBEK Project Management System, including this system's purpose, primary functions, and general constraints on the system.

This intended audience of this document is described in the following table:

Group of readers	Reasons for reading
Shareholders	To understand what are the intention and purpose of the system.
Users (Project members and managers)	To get a high level overview of the system and how it will work.
System developers	To understand clearly what functions and properties this system must contain to serve its purpose.
System testers	To understand what must be tested so the system will work as intended.

1.2 Business Goal

This software system is intended to be a simple project management tool for Project Managers but still provide essential functions to effectively plan for any small to medium size projects. This system is designed to maximize project successful rates and efficiency by providing project managers powerful tools to assist their decision making, planning, scheduling, and resources management.

Specifically, this software system allows Project Managers to plan and modify their projects with easy to use graphical interface. This allow Project Managers to gain quick overview on the progress of their projects.

This software system also contains a login system, so only managers with proper credential can modify projects and thus protect company's interest.

2 General Description

2.1 System Overview

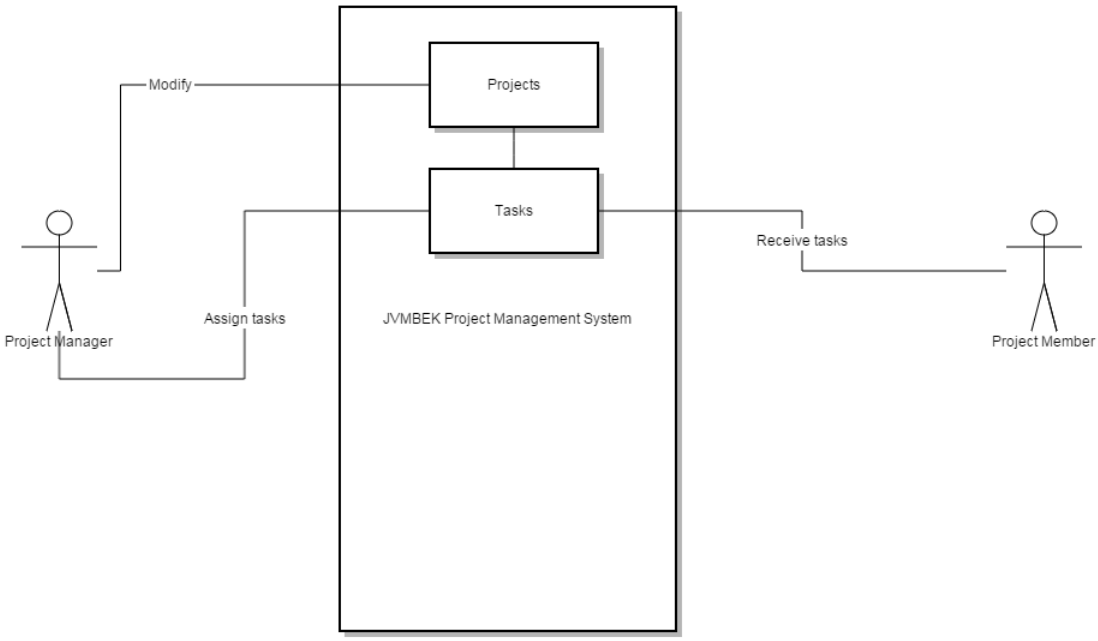


Figure 1: System diagram for JVMBEK project management system.

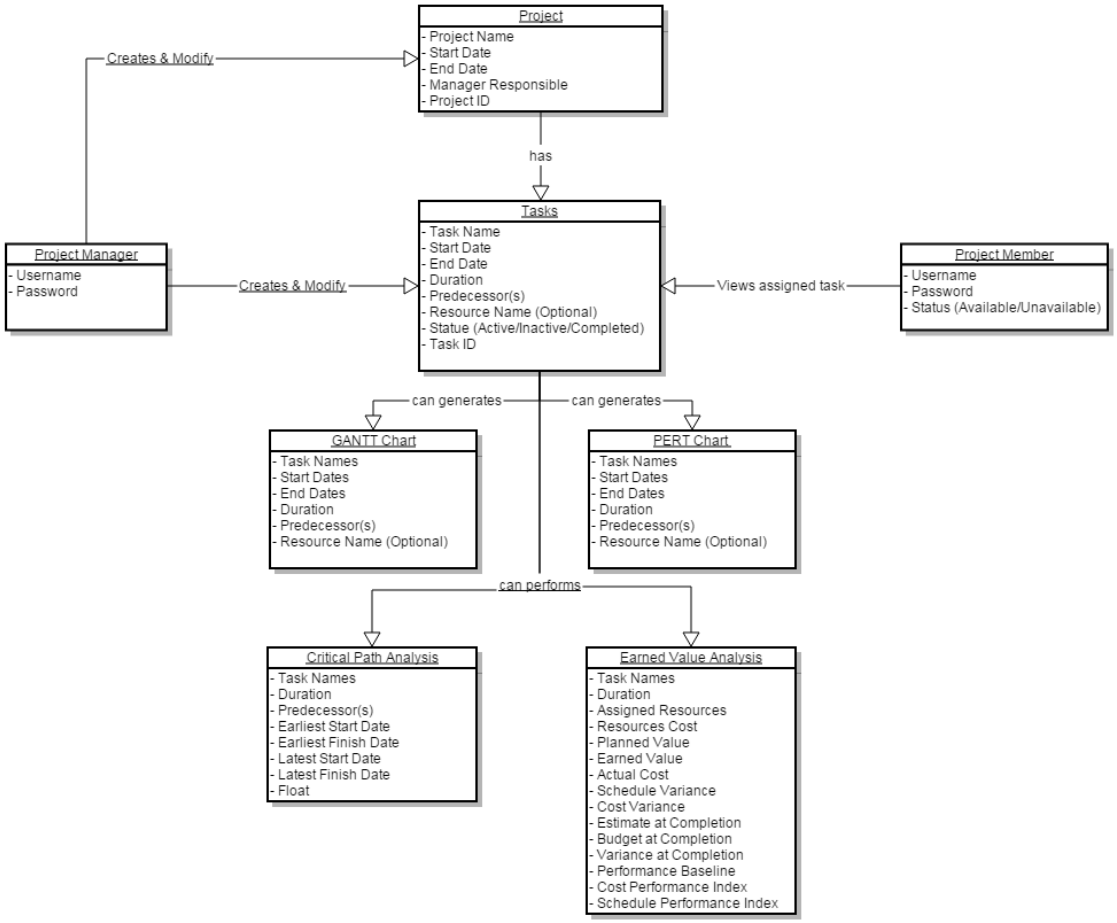


Figure 2: Domain Model Diagram for JVMBEK project management system.

The JVMBEK Project Management System has two actors and one system. Project Managers access their projects and project members view tasks assigned to them. All operation will be performed through the application locally from their computers. Project managers, by default, have the power to access and modify all projects stored in the database.

Here is a list of the essential features of this system:

- Create/modify/delete projects
- Create/modify/delete tasks
- Assign task(s) to another registered user
- Check assigned task (for project members)
- Generate GANTT charts
- Generate PERT charts
- Perform Critical Path Analysis
- Perform Earned Value Analysis

2.2 User Groups

User Group	**Definition**
Project Manager	Someone who can create, modify, delete project, and assign resources in this system.
Project Member	Someone who can view tasks that are assigned to him/her.

3 Functional Requirement Specification

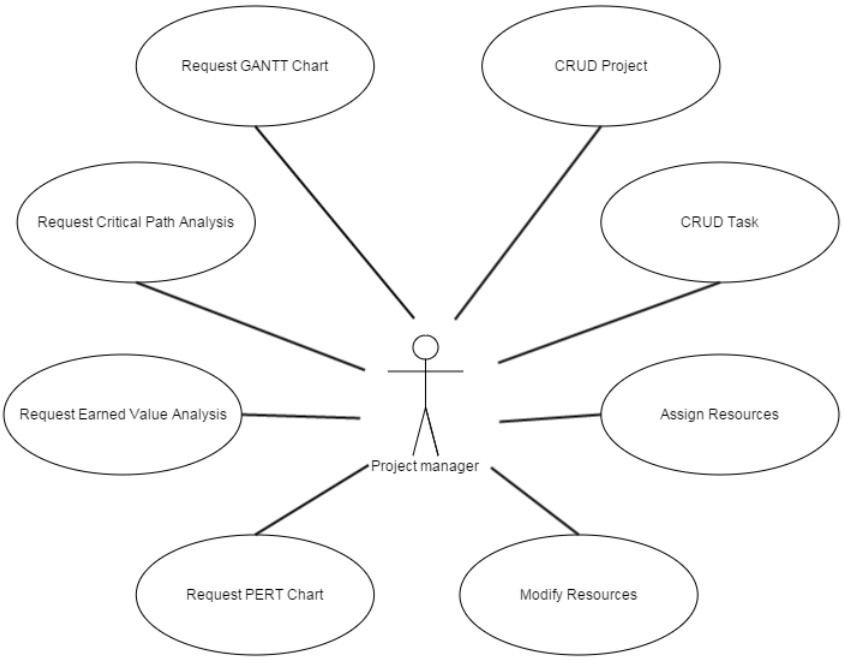
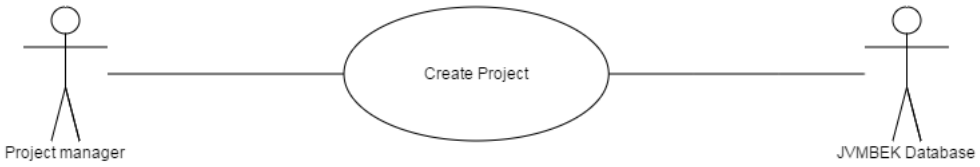


Figure 3: Project Manager's user cases.

3.1 Use Case: Create Project

3.1.1 Diagram



3.1.2 Brief Description

The Project Manager enters a new project into the system.

3.1.3 XRef

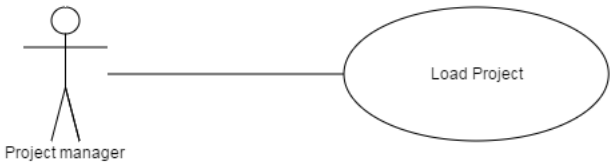
Section 3.3.1, Create Project

3.1.4 Step-By-Step Process

1. The Project Manager chooses the *Create Project* button.
2. The System generates a form with multiple fields for project information.
3. The Project Manager fills in the project name, start date, end date and submit the form.
4. The System generates the project in the database and load the project into Project Manager's machine.

3.2 Use Case: Load Project/View Project Status

3.2.1 Diagram



3.2.2 Brief Description

The Project Manager accesses a list of created projects and load a project into his/her machine.

3.2.3 XRef

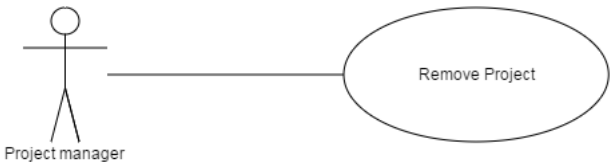
Section 3.3.2, View Project Status

3.2.4 Step-By-Step Process

1. The Project Manager chooses the *Load Project* button.
2. The Systems presents a list of stored projects from the database.
3. The Project Manager selects one of the projects from the list.
4. The System load the project into the Project Manager's machine.

3.3 Use Case: Remove Project

3.3.1 Diagram



3.3.2 Brief Description

The Project Manager removes an existing project from the database.

3.3.3 XRef

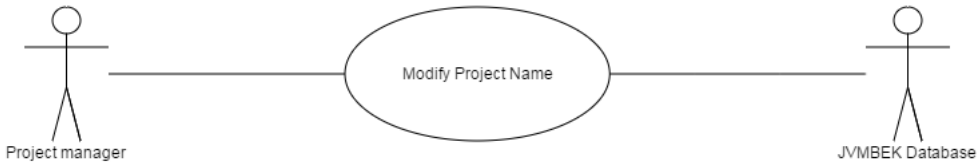
Section 3.3.3, Remove Project

3.3.4 Step-By-Step Process

1. The Project Manager chooses the *Remove Project* button.
2. The System presents a list of stored projects from the database.
3. The Project Manager selects a project from the list and confirm the operation.
4. The System generates a pop-up window warning that the operation is irreversible and prompt the Project Manager to enter the project name to confirm operation.
5. The Project Manager enters the project name (case sensitive).
6. The System deletes the project from the database and generate a delete confirmation.

3.4 Use Case: Modify Project Name

3.4.1 Diagram



3.4.2 Brief Description

The Project Manager updates the project name about an existing project.

3.4.3 XRef

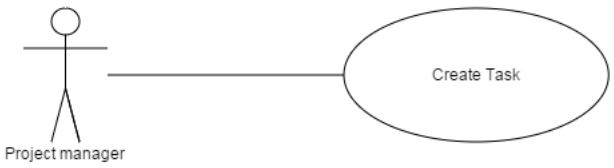
Section 3.3.4, Modify Project Name

3.4.4 Step-By-Step Process

1. The Project Manager choose *Modify Project Name* button after a project is loaded.
2. The System presents a pop-up box with a text field for the new name.
3. The Project Manager fills in the new name and confirm operation.
4. The System updates the project with the new name in the database and load the updated project into Project Manager's machine.

3.5 Use Case: Task Creation

3.5.1 Diagram



3.5.2 Brief Description

The Project Manager initializes a new task under an existing project.

3.5.3 XRef

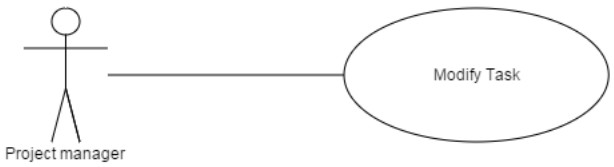
Section 3.3.5, Task Creation

3.5.4 Step-By-Step Process

1. The Project Manager chooses *Task Creation* button after a project is loaded.
2. The System presents a form with multiple fields for task information.
3. The Project Manager fills in the task name, start date, end date and submit the form.
4. The System generates the new task in the database, associate it with the selected project, and reload the updated project to Project Manager's machine.

3.6 Use Case: Modify Task

3.6.1 Diagram



3.6.2 Brief Description

The Project Manager modifies the detail of an existing task.

3.6.3 XRef

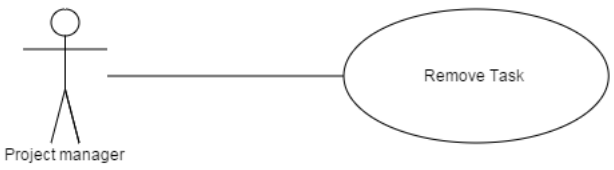
Section 3.3.6, Modify Task

3.6.4 Step-By-Step Process

1. The Project Manager chooses *Modify Task* button after a project is loaded and a task is selected.
2. The System presents a form with multiple fields with the selected tasks information.
3. The Project Manager edits task name, start date, end date and resubmit the form.
4. The System updates the task information with the database and reload the project to Project Manager's machine.

3.7 Use Case: Remove Task

3.7.1 Diagram



3.7.2 Brief Description

The Project Manager removes an existing task from the selected project.

3.7.3 XRef

Section 3.3.7, Remove Task

3.7.4 Step-By-Step Process

1. The Project Manager chooses *Remove Task* button after a project is loaded and a task is selected.
2. The System presents a pop-up window warning that the operation is irreversible.
3. The Project Manager reconfirms the operation.
4. The System deletes the task from the database, free all resources associated with the task and reload the updated project to Project Manager's machine.

3.8 Use Case: Assign Resources

3.8.1 Diagram

3.8.2 Brief Description

The Project Manager assigns resource(s) to a task.

3.8.3 XRef

Section 3.3.8, Assign Resources

3.8.4 Step-By-Step Process

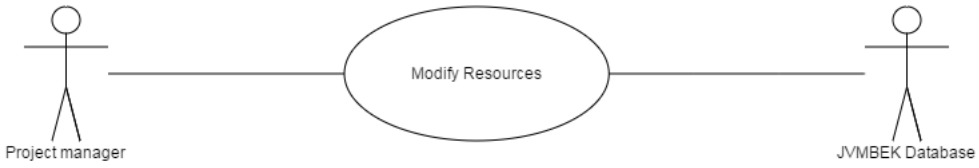
1. The Project Manager chooses *Assigns Resources* button after a project is loaded and a task is selected.
2. The System presents a list of Project Member users who has the available status.

3. The Project Manager chooses one or more resources and confirm operation.

4. The System associates the selected resources to the task and mark the selected resources as unavailable for the duration of the task in the database. The System then reload the updated project into Project Manager's machine.

3.9 Use Case: Modify Resources

3.9.1 Diagram



3.9.2 Brief Description

The Project Manager modifies resources of an existing task.

3.9.3 XRef

Section 3.3.9, Modify Resources

3.9.4 Step-By-Step Process

1. The Project Manager chooses *Modify Resources* button after project is loaded and a task is selected.

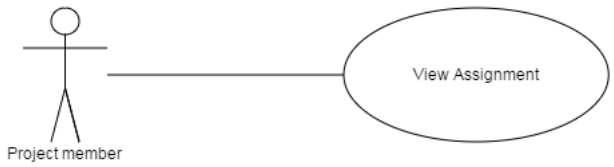
2. The System presents a list of Project Member users who has the available status. The already selected resources will also be presented in the list highlighted.

3. The Project Manager modifies his selection and confirm the operation.

4. The System associates all selects resources to the task and mark the selected resources as unavailable for the duration of the task in the database. The System then reload the updated project into Project Manager's machine.

3.10 Use Case: View Assignment

3.10.1 Diagram



3.10.2 Brief Description

The Project Member checks his/her assigned task.

3.10.3 XRef

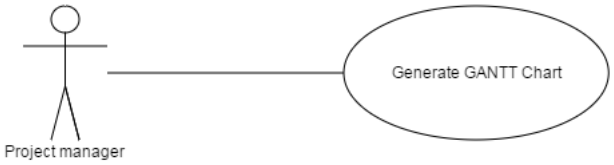
Section 3.3.10, View Assignment

3.10.4 Step-By-Step Process

1. The Project Member chooses *View Assignment* button.
2. The System presents a list of assigned tasks in grid form.

3.11 Use Case: Generate GANTT Chart

3.11.1 Diagram



3.11.2 Brief Description

The Project Manager requests a GANTT chart for his/her project.

3.11.3 XRef

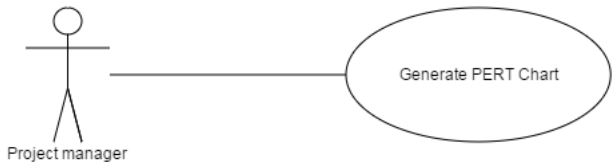
Section 3.3.11, Generate GANTT chart

3.11.4 Step-By-Step Process

1. The Project Manager chooses *Generate GANTT Chart* button after a project is loaded.
2. The System presents a GANTT chart based on the tasks information in the project.

3.12 Use Case: Generate PERT Chart

3.12.1 Diagram



3.12.2 Brief Description

The Project Manager requests a PERT chart for his/her project.

3.12.3 XRef

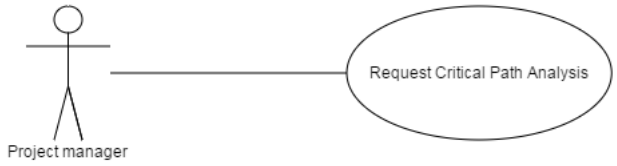
Section 3.3.12, Generate PERT chart

3.12.4 Step-By-Step Process

1. The Project Manager chooses *Generate PERT Chart* button after a project is loaded.
2. The System presents a PERT chart based on the tasks information in the project.

3.13 Use Case: Perform Critical Path Analysis (CPA)

3.13.1 Diagram



3.13.2 Brief Description

The Project Manager requests a CPA for his/her project.

3.13.3 XRef

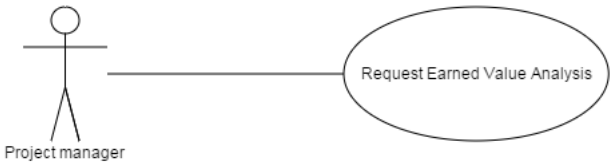
Section 3.3.13, Perform Critical Path Analysis (CPA)

3.13.4 Step-By-Step Process

1. The Project Manager chooses the *Critical Path Analysis* button after a project is loaded.
2. The System presents a form consist of all the current tasks in the project with multiple fields for required CPA attributes.
3. The Project Manager enters earliest start date, earliest finish date, latest start date, and latest finish date for all the existing tasks and submit the form.
4. The System presents a GANTT chart with the critical path highlighted.

3.14 Use Case: Perform Earned Value Analysis (EVA)

3.14.1 Diagram



3.14.2 Brief Description

The Project Manager requests an EVA for his/her project.

3.14.3 XRef

Section 3.3.14, Perform Earned Value Analysis (EVA)

3.14.4 Step-By-Step Process

1. The Project Manager chooses *Earned Value Analysis* button after a project is loaded.
2. The System presents a form of all the tasks in the project with multiple fields for required EVA attributes.
3. The Project Manager fills in the resource cost (per hour), total hours needed, total hours spent for each task and submit the form.
4. The System generates an EVA report in tabular form.

4 Requirement Specification

4.1 User Requirements

4.1.1 Use Case: Create Project

Use Case Name	Create Project
XRef	Section 3.1.1, Create Project
Actor	Project manager
Trigger	The Project Manager selects to create new project.
Precondition	The Project Manager has logged in successfully.
Basic Path	1. The system presents a form to enter project information. 2. The Project Manager enters the project name, start date, end date, and submit the form. 3. The system checks all required fields are filled, project name is valid and not duplicate, then update the database.
Alternative Paths	2A If the project name is started with a number or underscore, then invalid project name error message will be shown. 2B If the project name already existed in the database duplicate project error message.
Postcondition	A project is created and saved in the database with the entered project name.
Other	• The project is defaulted to start and end at the same day. • Manager responsible is default to be the user who created the project. • The form has optional fields for additional comments.

4.1.2 Use Case: Load Project/View Project Status

Use Case Name	View Project Status
XRef	Section 3.1.2, View Project Status
Actor	Project manager
Trigger	The Project Manager selects to load an existed project.
Precondition	1. The Project Manager has logged in successfully. 2. The project exists in the database.
Basic Path	1. The system presents a list of all the projects stored in the database. 2. The manager selects a project from the list. 3. The system presents the project and all the activities associated with the project.
Alternative Paths	None
Postcondition	The selected project is displayed along with all its associated activities.

4.1.3 Use Case: Remove Project

Use Case Name	Remove Project
XRef	Section 3.1.3, Remove Project
Actor	Project manager
Trigger	The Project Manager selects to remove a project.
Precondition	• The Project Manager has logged in successfully. • The project exists in the database.
Basic Path	1. The presents a list of projects stored in the database. 2. The Project Manager selects a project from the list. 3. The system warns that the operation is not reversible and prompt the manager to enter the project name to confirm the operation. 4. The Project Manager enters the project name and confirm the operation. 5. The system deletes the selected project along with all its associated activities from the database.
Alternative Paths	4A If the name is entered incorrectly then the operation will not carry out and the system will present the confirmation prompt again. 4B If the selected project is already loaded into Project Manager's machine then the System will present the unable to delete error message.
Postcondition	The selected project is deleted along with all associated activities from the database.

4.1.4 Use Case: Modify Project Name

Use Case Name	Modify Project Name
XRef	Section 3.1.4, Modify Project Name
Actor	Project manager
Trigger	The Project Manager selects to modify the project.
Precondition	• The Project Manager has logged in successfully. • An existing project that is loaded prior to the trigger action.
Basic Path	1. The system presents a popup box to enter a new name. 2. The Project Manager enters and confirm the new name. 3. The system checks the name's validity and if it already exist in the database. 4. The system updates the project's name to its new name.
Alternative Paths	3A If the new project name starts with a number or underscore, then the system will present an invalid project name error message. 3B If the new project's name already existed in the database then the system will present a duplicate project error message.
Postcondition	The selected project's name is modified.

4.1.5 Use Case: Task Creation

Use Case Name	Task Creation
XRef	Section 3.1.5, Activity Creation
Actor	Project manager
Trigger	The Project Manager selects to create task.
Precondition	• The Project Manager has logged in successfully. • An existing project that is loaded prior to the trigger action.
Basic Path	1. The system presents a form to enter task details. 2. The Project Manager enters task label, start day, end date, and submit the form. 3. The system validates the information, add the task to the project, and update the project to the database.
Alternative Paths	3A If the task name starts with a number or an underscore then the system will present an invalid task name error message and present the form again. 3B If the task name already existed in the project then the system will present a duplicate activity error message and present the form again.
Postcondition	A new task is added under the selected project and the project is updated to the database.
Other	• Default statue of a task is active unless a predecessor task is set. • Minimum duration is one day. Start date will be the earliest end date option to avoid negative duration error.

4.1.6 Use Case: Modify Task

Use Case Name	Modify Task
XRef	Section 3.1.6, Modify Task
Actor	Project manager
Trigger	The Project Manager selects to modify task.
Precondition	• The Project Manager has logged in successfully. • An existing project that is loaded prior to the trigger action. • A task is selected.
Basic Path	1. The system presents the task details form. 2. The Project Manager modifies task details and resubmit the form. 3. he system validates the updated information and update the database.
Alternative Paths	2A If the new task name already exist in the project then the system will present the duplicate task error message. 3B If the task is previously set as competed and then changed to anything else then all subsequent tasks that have it as predecessor will be set to inactive. 3C If the updated information causes resource conflicts then higher priority or earlier created task will take precedence.
Postcondition	The selected task detail is modified.

4.1.7 Use Case: Remove Task

Use Case Name	Remove Task
XRef	Section 3.1.7, Modify Task
Actor	Project manager
Trigger	The Project Manager selects remove task.
Precondition	• The Project Manager has logged in successfully. • An existing project that is loaded prior to the trigger action. • A task is selected prior to the trigger action.
Basic Path	1. The system presents a confirmation box warning the operation is irreversible. 2. The Project Manager confirm the operation. 3. The selected task is removed from the project and database and all its associated resources will have their status set to available.
Alternative Paths	None
Postcondition	The selected task is removed from both the project and database and all associated resources will have their status set to available.

4.1.8 Use Case: Assign Resources

Use Case Name	Assign Resources
XRef	Section 3.1.8, Assign Resources
Actor	Project manager
Trigger	The Project Manager selects to assign resources.
Precondition	• The Project Manager has logged in successfully. • An existing project that is loaded prior to the trigger action. • A task is selected prior to the trigger action.
Basic Path	1. The system presents a list of member class users who is available for the duration of the task. 2. The Project Managers selects one or more user and confirm the selection. 3. The system associate the resource to the task and mark the resource as unavailable for the task duration.
Alternative Paths	None
Postcondition	Selected resource(s) is associated with the task and marked unavailable in the database for the duration of the task.
Other	• Selected resources are highlighted on the list. • If another task is modified and cause resource conflict then earlier tasks or tasks with high priority will get the resource. There will be no notification for removed resources.

4.1.9 Use Case: Modify Resources

Use Case Name	Modify Resources
XRef	Section 3.1.9, Modify Resources
Actor	Project manager
Trigger	The Project Manager selects to modify resources.
Precondition	• The Project Manager has logged in successfully. • An existing project that is loaded prior to the trigger action. • A task is selected prior to the trigger action.
Basic Path	1. The system presents a list of member class users who is available for the duration of the task (including those who are already selected for this task, but already highlighted). 2. The Project Manager modifies the selection and submit the list. 3. The system associate the resource to the task and mark the resource as unavailable for the task duration.
Alternative Paths	None
Postconditions	Selected resource(s) is associated with the task and marked unavailable in the database for the duration of the task.
Other	• If there is no prior resource assignment then selecting modify resources will perform the same action as Assign Resources. • If another task is modified and cause resource conflict then earlier tasks or tasks with high priority will get the resource. There will be no notification for removed resources.

4.1.10 Use Case: View Assignment

Use Case Name	View Assignment
XRef	Section 3.1.10, View Assignment
Actor	Project member
Trigger	The Project Manager selects to view assignment.
Precondition	The project member has logged in successfully.
Basic Path	1. The system presents a list of assignments in grid form.
Alternative Paths	None
Postconditions	The requested information has been presented.
Other	• Each assignment node will have the task name, start date, end date, and duration. • If no assignment available then the system will say no task assigned. • Tasks are listed in descending order. From highest priority to lowest priority. If there are two equal priority tasks then they will be shown according to start date.

4.1.11 Use Case: Generate GANTT chart

Use Case Name	Generate GANTT chart
XRef	Section 3.1.11, Generate GANTT chart
Actor	Project manager
Trigger	The Project Manager selects to generate GANTT chart.
Precondition	• The Project Manager has logged in successfully. • An existing project that is loaded prior to the trigger action.
Basic Path	1. The systems displays a GANTT chart based on the tasks in the project.
Alternative Paths	None
Postconditions	The requested information has been presented.
Other	If there is no task in the project then the operation will do nothing and the system will say no task listed.

4.1.12 Use Case: Generate PERT chart

Use Case Name	Generate PERT chart
XRef	Section 3.1.12, Generate PERT chart
Actor	Project manager
Trigger	The Project Manager selects to generate PERT chart.
Precondition	• The Project Manager has logged in successfully. • An existing project that is loaded prior to the trigger action.
Basic Path	1. The systems displays a PERT chart based on the tasks in the project.
Alternative Paths	None
Postconditions	The requested information has been presented.
Other	If there is no task in the project then the operation will do nothing and the system will say no task listed.

4.1.13 Use Case: Perform Critical Path Analysis (CPA)

Use Case Name	Perform Critical Path Analysis
XRef	Section 3.1.13, Perform Critical Path Analysis
Actor	Project manager
Trigger	The Project Manager selects to perform CPA.
Precondition	• The Project Manager has logged in successfully. • An existing project that is loaded prior to the trigger action.
Basic Path	1. The system presents an item list of all the tasks in the project. 2. The Project Manager enters earliest start date, earliest finish date, latest start date, and latest finish date for all tasks in the project and submit the list. 3. The system computes and generate the critical path as a GANTT chart.
Alternative Paths	None
Postconditions	• The requested information has been presented. • Related dates saved to the database.
Other	• The system will store the entered data as the new default dates. • The critical path will be highlighted. • If there is no task in the project then the operation will do nothing and the system will say no task listed.

4.1.14 Use Case: Perform Earned Value Analysis (EVA)

Use Case Name	Perform Earned Value Analysis
XRef	Section 3.1.14, Perform Earned Value Analysis
Actor	Project manager
Trigger	The Project Manager selects to perform EVA.
Precondition	• The Project Manager has logged in successfully. • An existing project that is loaded prior to the trigger action.
Basic Path	1. The system presents a form of all the tasks in the project. 2. The Project Manager enters resource costs, total hours needed, and total hours spent for each task and submits the form. 3. The system computes and presents the EVA in tabular form.
Alternative Paths	None
Postconditions	The requested information has been presented.
Other	• Resource cost cannot be negative value. • Total hours needed and total hours spent cannot be less than zero. • The result table will show task name, PV, EV, AC, SV, CV, EAC, BAV, and VAC by default.

4.2 Non-Functional Requirements

4.2.1 Security

The JVMBEK project management system is connected to a SQLite database. All users are required to login before accessing any information on the database. Login are the same for all users. Users will enter their username and password at the welcome screen.

There are mainly two tiers of users: Managers and team members. Project managers have access to create, modify, and delete projects and activities. Project managers can also add/remove team members to the database by username. However, managers cannot add/remove other managers, and only system administers can do that. Project team member have read access only to the tasks details that are assigned to them.

There will be no additional security feature for the JVMBEK project management system other than the login system.

All transaction between actors and the system will also be logged and available for audit.

4.3 Constraints

This software system requires Java Runtime (JRE) 8.0. There is no additional constraint on version of operation system or hardware requirement. However, there could be additional requirement for JRE 8.0 to be installed successfully. Please check with vendor for most up-to-date requirement.

A Definitions, Acronyms, and Abbreviations

Term	Definition
CRUD	Create, retrieve, update and delete. Basic operations for the system.
Project	A sequence of tasks that require planning from beginning to end. A project has resources constraints, such as time or capital.
Resources	Available budget for the project. It can be time, manpower, supplies, equipment, or/and capital.
Task	An activities that has a clearly defined started day and deadline.
Dependencies	Tasks that are interconnected and linked together.
Project Manager	Someone who can create, modify, delete project, and assign resources in this system.
Project Member	Someone who can view tasks that is/are assigned to him.

B References

IEEE. *IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements Specifications.* IEEE Computer Society, 1998.