American International University-Bangladesh (AIUB)

Department of Computer Science

Faculty of Science & Technology (FST)

AIUB Smart Sport Complex Management System

A Software Engineering Project Submitted

By

Semester: Summer_23_24		Section: D	Group Number: 01	
SN	Student Name	Student ID	Contribution (CO3+CO4)	Individual Marks
1	Md. Shahab Uddin	22-47934-2	20%	
2	Md. Mostakin Ali	22-48005-2	20%	
3	Antara Saha	22-48052-2	20%	
4	P.M. Tasriful Islam	22-47885-2	20%	
5	Badhon Kumar Biswas	22-47992-2	20%	

The project will be Evaluated for the following Course Outcomes

CO3: *Select* appropriate software engineering models, project management roles and their associated skills for the complex software engineering project and evaluate the sustainability of developed software, taking into consideration the societal and environmental aspects	Total Marks
Appropriate Process Model Selection and Argumentation with Evidence	[5 Marks]
Evidence of Argumentation regarding process model selection	[5Marks]
Analysis the impact of societal, health, safety, legal and cultural issues	[5Marks]
Submission, Defense, Completeness, Spelling, grammar and Organization of the Project report	[5Marks]
CO4: *Develop* project management plan to manage software engineering projects following the principles of engineering management and economic decision process	Total Marks
Develop the project plan, its components of the proposed software products	[5Marks]
Identify all the activities/tasks related to project management and categorize them within the WBS structure. Perform detailed effort estimation correspond with the WBS and schedule the activities with resources	[5Marks]
Identify all the potential risks in your project and prioritize them to overcome these risk factors.	[5Marks]

Description of Student's Contribution in the Project work

Student Name: Md. Shahab Uddin
Student ID: 22-47934-2
Contribution in Percentage (%): 20
Contribution in the Project:
- Contribution Description: Background Description, Process model selection, System Features, Functional requirements, Non-Functional requirements, Use case Diagram, Class Diagram, Activity Diagram, Sequence Diagram, Project Role Identification and Responsibilities, Project Sustainability in Terms of Society and Environment
- Wireframe Design, Test Planning, Test Cases Design, WBS, Constructive Cost Method, Timeline Chart – 01, Timeline Chart – 02, EVA, Risk Management.

_____Shahab Uddin_____
Signature of the Student

Student Name: Md. Mostakin Ali
Student ID: 22-48005-2
Contribution in Percentage (%): 20
Contribution in the Project:
- Contribution Description : Background Description, Process model selection, System Features, Functional requirements, Non-Functional requirements, Use case Diagram, Class Diagram, Activity Diagram, Sequence Diagram, Project Role Identification and Responsibilities, Project Sustainability in Terms of Society and Environment
- Wireframe Design, Test Planning, Test Cases Design, WBS, Constructive Cost Method, Timeline Chart – 01, Timeline Chart – 02, EVA, Risk Management.

_____Mostakin Ali_____
Signature of the Student

Student Name: Antara Saha
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Contribution in Percentage (%): 20
Contribution in the Project:
- Contribution Description : Background Description, Process model selection, System Features, Functional requirements, Non-Functional requirements, Use case Diagram, Class Diagram, Activity Diagram, Sequence Diagram, Project Role Identification and Responsibilities, Project Sustainability in Terms of Society and Environment

- Wireframe Design, Test Planning, Test Cases Design, WBS, Constructive Cost Method, Timeline Chart – 01, Timeline Chart – 02, EVA, Risk Management.

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Student Name: P.M. Tasriful Islam
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Contribution in the Project:

- Contribution Description: Background Description, Process model selection, System Features, Functional requirements, Non-Functional requirements, Use case Diagram, Class Diagram, Activity Diagram, Sequence Diagram, Project Role Identification and Responsibilities, Project Sustainability in Terms of Society and Environment
- Wireframe Design, Test Planning, Test Cases Design, WBS, Constructive Cost Method, Timeline Chart – 01, Timeline Chart – 02, EVA, Risk Management.

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Contribution in Percentage (%): 20
Contribution in the Project:

- Contribution Description : Background Description, Process model selection, System Features, Functional requirements, Non-Functional requirements, Use case Diagram, Class Diagram, Activity Diagram, Sequence Diagram, Project Role Identification and Responsibilities, Project Sustainability in Terms of Society and Environment
- Wireframe Design, Test Planning, Test Cases Design, WBS, Constructive Cost Method, Timeline Chart – 01, Timeline Chart – 02, EVA, Risk Management.

_____Badhon_____
Signature of the Student

1. PROJECT PROPOSAL

Introduction

The University Sports Complex Management System (USCMS) is designed to streamline the booking and management of sports facilities within the university. The system will provide a centralized platform for students to book slots for various indoor and outdoor games, ensuring efficient utilization of sports facilities and enhancing the overall student experience.

Objectives

- o Streamline Booking Process: Facilitate easy and efficient booking of sports facilities.
- o Enhance User Experience: Provide a user-friendly interface for students and staff.
- o Optimize Facility Utilization: Ensure optimal use of sports facilities by managing bookings effectively.
- o Automate Management Tasks: Reduce manual effort in managing bookings and schedules.
- o Provide Real-time Information: Offer up-to-date information on available slots and facility status.

1.1 Background to the Problem:

In recent years, the management of the university sports complex has encountered several challenges, underscoring the need for modernization. The sports complex plays a vital role in the university experience, providing a space for students to participate in various sports activities, socialize, and maintain their physical health. However, the current management system is outdated and inefficient, necessitating a thorough re-evaluation and upgrade.

Identified Problems:

A. Inefficient Booking System: The manual booking process is cumbersome, often leading to double bookings and confusion.

B. Limited Access to Information: Students lack real-time access to facility availability, leading to frustration and wasted time.

C. Underutilization of Facilities: Ineffective scheduling and lack of proper management result in underutilized sports facilities.

D. Inadequate Communication: Poor communication channels between the administration and students hinder effective dissemination of important information.

E. Security Concerns: The current system does not adequately track usage, posing security concerns for both facilities and users.

These issues lead to a compromised sports experience, affecting students' well-being, productivity, and overall satisfaction. Addressing these challenges through a comprehensive Sports Complex Management System (SCMS) is essential for enhancing the overall campus experience and ensuring students have optimal access to sports facilities.

Problem Domain of the project:

The AIUB Sports Complex Management System falls under **Category B,** which involves extending existing software solutions to address real-life problems and provide business benefits. The current sports complex management systems in universities are often outdated, inefficient, and lack modern functionalities such as real-time booking, facility management, and tournament scheduling. The aim of this project is to enhance the efficiency of managing sports facilities, improve user engagement, and streamline administrative tasks.

Key issues include manual booking processes, lack of transparency in facility availability, and poor communication between users and administrators. These inefficiencies lead to underutilized facilities, user dissatisfaction, and difficulty in managing tournaments or sports events. By extending current software solutions, this project will address these gaps and offer a more comprehensive, user-friendly platform.

The AIUB Sports Complex Management System will provide real-time slot booking, notifications, and tournament management, ensuring a smooth experience for both students and administrators. It will integrate modern technologies such as mobile and web interfaces, allowing for better accessibility and usage of sports facilities.

In summary, the system aims to enhance the current sports management infrastructure, making it more efficient, transparent, and accessible to all users, extending the existing software solutions in this domain.

1.2 Solution to the Problem:

The objective of this project is to enhance the sports complex management at the university by addressing the recurring issues. Our goal is to design and implement a Sports Complex Management System that solves problems related to inefficient booking, limited information access, underutilization of facilities, inadequate communication, and security concerns.

- Efficient Booking System:
  - Implement an online booking system where students can view available slots and book facilities in real-time.
  - Provide options to modify or cancel bookings easily.
  - Utilize algorithms to manage and optimize facility schedules, ensuring maximal utilization and reducing conflicts.
- Real-time Information Access:
  - Develop a user-friendly platform where students can check facility availability, upcoming events, and schedules.
  - Implement notification systems for booking confirmations, reminders, and important updates.
- Facility Utilization Optimization:
  - Use data analytics to monitor facility usage and identify patterns to improve scheduling and resource allocation.
  - Implement a reporting system for maintenance needs, ensuring facilities are in optimal condition.
- Enhanced Communication:
  - Create communication channels within the platform for announcements, feedback, and support.
  - Enable direct communication between students and facility managers for specific queries and issues.
- Improved Security Measures:
  - Introduce a digital check-in/check-out system to track facility usage.
  - Implement access control measures to ensure only authorized users can book and use the facilities.

System Features

- User Registration and Authentication:

  o   Secure login for students and staff.

  o   Role-based access control.

- Slot Booking System:

  o   View available slots for various sports facilities.

  o   Book, modify, or cancel slots.

  o   Receive confirmation and reminders via email/SMS.

- Facility Management:

  o   Manage availability and maintenance schedules.

  o   Update facility status (e.g., under maintenance, available).

  o   View usage statistics and reports.

- Administrative Dashboard:

  o   Overview of facility utilization.

  o   Reports on booking trends and peak usage times.

  o   User management and support features.

- Indoor and Outdoor Games Management:

  o   Support for multiple sports (e.g., basketball, tennis, soccer, swimming).

  o   Customizable booking rules for different sports.

- Notification System:

  o   Notify users about booking status, cancellations, and updates.

  o   Send reminders for upcoming bookings.

Target Group of Users and Benefits

a)   University Students & Staff: They will benefit from improved access to sports facilities, reduced wait times, and enhanced convenience through real-time information and digital booking.

b) Facility Managers: The system will streamline operations, making it easier to manage bookings, schedules, and maintenance.

c) University Administration: The data collected can inform decisions related to facility management and resource allocation.

d) Security Teams: Improved tracking and access control measures will enhance the security of the sports complex.

Expected Benefits:

- o Improved orderliness and reduced wait times.
- o Increased efficiency through real-time booking and information access.
- o Enhanced convenience and transparency via the online platform.
- o Better facility utilization and maintenance management.

Overall, the Sports Complex Management System aims to create a more pleasant, efficient, and inclusive environment for sports activities, ultimately enhancing the overall quality of campus life.

2. SOFTWARE DEVELOPMENT LIFE CYCLE

2.1 Process Model

Selected Process Model:

For the AIUB Sports Complex Management System, the Waterfall model is selected as the most appropriate process model. This choice is made due to the well-defined and stable nature of the project requirements, which are unlikely to change significantly throughout the development process.

Reasons for Choosing This Model:

The Waterfall model is a linear and sequential approach, which suits projects with clearly defined stages and requirements. Given the straightforward nature of the AIUB Sports Complex Management System, this model ensures a disciplined approach with distinct phases for requirement gathering, design, implementation, testing, deployment, and maintenance. Each

phase must be completed before moving on to the next, allowing for meticulous documentation and systematic progress tracking.

1) Communication:

Detailed and comprehensive requirements are gathered from stakeholders at the beginning of the project. This phase ensures that all functionalities, such as user registration, slot booking, facility management, notification systems, and tournament management, are clearly defined and documented.

2) Planning:

In this phase, the project team focuses on estimating the scope, scheduling tasks, and tracking progress. Effective planning is crucial for setting realistic timelines and resource allocation.

3) Modeling:

The architectural and detailed design of the system is created based on the requirements. This phase includes designing the database schema, defining user interfaces, and planning the overall system architecture.

4) Construction:

The actual coding and development of the system take place in this phase. Developers create the modules for user registration, slot booking, facility management, notification system, and tournament management as per the design specifications. Once the system is built, it is rigorously tested to ensure that all components work together seamlessly, and that the system meets the specified requirements. This phase includes unit testing, integration testing, system testing, and acceptance testing.

5) Deployment:

After successful testing, the system is deployed in the university environment. Users are trained, and the system is made live for actual use. The final phase involves delivering the completed system to the users, providing support, and gathering feedback. It ensures that the software is correctly implemented, and users are satisfied with its functionality.

Post-deployment, the system enters the maintenance phase where it is monitored for any issues, and necessary updates and enhancements are made based on user feedback and evolving needs.

Why Other Models Are Insufficient:

➢ <u>Agile Model:</u> The Agile model is best suited for projects with evolving requirements and the need for frequent changes. However, the AIUB Sports Complex Management System has well-defined requirements that are not expected to change significantly, making the structured approach of the Waterfall model more suitable.

➢ <u>Scrum Framework:</u> Scrum, a popular Agile framework, emphasizes iterative development and constant feedback. While beneficial for projects requiring continuous refinement, it may introduce unnecessary complexity for a project with stable requirements like this one.

➢ <u>Extreme Programming (XP):</u> XP focuses heavily on technical practices such as pair programming and test-driven development. While this ensures high-quality code, it might not provide the structured and phased approach needed for this project.

➢ <u>Feature-Driven Development (FDD):</u> FDD involves extensive planning and parallel work in large teams, which might not be necessary for this project. The Waterfall model's simplicity and clear phase demarcations better suit the project's needs.

➢ <u>Dynamic Systems Development Method (DSDM):</u>DSDM is another Agile method emphasizing frequent delivery and user involvement. However, its focus on fixed time and cost constraints may not align well with the clear, stable requirements of this project, making Waterfall a better choice.

2.2 Project Role Identification and Responsibilities

In a Waterfall model, roles are clearly defined at each phase of the development process. The following roles and responsibilities are identified for the AIUB Sports Complex Management System project:

- **Project Manager:** Oversees the entire project, ensuring adherence to timelines, budget, and scope. Manages communication between stakeholders and the development team.
- **Requirements Analyst:** Gathers and documents detailed requirements from stakeholders. Ensures that all functionalities are clearly specified and understood.
- **System Architect:** Designs the overall system architecture, ensuring that the system meets the specified requirements and adheres to best practices.

- **Development Team:** Responsible for coding and implementing the system as per the design specifications. Divided into smaller teams handling different modules like user registration, slot booking, and facility management.
- **Quality Assurance (QA) Team:** Conducts thorough testing of the system, including unit testing, integration testing, system testing, and user acceptance testing.
- **Maintenance Team:** Monitors the system post-deployment, addressing any issues and implementing necessary updates and enhancements.

2.3 Project Sustainability in Terms of Society and Environment

The AIUB Sports Complex Management System is designed to enhance the university sports experience, promoting physical health, social interaction, and efficient facility management. The system supports sustainable practices by optimizing facility usage and reducing manual administrative tasks.

Societal Impact

The AIUB Sports Complex Management System is designed to foster an inclusive and efficient sports environment within the university. It promotes:

- **Physical Health and Well-Being:** By making it easier for students to access and book sports facilities, the system encourages regular physical activity, which contributes to overall well-being.
- **Social Interaction:** The system encourages social engagement by facilitating participation in sports events, tournaments, and recreational activities, thereby fostering teamwork and collaboration among students.
- **Inclusivity:** The platform is designed to be accessible to all students, regardless of their socio-economic background. It aims to remove barriers that might prevent students from participating in sports activities, making it a more equitable experience.

To ensure environmental sustainability, the system is developed with energy-efficient technologies and adheres to best practices for reducing electronic waste. The project also aims to be inclusive,

ensuring that all students, regardless of socio-economic background, can benefit from improved access to sports facilities and events.

Environmental Impact

The project incorporates several sustainable practices, aiming to minimize its environmental footprint while delivering efficient facility management:

1. **Energy-Efficient Technologies:** The system is developed using energy-efficient algorithms and hosted on servers with minimal energy consumption. It also supports cloud-based solutions to reduce the physical infrastructure needed for sports facility management, contributing to reduced energy use.

2. **Reduction in Manual Processes:** By automating booking, notifications, and facility management, the system reduces the need for printed materials and manual records, leading to decreased paper usage and promoting digitalization.

3. **Minimizing Electronic Waste:** The system leverages modern cloud infrastructure and scalable software platforms, which reduce the need for frequent hardware updates or specialized electronic equipment, thereby contributing to lower electronic waste generation.

4. **Optimizing Facility Usage:** By providing real-time data on facility usage and availability, the system reduces the likelihood of underutilized resources, contributing to better energy management. Well-managed sports facilities avoid unnecessary energy use for lighting, cooling, or maintenance, especially during off-peak hours.

5. **Environmental Awareness:** The system can include features to promote environmentally friendly practices, such as reminders to conserve resources like water or energy when using facilities.

In conclusion, the **AIUB Sports Complex Management System** not only aims to improve the user experience and operational efficiency of the sports complex but also supports sustainable practices that positively impact both society and the environment. Through thoughtful design, the system ensures the promotion of physical health, social engagement, and inclusivity, while also contributing to environmental sustainability by reducing resource wastage and promoting energy efficiency.

3. SOFTWARE REQUIREMENTS ANALYSIS

Functional Requirements:

1. User Sign-up:

Description: The system should allow new users (students) to sign up by providing essential information.

Detailed Steps:

1. The user navigates to the sign-up page.

2. The user clicks the "Sign-up" button.

3. The user provides valid data (full name, email, phone number, institution name, and student ID).

4. After submitting the information, the user clicks on the confirmation button.

Precondition:

- The user must be a valid student from a school, college, or university.

Postcondition:

- The user receives a confirmation email.

- The user's information is stored in the university's main database.

- The university reserves the right to approve or cancel any registration.

Priority: High

2. **User Login:**

Description: The system should authenticate users who have already signed up.

Detailed Steps:

1. The user navigates to the login page.

2. The user inputs their username and password.

3. The user clicks on the "Log In" button.

Precondition:

- Users must be registered in the system.

- If the user is not an AIUB student, they must sign up first.

Postcondition:

- Upon successful login, session details are logged in the database.

- The user is granted access to the system.

Priority: High

3. Slot Booking System:

Description: Logged-in users should be able to book available slots for indoor or outdoor games.

Detailed Steps:

1. The user logs into the system.

2. The user selects the "Slots Booking" option.

3. The user chooses the type of game (indoor or outdoor).

4. The user selects the game (e.g., Chess, Carrom).

5. The user selects the desired slot time from available options.

6. The user provides the total number of players and their details (name, ID).

7. The user selects any optional kits if needed.

8. The user confirms the booking.

Precondition:

- The user must be logged in.

Postcondition:

- The booking details are saved in the database.

- The admin can modify or delete the booking and can ban players in case of disciplinary issues.

Priority: High

4. Tournament Registration:

Description: Logged-in users should be able to register for tournaments by providing team and player details.

Detailed Steps:

1. The user logs into the system.

2. The user selects the "Tournament" option.

3. The user chooses the preferred tournament.

4. The user reviews the terms and conditions and checks the "Check Box."

5. The user selects the type of game (e.g., football, cricket).

6. The user provides team and player details (university name, team name, player names, and IDs).

7. The user submits the form.

Precondition:

- The user must be logged in.

Postcondition:

- The admin can modify or delete the tournament registration and enforce team discipline if necessary.

Priority: High

5. Tournament Creation by Admin:

Description: Admins should be able to create new tournaments with necessary details.

Detailed Steps:

1. The admin logs into the system.

2. The admin selects the "Create New Tournament" option.

3. The admin enters the tournament details (name, total teams, registration fees).

4. The admin submits the form to create the tournament.

Precondition:

- Admin login is required.

Postcondition:

- The admin can modify or delete the tournament anytime.

Priority: High

6. Slot Modification by Admin:

Description: Admins should be able to modify game slots by updating the slot name, timing, and player details.

Detailed Steps:

1. The admin logs into the system.

2. The admin selects "Manage Slots."

3. The admin chooses the game type (indoor or outdoor).

4. The admin updates the slot name, start time, end time, and number of players.

5. The admin confirms the changes.

Precondition:

- Admin login is required.

Postcondition:

      - The admin can modify or delete slot details anytime.

Priority: Medium

7. Slot Deletion by Admin:

Description: Admins should be able to delete any existing slots.

Detailed Steps:

      1. The admin logs into the system.

      2. The admin selects "Manage Slots."

      3. The admin selects the desired slot to be deleted.

      4. The admin clicks on the "Delete Slot" button.

      5. The admin confirms the deletion in a popup.

Precondition:

      - Admin login is required.

Postcondition:

      - The slot is deleted, and the admin can recreate it if needed.

Priority: Medium

8. Sending Notices by Admin:

Description: Admins should be able to send notices regarding tournaments or other updates.

Detailed Steps:

      1. The admin logs into the system.

      2. The admin selects "Manage Current Tournament."

      3. The admin chooses the tournament and clicks "See Details."

      4. The admin writes the notice and submits it.

Precondition:

      - Admin login is required.

Postcondition:

      - The admin can modify or update the notice anytime.

Priority: Medium

❖ <u>Non-functional Requirements</u>

1. Performance and Scalability

The system should efficiently handle multiple concurrent users without noticeable performance degradation. It must be scalable to support an increasing number of users, sports facilities, and booking transactions over time, ensuring response times for critical operations like booking slots and user registration are typically under 2 seconds.

2. Reliability and Availability

The system must maintain high reliability with minimal downtime, ensuring an availability rate of 99.9%. Regular backups and robust disaster recovery procedures should be in place to prevent data loss and ensure swift recovery in case of system failures.

3. Usability

The software should be user-friendly and intuitive, allowing users to easily navigate and perform tasks with minimal training. It should follow best practices in user experience (UX) design, providing clear instructions, error messages, and help resources to assist users.

4. Security

The system must adhere to industry-standard security practices to protect user data and prevent unauthorized access. This includes encryption of sensitive data, secure communication channels

(e.g., HTTPS), and regular security audits, along with enforcing multi-factor authentication and strong password policies.
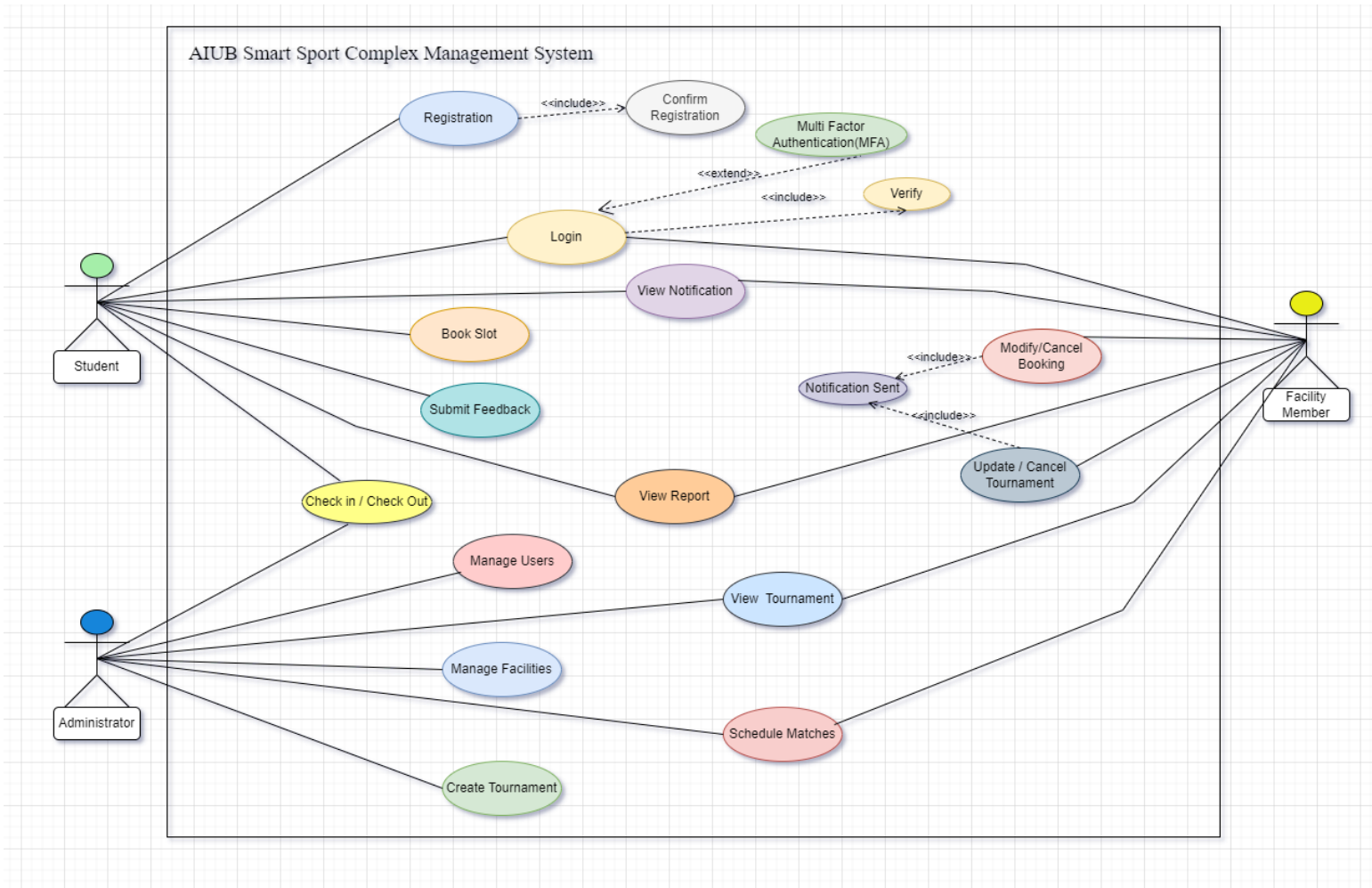
5. Maintainability

The software should be designed for ease of maintenance and updates, with a modular and well-documented codebase. This approach allows developers to make changes or add new features with minimal disruption, supported by automated testing and continuous integration to ensure the reliability of updates.
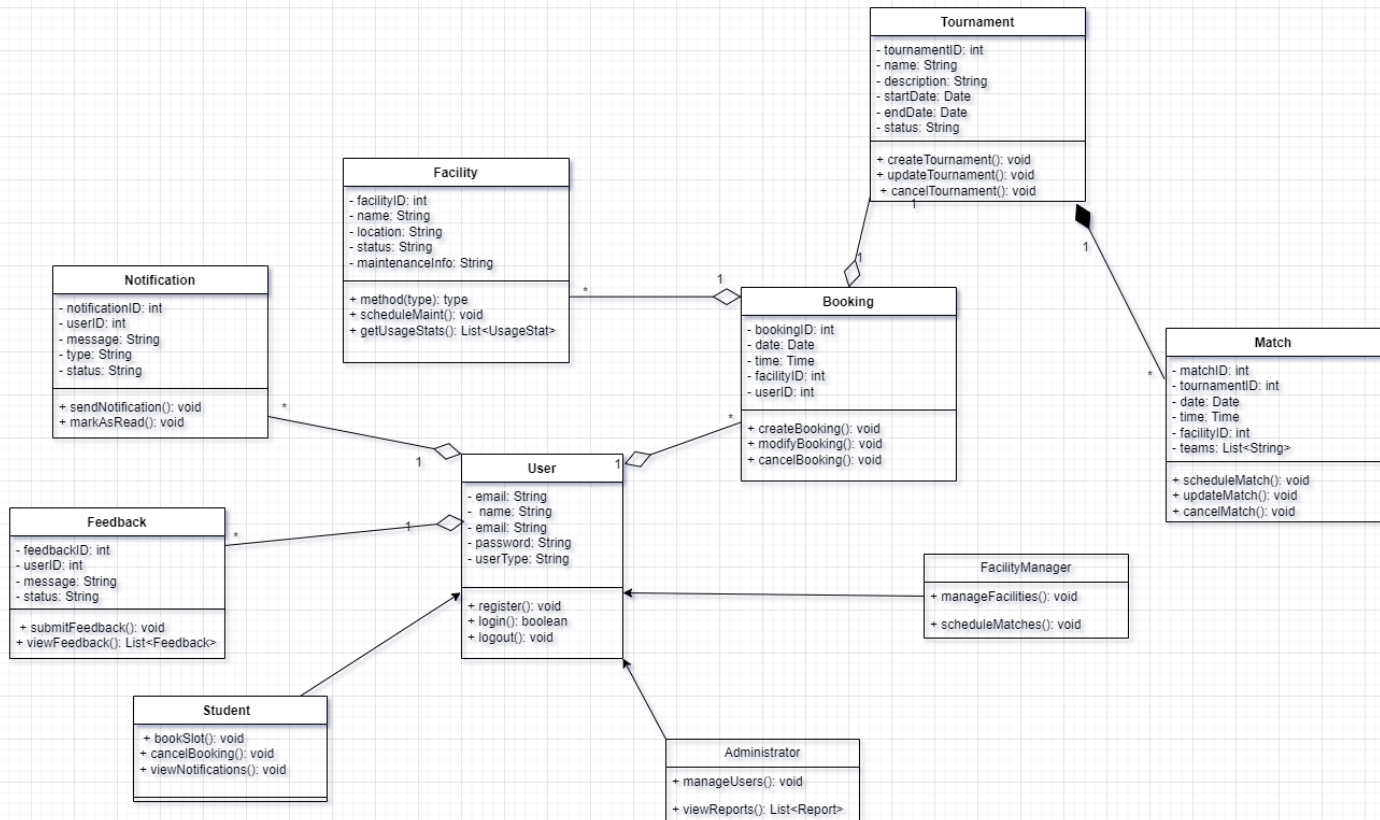
6. Compatibility

The system should be compatible with various web browsers and operating systems, allowing access from different devices, including desktops, laptops, tablets, and smartphones. It should also seamlessly integrate with existing university systems and databases to ensure a cohesive user experience.
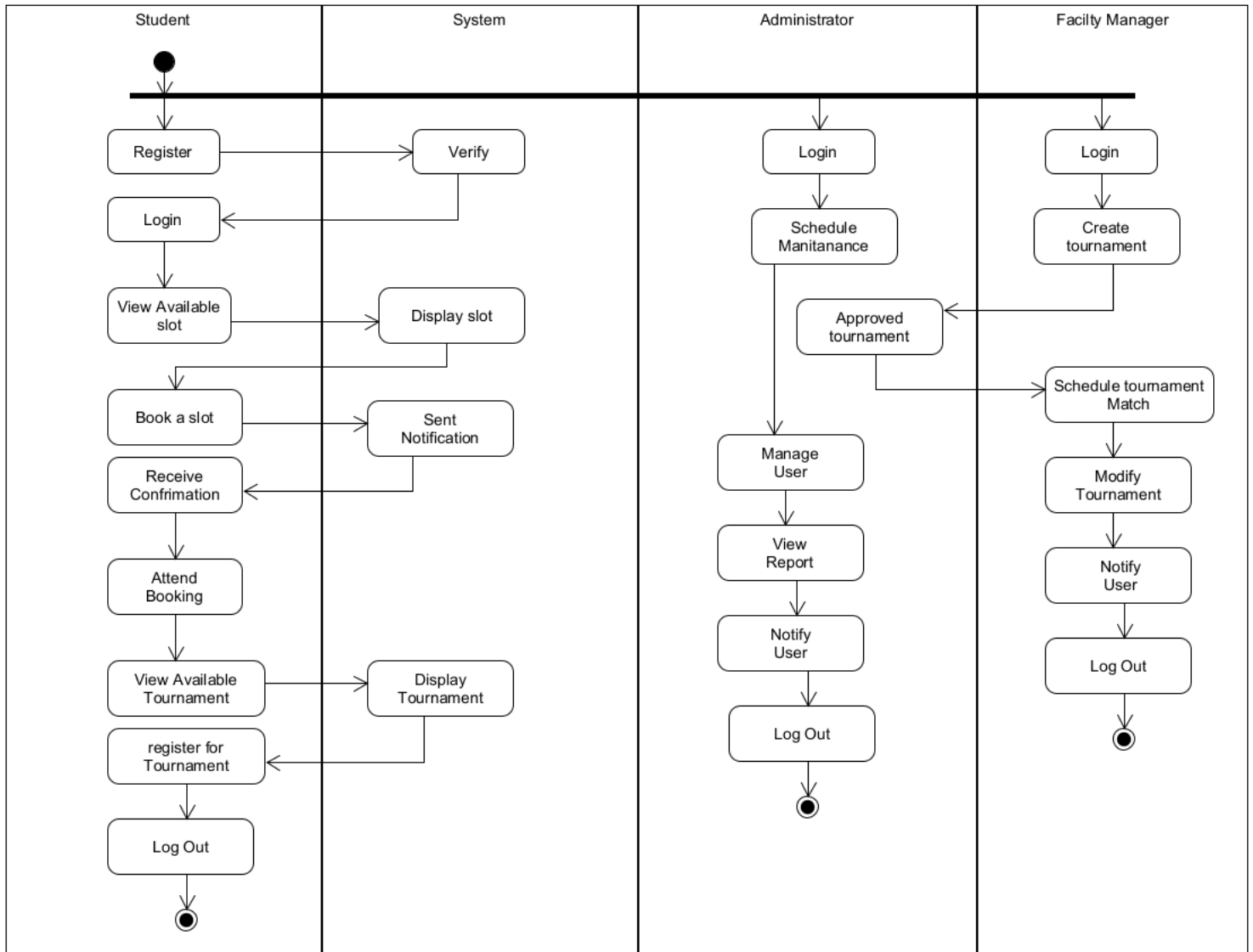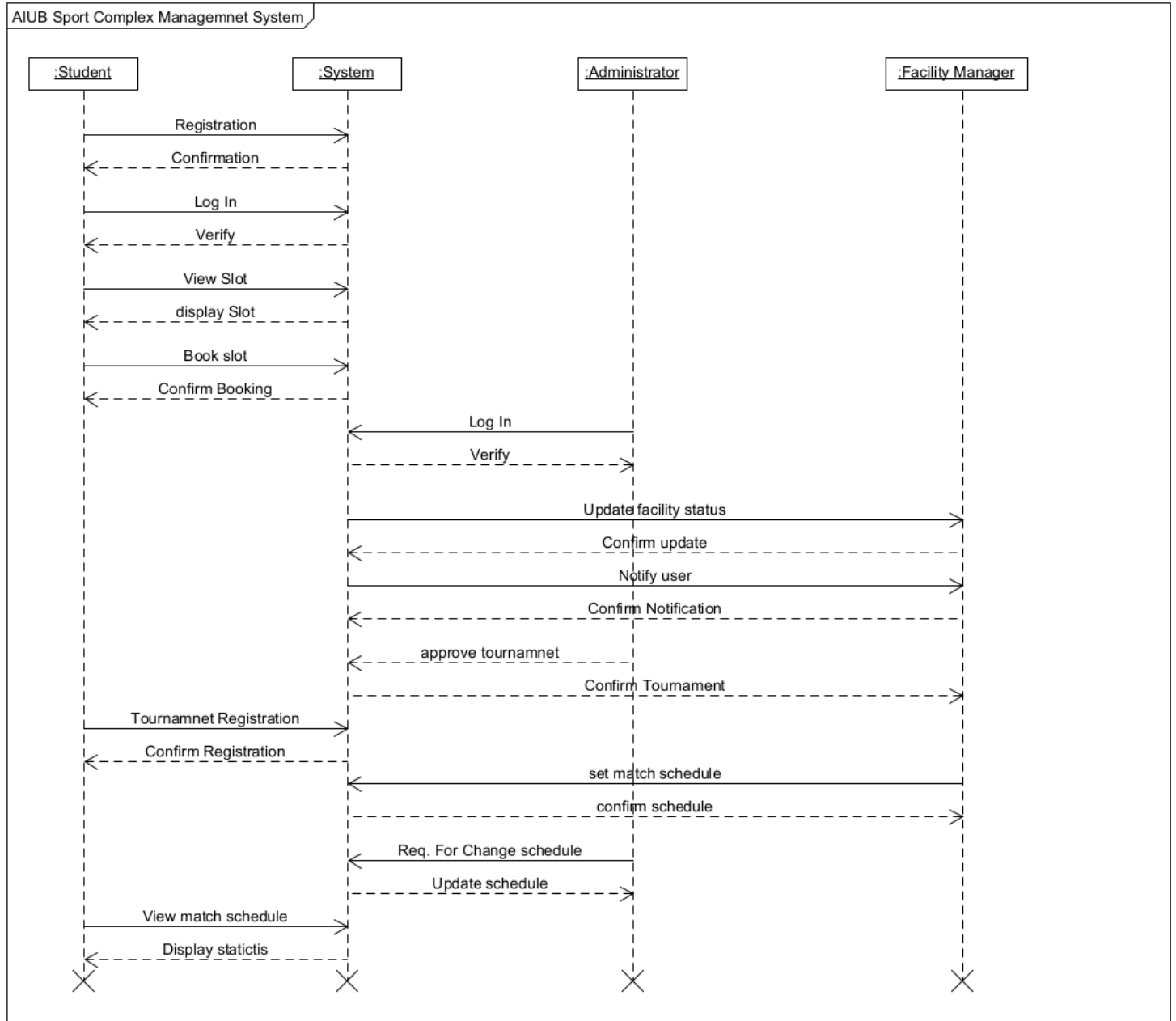
4. SYSTEM DESIGN SPECIFICATION

4.1 Use Case Diagram:

4.2 Class Diagram:

Tournament
- tournamentID: int
- name: String
- description: String
- startDate: Date
- endDate: Date
- status: String

+ createTournament(): void
+ updateTournament(): void
+ cancelTournament(): void

Facility
- facilityID: int
- name: String
- location: String
- status: String
- maintenanceInfo: String

+ method(type): type
+ scheduleMaint(): void
+ getUsageStats(): List<UsageStat>

Notification
- notificationID: int
- userID: int
- message: String
- type: String
- status: String

+ sendNotification(): void
+ markAsRead(): void

Booking
- bookingID: int
- date: Date
- time: Time
- facilityID: int
- userID: int

+ createBooking(): void
+ modifyBooking(): void
+ cancelBooking(): void

Match
- matchID: int
- tournamentID: int
- date: Date
- time: Time
- facilityID: int
- teams: List<String>

+ scheduleMatch(): void
+ updateMatch(): void
+ cancelMatch(): void

User
- email: String
- name: String
- email: String
- password: String
- userType: String

+ register(): void
+ login(): boolean
+ logout(): void

Feedback
- feedbackID: int
- userID: int
- message: String
- status: String

+ submitFeedback(): void
+ viewFeedback(): List<Feedback>

FacilityManager
+ manageFacilities(): void
+ scheduleMatches(): void

Student
+ bookSlot(): void
+ cancelBooking(): void
+ viewNotifications(): void

Administrator
+ manageUsers(): void
+ viewReports(): List<Report>

4.3 Activity Diagram:

4.4 Sequence Diagram:

AIUB Sport Complex Managemnet System

| :Student | :System | :Administrator | :Facility Manager |

- Registration →
- ← Confirmation
- Log In →
- ← Verify
- View Slot →
- ← display Slot
- Book slot →
- ← Confirm Booking
- Log In →
- ← Verify
- Update facility status →
- ← Confirm update
- Notify user →
- ← Confirm Notification
- ← approve tournamnet
- Confirm Tournament →
- Tournamnet Registration →
- ← Confirm Registration
- set match schedule →
- ← confirm schedule
- ← Req. For Change schedule
- Update schedule →
- View match schedule →
- ← Display statictis

5. Wireframe

Logo

AIUB Smart Sport Complex
Management System

Who are you?

Login as User

Login as Admin

Admin Login

User ID :

Password :

Sign in

Forgotten Password

Notifications

Admin Dashboard

Create New Tournament

Manage Current Tournament

Manage Slots

🔔 New Notification

Create New Tournament

Tournament Name : [   ]

Total Teams : [   ]

Registration Fees : [   ]

[Create]

Manage Current Tournament

«

| Inter School Competition | AIUB World Cup | Inter College Competition |
| See Details | See Details | See Details |

»

AIUB World Cup

[See Total Teams]

[Add New Teams]

[Delete Teams]

[Create New Notice]

Intra School Competition

[See Total Teams]

[Add New Teams]

[Delete Teams]

[Create New Notice]

Intra College Competition

[See Total Teams]

[Add New Teams]

[Delete Teams]

[Create New Notice]

Manage Slots

Notifications

🔔 New Notification

Indoor Games

Outdoor Games

Indoor Games

Create New Games

« Ludo | Carrom | Chess »

Send Notice

Carrom

Slots (Click to view info)

1	2	3	4	5

Create New Slots

Modify Slots

Delete Slots

Modify Slot (Carrom) 1

Starting Time : 10:30 ∨ AM

Ending Time : 10:30 ∨ AM

Total Player : 4 ∨

Confrim

« Slot 1 Info Carrom

Player 1 Name : Abu Bakar (ID)

Player 2 Name : Riya (ID)

Playing Time : 10 AM to 10:30 AM

Date : 10 Sept. 2024

BAN Players

Delete Slot

Football

Slots (Click to view info)

1	2	3	4	5

Create New Slots

Modify Slots   Delete Slots

❮❮ Slot 1 Info Football

Player 1 Name : Abu Nasir (ID)

Player 2 Name : Saiful (ID)

Playing Time : 11 AM to 11:45 AM
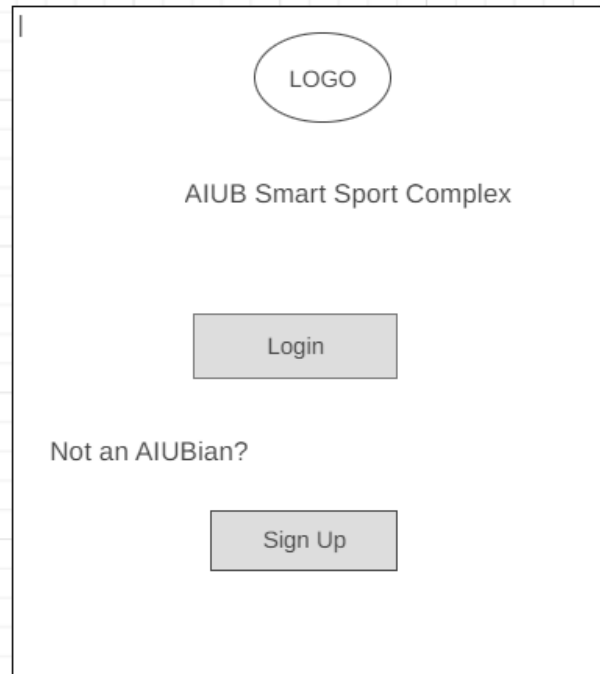
BAN Players   Delete Slot
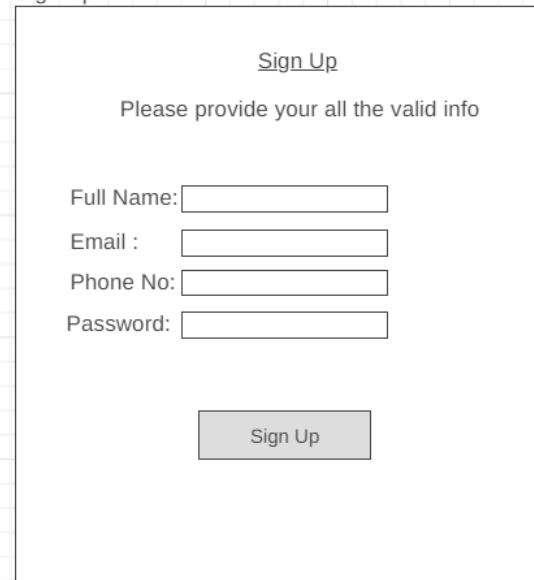
Modify Slot (Football) 1

Starting Time :   11:00   ⌄ AM

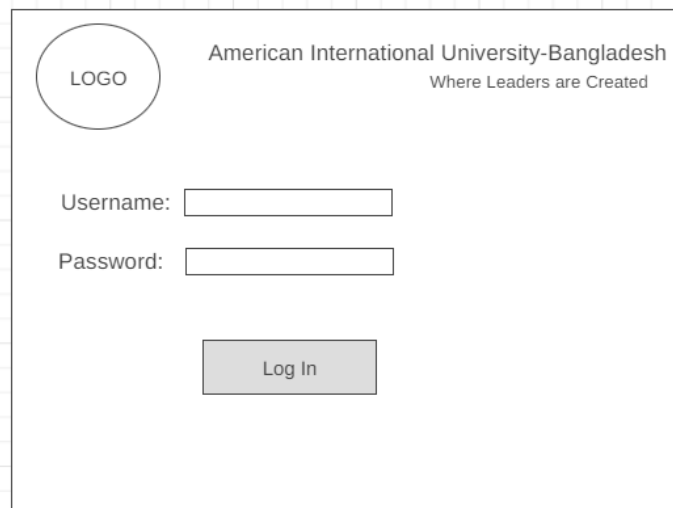Ending Time :   11:45   ⌄ AM

Total Player :   4   ⌄

Home

LOGO

AIUB Smart Sport Complex

Login

Not an AIUBian?

Sign Up

Sign Up

Sign Up

Please provide your all the valid info

Full Name: [   ]

Email : [   ]

Phone No: [   ]

Password: [   ]

Sign Up
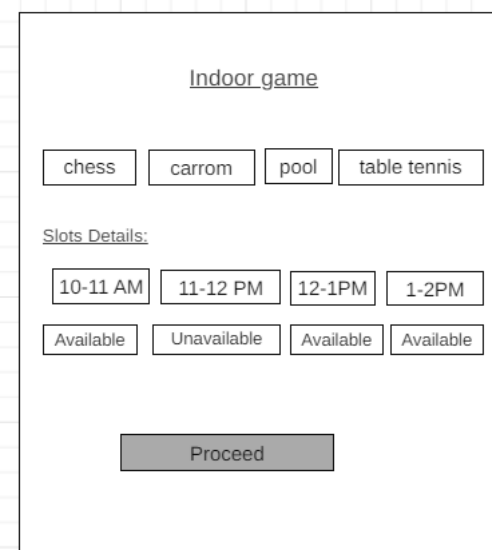
Log in

LOGO

American International University-Bangladesh
Where Leaders are Created

Username: [   ]

Password: [   ]

Log In

Indoor game

| chess | carrom | pool | table tennis |

Slots Details:

| 10-11 AM | 11-12 PM | 12-1PM | 1-2PM |
| Available | Unavailable | Available | Available |

Proceed

LOGO

AIUB Smart Sport Complex
Management System

Available Sport Slot

Indoor ▼

Outdoor ▼

Tournament ▼

Slot 10 AM- 11 AM

Game name :   chess

Total players : 2

Player 1 name: [   ]

player 1 ID : [   ]

Player 2 Name: [   ]

Player 2 ID: [   ]

Kits :   [Chess board   ]

[confirm]

Outdoor game

[Football]   [Volleyball]   [Cricket]

Available slots

[11-12PM]   [12-1PM]   [1-2PM]

[Available]   [Unavailable]   [Available]

[Proceed]

Payment

Your Payment Amount is [   ]

Choose Payment Method

[bKash]   [Nagad]   [Rocket]

[Card Payment]

Slot 11AM -12PM

Game Name :   Volleyball

Total Players: 6

Player 1 Name : [   ]
Player 1 ID : [   ]
Player 2 Name : [   ]
Player 2 ID : [   ]
Player 3 Name : [   ]
Player 3 ID : [   ]
Player 4 Name : [   ]
Player 4 ID : [   ]
Player 5 Name : [   ]
Player 5 ID : [   ]
Player 6 Name : [   ]
Player 6 ID : [   ]

[confirm]

Tournament

‹‹

Inter school competition
See Details

Intra university competition

››

Inter school competition

Cricket	Football	Indoor	Annual

see all teams

☐ I agree all tearms and condition

Registry

Registry

University name : _____

Team name : _____

Players name : _____

Players ID : _____

Year : _____

Contact : _____

Submit

Notification:

Details are shown here :

[   ]

Ok

6. Test Plan

Introduction

This test plan outlines the testing strategy for the AIUB Sports Complex Management System. The aim is to verify that the system functions as intended and meets all specified requirements. The testing process will involve Unit Testing, Integration Testing, System Testing, and Acceptance Testing to ensure that all features, including user registration, slot booking, facility management, and notifications, work seamlessly.

Testing Objectives:

- Verify Functionality: Ensure that each unit, such as the slot booking module, user registration, and facility management, performs as expected.

- Edge Case Validation: Test boundary cases, such as overlapping bookings or invalid credentials, to confirm proper error handling.

- Integration of Components: Validate that various modules interact correctly within the system.

- Performance Testing: Assess system performance under both normal and high load conditions.

- User Experience: Evaluate the ease of navigation and overall user experience across different devices.

- Security Validation: Identify any vulnerabilities, such as unauthorized access or data breaches.

- System Reliability: Simulate failure scenarios to test the system's reliability and its ability to recover without downtime or data loss.

Testing Approach

1. Unit Testing:

   - Focus on testing isolated units like booking and registration modules.

   - Verify that each function works as expected using mock data.

   - Developers will conduct unit testing with high code coverage.

- All unit tests will be integrated into a CI/CD pipeline for early detection of issues.

2. Integration Testing:

   - Validate that different system modules (e.g., booking, facility management) integrate smoothly.

   - Developers will focus on testing the interaction between the subsystems.

   - This will ensure that features like notifications trigger correctly after a slot is booked.

3. System Testing:

   - Conducted once integration testing is complete.

   - System-wide testing to confirm that all functionalities, such as multi-user booking and administrative features, are working properly.

   - Performance under various load conditions will be tested.

4. Acceptance Testing:

   - Performed after deployment and documentation preparation.

   - Validate that the system meets all user and stakeholder requirements.

   - Ensure that the system is fully functional in the real university environment and delivers the expected user experience.

In conclusion, the testing process for the AIUB Sports Complex Management System will focus on ensuring that all components work in isolation and as a whole. The testing phases—unit testing, integration testing, system testing, and acceptance testing—will verify that the system is reliable, secure, and user-friendly. This comprehensive testing approach will help deliver a high-quality and efficient sports complex management experience for the university.

7. Test Cases

Project Name: AIUB Smart Sport Complex Management System	Test Designed by:Antara1
Test Case ID: FR_1	Test Designed date: 10/9/2024
Test Priority (Low, Medium, High): High	Test Executed by:
Module Name: Sign up Session	Test Execution date:

Test Title: To verify the sign-up process of the system

Description: Test website sign-up

Precondition (If any): The person must be a valid school/college/university student

Test Steps	Test Data	Expected Results	Actual result	Status (Pass/ Fail)
1. Go to the website 2. Click on the sign-up button 3. Provide all the valid information (Full name, email, Phone no, Institution name, Student ID) 4. Click sign-up button 5. Click on the sign-up confirmation button	Username: Mokbul Hossain Password: BdCric@897 Email: mokbul897@gmail.com, Mobile: 01756874636, Institute: Dhaka University Student ID: 68963	User should sign up into the application		

Post Condition: There will be a mail sent to the user to confirm his sign-up process and the users' data will be stored in the university main database. AIUB authority preserves all right to take any further decision to cancel anyone's registration.

Project Name: AIUB Smart Sport Complex Management System	Test Designed by: Tasrif_1
Test Case ID: FR_2	Test Designed date: 10/9/2024
Test Priority (Low, Medium, High): High	Test Executed by:
Module Name: Log in Session	Test Execution date:
Test Title: To verify the Log in process of the system	
Description: Test website Log in	
Precondition (If any): The person (If not an AIUB student) must Sign-up before login.	

Test Steps	Test Data	Expected Results	Actual result	Status (Pass/ Fail)
1. Go to the website 2. Click on the Log In button 3. Fill up with all the valid information (Username, Password) 4. Click the Log in button	Username: Mokbul Hossain Password: BdCric@897	User should Log In into the system.		

Post Condition: User is validated with database and successfully login to account. The account session details are logged in the database.

Project Name: AIUB Smart Sport Complex Management System	Test Designed by: Tasrif_1
Test Case ID: FR_3	Test Designed date: 10/9/2024
Test Priority (Low, Medium, High): Medium	Test Executed by:
Module Name: Slot Booking	Test Execution date:

Test Title: To book for the slot of any indoor or outdoor games

Description: Test website Slot Booking

Precondition (If any): The user must login to the system.

Test Steps	Test Data	Expected Results	Actual result	Status (Pass/ Fail)
1. Go to the website and login 2. Click on the Slots Booking Button 3. Choose the slot between indoor or outdoor games. 4. Select the game name (Chess, Carrom, Pool etc.) 5. Select the time for slot from the available slot options. 6. Click on the proceed button. 7. Input the total number of Players 8. Input all the players' Name and ID. 9. Choose the playing kits (If any) 10. Press on the confirm button.	Game Name: Chess Total Players: 2 Player1 Name: Asif Player1 ID: 22-57157-3 Player2 Name: Pooja Player2 ID: 23-56579-1 Slot Time: 10AM to 11AM	User should successfully book for the slot.		

Post Condition: Users data is preserved to the Admin. The Admin can modify or delete the slot anytime and also can Bann any players if something disciplinary issues come to light.

Project Name: AIUB Smart Sport Complex Management System	Test Designed by: Badhon_1
Test Case ID: FR_4	Test Designed date: 10/9/2024
Test Priority (Low, Medium, High): Medium	Test Executed by:
Module Name: Registry in Tournament	Test Execution date:

Test Title: To registry for the current available tournament
Description: Test website Tournament registration process
Precondition (If any): The user must login to the system.

Test Steps	Test Data	Expected Results	Actual result	Status (Pass/ Fail)
1. Go to the website and login 2. Click on the Tournament Button 3. Choose the preferred tournament and click on the see details button. 4. Read the terms and conditions and tick on the 'Check Box' 5. Select the type of game (football, cricket etc.) 6. Click on the Registry button. 7. Input all valid information 8. Press on the Submit button.	Your University Name: North South University Team Name: Red Boys Total Players: 11 Player1 Name: Rahim Player2 Name: Jony Player3 Name: Raj Player1 ID: 67463 Player2 ID: 94836 Player3 ID: 68769 Contact: 0175678395 Year: 3rd	User should successfully Registry for the tournament.		

Post Condition: Users data is preserved to the Admin. Admin can modify or delete the slot anytime and also can Bann any players if something disciplinary issues come to light.

| Project Name: AIUB Smart Sport Complex Management System		Test Designed by: Badhon_1		
Test Case ID: FR_5		Test Designed date: 10/9/2024		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: Create New Tournament		Test Execution date:		
Test Title: To create new tournament by Admin				
Description: Test website New Tournament Creation process				
Precondition (If any): The user must login as admin to the system.				
Test Steps	Test Data	Expected Results	Actual result	Status (Pass/ Fail)
1. Go to the website and login as admin 2. Click on the Create New Tournament Button 3. Input all the information (Tournament name, Total Team, Registration Fees) 4. Press on the Create button.	Username: Admin Password: admin Tournament name: ACPL Total Team: 12 Registration Fees: 5000 Tk	Admin should successfully create new tournament		
Post Condition: Admin can modify or delete the tournament anytime and also can Bann any players if something disciplinary issues come to light.				

Project Name: AIUB Smart Sport Complex Management System	Test Designed by: Badhon_2
Test Case ID: FR_6	Test Designed date: 10/9/2024
Test Priority (Low, Medium, High): Medium	Test Executed by:
Module Name: Modify Slots	Test Execution date:

Test Title: To Modify Slots by Admin				
Description: Test website to Modify Slot process				
Precondition (If any): The user must login as admin to the system.				
Test Steps	Test Data	Expected Results	Actual result	Status (Pass/ Fail)
1. Go to the website and login as admin 2. Click on the Manage Slots button 3. Choose the game type (Indoor or Outdoor) 4. Click on the Modify Slots Button 5. Input all the information (Slot Name, Starting Time, Ending time, Total Players) 6. Press on the Confirm button.	Username: Admin Password: admin Slot Name: 6 Starting Time: 5:30 Ending time: 6:00 Total Players: 8	Admin should successfully modify slots		
Post Condition: Admin can modify or delete the slots information anytime.				

Project Name: AIUB Smart Sport Complex Management System	Test Designed by: Mostakin_1
Test Case ID: FR_7	Test Designed date: 10/9/2024
Test Priority (Low, Medium, High): Medium	Test Executed by:
Module Name: Delete Slots	Test Execution date:
Test Title: To Delete Slots by Admin	
Description: Test website to Delete Slot process	
Precondition (If any): The user must login as admin to the system.	

Test Steps	Test Data	Expected Results	Actual result	Status (Pass/ Fail)
1. Go to the website and login as admin 2. Click on the Manage Slots button 3. Choose the game type (Indoor or Outdoor) 4. Select the required slot to be deleted 5. Click on the Delete Slots Button 6. Press on the popup Confirm button.	Username: Admin Password: admin Slot Name: 6 Starting Time: 5:30 Ending time: 6:00 Total Players: 8	Admin should successfully delete slots		

Post Condition: Admin can recreate the slots anytime.

Project Name: AIUB Smart Sport Complex Management System	Test Designed by: Shahab_1
Test Case ID: FR_8	Test Designed date: 10/9/2024
Test Priority (Low, Medium, High): Low	Test Executed by:
Module Name: Send Notice	Test Execution date:
Test Title: To Send New Notice by Admin	
Description: Test website to Send Notice process	
Precondition (If any): The user must login as admin to the system.	

Test Steps	Test Data	Expected Results	Actual result	Status (Pass/ Fail)
1. Go to the website and login as admin 2. Click on the Manage Current Tournament Button 3. Choose the Tournament type and click on see details. 4. Click on the Create New Notice Button 5. Write the Notice 6. Press the Send Button	Username: Admin Password: admin Tournament Type: Intra School Competition Notice: Dear participants, Welcome to AIUB.	Admin should successfully send notice to all.		

Post Condition: The admin has the authority to make any changes in the notice anytime.

8. WBS
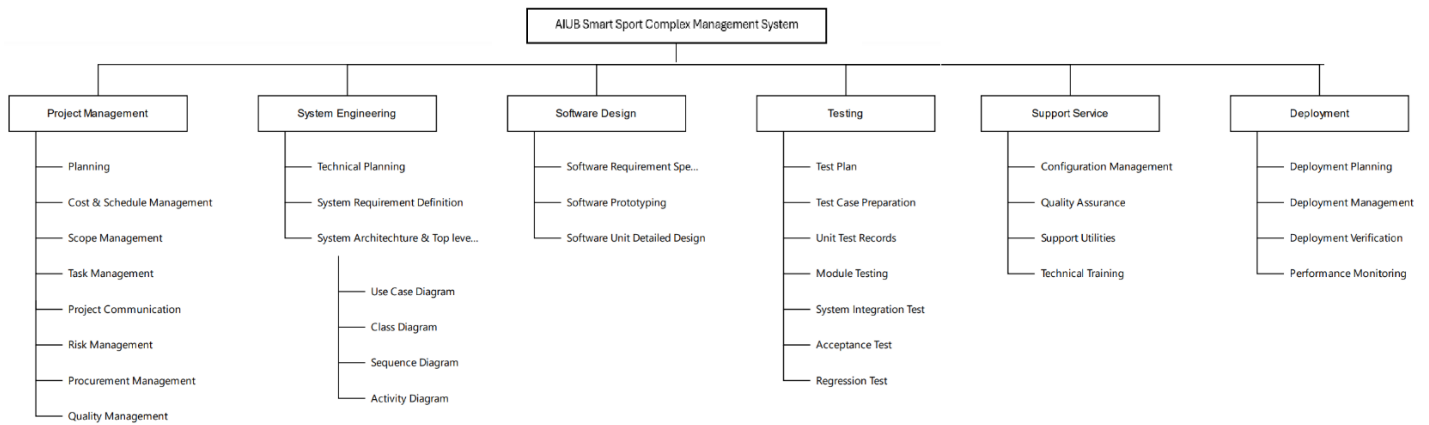
9. Effort Estimation:

COCOMO (Constructive Cost Model)

Software Project Type	Coefficient <Effort Factor>	P	T
Organic	2.4	1.05	0.38
Semi-detached	3.0	1.12	0.35
Embedded	3.6	1.20	0.32

Let's assume Source Line of Code is 6000

So, effort needs to be, $PM = 2.4 \times (6000/1000)^{1.05} = 15.75$

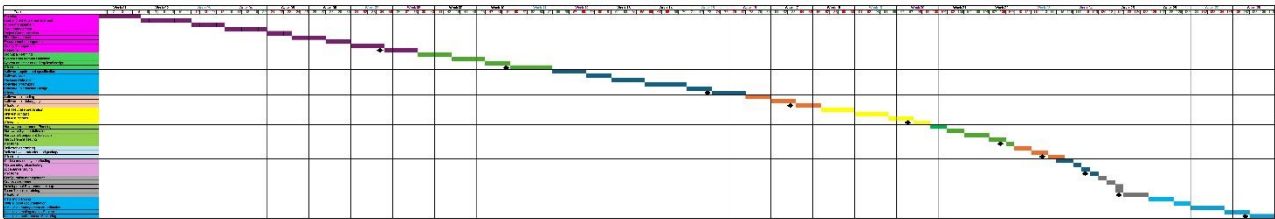Development time, $DM = 2.50 \times (PM)^{0.38} = 7.13 \approx 7$

Required number of people, $ST = PM/DM = 2.2 \approx 3$

This means we need to work for $(4 \times 7) = 28$ weeks

10. Timeline Chart 1

Week Task:Person	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
A : Antara																												
B: Badhon																												
C: Mostakin																												
D: Badhon																												
E: Antara																												

Activity Key:	A : Communication	B : Planning	C : Modeling	D : Construction	E : Deployment		

11. Timeline Chart 2

12. EVA

Earned Value Analysis (EVA)

The project has 33 planned work tasks that are estimated to require PM*22= 16*22 = 352 person-days to complete. At the time, 9 tasks have been completed. However, the project schedule indicates that 12 tasks should have been completed. The following scheduling data (in person-days) are available:

Task	Planned Effort	Actual Effort
1	5	4
2	6	5
3	4	5
4	5	6
5	3	2
6	4	5
7	3	4
8	4	3
9	4	5
10	4	
11	3	
12	5	

- **Total Task = 33; Effort Estimated= 352 person-day**
- **BCWS= 50; BCWP=38; ACWP=39**
- **BAC = 352.00**
- **SPI = BCWP/ BCWS = 38 / 50 = 0.76**
- **SV = BCWP - BCWS = 38 - 50 = -12 person-day**
- **CPI = BCWP/ ACWP = 38 / 39 = 0.97**
- **CV = BCWP – ACWP = 38- 39 = -1 person-day**

- **% schedule for completion = BCWS/ BAC = 50 / 352.00 = 14.2 %**
  [% of work scheduled to be done at this time]
- **% complete = BCWP/ BAC = 38 / 352.00 = 10.8 %**
  [% of work completed at this time]

13. Risk Management

Risks	Category	Probability	Impact	RMMM
Size estimate may be significantly low	PS	50%	2	**Revisit size estimation due to potential significant underestimation**
Larger number of users than planned	PS	20%	2	**Adjust project scalability strategy to accommodate the unexpected increase in user volume.**
Less reuse than planned	PS	60%	3	**Revise reuse strategy and explore alternative approaches to maximize resource utilization**
Resistance from end-users	BU	50%	2	**Train the users to use this new technology.**
Tightened delivery deadline	BU	40%	3	**Prioritize must have feature development to accelerate development**
Loss of funding	CU	40%	1	**Hold frequent meeting with shareholders to show them the value they will get from funding**
Changing customer requirements	PS	70%	3	**Follow agile practices to be ready to accommodate quick changes**
Technology not meeting expectations	TE	40%	2	**Import advanced technology to meet expected quality or custom build from Bangladesh.**
User data privacy concerns	CU	50%	3	**Implement strong encryption, privacy policies, and compliance with regulations (e.g., GDPR). Communicate privacy protocols clearly to users.**

Integration issues with third-party services	TE	30%	3	**Plan for integration testing and have fallback mechanisms in case of service failure. Maintain close communication with third-party vendors.**
Inadequate user feedback during testing	BU	40%	2	**Implement user feedback loops during beta testing phases and conduct usability testing with real users to ensure requirements are met.**
Failure in data migration from old systems	TE	40%	3	**Test data migration processes thoroughly with mock data, and maintain backups. Have a rollback plan in case of failure.**

Rubric for Project Assessment (CO3)

Criteria	Marks distribution (Max 3X5= 15)				Acquired Marks
	Inadequate (1-2)	Satisfactory (3)	Good (4)	Excellent (5)	
Selection of Software Engineering Models	Does not articulate a position or argument of choosing appropriate model. Does not present any evidence to support the arguments for the choice of the model	Articulates a position or argument for choosing models that is unfocused or ambiguous. Presents incomplete/vague evidence to support argument for model choice	Articulates a position or argument of choosing models that is limited in scope. Does not present enough evidence to support the argument for the choice of the model	Clearly articulates a position or argument for the choosing software engineering models. Presents sufficient amount of evidence to support argument for the model selection	
Role identification and Responsibility Allocation	The project has poor project management plans for identifying roles and assigning the responsibilities	Identify few roles in the project management where some of the roles are left alone with any project responsibilities	Identify most of the roles in the project management and assign their responsibilities	Well planned project with proper role identification and responsibility allocation in the project management activities	
Impact identification					
Formatting and Submission	Project report is not complete and Several errors in spelling and grammar. Present a Confusing	Some errors in spelling and grammar. Some problems	Few errors in spelling and grammar. Presents most of the details in	Project report is complete and No errors in spelling and grammar. Consistently	

organization of concepts, supporting arguments, and real-life example. Sentences rambling, and details are repeated.	of organizing the answer in a logical order of defining, elaborating, and providing real-life examples.	a logical flow of organization in definition, details, and example.	presents a logical and effective organization of definition, details, and real-life example of the topic.	
			Acquired marks:	
			CO Pass / Fail:	

Rubric for Project Assessment (CO4)

Marking Criteria	Marks Distribution (Maximum 3X5=15)				Acquired Marks
	Inadequate (1-2)	Satisfactory (3)	Good (4)	Excellent (5)	
Project Planning	No background information regarding the project is given; project goals and benefits are missing.	Insufficient background information is given; project goals and benefits are poorly stated	Sufficient background information is given; the purpose and goals of the project are explained.	Thorough and relevant background information is given; project goals are clear and easy to identify.	
Effort Estimation and Scheduling	Student vaguely discuss the impact of societal, health, safety, legal and cultural issues in their project	Student provided with partial relevance to the impact of societal, health, safety, legal and cultural issues in their project	Student fairly provided the analysis to the impact of societal, health, safety, legal and cultural issues in their project	Student comprehensively provided the analysis to the impact of societal, health, safety, legal and cultural issues in their project	
Risk Management	Ambiguous representative example.	Partially identify / indicate towards real-life example.	Real-life example is fairly connected towards the definition.	Comprehensively defend with real life example.	
				Acquired Marks:	
				CO Pass / Fail:	