SECD2613 System Analysis and Design

Section 03

Campus Resource Management System

Team members:

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https://github.com/KhaledT5/cpp_project1_SAD_20232024.git

## 1.0 Introduction

The introduction of the Campus Resource Management System (CRMS) aims to address the complexities of managing campus resources in a modern educational environment. The CRMS is designed to be a centralized platform through which all administrative and operational tasks related to campus management can be streamlined. This system is expected to significantly enhance efficiency, improve communication, and optimize the utilization of resources across various departments and stakeholders.

## 2.0 Background Study

In the background study, we examine existing resource management systems implemented at different campuses and identify common shortcomings, such as inefficiencies in resource allocation, limited integration capabilities, and poor user interfaces. By analyzing systems from institutions like MIT, Stanford, and Harvard, we draw insights into what functionalities are most beneficial and where improvements are needed. Additionally, we explore the technological advancements in database management, user interface design, and system security that will form the backbone of our proposed system.

## Problem Background

### Organizational Background Study

Review the existing systems at the institution, noting their functions and limitations. Assess how these systems handle administrative tasks and identify areas for improvement to support the need for a more integrated approach.

### Scope of the System

- **What will be included**:
    - Facility booking and management
    - Event management
    - Student, faculty, and staff management
    - Communication and notification systems
- **What will not be included**:
    - Alumni management
    - Direct handling of financial transactions related to student fees
    - Parking management system

## 4.0 Proposed Solutions

The proposed CRMS will integrate several key modules to tackle the problems identified:

- **Facility Booking and Management**: A robust system allowing end-to-end management of all campus facilities.

- **Event Management**: Tools for organizers to plan, execute, and analyze campus events.
- **Student, Faculty, and Staff Management**: Databases and interfaces for managing academic and employment life cycles.

**Feasibility Study**

- **Technical Feasibility**: The system will be developed using scalable cloud services and modern, open-source frameworks to ensure robustness and flexibility.
- **Operational Feasibility**: With an intuitive UI/UX, the system will be accessible to all campus members, ensuring high adoption rates.
- **Economic Feasibility**: A detailed cost-benefit analysis shows that while initial costs are significant, the long-term savings and efficiency gains justify the investment.

## 5.0 Objectives

The objectives of the CRMS include:

- To create a unified platform that simplifies the management of campus resources.
- To reduce operational costs through improved resource utilization.
- To enhance communication and collaboration among all campus stakeholders.

## 6.0 Scope of the Project

The CRMS will cover the following:

- Development of modules for managing facilities, events, students, faculty, and staff.
- Integration capabilities with existing academic and administrative systems.
- Exclusions include alumni management and external partnerships which are out of this project's immediate scope.

## 7.0 Project Planning

### 7.1 Human Resource

- Identify the roles required for the project team:
    - Project Manager
    - Software Developers
    - Database Administrators
    - System Analysts
    - User Interface/User Experience (UI/UX) Designers
    - Quality Assurance/Testers
    - Network Engineers (for infrastructure considerations)

- Determine the skills and expertise needed for each role.
- Assess the availability of internal resources and consider hiring external resources if necessary.
- Define responsibilities and reporting structure for each team member.
- Develop a recruitment plan if additional team members are required.
- Establish communication channels and protocols within the team.
- Implement a training plan to ensure that team members are equipped with the necessary knowledge and skills.
- Set up a performance evaluation system to monitor the progress of the project team and address any issues that may arise.

### 7.2 Work Breakdown Structure (WBS)

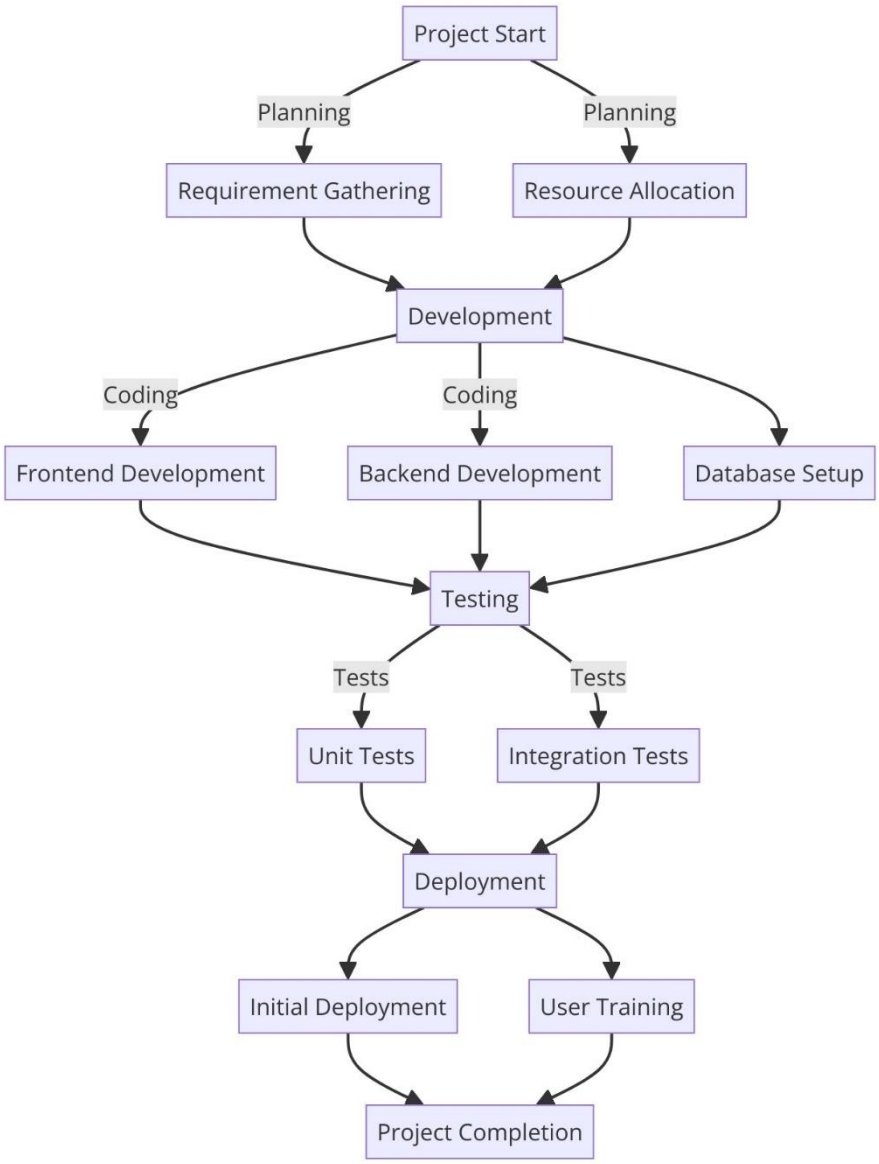
The project is divided into phases such as planning, development, testing, and deployment, with further breakdown into tasks like requirement gathering, coding, and user training.

- Level 1: Campus Resource Management System Project
    - Level 2: Facility Booking and Management Module
        - Level 3: Backend Development
            - Level 4: Database Design for Facility Management
            - Level 4: API Development for Facility Booking
        - Level 3: Frontend Development
            - Level 4: User Interface Design for Booking System
            - Level 4: User Experience Optimization for Facility Managers
        - Level 3: Testing and Quality Assurance
            - Level 4: Unit Testing
            - Level 4: Integration Testing
            - Level 4: User Acceptance Testing
    - Level 2: Event Management Module
        - Level 3: Event Scheduling System
        - Level 3: Attendee Management System
        - Level 3: Event Feedback Collection System
    - Level 2: Student Management Module
        - Level 3: Student Enrollment System
        - Level 3: Academic Records Management
        - Level 3: Course Registration System
    - Level 2: Faculty and Staff Management Module
        - Level 3: Recruitment and Onboarding System
        - Level 3: Leave Management System
        - Level 3: Performance Evaluation System
    - Level 2: Communication and Notification System
        - Level 3: Email and Messaging System Development

        - Level 3: Notification System Setup
        - Level 3: System Integration with Existing Platforms
    - Level 2: Integration and Deployment
        - Level 3: System Integration
        - Level 3: Deployment to Campus IT Infrastructure
        - Level 3: User Training and Support
    - Level 2: Maintenance and Support
        - Level 3: Ongoing Bug Fixes and System Updates
        - Level 3: User Support and Helpdesk Setup
        - Level 3: System Performance Monitoring

### 7.3 PERT Chart

Based on the WBS, a PERT chart will be created, estimating the minimum time required to complete each task, with dependencies clearly marked.




## Cost Analysis

### Initial Costs

- **Software Development**: Costs associated with hiring software developers, purchasing development tools, and acquiring necessary software licenses.
- **Hardware**: Investment in servers, network enhancements, and other hardware required to support the CRMS.
- **Training**: Expenses related to training the staff and users on how to use the new system effectively.
- **Project Management**: Costs incurred from project management activities, including planning, monitoring, and controlling project resources.

### Recurring Costs

- **Maintenance and Upgrades**: Annual costs for maintaining the system, including technical support, updates, and upgrades.
- **Operational Costs**: Energy consumption, system administration, and other ongoing expenses necessary for the continuous operation of the CRMS.

## Benefit Analysis

### Direct Benefits

- **Increased Efficiency**: Reduction in time and labor for managing campus resources, leading to lower operational costs.
- **Improved Resource Utilization**: Enhanced ability to monitor and allocate resources effectively, reducing wastage and improving service delivery.
- **Enhanced Data Management**: Better data handling and reporting capabilities, leading to improved decision-making processes.

### Indirect Benefits

- **User Satisfaction**: Improved user experience for students, faculty, and staff due to easier access to information and resources.
- **Administrative Productivity**: Streamlined administrative processes allow staff to focus on higher-value activities instead of routine management tasks.
- **Scalability**: The system's flexibility to grow with the campus needs, potentially avoiding future costs associated with system replacements or significant upgrades.

## Calculating Return on Investment (ROI)

The ROI can be calculated using the formula:

ROI=Net BenefitsTotal Costs×100ROI=Total CostsNet Benefits×100

Where:

- **Net Benefits** = Total Benefits (quantifiable) - Total Costs
- **Total Costs** include all initial and recurring costs over a certain period (commonly 5 years for IT projects).

### Example Calculation

Suppose the following estimates (hypothetical values):

- **Initial Costs**: $500,000 (development, hardware, training, project management)
- **Annual Recurring Costs**: $50,000 (maintenance, operational costs)

- **Annual Benefits**: $150,000 (savings from efficiency, improved resource utilization, and reduced administrative workload)

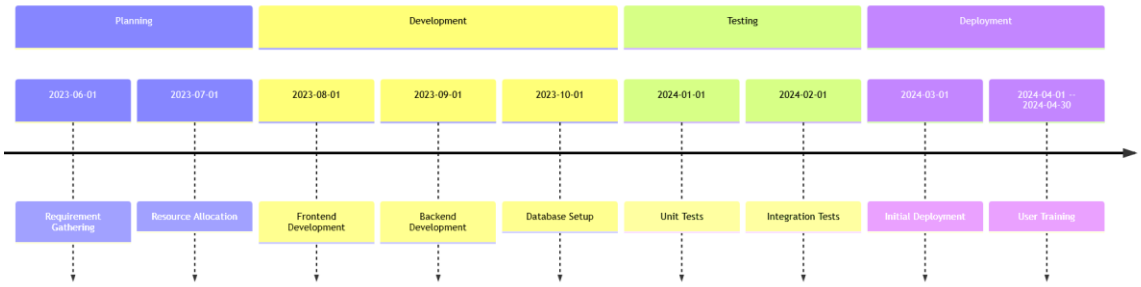
Calculate over a 5-year period:

- **Total Costs**: $500,000+(5×$50,000)=$750,000
- **Total Benefits**: 5×$150,000=$750,000
- **Net Benefits**: $750,000−$750,000=0

ROI=$0$750,000×100=0%

### 7.4 Gantt Chart

A Gantt chart will be used to plan and track the progress of the project activities over time, providing a visual timeline for all stakeholders.




## 8.0 Benefits and Overall Summary of Proposed System

The CRMS promises substantial benefits including increased operational efficiency, better resource utilization, and improved user satisfaction. The implementation of CRMS is expected to transform campus operations into a more streamlined, user-friendly, and cost-effective framework.