
Software Requirements Specification

for

WORLD OF SOFTWARE

Version 1.0 approved

Prepared by:

Govindu Leela Krishna(PES1UG21CS209)

Girish YP(PES1UG21CS207)

G Bharadwaja Pranav(PES1UG21CS190)

Harikrishna(PES1UG21CS217)

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

The purpose of this document is to define the software requirements for the "Time Table Generator for College" project. This document outlines the scope, functionality, and constraints of the software.

1.2 Document Conventions

This document follows standard formatting conventions such as headings, lists, and placeholders for specific information like priorities and requirements.

1.3 Intended Audience and Reading Suggestions

This document is intended for college administrators, software developers, project managers, and any stakeholders involved in the project. For an optimal understanding, we recommend starting with the Introduction section and then referring to specific sections as needed.

1.4 Product Scope

The "Time Table Generator for College" is a software solution designed to automate and optimize the process of creating and managing college schedules. It aims to improve efficiency and accuracy in scheduling classes, exams, and other college activities.

2. Overall Description

2.1 Product Perspective

The Time Table Generator is a standalone application developed to meet the unique scheduling needs of our college. It is not part of a larger system.

2.2 Product Functions

Automatic generation of class schedules

Conflict resolution for class and room allocations
User-friendly interface for schedule management

2.3 User Classes and Characteristics

1)College Administrators

Characteristics:College administrators are responsible for managing and overseeing the scheduling process at the college.They have a deep understanding of the college's scheduling requirements and constraints.Administrators have full access to the Time Table Generator system.

They need the ability to input and configure scheduling preferences and constraints.They are responsible for resolving scheduling conflicts.College administrators are typically experienced professionals with knowledge of academic scheduling practices.

2)Professors

Characteristics:Professors are college faculty members who teach courses.They have limited access to the Time Table Generator system, primarily for viewing their own class schedules.Professors may need to provide input regarding their availability or preferences for class times.They require access to their individual class schedules to prepare for teaching.Professors may have varying levels of technical expertise, so the system should be user-friendly.

3)Students

Characteristics:Students are the primary beneficiaries of the class schedules generated by the system.They do not interact directly with the Time Table Generator system but rely on the schedules provided to plan their academic activities.Students need clear and accurate class schedules to attend classes, labs, and exams.Their characteristics may include varying academic levels (e.g., freshmen, sophomores) and academic programs (e.g., science, arts), each with its own set of course requirements.

4)Technical Support Staff

Characteristics:Technical support staff may not interact with the system on a regular basis.They are responsible for ensuring the system runs smoothly, addressing technical issues, and providing assistance if there are system-related problems.Their characteristics include technical expertise in system maintenance and troubleshooting.

2.4 Operating Environment

The College Timetable Generation System operates on standard server hardware with a server operating system (e.g., Windows Server, Linux). Clients access the system via various web browsers (e.g., Chrome, Firefox, Edge) on different operating

systems (e.g., Windows, macOS, iOS, Android). It interacts with web server software, databases, and other network services. Security and compatibility with existing college systems are essential considerations. The system should be scalable to accommodate growth.

2.5 Design and Implementation Constraints

CO-1: The system's design, code, and maintenance documentation shall adhere to the college's internal software development standards and guidelines

CO-2: The system shall utilize a relational database management system (RDBMS) compatible with the college's existing infrastructure.

CO-3: The Timetable Management System shall implement role-based access control (RBAC) to ensure that only authorized users have access to specific functionalities and data within the system.

CO-4: The system shall include comprehensive logging and auditing functionality to track user activities, system events, and potential security breaches.

2.6 User Documentation

UD-1: The Timetable Management System shall provide an extensive online help system accessible through the user interface.

UD-2: The user documentation shall include a comprehensive Frequently Asked Questions (FAQ) section, addressing common queries and issues that users may encounter while using the system.

UD-3: The user documentation shall be regularly updated to reflect changes and improvements made to the system, ensuring that it remains current and accurate. User documentation will include user manuals and online help accessible through the software interface.

2.7 Assumptions and Dependencies

The college database containing course and room information is available.

The college network infrastructure supports the software's communication requirements.

3. External Interface Requirements

3.1 User Interfaces

The College Timetable Generation System will have a web-based user interface. It will follow modern and intuitive design principles. The interface will be responsive to different screen sizes and devices, ensuring usability on desktops, laptops, tablets, and smartphones. A standardized color scheme, typography, and layout will be maintained for a cohesive user experience.

Users will enter their credentials in login page to access the system. After login, users will be directed to a dashboard displaying relevant information. Users can view class schedules, room assignments, and make schedule requests.

3.2 Hardware Interfaces

Supported Devices: The system will support a wide range of hardware devices, including desktop computers, laptops, tablets, and smartphones, running various operating systems.

Data and Control Interactions: The software will interact with hardware components for user input and display output.

Communication Protocols: The interaction between the software and hardware will rely on standard communication protocols such as HTTP/HTTPS for web-based access.

3.3 Software Interfaces

DBMS: MySQL for data storage. Uses SQL queries.

Web Server: Apache for serving web pages. Relies on HTTP/HTTPS.

3.4 Communications Interfaces

The system must facilitate communication between faculty members and administrators regarding teacher absences. Administrators should be able to communicate schedule changes to students and other relevant parties.

4. System Features

4.1 Description and Priority

Description: The Time Slot Optimization feature involves the intelligent allocation of classes to specific time slots in a way that maximizes resource utilization and

minimizes scheduling conflicts. It ensures that rooms, instructors, and students are efficiently allocated without overlapping or underutilizing resources.

Benefit: Optimizing time slots ensures that classrooms and instructors are used efficiently, leading to a more streamlined and cost-effective scheduling process.

Penalty: Failure to optimize time slots can result in resource wastage, scheduling conflicts, and dissatisfaction among students and faculty.

Cost: Implementing time slot optimization may require a moderate investment in software development and testing.

Risk: There is a moderate level of risk associated with this feature, as developing a reliable optimization algorithm and ensuring its accuracy can be challenging.

However, the potential benefits outweigh the risks due to its high importance in a time table generator project.

4.2 Stimulus/Response Sequences

Stimulus: Academic staff (faculty) submits class preferences, course requirements, and scheduling constraints.

Response: The system processes the input and generates a preliminary timetable for review.

Stimulus: Administrators set global scheduling policies and resource constraints.

Response: The system incorporates these policies into the timetable generation algorithm.

4.3 Functional Requirements

REQ-1: Users must be able to create accounts with unique usernames and passwords. Users must have the ability to log in securely.

REQ-2: The system must automatically generate course schedules based on academic requirements, faculty availability, and classroom capacity. Manual adjustments and overrides by administrators must be supported.

REQ-3: The system shall allow academic staff to submit class preferences, including preferred time slots, classrooms, and teaching assignments.

REQ-4: The system shall support the definition of resource constraints such as room capacities and faculty availability.

REQ-5: The generated timetable shall avoid conflicts, including overlapping class times, room double-bookings, and faculty teaching conflicts.

REQ-6: In case of conflicts, the system shall provide options for resolution and notify the user.

REQ7: Administrators shall have the ability to review and approve the final timetable.

REQ-8: Viewing Absence Records authorized users should have access to a list or calendar view of teacher absences. Users should be able to filter and search for absence records by faculty member, date, or reason.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

Timely timetable generation:

The system will generate class timetables efficiently and within a reasonable timeframe, typically within a few minutes, to ensure that schedules are available promptly.

Responsive User Interactions:

User interactions with the system, such as searching for classes, making reservations, or updating personal information, should consistently provide fast response times, typically within a few seconds.

Concurrent User Support:

The system should be capable of handling a specified number of concurrent user requests during peak times, such as class registration periods. Specify the expected peak user load and define how the system will scale to accommodate this load.

Scalability:

Define how the system can horizontally scale by adding more servers or resources to handle increased concurrent user requests as user demand grows.

5.2 Safety Requirements

Prevent scheduling conflicts:

Resource allocation: Implement rules for allocating resources such as classrooms, equipment, and instructors to avoid overbooking or resource conflicts.

Override permissions: Define which roles (e.g., administrators, department heads) can override scheduling conflicts and specify the process for doing so.

Ensure class availability:

Minimum and maximum enrollments: Specify minimum and maximum enrollment limits for each class, ensuring that classes don't become too crowded or underfilled.

Cancellation policy: Define a cancellation policy to free up class slots when users cancel their reservations within a certain timeframe.

User authentication and authorization:

Session management: Describe how user sessions are managed securely, including session timeouts and reauthentication requirements.

Authorization auditing: Implement auditing features to log and review authorization decisions, helping identify potential security breaches.

5.3 Security Requirements

User Authentication Requirement:

Users must log in or authenticate themselves before accessing any part of the system.

Secure Storage and Encryption Requirement:

All user data and sensitive information must be stored securely and encrypted to prevent unauthorized access.

Data Protection Compliance Requirement:

The system must adhere to applicable data protection regulations and privacy laws to ensure user data is handled legally and ethically.

5.4 Software Quality Attributes

Usability:

User onboarding: Develop a user-friendly onboarding process to guide new users in setting up their accounts and profiles.

Personalization: Allow users to customize their experience, such as setting preferences for notifications and interface themes.

Reliability:

Scheduled maintenance: Communicate scheduled maintenance windows to users in advance to minimize disruption.

Maintainability:

Documentation updates: Specify a process for keeping documentation up to date alongside code changes.

Performance:

Resource optimization: Monitor server resource utilization and implement optimizations as needed to maintain performance.

5.5 Business Rules

Authorized Staff Propose Schedules:

Only authorized college staff members, such as academic department heads or scheduling coordinators, are allowed to propose class schedules.

Administrators Approve/Reject Proposals:

College administrators or designated authorities are responsible for reviewing and approving or rejecting proposed class schedules.

Students Follow Program Rules:

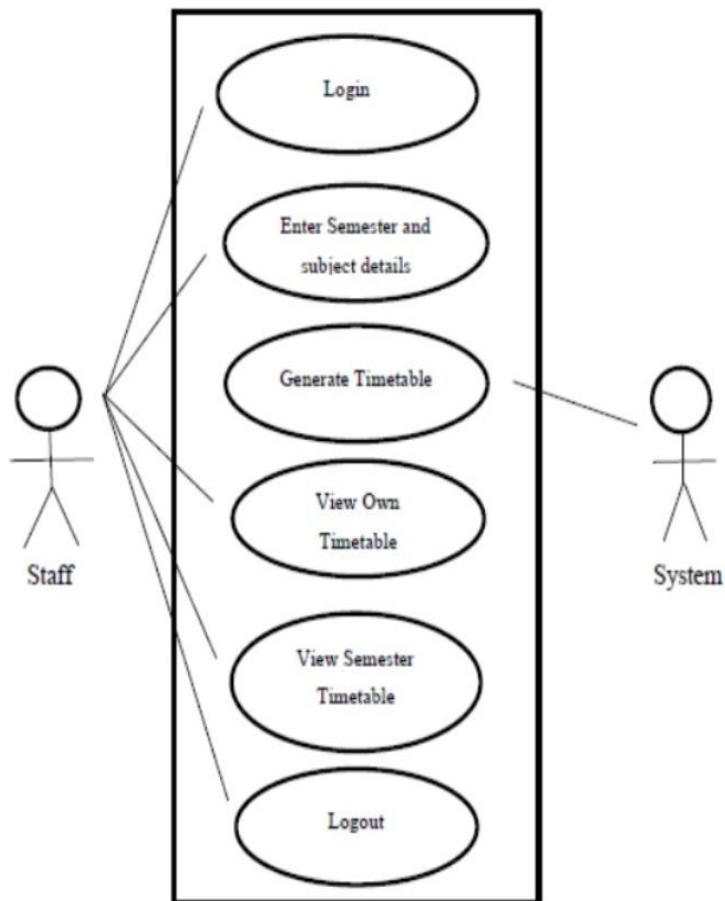
Students must adhere to the college's program rules and requirements when selecting courses.

Class Cancellation Policy:

Define a policy for class cancellation, specifying the conditions under which a class may be canceled (e.g., insufficient enrollment, faculty unavailability).

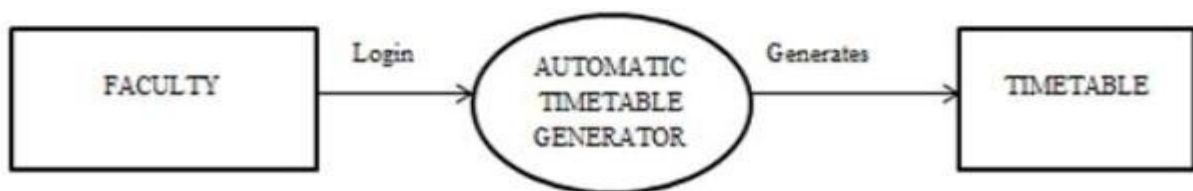
6. Diagrams

6.1 User case relationship diagram:

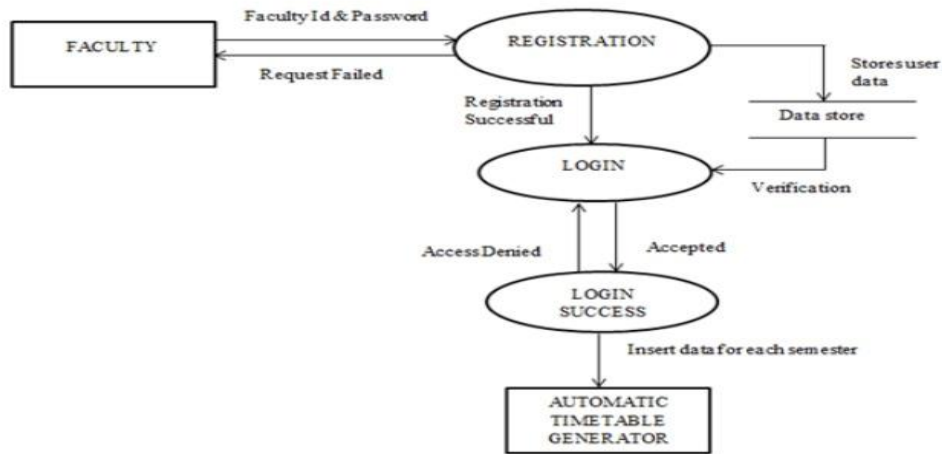


6.2 Data Flow Diagram:

Level 0:



Level 1:



Level 2:

