



AHMAD MEHRAN AMINI

01-235171-070

ASAD ULLAH

01-235171-008

Backlog Scheduling System

Bachelor of Science in Information Technology

Supervisor: Muhammad Umar Khattak

Department of Computer Science

Bahria University, Islamabad

April 2021

Abstract

Backlog Scheduling System (BSS) deals with the scheduling of backlog courses for students and provides a suitable environment for resolving clashes between the courses as the Time Table is generated for any respective department of the University. Furthermore, it will facilitate the teachers to go on leave without disrupting the overall schedule. We are well aware of the fact that it is a complex procedure for the administration to create Time Tables for numerous departments because they do it manually which leads to clashes between courses and despite administrations' timed efforts in devising an effective approach for resolving the clashes, a lot of time is wasted and students have to manually resolve their course clashes by managing their own Time Table for the current semester and the one with which they may have a clash of course. The given paper presents a suitable approach for generating an "Automated Time Table" which will eliminate clashes between courses, "Backlog Scheduling Panel" for the students to track their registered courses and resolve their clashes in order to schedule their Time Table, and a "Leave System" for teachers to go on leave with a single click of button that will update their schedule for the day and generate a notification for the students that will let them know the changes occurred in schedule for any given course. Hence, the paper explains the consistency of the "Backlog Scheduling System" in detail along with the impression to improvise and improve our scheduling system which has been outdated for almost a decade.

Contents

Abstract	i
1 Introduction	1
1.1 Project Overview	1
1.2 Problem Description	2
1.3 Project Objectives	2
1.4 Project Scope	3
2 Literature Review	5
2.1 Problem Description	5
2.2 Problem in existing systems	5
2.3 Proposed Solution	6
2.4 Key Requirements for proposed solution	6
2.5 Real-World Existing System Review	6
2.6 Research Question and Aim	7
2.7 Literature Survey	7
2.8 Conclusion	8
3 Requirement Specifications	9
3.1 Existing Systems Survey	9
3.1.1 Limitations of existing system	9
3.2 Real-World Existing System Review	9
3.3 Proposed System	10
3.4 Requirement Specifications	10
3.4.1 Key Features	10
3.4.2 Functional Requirements	11
3.4.3 Non-functional Requirements	11
3.5 Use Case	12
3.5.1 Login Sub Use Cases	13
3.5.2 Admin Sub Use Cases	14
3.5.3 Instructor Sub Use Cases	15
3.6 Use Case Descriptions	16
4 Design	23
4.1 System Architecture	23
4.1.1 Level-0 DFD (Context Diagram)	24
4.1.2 Level-1 DFD (Data Flow Diagram)	25

4.1.3	Level-2 DFD (Data Flow Diagram)	25
4.2	Design Constraints	26
4.2.1	Trade-Off Analysis	26
4.3	Design Methodology	26
4.3.1	Login Page	26
4.3.2	Wrong Email/Password	26
4.3.3	Successful Login	26
4.3.4	Generate Time Table	27
4.4	High Level Design	27
4.4.1	Conceptual or Logical	27
4.4.2	Process	28
4.4.3	Activity Diagram for Admin Login Process	29
4.4.4	Login Sequence Diagram	30
4.4.5	Time Table Sequence Diagram	30
4.4.6	Customized Time Table (Student) Sequence Diagram	31
4.4.7	Leave System (Real-Time) Sequence Diagram	31
4.4.8	Class Diagram	32
4.4.9	Deployment Diagram	33
4.5	Low-Level Design	34
4.6	MongoDB Atlas Cluster	35
4.6.1	Cluster Collection 1	35
4.6.2	Cluster Collection 2	36
4.6.3	Cluster Collection 3	36
4.6.4	Cluster Collection 4	37
4.7	Firebase Real-time dB	38
4.7.1	Firebase Real-time dB Rules	38
4.8	GUI Design	39
4.8.1	Landing Page (Low-Fidelity)	39
4.8.2	Landing Page (High-Fidelity)	40
4.8.3	Login Form (High-Fidelity)	41
	System Implementation	43
5.1	System Architecture	43
5.1.1	Tools and Technology	43
5.1.2	Programming Language	44
5.1.3	Security Measures (DB related)	44
5.1.4	MERN Architecture	44
	System Testing and Evaluation	45
6.1	Introduction	45
6.1.1	Error Detection	45
6.1.2	Approval	45
6.2	Reasons for testing	46
6.3	Significance of testing	46
6.4	Challenges in testing	46
6.5	System Explicitness Checklist	47
6.6	Maintenance/ Updates	48

6.7	Test Cases	48
7	Conclusions	53
7.1	Description	53
7.2	Future Planning	53
7.3	Conclusion	54
A	User Manual	55
A.1	Loading and executing the packages	55
A.2	Home Page Navigation	56
A.3	Login Page	57
A.4	User Panels	58
	References	59