ÇANKAYA UNIVERSITY

FACULTY OF ENGINEERING

COMPUTER ENGINEERING DEPARTMENT

CENG 407

INNOVATIVE SYSTEM DESIGN AND DEVELOPMENT I

SENIOR PROJECT

PROJECT REPORT

EXAM PROCTOR AND CLASS ASSIGNMENT SYSTEM

BY

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Abstract

The key problem of all schools and universities is scheduling of classes and exams. Many lecturers face with problems when they try to arrange their exam schedule. Also students may have overlaps in exam dates or exam time. With this project; we aim to develop a system which can distribute exams performed at an educational organization to the classes by arranging suitable proctors. Preventing overlaps and conflicts between any exam dates, classrooms and proctors of the exam is the main goal of this project. The system does not provide manual intervention so that overlaps and conflicts will not occur.

Keywords:

Exam, School, Proctor, Exam Assignment, Class Assignment, Proctor Assignment, School System, University

Özet

Okullarda ve üniversitelerde, sınıfları ve sınavları programlamak başlıca problemlerden biridir. Pek çok öğretmen sınav programlarını ayarlamaya çalışırken problemlerle karşılaşıyor. Aynı zamanda öğrenciler sınav tarihleri ve sınav zamanlarının çakışmasıyla karşılaşabilirler. Bu proje ile biz eğitim kurumlarında sınavları sınıflara uygun öğretmenlere göre dağıtan bir sistem geliştirmeyi amaçladık.Bu projenin asıl amacı sınav günlerindeki, sınav yerlerindeki ve sınava atanan gözetmenler arasındaki çakışmayı önlemektir. Bu sistem manüel bir müdahele gerektirmediği için çakışmalar meydana gelmeyecektir.

Anahtar Kelimeler:

Sınav, Okul, Sınav Gözetmeni, Sınav Dağıtımı, Sınıf Dağıtımı, Gözetmen Dağıtımı, Okul Sistemi, Üniversite

1. INTRODUCTION

Nowadays, process of distributing exams and proctors by time or class is performed manually. However this method takes more time than needed and it can cause many conflicts in terms of exam dates and classes. People who organize the exam dates and time need to make the exam calendar again and it causes waste of time. Also, students, especially double-major students, face with the conflicts of exam places and time. There are several web applications to solve this problem but they are still not enough to handle all conflicts. This leads to create a chaos in exam weeks so it decreases motivation of students and proctors.

1.1. Problem Statement

There are few systems which can make basic exam tables but they do not let lecturers choose the exam day, start time and assistant. In addition, existing systems do not make enough interaction with lecturers and have not system security. Also when students get the exam calendar; there can occur some changes about exam place or time. This situation negatively effects productivity of lecturers and students.

1.2.Solution Statement

As a solution to the problems that we mentioned, Exam Proctor and Class Assignment System aims to make people put less effort and increase their productivity. The system interacts with lecturers who request an exam and have high-security as in every important step, it asks for a confirmation code.

2. LITERATURE SEARCH

The scheduling of classes and exams in almost all schools and universities is a key problem. With our project, we aim to develop a system that distributes exams performed at an educational organization to the classes correctly by arranging suitable proctors. The essential goal of this project is to prevent overlaps and conflicts between any exam dates, classrooms and supervisors of the exam. This system does not provide manual intervention so that overlaps and conflicts will not occur. When we decided to make this project we investigated other researches as explained in the below.

2.1.Literature Review

Several researches have tackled the proctor and class assignment problem [1]-[7].In Vasupongayya et al.[1], the examination room assignments and the examination proctor assignments in each room are managed in order to the examination. The authors focused on the improving an examination management system as a web-based application. All rooms has its own type and capacity, the system allows to select the scheduled time online, at the same time each subject assigned to rooms. This software is used real data and Greedy algorithm with a simple priority function. All attributes are sorted according some properties, e.g. capacities of rooms are sorted large to small, hour of days are sorted morning to afternoon. By using this algorithm, the system maps the large subject to the large capacity room. This algorithm stops when all the subjects is finished.

To provide decision-making support to reassign methods and attributes to classes in a class diagram is the aim of the study performed by Browman et al.[2]. They used the multi-objective genetic algorithm (MOGA) which takes as input a class diagram. They also used class coupling and cohesion measurement for defining fitness functions.

Jain et al. [3] thoughted a special type of multi-label learning. They suggested a ranking based multi-label learning framework that explicitly which addresses the challenge of learning from defectively labeled data. They showed a learning algorithm that is shown to be efficient for solving the related optimization problem. Their study showed that the proposed framework is more influent than the state-of-the-art algorithms for multi-label learning in dealing with incompletely labeled data.

In study of Marti et al. [4], they presented an algorithm to assign proctors to exams. The problem of the assignment teachers to exams at a university is formulated by them. They used multiobjective Integer Program (IP) and a work-load fairness function and a preference function. Their consideration also includes a weighted objective which joins these two functions (preference and work-load fairness). They compared their scatter search procedure's result with the founded solutions which reached by solving IP model with CPLEX 6.5. Their first approach to the problem is that formulation of the presented problem's mathematical programming. The problem formulation rewarding in terms of facilitating and managing the main problem. When we develop our system, we can use this method like them. The second approach is that their description about the scatter search approach and the main procedure's details of the scatter search which is developed to solve the proctor assignment problem. This approach is that explaining the main operations of the

scatter search in detail. Also, the phase is beneficial in terms of observing the method's applicability with the problem. The third approach is that their description which is about the computational experiments which are to appraise the proposed heuristics and present the computational result and makes a comparison with the founded solutions by the IP formulation with a utility function. They compared their two different results. One of the results is that assignments which were created manually. The other is that assignments which found by solving formulation of the mixed integer programming with CPLEX 6.5. This approach should be what we intend to do, absolutely. If we get the data from our university or create a sample data set to compare with the method, we can make a benchmark. The disadvantage of scatter method is that some combinations are exterminated before they took into account. Exterminating a combination can cause an occurrence of overlaps. Assigning Proctors to Exams with Scatter Search system does not offer a solution to prevent eliminated combinations. In our system, we will determine the cases that cause of eliminated combination and offer a solution to deal with this case.

Additionally, Koide et al. [5] introduced a prototype spreadsheet-based system for an examination proctor assignment task. The task is modeled mathematically as a mixed integer programing problem which is preferable for general users to comprehend system mechanism. The model considers availability of assigned members as well as load balance for assigned members charged by the assignment. Resulting assignments outputted by the developed system are desirable for practical datasets. In brief, they used some different modelling types and systems such as mathematical modeling, VBA (Visual Basic for Application) and solving Problem EPA by CPLEX[6].

Finally, there are several studies focusing on timetable scheduling. Over the last thirty to forty years, a great achievement has been made to establish timetable procedures.

Problems are handled by examination timetabling and course timetabling procedures [7]. Examination timetabling is a set of exams which are scheduled over a period of time. Course timetabling is a set of courses which are planned throughout the entire semester. The complexity of timetabling problems is that there are innumerable limitations. For example; students cannot enter two different exams at the same time. Scheduling should be done considering such limitations. Such limitations are divided into hard constraints that should not be violated and soft constraints that have a penalty when infringed. As an example of soft restriction in the course timetabling problem is that reducing the number of students who entered two exams one after another. As an example of a hard restriction is that making possible to any teacher is planning to teach two classes at the same time. The

presence of so many constraints makes it difficult to manually resolve the problem and creates NP-hard problems. This ensures that finding effective timetabling algorithms become to be necessary. Direct heuristics and graph coloring problem's reduction are among the traditional techniques that are tested in the timetabling. Direct heuristics fill the timetable with an event at a time and solves conflicts by swapping exams. Graph coloring problem is that where events are associated with possible overlaps where the corners and edges of a graphic.

In summary, there are many researches and projects about usable timetable scheduling with using complex algorithms and programming. Our researched focused on the most understandable and adaptable programs to achieve our goals and desired outcomes.

3. SOLUTIONS

3.1.Technologies Will Be Used

• ***Microsoft Visual Studio:*** The IDE which is developed by Microsoft, it will be used for the web environment.
• ***C# Programming Language:*** The programming language that will be used for implementing codes.
• ***JavaScript:*** The programming language that will be using for implementing actions such as timer in popup.
• ***AJAX (Asynchronous JavaScript and XML):*** Non- synchronously, it allows web pages to be updated by exchanging data with a web server.
• ***.NET Framework:*** A platform for programming that will be used with C# for the web platform.
• ***HTML (Hyper Text Markup Language):*** A markup language which is used for designing of web pages.
• ***CSS (Cascading Style Sheets):*** A language describes how HTML elements will be displayed on screen.
• ***MS SQL Management Studio:*** The database management tool which is an integrated environment for conducting any SQL infrastructure.
• ***SQL (Standard Query Language):*** The query language which is used for retrieving data in tables.

4. SOFTWARE REQUIREMENTS SPECIFICATION

4.1. Introduction

4.1.1. Purpose

The purpose of this document is to represent the Exam Proctor and Class Assignment System. This document explains the system's software requirements of the project. The purpose of this system is distributing exams performed at an educational organization to the classes correctly by arranging suitable proctors. The main goal of this project is to prevent overlaps and conflicts between any exam dates, classrooms, and supervisor at the exam. This document includes use case diagrams and initial step by step description. Also, this document explains how users and stakeholders interact with this system in detail.

4.1.2. Scope of Project

In many colleges, in the exam assignment process, some errors may occur like overlaps and conflict between exam dates, classes and even proctors. This causes waste of time and stress before the exams. To solve this problem, the proctor and class assignment system is necessary to provide efficient systems for college. The aim of this project is to develop a system that distributes exams, classes, and proctors without conflicts and overlaps which we and many students need in real life. The stakeholder is GES TELEKOM. This project will use database of a college which includes tables of users, courses, classes, etc. The table of users has important attribute which shows the type of users because not all users reach the same pages. System will ask authorization to reach to certain function. This system also considers users'(student, teacher, assistant...) security so users will log in the system with their TC ID numbers but they can only access to their personal accounts with the password which is assigned to their GSM numbers or emails. When users reach to their personal page, they can view exam calendar which courses they are related; lessons are taken by students and given by teachers. Students can only view the exams but teachers can also make changes about exam date, exam time and exam place. This project aims to prevent exam assignment mistakes when performed manually.

4.1.3. Glossary

TERM	DEFINITION
Student	The user who wants to view the own exam calendar.

Teacher	The user who wants to create the exams date with a minimum overlap.
Assistant	The user who wants to learn the assigned exams.
Admin or Main User	People who start the Exam Proctor and Class Assignment System and give authorizations to any users.
Department Chair	The user who wants to view the whole exams calendar of own department.
Dean	The user who wants to view the whole exams calendar of own faculty.
Rector	The user who wants to view the whole exams calendar of the university.

4.1.4. Overview of Document

This document has three main parts. The first part, “Introduction” explains purpose, scope, and glossary of this project in general. The second part, “Overall Description” shows system environment and functional requirements with use case diagrams. In the last part, “Requirement Specification” there is the more detailed explanation of requirements, non-functional requirements with use cases and interfaces.

4.2. Overall Description

The following part of the project involves the overall description of the Exam Proctor and Class Assignment Project. It elaborates on a system environment of the project as a use case diagram, all functional requirements of the eight users of the project, user characteristics, and product perspective.

4.2.1. System Environment

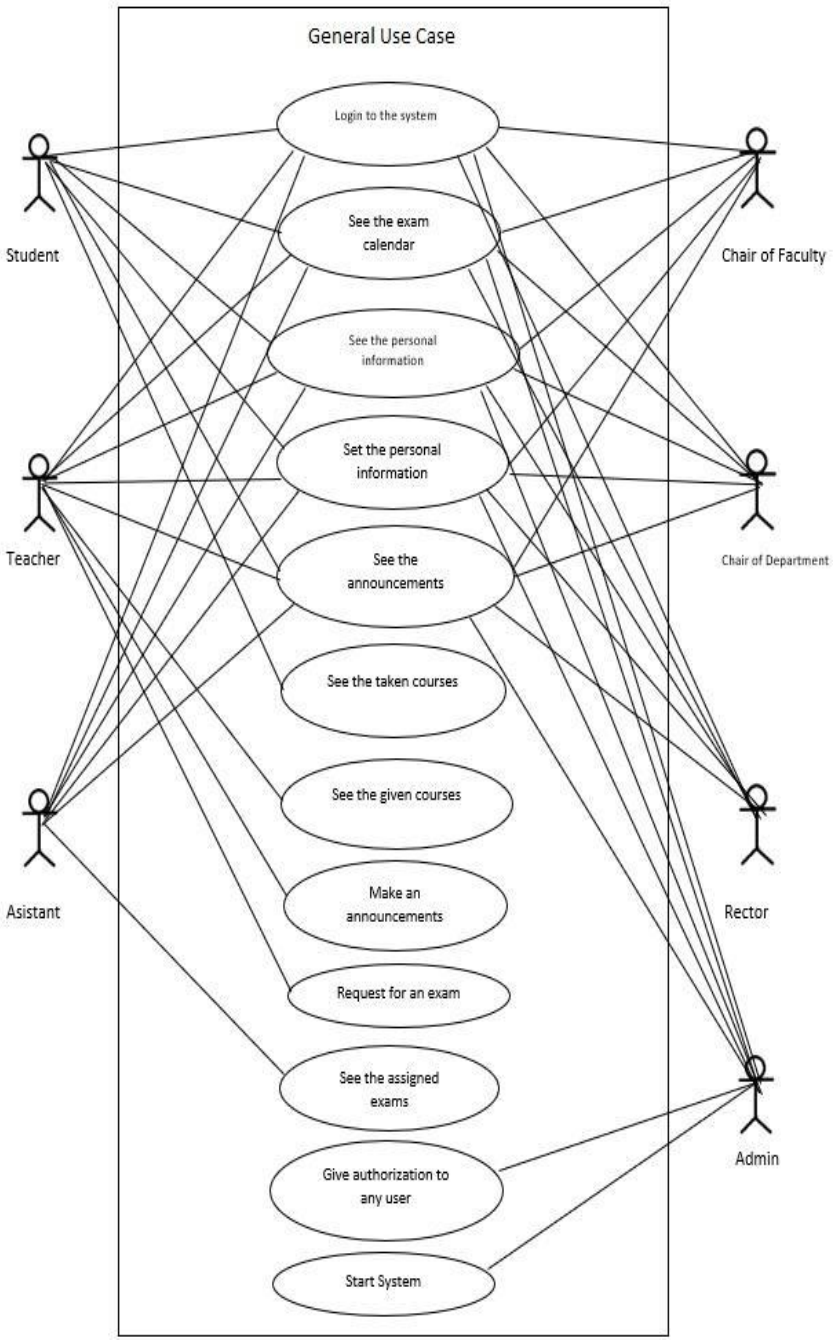

Figure 1: System Environment

4.2.2. Functional Requirements Specification

Exam Proctor and Class Assignment System has 7 users which are the student, teacher, assistant, department chair, dean, rector and the main user.

4.2.2.0. General Use Case about Login

The login page is used as a common page for all users in this system.

Initial Step-by-Step Description:

1. When a user enters to the system, s/he sees the login page.

2. The user can enter the system with her/his TC id and random password is sent to her/his telephone number by the system for the first entry.

3. The system also sent a random security code to the user for each entry.

3.1. The user may enter the security code 3 times wrong.

3.2. There are 3 minutes to write one security code.

3.2.1. If the user does not write the correct code, there is an email choice to send the code.

3.2.2. If the user does not write the correct code 3 times in 3 minutes for each, the user will be on the blacklist.

3.3. If all inputted information is true, the user can enter the Exam Proctor and Class Assignment System.

4.2.2.1. Student Use Case

Use Case:

- Login to the system
- View the exam calendar
- Set the personal information
- View the taken courses
- View the announcements
- View the personal information

Diagram:

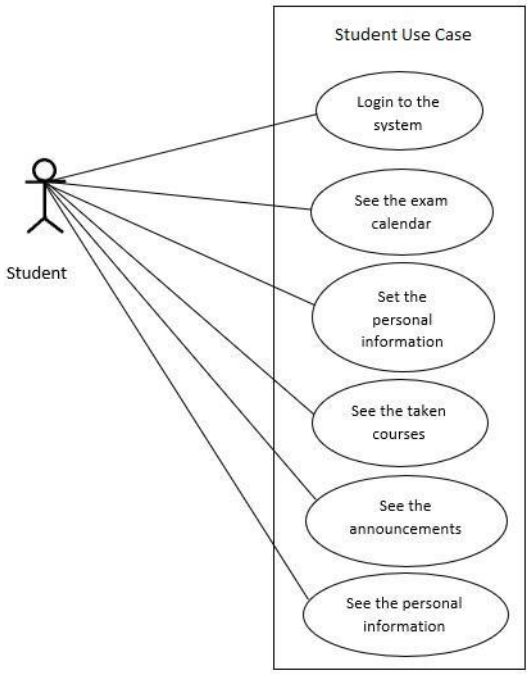

Figure 2: Student Use Case

Brief Description:

A student can be able to login to the system, view his/her exam calendar and announcements. In addition, the student shall be able to set, update and view the personal information and view the taken courses.

Initial Step-by-Step Description:

1. When a student enters to the system, s/he views the login page.

2. Student can choose how to get a random password by GSM or Email to use on the login page.(Default: GSM)

3. In Settings part, the student can change her/his password.

4. In Settings part, the student can choose how to receive messages and how many days before s/he wants to be informed about coming exams by GSM or Email.(Default: GSM, 7 days ago)

5. Student can view exam calendar of the courses which s/he takes in the semester in gridview.

6. Student can sort the exams, which are in gridview, by properties such as course code, course name, date of the exam etc.

7. In exam calendar, there are course code, course name, exam's date, class, time, duration, additional notes. For these additional notes, there is alert. When the student clicks the alert link, this course's notes will be opened as the popup.

8. There are some options under exam calendar to print out the calendar.

9. The student can view courses that s/he takes in the semester with course name, course code and lecturer of the course.

10. The student can view announcements on the her/his main page.

11. In Setting part, the student can choose "I want to be notified" choice to get to be notified when the teacher assigns an exam in a certain day in the system.

4.2.2.2. Teacher Use Case

Use Case:

- Login to the system.
- View the exam calendar
- Set the personal information
- View the given courses
- View the announcements
- View the personal information
- Make an announcement
- Request for an exam
- Cancel the request for an exam

Diagram:

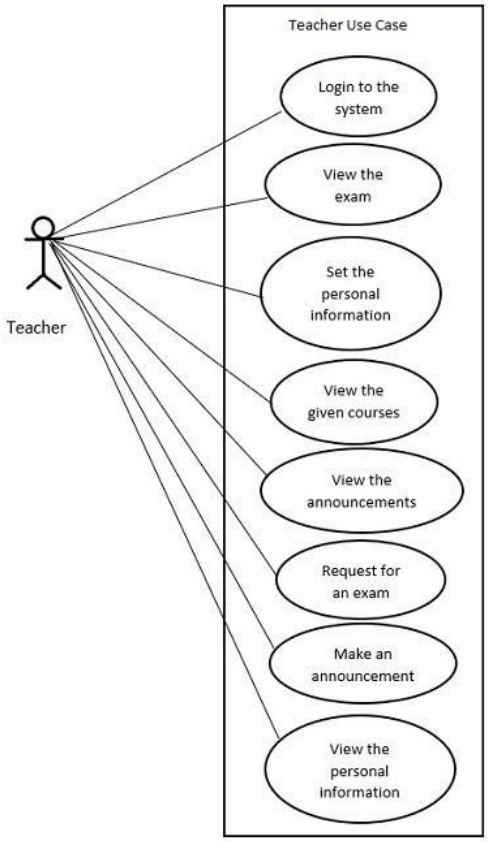

Figure 3: Teacher Use Case

Brief Description:

A teacher can be able to login to the system, view the own exam calendar and announcements. In addition, the teacher shall be able to set and view the personal information and view the taken courses. Also, the teacher can be able to make an announcement for the courses given by him/her. An exam request can be done by the teacher.

Initial Step-by-Step Description:

1. The teacher can log in to the system.

2. He/she will be able to view the exam schedule and announcements on his / her page.

3. In Settings part, the teacher can choose how to receive messages and how many days before s/he wants to be informed about coming exams which s/he gives as a course by GSM or Email.(Default: GSM, 7 days ago)

4. He/she will be able to change the password from the settings section.

5. The teacher will be able to choose to take alert how many days in advance. At the same time, he/she can choose to take with Email or GSM. (default: GSM, 7 days in advance)

6. He/she will be able to view his/her personal information in the about section. (Name, surname, department, faculty, title, address, telephone, email and picture)

7. He/she will be able to view courses which are given by him/her.

8. He/she can view his/her own exam calendar.

9. The parts that can be seen in the exam schedule; the code of the course, the name of the course, the date of the exam, the class, the duration of the exam, the time of the examination, approval status, the examiner supervisor in the exam.

10. The teacher is able to sort the exams which are in the gridview control according to certain characteristics. (course name, course code, exam date etc.)

11. When teacher requests for an exam; the name of the examination, which department's, which classroom, daytime interval, time interval, supervisor assistant preference, class type, student absence information can be entered.

12. After teacher clicks on the request button, a pop-up which includes "You requested XXX exam's time period in between DD-MM-YYYY and DD-MM-YYYY. Do you confirm your request?" will be opened on the screen.

13. When the exam is approved, the teacher will receive a confirmation message such as "In DD-MM-YYYY at XX:XX you have XXX's exam, do you confirm it?"

14. When teacher confirms the confirmation message, the exam is set on the exam calendar. If the teacher does not, the teacher should make a new request.

4.2.2.3. Assistant Use Case

Use Case:

- Login to the system
- View the exam calendar
- Set the personal information
- View the announcements
- View the personal information

- View the assigned exams

Diagram:

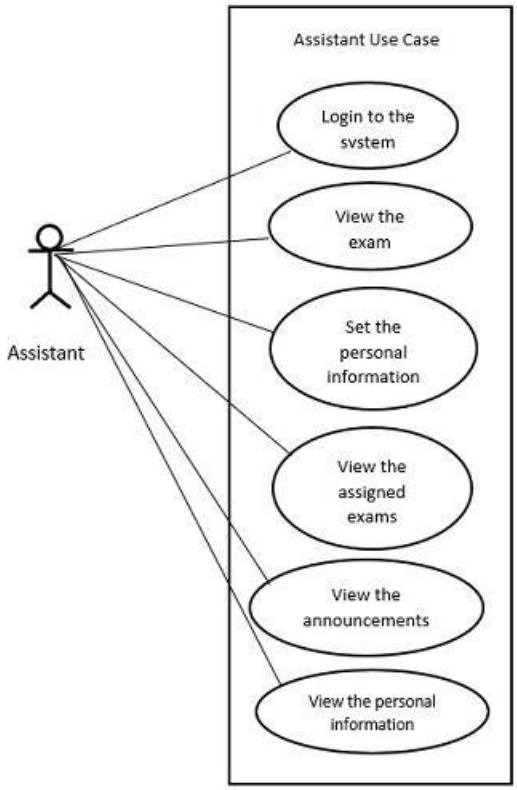

Figure 4: Assistant Use Case

Brief Description:

An assistant can be able to login to the system, view the own exam calendar and announcements. In addition, the assistant shall be able to set and view the personal information and view the assigned exams.

Initial Step-by-Step Description:

1. Assistant can login into the system.

2. Assistant can view the calendar of exam and announcements.

3. Assistant can choose how to get a random password by GSM or Email to use on the login page.(Default: GSM)

4. In Settings part, the assistant can change her/his password.

5. In Settings part, the assistant can choose how to receive messages and how many days before s/he wants to be informed about coming exams by GSM or Email.(Default: GSM, 7 days ago)

6. The assistant will be able to get his own exam schedule.

7. Course code, course name, exam date, exam class, exam duration, exam hour, exam notes and assistant of the exam can be seen in the exam schedule.

8. Assistant can sort the exams, which are in gridview, by some properties such as course code, course name, date of the exam etc.

9. When the exam is approved, the assistant will be informed by the system via Email or GSM.

10. In Setting part, if assistant wants to be notified when the teacher assigns an exam for this assistant in a certain day in the system, s/he can choose "I want to be notified" choice to get to be notified in that moment.

4.2.2.4. Department Chair Use Case

Use Case:

- Login to the system
- View the exam calendar
- Set the personal information
- View the announcements
- View the personal information

Diagram:

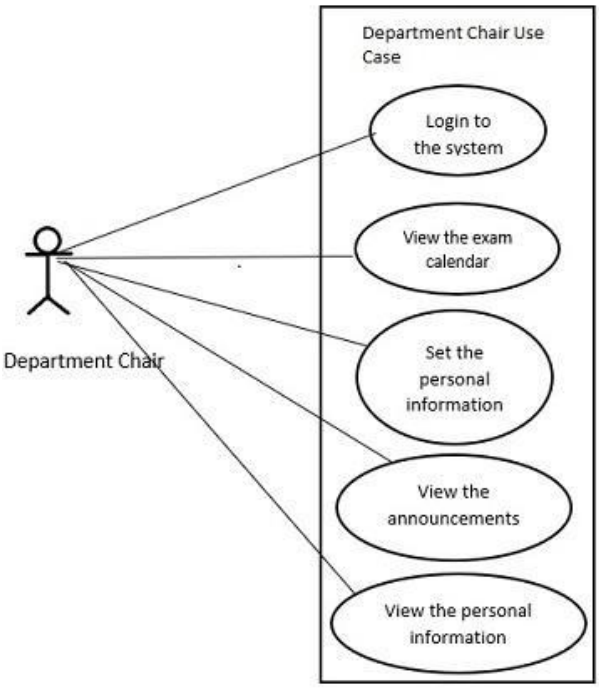

Figure 5: Department Chair Use Case

Brief Description:

A department chair can be able to login to the system, view the whole exam calendar of his/her department and announcements. In addition, the department chair shall be able to set and view the personal information. If s/he also gives courses, s/he has teacher abilities.

Initial Step-by-Step Description:

1. Department chair can login into the system.

2. Department chair can view the calendar of exam and announcements.

3. Department chair can choose how to get a random password by GSM or Email to use on the login page.(Default: GSM)

4. In Settings part, department chair can change her/his password.

5. In Settings part, department chair can choose how to receive messages and how many days before s/he wants to be informed about coming exams by GSM or Email.(Default: GSM, 7 days ago)

6. In exam calendar, department chair can reach information such as course code, course name, lecturer of the course, proctor(assistant), exam's date, class, time, duration, additional notes.

7. Department chair can sort the exams, which are in gridview, by some properties such as course code, course name, date of the exam etc.

8. There are some options under exam calendar to print out the exam calendar of the department.

4.2.2.5. Dean Use Case

Use Case:

- Login to the system
- View the exam calendar
- Set the personal information
- View the announcements
- View the personal information

Diagram:

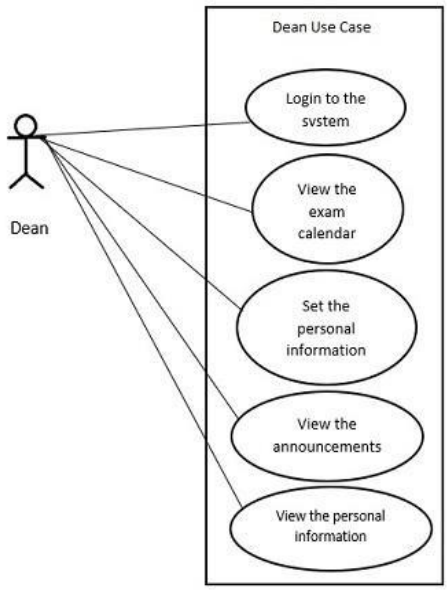

Figure 6: Dean Use Case

Brief Description:

A chair of a department faculty can be able to login to the system, view the whole exam calendar of his/her faculty and announcements. In addition, the chair of the faculty shall be able to set and view the personal information. If s/he also gives courses, s/he has teacher abilities.

Initial Step-by-Step Description:

1. Dean can login into the system.

2. Dean can view the calendar of exam and announcements.

3. Dean can choose how to get a random password by GSM or Email to use on the login page.(Default: GSM)

4. In Settings part, dean can change her/his password.

5. In Settings part, chair of the faculty can choose how to receive messages and how many days before s/he wants to be informed about coming exams by GSM or Email.(Default: GSM, 7 days ago)

6. In exam calendar, chair of the faculty can reach information such as course code, course name, lecturer of the course, proctor(assistant), exam's date, class, time, duration, additional notes.

7. Dean can sort the exams, which are in gridview, by some properties such as course code, course name, date of the exam etc.

8. There are some options under exam calendar to print out the exam calendar of the faculty.

4.2.2.6. Rector Use Case

Use Case:

- Login to the system
- View the exam calendar
- Set the personal information
- View the announcements
- View the personal information

Diagram:

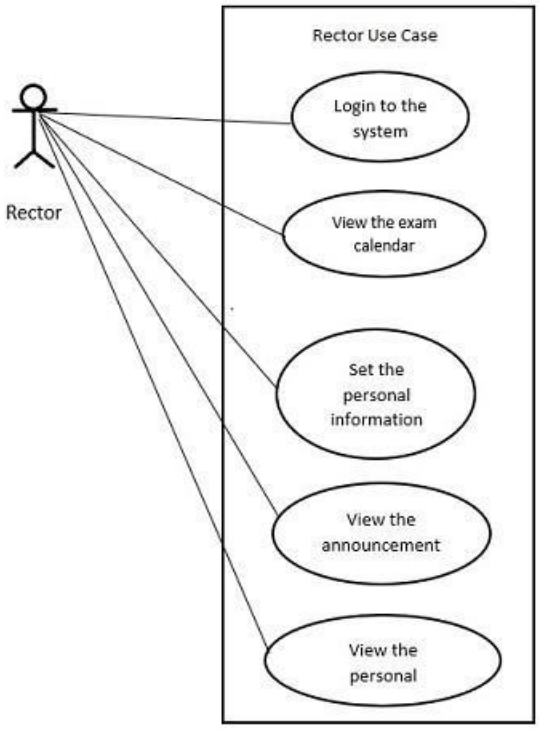

Figure 7: Rector Use Case

Brief Description:

A rector can be able to login to the system, view the whole exam calendar of the university and announcements. In addition, the rector shall be able to set and view the personal information. If s/he also gives courses, s/he has teacher abilities.

Initial Step-by-Step Description:

1. Rector can login into the system.

2. In the main page, rector can view the calendar of exam and announcements.

3. Rector can choose how to get a random password by GSM or Email to use on the login page.(Default: GSM)

4. In Settings part, rector can change her/his password

5. In Settings part, chair of the department can choose how to receive messages and how many days before s/he wants to be informed about coming exams by GSM or Email.(Default: GSM, 7 days ago)

6. In exam calendar, rector can reach information such as course code, course name, lecturer of the course, proctor(assistant), exam's date, class, time, duration, additional notes.

7. Rector can sort the exams, which are in gridview, by some properties such as course code, course name, date of the exam etc.

8. There are some options under exam calendar to print out the exam calendar of the faculty.

4.2.2.7. Admin or Main User Use Case

Use Case:

- Login to the system
- View the exam calendar
- Set the personal information
- View the announcements
- View the personal information
- Give authorizations to any user
- Start the Exam Proctor and Class Assignment System

Diagram:

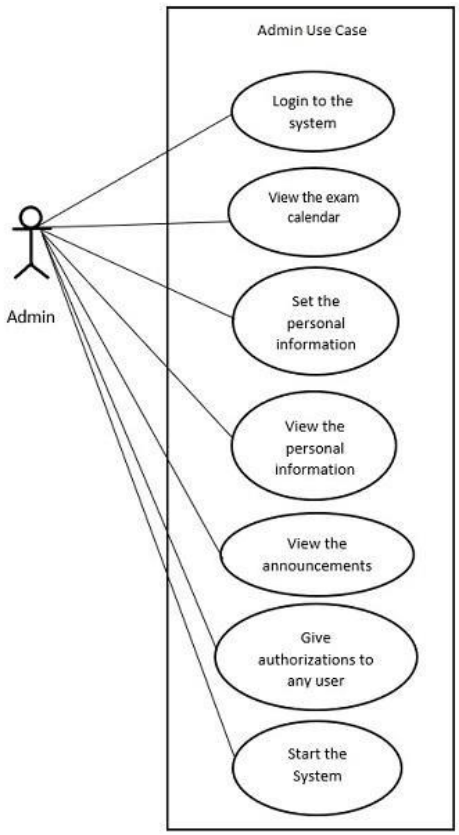

Figure 8: Admin Use Case

Brief Description:

The main user can be able to login to the system, view the whole exam calendar of the university and announcements. In addition, the main user shall be able to set and view the personal information. The main user starts the system or distribution of exams and can be able to give authorizations to any user s/he wants.

Initial Step-by-Step Description:

1. Admin can log in to the system.

2. Admin can view the exam schedule and announcements.

3. In Settings part, admin can change her/his password.

4. Admin can view personal information in the about part (Name, surname, department, faculty, title, address, telephone, email and picture)

5. There are some options under exam calendar to print out the exam calendar of all exams in college.

6. Admin will be able to view course code, the name of course, date, class, duration, time, supervisor teacher, notes in the exam schedule.

7. Admin can sort the exams, which are in gridview, by some properties such as course name, course code, exam date etc.

8. Admin will make start the exam distribution system.

8.1. At the end of each day, the admin will create the exam schedule for the exams that were requested on that day.

9. The admin will be able to authorize the requested person.

9.1. Admin will enter the TC number of the person whom he wants to authorize. When he/she click the give authorization named button, he/she will get through his/her phone a random password and the name of the person he/she wants to authorize.

9.2. When the password is entered correctly by the admin, he/she will be given the authority he wants.

9.3. When admin enters her/his password incorrectly for 3 times, s/he will be not able to access the authorization part for 1 hour.

4.2.3. User Characteristics

- Only students, teachers, assistants, chairs of departments and faculties, rector, main user and school system can use this Exam Proctor and Class Assignment system.
- All they need is the Internet connection to use this system.

4.2.4. Product Perspective

Exam Proctor and Class Assignment Project is a project developed by the support of the firm that is also the stakeholder of this project, GES TELEKOM. This project aims to the schedule the exams in any university with less conflict, and to help the people who arrange the planning of the exams.

4.2.4.1. Development Methodology

During the project which is focused on the education sector, the Scrum method is chosen to be applied which is an agile development methodology. The software manager of the stakeholder firm suggested the agile methodology for this project. A reason for choosing of agile

development methodology is agile works more rapidly with respect to waterfall method and others. Also, the circumstances and design of the project can be changed during the project and it makes the project more flexible. By using the scrum method, new changes can be implemented in any parts of the project. In consequence of the above reasons, the usage of scrum method is suitable for the development of the project.

4.3. Requirements Specification

4.3.1. External Interface Requirements

4.3.1.1. User Interfaces

The user interface will work on Windows Operating System through a browser.

4.3.1.2. Hardware Interfaces

There are no external hardware interface requirements.

4.3.1.3. Software Interfaces

There are no external software interface requirements.

4.3.1.4. Communications Interfaces

There are no external communication interface requirements.

4.3.2. Functional Requirements

In this part, main functions of Exam Proctor and Class Assignment System is shown below.

4.3.2.1. Student Use Case

The main sequential functions of student-side of the system are shown in below tables.

4.3.2.1.1. Login to the System

Case	Description
Use Case Name:	Login to the system
Xref:	Section 4.2.2.1, Student Use Case
Trigger:	Click on the Login button
Pre-	All information comes from the Exam Proctor and Class Assignment database about

Condition:	students
Basic Path:	Student opens the website
Alternative Path:	None
Post-Condition:	Student can be able to view exam calendar, taken courses by him/her, the announcement of his/her courses, and personal information. It can be able to set the personal information
Exception Paths:	If the all written information, TC no and password, security code are not true, or click on the Logout button
Other:	Section 4.2.2.0, General Use Case about Login

4.3.2.1.2. Set the Personal Information

Case	Description
Use Case Name:	Set the personal information
Xref:	Section 4.2.2.1, Student Use Case
Trigger:	Click on the Settings button
Pre-Condition:	Access the settings page
Basic Path:	Student opens the settings page
Alternative Path:	None

Post-Condition:	Student can be able to change the approval situation about the platform where the random security code comes, password and alert attribute of the system for herself/himself
Exception Paths:	The attempt may be abandoned at anytime
Other:	As a default for approval situation is chosen as GSM, and a default value of an alert attribute is alerting the student 7 days before the exam.

4.3.2.1.3. View the Exam Calendar

Case	Description
Use Case Name:	View the exam calendar
Xref:	Section 4.2.2.1, Student Use Case
Trigger:	Visit the main page of the system
Pre-Condition:	Login to the system
Basic Path:	Student opens the website
Alternative Path:	None
Post-Condition:	Student reaches her/his exams' information
Exception Paths:	If the exam calendar has not created yet

Other:	Student can be able to print out the exam calendar as pdf export, excel export or word export.

4.3.2.1.4. View the Taken Courses

Case	Description
Use Case Name:	View the taken courses
Xref:	Section 4.2.2.1, Student Use Case
Trigger:	Click on the My Courses button
Pre-Condition:	Login to the system
Basic Path:	Student clicks to the My Courses button which is on the main page of the website
Alternative Path:	None
Post-Condition:	Student reaches the taken courses information that are course name, course code, course's teacher name
Exception Paths:	If the student does not take any lessons
Other:	None

4.3.2.1.5. View the Announcements

Case	Description
Use Case Name:	View the announcements
Xref:	Section 4.2.2.1, Student Use Case
Trigger:	Visit the main page of the system
Pre-Condition:	Login to the system
Basic Path:	Student opens the website
Alternative Path:	None
Post-Condition:	Student can be able to view the announcements about her/his taken courses
Exception Paths:	If there are no announcements
Other:	The announcements section will be on the right side of the page

4.3.2.1.6. View the Personal Information

Case	Description
Use Case Name:	View the Personal Information
Xref:	Section 4.2.2.1, Student Use Case
Trigger:	Click on the Information button

Pre-Condition:	Login to the system
Basic Path:	Student clicks the Information button on the main page of the website
Alternative Path:	None
Post-Condition:	Student can be able to view her/his personal information
Exception Paths:	None
Other:	None

4.3.2.2. Teacher Use Case

The main sequential functions of teacher-side of the system are shown in below tables.

4.3.2.2.1. Login to the System

Case	Description
Use Case Name:	Login to the system
Xref:	Section 4.2.2.2, Teacher Use Case
Trigger:	Click on the Login button
Pre-Condition:	All information comes from the Exam Proctor and Class Assignment database about teachers
Basic Path:	Teacher opens the website
Alternative	None

Path:	
Post-Condition:	Teacher can be able to view exam calendar, given courses by him/her, the announcement of his/her courses, and personal information. It can be able to set the personal information and make an announcement. Also, a teacher can be able to request for an exam which is given by her/him
Exception Paths:	If the all written information, TC no and password, security code are not true, or click on the Logout button
Other:	Section 4.2.2.0, General Use Case about Login

4.3.2.2.2. Set the Personal Information

Case	Description
Use Case Name:	Set the personal information
Xref:	Section 4.2.2.2, Teacher Use Case
Trigger:	Click on the Settings button
Pre-Condition:	Access the settings page
Basic Path:	Teacher opens the settings page
Alternative Path:	None
Post-Condition:	Teacher can be able to change the approval situation about the platform where the random security code comes, password and alert attribute of the system for herself/himself

Exception Paths:	The attempt may be abandoned at anytime
Other:	As a default for approval situation is chosen as GSM, and default value of alert attribute is alerting the student 7 days before the exam

4.3.2.2.3. View the Exam Calendar

Case	Description
Use Case Name:	View the exam calendar
Xref:	Section 4.2.2.2, Teacher Use Case
Trigger:	Visit the main page of the system
Pre-Condition:	Login to the system
Basic Path:	Teacher opens the website
Alternative Path:	None
Post-Condition:	Teacher reaches her/his exams' information
Exception Paths:	If the exam calendar has not created yet
Other:	Teacher can be able to print out the exam calendar as pdf export, excel export or word export

4.3.2.2.4. View the Given Courses

Case	Description
Use Case Name:	View the given courses
Xref:	Section 4.2.2.2, Teacher Use Case
Trigger:	Click on the My Courses button
Pre-Condition:	Login to the system
Basic Path:	Teacher clicks to the My Courses button which is on the main page of the website
Alternative Path:	None
Post-Condition:	Teacher reaches the given courses information
Exception Paths:	If the teacher does not give any lessons
Other:	None

4.3.2.2.5. View the Announcements

Case	Description
Use Case Name:	View the announcements
Xref:	Section 4.2.2.2, Teacher Use Case
Trigger:	Visit the main page of the system
Pre-Condition:	Login to the system

Basic Path:	Teacher opens the website
Alternative Path:	None
Post-Condition:	Teacher can be able to view the announcements about her/his given courses
Exception Paths:	If there are no announcements
Other:	The announcements section will be on the right side of the page

4.3.2.2.6. View the Personal Information

Case	Description
Use Case Name:	View the Personal Information
Xref:	Section 4.2.2.2, Teacher Use Case
Trigger:	Click on the Information button
Pre-Condition:	Login to the system
Basic Path:	Teacher clicks the Information button on the main page of the website
Alternative Path:	None
Post-Condition:	Teacher can be able to view her/his personal information
Exception Paths:	None
Other:	None

4.3.2.2.7. Make an Announcement

Case	Description
Use Case Name:	Make an Announcement
Xref:	Section 4.2.2.2, Teacher Use Case
Trigger:	Click on the Add Announcement button
Pre-Condition:	Click to the Given Courses section, and fill all necessary information about an announcement
Basic Path:	Teacher clicks to the Given Courses button on the main page, and clicks the add announcement button
Alternative Path:	None
Post-Condition:	Teacher's announcement can be seen
Exception Paths:	Clicks to the Cancel button
Other:	None

4.3.2.2.8. Request for an Exam

Case	Description
Use Case Name:	Request for an Exam
Xref:	Section 4.2.2.2, Teacher Use Case

Trigger:	Click on the Request Exam button
Pre-Condition:	Login to the system, and fill all necessary information about the exam
Basic Path:	Teacher clicks to the Request Exam button on the main page
Alternative Path:	None
Post-Condition:	Teacher has been requested for an exam
Exception Paths:	If the teacher has already been requested for this exam, or clicks to the Cancel button
Other:	None

4.3.2.3. Assistant Use Case

The main sequential functions of assistant-side of the system are shown in below tables.

4.3.2.3.1. Login to the System

Case	Description
Use Case Name:	Login to the system
Xref:	Section 2.2.3, Assistant Use Case
Trigger:	Click on the Login button
Pre-Condition:	All information comes from the Exam Proctor and Class Assignment database about assistants
Basic Path:	Assistant opens the website

Alternative Path:	None
Post-Condition:	Assistant can be able to view exam calendar, announcement, and personal information. It can be able to set the personal information.
Exception Paths:	If the all written information, TC no and password, security code are not true, or click on the Logout button
Other:	Section 4.2.2.0, General Use Case about Login

4.3.2.3.2. Set the Personal Information

Case	Description
Use Case Name:	Set the personal information
Xref:	Section 2.2.3, Assistant Use Case
Trigger:	Click on the Setting button
Pre-Condition:	Access the settings page
Basic Path:	Assistant opens the settings page
Alternative Path:	None
Post-Condition:	Assistant can be able to change the approval situation about the platform where the random security code comes, password and alert attribute of the system for herself/himself

Exception Paths:	The attempt may be abandoned at anytime
Other:	As a default for approval situation is chosen as GSM, and a default value of an alert attribute is alerting the student 7 days before the exam.

4.3.2.3.3. View the Assigned Exam Calendar

Case	Description
Use Case Name:	View the exam calendar
Xref:	Section 2.2.3, Assistant Use Case
Trigger:	Visit the main page of the system
Pre-Condition:	Login to the system
Basic Path:	Assistant opens the settings page
Alternative Path:	None
Post-Condition:	Assistant reaches her/his exams' information
Exception Paths:	If the exam calendar has not created yet
Other:	Assistant can be able to print out the exam calendar as pdf export, excel export or word export.

4.3.2.3.4. View the Announcements

Case	Description
Use Case Name:	View the announcements
Xref:	Section 2.2.3, Assistant Use Case
Trigger:	Visit the main page of the system
Pre-Condition:	Login to the system
Basic Path:	Assistant opens the settings page
Alternative Path:	None
Post-Condition:	Assistant can be able to view the announcements about her/his given courses
Exception Paths:	If there are no announcements
Other:	The announcements section will be on the right side of the page

4.3.2.3.5. View the Personal Information

Case	Description
Use Case Name:	View the Personal Information
Xref:	Section 2.2.3, Assistant Use Case
Trigger:	Click on the Information button
Pre-Condition:	Login to the system

Basic Path:	Assistant clicks the About button on the main page of the website
Alternative Path:	None
Post-Condition:	Assistant can be able to view her/his personal information
Exception Paths:	None
Other:	None

4.3.2.4. Department Chair, Dean, and Rector Use Cases

The main sequential functions of the chair of the department, chair of the faculty and rector-sides of the system are shown in below tables. These 3 users' use case tables are nearly same with each other, so the common use case tables are used in this section.

4.3.2.4.1. Login to the System

Case	Description
Use Case Name:	Login to the system
Xref:	Section 4.2.2.4, Department Chair Use Case , Section 4.2.2.5, Dean Use Case ,Section 4.2.2.6, Rector Use Case
Trigger:	Click on the Login button
Pre-Condition:	All information come from the Exam Proctor and Class Assignment database about the department chair, dean and rector.
Basic Path:	User opens the website
Alternative Path:	None

Post-Condition:	User can be able to view exam calendar, announcement, and personal information. It can be able to set the personal information
Exception Paths:	If the all written information, TC no and password, security code are not true, or click on the Logout button
Other:	Section 4.2.2.0, General Use Case about Login

4.3.2.4.2. Set the Personal Information

Case	Description
Use Case Name:	Set the personal information
Xref:	Section 4.2.2.4, Department Chair Use Case , Section 4.2.2.5, Dean Use Case ,Section 4.2.2.6, Rector Use Case
Trigger:	Click on the Setting button
Pre-Condition:	Access the settings page
Basic Path:	User opens the settings page
Alternative Path:	None
Post-Condition:	User can be able to change the approval situation about the platform where the random security code comes, password and alert attribute of the system for herself/himself
Exception Paths:	The attempt may be abandoned at anytime

Other:	As a default for approval situation is chosen as GSM, and a default value of an alert attribute is alerting the student 7 days before the exam.

4.3.2.4.3. View the Exam Calendar Specifically

Case	Description
Use Case Name:	View the exam calendar
Xref:	Section 4.2.2.4, Department Chair Use Case , Section 4.2.2.5, Dean Use Case ,Section 4.2.2.6, Rector Use Case
Trigger:	Visit the main page of the system
Pre-Condition:	Login to the system
Basic Path:	User opens the website
Alternative Path:	None
Post-Condition:	Department chair reaches the own department exam calendar. Chair of the faculty reaches the own faculty exam calendar. Rector reaches the whole exam calendar of the university.
Exception Paths:	If the exam calendar has not been created yet
Other:	User can be able to print out the exam calendar as pdf export, excel export or word export.

4.3.2.4.4. View the Announcements

Case	Description
Use Case Name:	View the announcements
Xref:	Section 4.2.2.4, Department Chair Use Case , Section 4.2.2.5, Dean Use Case ,Section 4.2.2.6, Rector Use Case
Trigger:	Visit the main page of the system
Pre-Condition:	Login to the system
Basic Path:	User opens the website
Alternative Path:	None
Post-Condition:	Chair of the department can be able to view the announcements about own department. Chair of the faculty can be able to view the announcements about own faculty. Rector can be able to view the announcements about the whole university.
Exception Paths:	If there are no announcements
Other:	The announcements section will be on the right side of the page

4.3.2.4.5. View the Personal Information

Case	Description
Use Case Name:	View the Personal Information
Xref:	Section 4.2.2.4, Department Chair Use Case , Section 4.2.2.5, Dean Use Case ,Section 4.2.2.6, Rector Use Case
Trigger:	Click on the Information button
Pre-Condition:	Login to the system
Basic Path:	User clicks the About button on the main page of the website
Alternative Path:	None
Post-Condition:	User can be able to view her/his personal information
Exception Paths:	None
Other:	None

4.3.2.5. Main User Use Case

The main sequential functions of the main user-side of the system are shown in below tables.

4.3.2.5.1. Login to the System

Case	Description
Use Case Name:	Login to the system
Xref:	Section 4.2.2.7, Main User Use Case
Trigger:	Click on the Login button
Pre-Condition:	Login to the system
Basic Path:	Main user opens the website
Alternative Path:	None
Post-Condition:	Main user can be able to view the whole exam calendar, announcement, and personal information. It can be able to set the personal information. The main user shall be able to give authorizations to any user s/he wants and starts the Exam Proctor and Class Assignment System
Exception Paths:	If the all written information, TC no and password, security code are not true, or click on the Logout button
Other:	Section 4.2.2.0, General Use Case about Login

4.3.2.5.2. Set the Personal Information

Case	Description
Use Case Name:	Set the personal information
Xref:	Section 4.2.2.7, Main User Use Case
Trigger:	Click on the Setting button
Pre-Condition:	Access the settings page
Basic Path:	Main user opens the settings page
Alternative Path:	None
Post-Condition:	Main user can be able to change password
Exception Paths:	The attempt may be abandoned at anytime
Other:	None

4.3.2.5.3. View the Whole Exam Calendar

Case	Description
Use Case Name:	View the exam calendar
Xref:	Section 4.2.2.7, Main User Use Case
Trigger:	Visit the main page of the system

Pre-Condition:	Login to the system
Basic Path:	Main user opens the website
Alternative Path:	None
Post-Condition:	Main user reaches the university's all exam calendars
Exception Paths:	If the exam calendar has not created yet
Other:	Main user can be able to print out the exam calendar as pdf export, excel export or word export.

4.3.2.5.4. View the Announcements

Case	Description
Use Case Name:	View the announcements
Xref:	Section 4.2.2.7, Main User Use Case
Trigger:	Visit the main page of the system
Pre-Condition:	Login to the system
Basic Path:	Main user opens the website
Alternative Path:	None
Post-Condition:	Main user can be able to view the whole announcements

Exception Paths:	If there are no announcements
Other:	The announcements section will be on the right side of the page

4.3.2.5.5. View the Personal Information

Case	Description
Use Case Name:	View the Personal Information
Xref:	Section 4.2.2.7, Main User Use Case
Trigger:	Click on the Information button
Pre-Condition:	Login to the system
Basic Path:	Main user clicks the About button on the main page of the website
Alternative Path:	None
Post-Condition:	Main user can be able to view her/his personal information
Exception Paths:	None
Other:	None

4.3.2.5.6. Give Authorizations to Any User

Case	Description
Use Case Name:	Give authorizations to any user

Xref:	Section 4.2.2.7, Main User Use Case
Trigger:	Click on the Give Authorization button
Pre-Condition:	Enters the random security code which comes to the main user's phone truly
Basic Path:	Main user clicks the Give authorizations button on the main page
Alternative Path:	None
Post-Condition:	Main user can be able to give an authorization to the person whose information is written
Exception Paths:	If the main user cannot enter the true random security code 3 times, Give Authorizations button will not be enabled for an hour
Other:	None

4.3.2.5.7. Start the Exam Proctor and Class Assignment System

Case	Description
Use Case Name:	Start the Exam Proctor and Class Assignment System
Xref:	Section 4.2.2.7, Main User Use Case
Trigger:	Click on the Create Exam Calendar button
Pre-Condition:	It should be a list of requested exams
Basic Path:	Main user clicks the Exam Requests button on the main page, and then clicks Create

	Exam Calendar button
Alternative Path:	None
Post-Condition:	At the end of each day, the exam calendars are created to be fair
Exception Paths:	If there are no exam requests
Other:	None

4.3.3. Non-functional Requirements

Some significant non-functional requirements for the Exam Proctor and Class Assignment System are listed below.

Non-functional Requirement	Description
Security	1. When a user login to the system, a random security code is sent to his/her phone or email address. The user should enter the code truly to enter the website. 2. All information of users is kept secret in the database system. 3. When the main user wants to give an authorization to any user, again a random security code is sent to admin.
Usability	1. If the written information on the login page is wrong, there will be an error message. 2. If the necessary information is not written, there will be an error message.
Portability	Exam Proctor and Class Assignment System is produced by using Visual Studio, C#, and ASP.Net. The system can be transported to mobile.

5. SOFTWARE DESIGN DESCRIPTION

5.1. Introduction

5.1.1. Purpose

The purpose of this document is to represent the design of Exam Proctor and Class Assignment System. Detailed description of software design of the system is explained with diagrammatic representations. The purpose of this system is to distribute exams performed at an educational organization to the classes correctly by arranging suitable proctors. The main goal of this project is to prevent overlaps and conflicts between any exam dates, classrooms, and proctor at the exam. This software design document includes deployment diagram, system architecture, scrum meeting simulation, database design, and motivation of the project.

5.1.2. Scope of Project

In system's requirement specification document, how system would behave and its interaction with users were explained in detail. In order to solve the exam conflict problem, the proctor and class assignment system is necessary that would provide efficient exam arrangement in higher education institutions. The aim of this project is to develop a system that distributes exams, classes, and proctors without conflicts and overlaps which we and many students need in real life. This project will use database of a college which includes all necessary information such as tables of users, courses, classes, etc. details of the database tables and diagrams are explained in this document. System will ask authorization to reach to certain functions. This system also considers users' security by letting users logging in to the system with their TC ID numbers. However, users can only access to their personal accounts with the password which is sent to their GSM numbers or emails. When users reach to their personal page, they can view exam calendar which courses they are related; courses that are taken by students and given by teachers. Students can only view the exams but teachers can also make changes about exam date, exam time and exam place. This project aims to prevent exam assignment mistakes when performed manually.

5.1.3. Glossary

TERM	DEFINITION
SDD	Software Design Document
Sprint	The time required to complete a specific job and be ready for review is called sprint.
Database	Location of all users' information.

GUI	Graphical User Interface
Scrum	Scrum which is a lightweight process framework which is an agile way to manage a project.

5.1.4. Overview of Document

This document has 6 sections. First one is introduction section which includes purpose, scope, glossary, overview of document and motivation of the project. The second one is deployment diagram. By using this diagram hardware parts of the system can be seen. The third one is that system's architecture. The fourth section is that scrum meeting simulation. The fifth section is database design which includes database tables, tables' attributes, attribute types and their sizes. The last section is references.

5.1.5. Motivation

In many colleges, exam date planning process is performed manually which creates errors like overlaps and conflicts in exam dates, classes and even proctors. This causes waste of time and stress before the exams and as a result it takes too much time to plan the exam calendars. Hence this project we aim to develop an exam proctor and class assignment system. The exam proctor and class assignment system is necessary not only for students but also for teachers to plan the exams with less conflicts and workforce.

Scrum, the agile project management methodology has motivated us to support production and feedback in short cycles. That's why we prefer scrum methodology in the project. When using this methodology, our priority is meeting the expectation of the company. In order to be able to do this, we are holding regular meetings. With feedbacks that we received, we have taken into consideration the satisfaction of the customer by completing the functions and features that must be completed in each sprint.

The interfaces of the pages that can be accessed by users with different authorities are designed. System’s architecture is composed. Deployment diagram and Entity relationship diagram are illustrated in this SDD document.

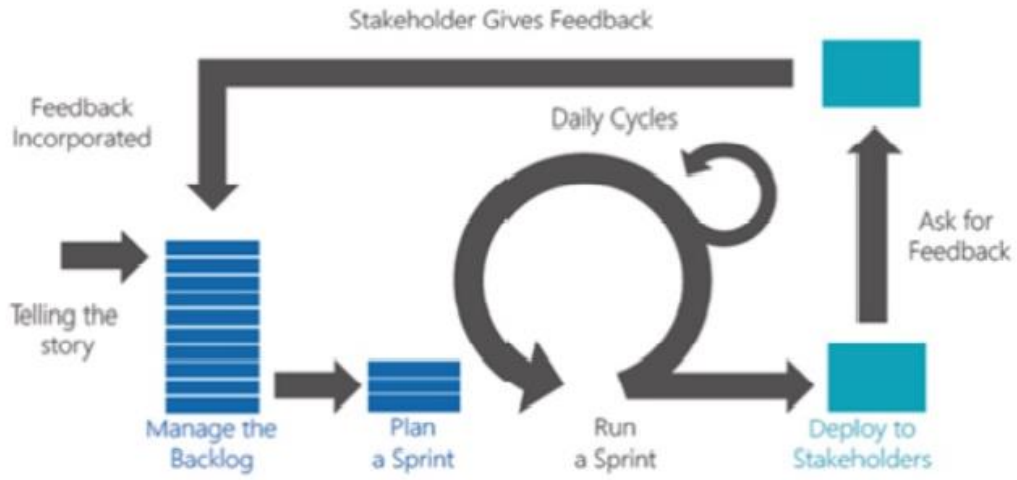

Figure 9: Scrum System Architecture [8]

5.2. Deployment Diagram

The purpose of the deployment diagram is to explain the working principles of Exam Proctor and Class Assignment System of the website. The main 3 submodules of the system:

1. Client: Has only web browser. Makes a connection between a system and user/main user.
2. Web server: Has web application. In web application development, Html, JavaScript and CSS will be used in the project.
3. Database server: Stores the university information; classes, class types, courses, departments, faculties and user information. MsSQL is used to accumulate all this information.

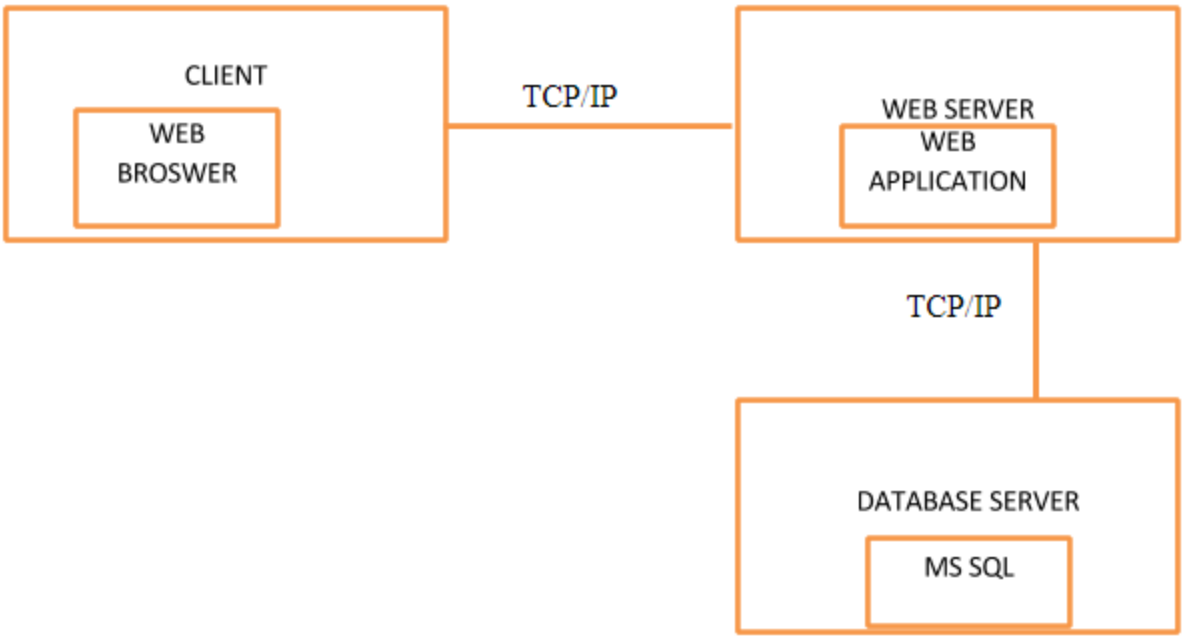

Figure 9: Deployment Diagram

5.2.1. Client

The client sends requests to connect the server to accomplish their operations. After connection is established, result can be seen on the web browser.

5.2.2. Server

The system has 6 different interfaces for ASP.NET users. There are many fundamentals like email forms, SMS forms, database list.

5.2.3. MsSQL

Ms – SQL is a relational web hosting database that is used to store web site information. It is capable to update the data, and delete the records.

5.2.4. ASP.NET

An open source, server-side web application framework which is a subset of the .NET Framework that focuses specifically on building web application, web sites, and web services-[9]-

5.2.5. C#

C# is an object-oriented programming language from Microsoft that aims to combine the computing power of C++ -[10]-

5.2.6. HTML CSS JS

HTML is used to design contents. CSS is used to determine style of the ASP.NET page. JavaScript is used for behavior such as timer to provide security.

5.3. System Architecture

5.3.1. Architectural Design

In architectural design, user types and their use cases are explained.

5.3.1.1. User

Name: All Users: Student, Teacher, Assistant, Department Chair, Dean, Rector

Type: Web Page

Description: User should login to the system to reach the personal home page. The user can enter the system with her/his TC id and random password sent her/his telephone number by the system for the first entry. The system also sends a random security code to the user for each entry. The user can view announcements on her/his main page. In the main page, user's personal information is seen in the middle of the screen. At top of the main page, there is a header navigation that includes Settings and Exam Calendar buttons. When the user clicks Settings button, settings page is divided into 3 parts; contact information settings, notification settings, and password settings. After clicking Contact Information Settings button, the user can add or delete a new GSM or e-mail address. There is a Save button which saves the chosen information to the database. After clicking Notification Settings button, the user can choose the way(by GSM or Email) of receiving messages and how many days before s/he wants to be informed about coming exams.(Default: GSM, 7 days ago). After clicking Password Settings button, the user can change his/her own password. When user wants to change the password, a confirmation code is sent and popup screen is opened on the website. By approving the confirmation code truly, the password is changed successfully. When clicking Exam Calendar button, an exam calendar can be seen. Below the calendar, there are 2 buttons which are export in pdf, and export in the word.

Operations:

These 4 operations which are Login(), Set personal information(), view personal information(), view announcement() are common for other user types.

Name: Login()

Pre-condition: All information comes from the Exam Proctor and Class Assignment database about users

Post-condition: User can be able to view exam calendar, taken/given/assigned courses by him/her, the announcement of his/her courses, and personal information. It can be able to set the personal information

Exception Path: If the all written information, TC no and password, security code is not true, or click on the Logout button

Flow of Events:

1. The user opens Exam Proctor and Class Assignment System website.

2. User clicks the Login button.

3. The system displays textboxes for login. The user enters his/her TC id and password which is given by university for the first time and clicks Login buttons.

4. A random confirmation code is sent to the user's phone/e-mail address. If the user correctly enters this code, s/he can access the personal home page. If the user does not enter the code 6 times truly, s/he will be on the blacklist of the system.

Name: View Announcements()

Pre-condition: Login to the system

Post-condition: User can be able to view the announcements about her/his taken/given/assigned courses

Exception Path: If there are no announcements

Flow of Events: When the user enters to the main page of the system, he/she can view announcements which are located on the right side of the website.

Name: View the personal Information()

Pre-condition: Login to the system

Post-condition: User can be able to view her/his personal information

Exception Path: None

Flow of Events:

When user logins to the system, her/his personal information can be seen in the middle of the website.

Name: Set the personal information()

Pre-condition: Access the settings page

Post-condition: User can be able to change the approval situation about the platform where the random security code comes, password and alert attribute of the system for herself/himself

Exception Path: The attempt may be abandoned at anytime

Flow of Events:

1. When the user clicks Settings button which is on the menu, he/she can change the personal information.

2. After clicking Contact Information Settings button, the user can add or delete a new GSM or e-mail address. There is a Save button which saves the chosen information to the database.

3. After clicking Notification Settings button, the user can choose the way(by GSM or Email) of receiving messages and how many days before s/he wants to be informed about coming exams.(Default: GSM, 7 days ago).

4. After clicking Password Settings button, the user can change his/her own password. When user wants to change the password, a confirmation code is sent and popup screen is opened on the website. By approving the confirmation code truly, the password is changed successfully.

5.3.1.2. Student

Name: View the taken courses()

Pre-condition: Login to the system

Post-condition: Student reaches the taken courses information that are course name, course code, course's teacher name

Exception Path: If the student does not take any lessons

Flow of Events:

1. In the student's menu, there is a button whose name is View taken courses.

2. When the student clicks this button, he/she can view taken courses.

5.3.1.3. Teacher

Name: View the given courses()

Pre-condition: Login to the system

Post-condition: Teacher reaches the given courses information

Exception Path: If the teacher does not give any lessons

Flow of Events:

1. In the teacher's menu, there is a button whose name is View given courses.

2. When teacher clicks this button, he/she can view given courses.

Name: Make an announcement()

Pre-condition: Click on the Given Courses section, and fill all necessary information about an announcement

Post-condition: Teacher's announcement can be seen

Exception Path: Clicks to the Cancel button

Flow of Events:

1. In the teacher's menu, there is a button whose name is Add an announcement.

2. When teacher clicks this button, he/she can add an announcement.

3. An announcement has announcement name, start and end date, title.

Name: Request for an exam()

Pre-condition: Login to the system, and fill all necessary information about the exam

Post-condition: Teacher has been requested for an exam

Exception Path: If the teacher has already been requested for this exam, or clicks to the Cancel button

Flow of Events:

1. In the teacher's menu, there is a button whose name is Request for an exam.

2. When teacher clicks this button, he/she can request an exam.

3. An exam has the class capacity, type, exam duration, assigned assistant, exam subject, exam starting time.

5.4. Database Design

5.4.1. Tables

5.4.1.1. Announcement Table

Attribute Name	Attribute Type	Attribute Type
announcementId (PK)	int	
announcementTitle	nvarchar	50
announcementStartDate	date	
announcementEndDate	date	
userCourseReferenceId (FK)	int	

TABLE 1: ANNOUNCEMENT

5.4.1.2. Class Table

Attribute Name	Attribute Type	Attribute Type
classId (PK)	int	

className	nvarchar	10
classCapacity	int	
facultyReferenceId (FK)	int	
classTypeId (FK)	int	

TABLE 2: CLASS

5.4.1.3. Class Type Table

Attribute Name	Attribute Type	Attribute Type
classTypeId (PK)	int	
classTypeName	nvarchar	30

TABLE 3: CLASS TYPE

5.4.1.4. Course Table

Attribute Name	Attribute Type	Attribute Type
courseId (PK)	int	
courseName	nvarchar	50
courseNoteLink	nvarchar	100

courseQuota	int	
courseClassDegree (FK)	int	
courseIsActive	bit	
examReferenceId (FK)	int	

TABLE 4: COURSE

5.4.1.5. Department Table

Attribute Name	Attribute Type	Attribute Type
departmentId (PK)	int	
departmentName	nvarchar	50
facultyReferenceId (FK)	int	

TABLE 5: DEPARTMENT

5.4.1.6. Exam Table

Attribute Name	Attribute Type	Attribute Type
examId (PK)	int	
examDuration	int	
examDate	date	

examStartingTime	time	7
userReferenceId (FK)	int	
courseReferenceId (FK)	int	
isCourseSelected	bit	
examSubject	nvarchar	70

TABLE 6: EXAM

5.4.1.7. Reference Table

Attribute Name	Attribute Type	Attribute Type
referenceDoubleIndexId (PK)	int	
departmentId (FK)	int	
userId (FK)	int	

TABLE 7: REFERENCE

5.4.1.8. User Table

Attribute Name	Attribute Type	Attribute Type
userId (PK)	int	
userName	nvarchar	30

userSurname	nvarchar	30
userTcID	varchar	11
userStudentNo	int	
userEmail	nvarchar	30
userPassword	varchar	50
userDepartmentId (FK)	int	
userFacultyId (FK)	int	
userIsActive	bit	
userTypeId (FK)	int	
userTitle	nvarchar	30
userIsDouble	int	
userClassDegree	int	
userRemainingCourseHour	int	
userPhoneNumber	varchar	15
userPhoneNumber2	varchar	15
userEmail2	nvarchar	30

userApprovalPlatform	varchar	10
userApprovalDay	int	
userApprovalTime	varchar	10
userIsInformedChecked	bit	

TABLE 8: USER

5.4.1.9. User Course Table

Attribute Name	Attribute Type	Attribute Type
userCourseId (PK)	int	
userId (FK)	int	
courseId (FK)	int	
userAttedance	int	

TABLE 9: USERCOURSE

5.4.1.10. User Type Table

Attribute Name	Attribute Type	Attribute Type
userTypeId (PK)	int	
userTypeName	nvarchar	20

TABLE 10: USERTYPE

5.4.1.11. Faculty Table

Attribute Name	Attribute Type	Attribute Type
facultyId (PK)	int	
facultyName	nvarchar	70

TABLE 11: FACULTY

5.4.1.12. Is Double Table

Attribute Name	Attribute Type	Attribute Type
isDoubleId (PK)	int	
minorMajor	bit	
doubleMajor	bit	
noMajor	bit	

TABLE 12: ISDOUBLE

5.4.2. Database Diagram

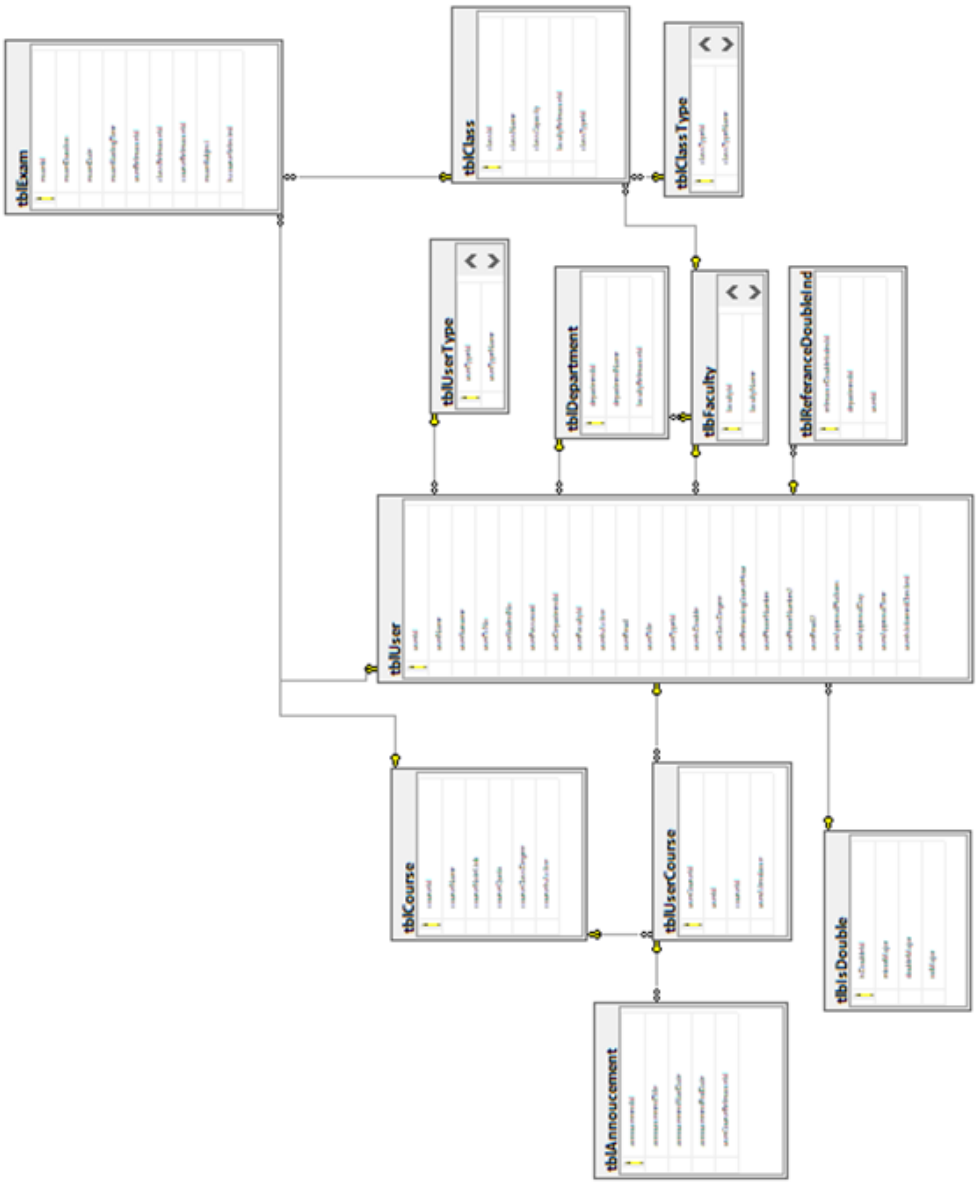

Figure 10: Database Diagram

The database diagram is required to specify the primary and foreign keys in the database tables.

5.4.3. ER Diagram

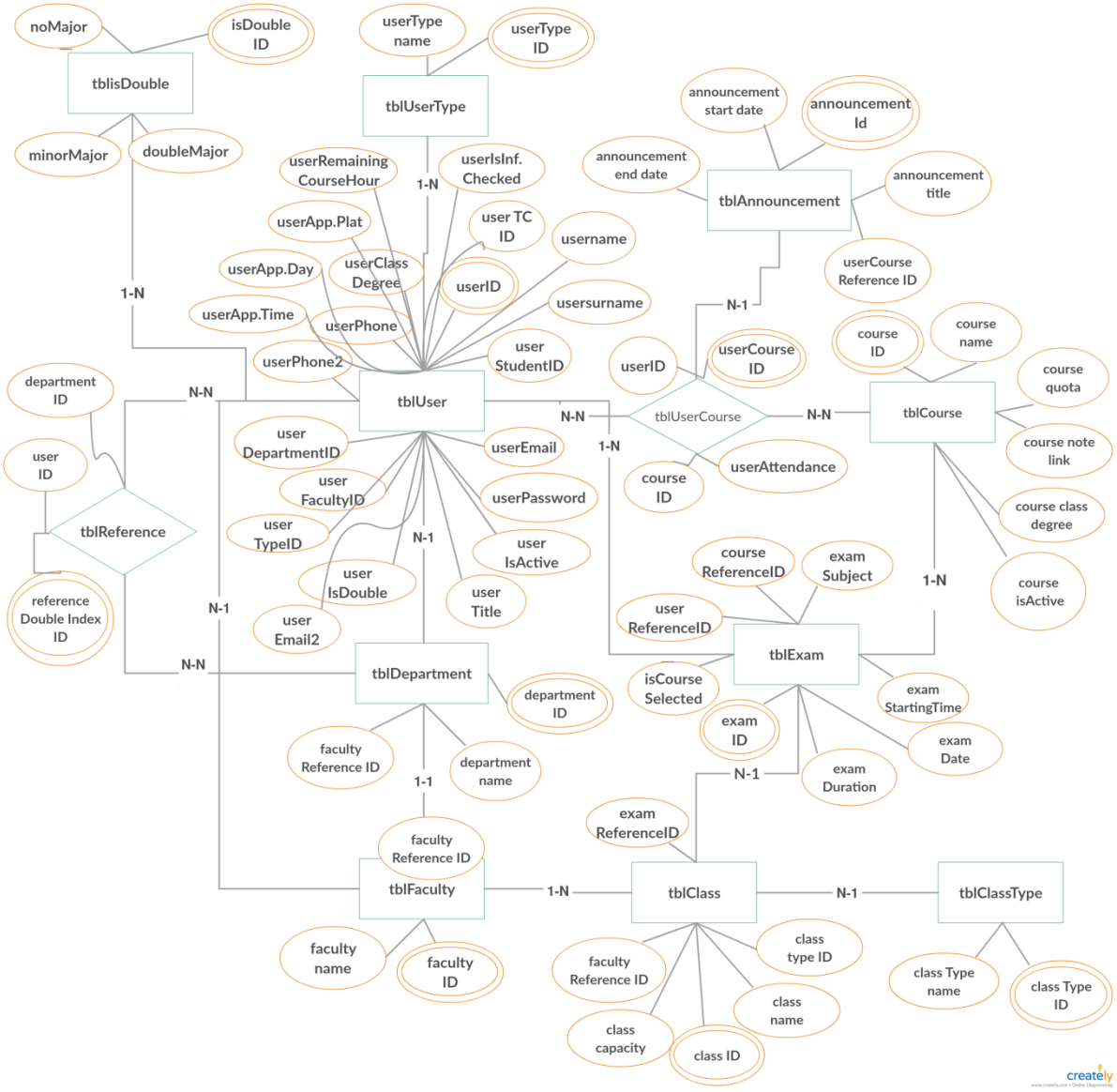

Figure 11: ER Diagram

ER diagram shows the database tables in the system and the relationships between them. There are twelve tables in the system. These are announcement, class, class type, course, department, exam, reference, user, user-course, user type, faculty and isdouble. Attributes of the tables can be seen in the diagram. The types of relationships between tables are shown in the diagram

5.4.4. UML Class Diagram

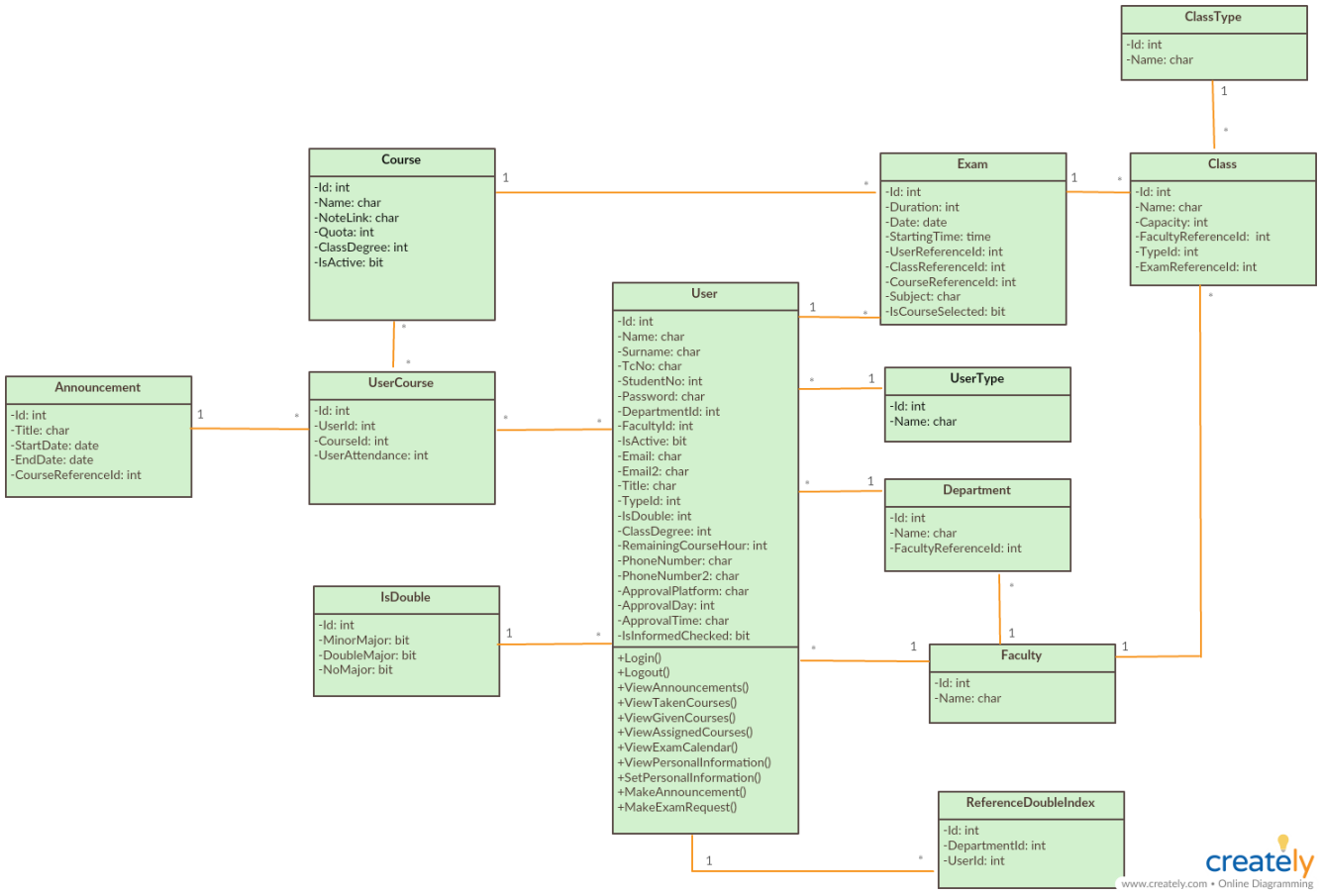

Figure 12: UML CLASS Diagram

-Login(): User can login into the system.

-Logout(): User can logout from the system.

-ViewAnnouncements(): User can view announcements.

-ViewTakenCourses(): User can view courses which are taken by his or her.

-ViewExamCalendar(): User can view her/his exam calendar.

-ViewPersonalInformation(): User can view her/his personal information.

-SetPersonalInformation(): User can update her/his personal information.

-MakeAnnouncement(): User can make an announcement.

-MakeExamRequest(): User can request for an exam.

-ViewGivenCourses(): User can view courses which are given by his or her.

-ViewAssignedCourses(): User can view courses which are assigned to him or her.

5.5. Interface Design

In this section, forms pages that user will use in the system are given in modules and objects basically to show main functionality of pages. Design of form pages will be developed in next stages of the project.

Figure 13: Login Page

After login page, user has to enter confirmation code correct in Login Access page to access his or her home page. Confirmation code is sent to user's GSM by system.

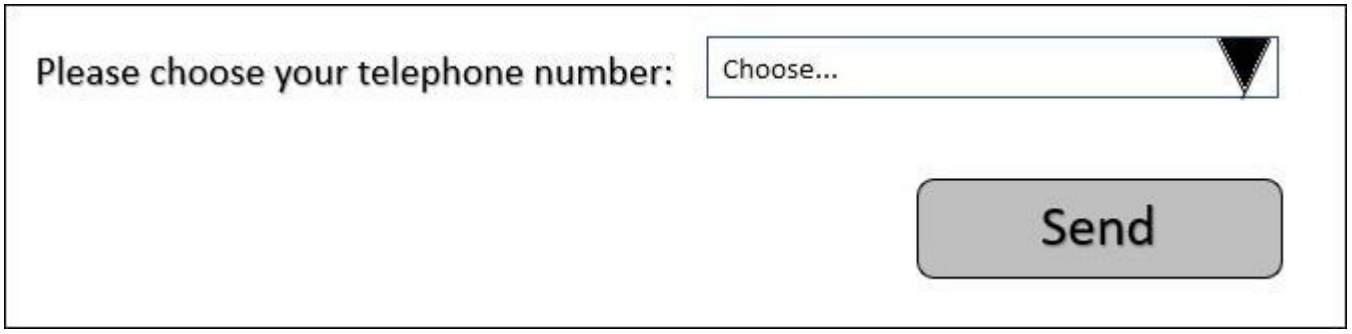

Figure 14: Login Access Page - First Part

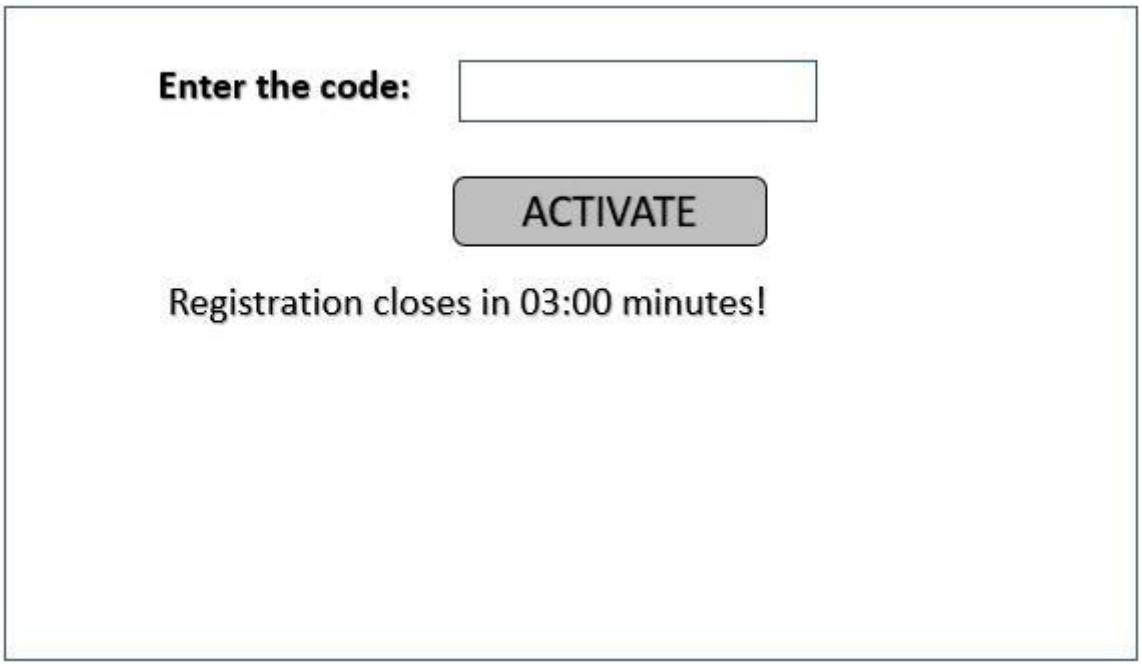

Figure 15: Login Access Page - Second Part

After login into system and access to homepage, user can change his or her contact information in Contact Information Settings.

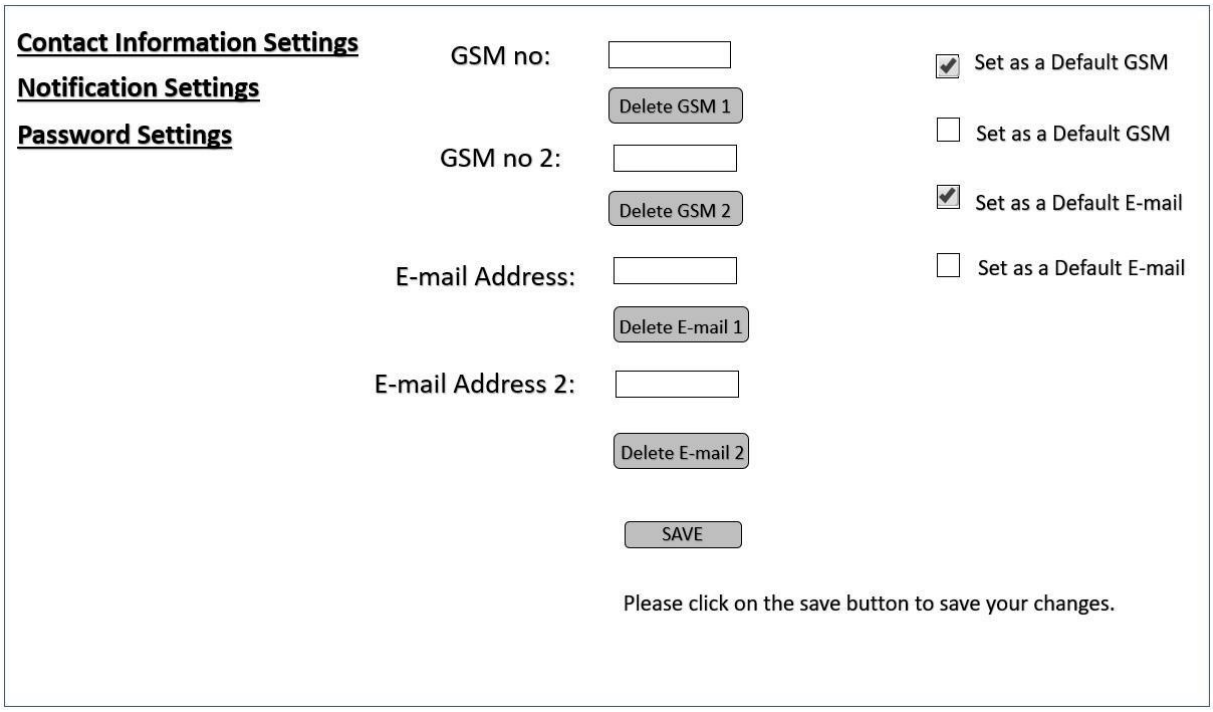

Figure 16: Contact Information Page

User can change his or her exam notification settings in Notification Settings.

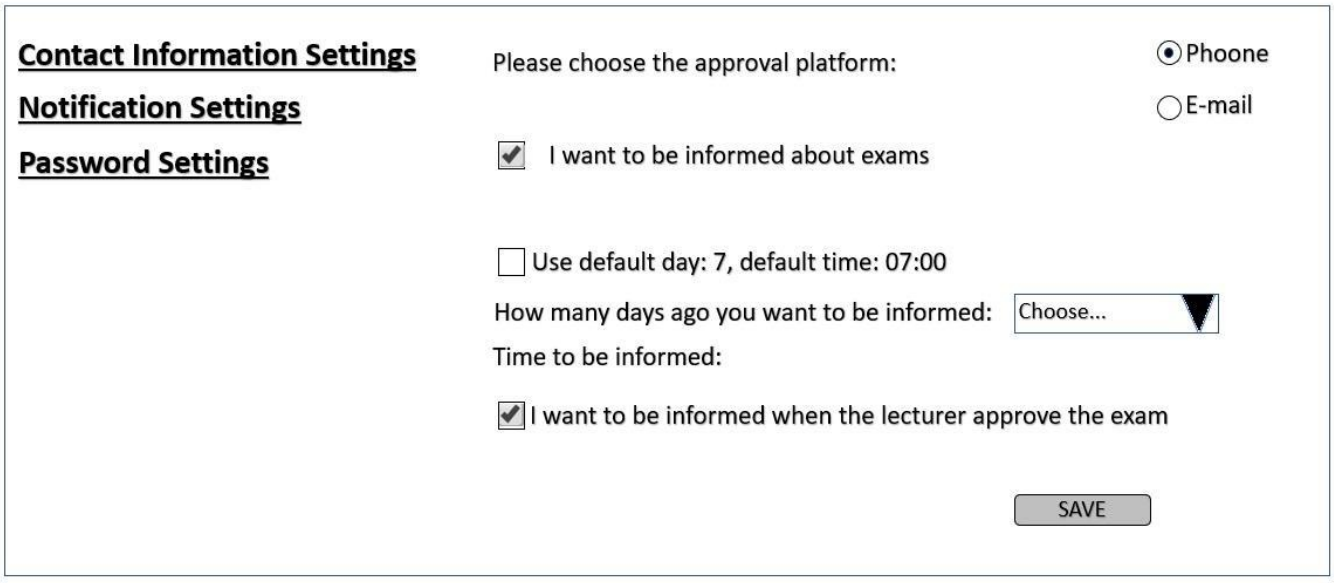

Figure 17: Notification Settings Page

User can change his or her password in Password Settings.

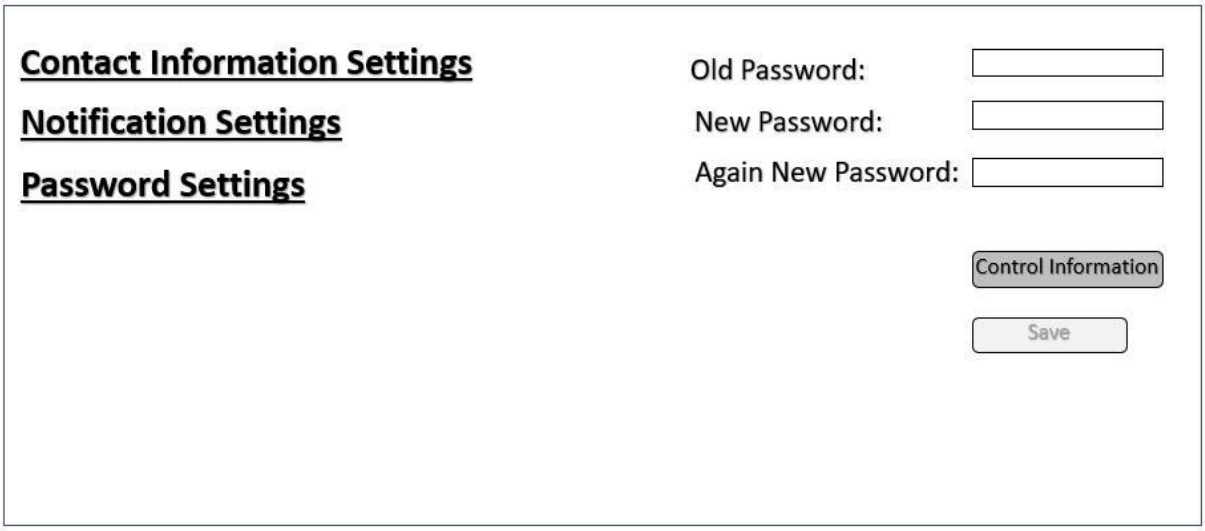

Figure 18: Password Settings Page – First Part

User has to enter confirmation code correct in popup box to change his or her password.

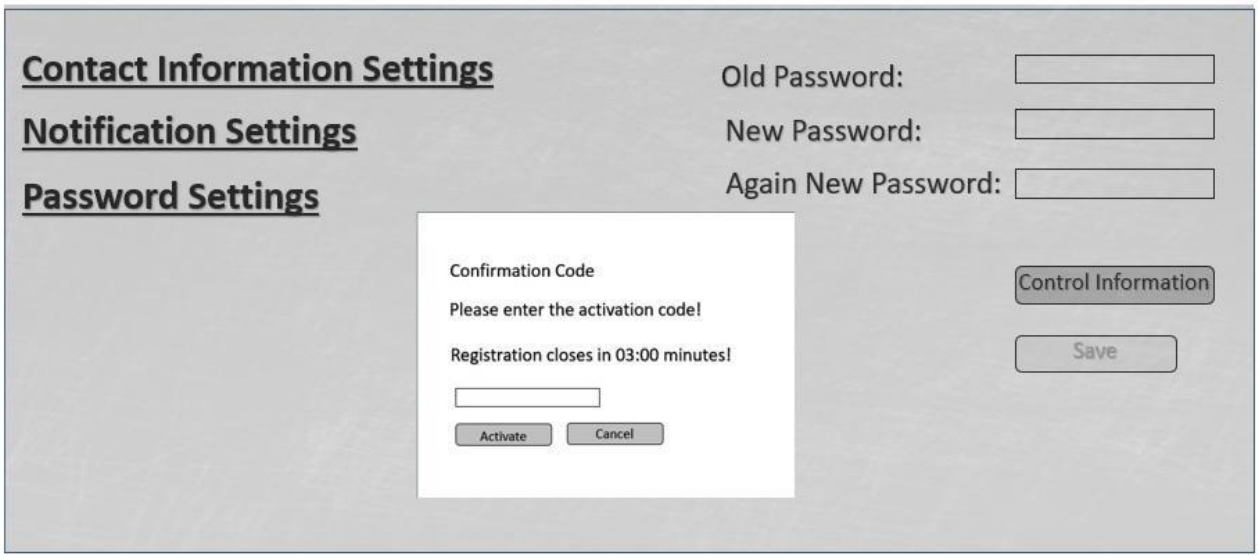

Figure 19: Password Settings Page - Second Part

6. CONCLUSION

In conclusion, this web application will make it easier to assign exams, classes and proctors in educational organizations. After when literature review is completed, we have done Software Requirements Specification (SRS) and Software Design Document (SDD). In during of the progress, we completed the tasks step by step. In SRS and SDD, we used the information we get from literature review. In this process, we made a draft for implementation. With this system, educational organizations will be able to prevent overlaps and conflicts in their exam schedules.

7. ACKNOWLEDGEMENT

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