EPOKA UNIVERSITY

FACULTY OF ARCHITECTURE AND ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

TestMe Requirements Specification

Version 1.0

April 19, 2021

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Project name: TestMe

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1. Executive Summary

1.1 Project Overview

TestMe is a new project that concerns online examination. The project will consist of a java application and a webpage that advertises it. The program can be used by anyone who is interested in boosting their academic career and skills.

The application will include exams of different subjects during a specified time frame. This way anyone can get a certification of any specific topic without the need of any previous university diploma. With just some simple configuration, teachers can create an exam using multiple choice questions or open questions.

Purpose and Scope of this Specification

Nowadays, everything and everyone is constantly online. People find it easier and more comfortable to sort things out through technology. Because of this and because of how covid-19 has impacted our everyday life, we thought of the idea of a program that enables the online examination.

The purpose of our project is to test the subject knowledge of the students. It will conduct digital exams and will make the evaluation of the students' academic knowledge easier. With some simple configuration, teachers & professors can create an exam using multiple choice questions or open questions. This method eliminates the drawbacks in the traditional mode of the pen-and-paper examination. People can conduct exams anytime, anywhere, while preserving the exam's credibility and integrity.

This project has many benefits as further mentioned:

THE BENEFITS:

1. Automatic evaluation – the process of evaluation is easier and faster because it is automated. Students like it better because they do not have to wait too long for the results. Teachers prefer it too, because it is less time consuming than the traditional way.
2. Cost effective – When taking conventional exams, there is a higher consumption of question papers and answer sheets than online examination. Thus, online exams reduce these expenses.
3. Respects social distancing (covid-19) – we are living through a pandemic and everything is unpredictable. Online exams prevent the spread of the virus and protect our lives.
4. It is more secure – since the exam is stored in a database there is no chance for a paper leakage. Also the system will store the exam directly and it can be visible only to the student who took it in anytime.
5. Motivation – each time a student correctly completes more than 85% of the exam, they are awarded with a certificate. We want this certificate to be a source of motivation for every learner. Studies show that when certificates are removed from the learning platform, exam results drop by almost 50%.

2. Product/Service Description

2.1 Product Context

The project will offer an online examination program where students can take exams and a web page which will offer information about the program. The program will have three types of users: teacher, student and administrator. The teacher will be able to declare the right answers of a test so that the evaluation can be automatically done. The students will be able to take exams and the administrator will be able to handle any inconvenience. The website will contain information about the program, the exams, exam's date, the students' certificates, and information about teachers. People can log in and get updates on the exams.

This online examination program will offer students from all over the world the chance to take exams just by sitting in front of the computer. It aims for the students to increase their knowledge by learning from their mistakes. The certificate is also added as a way to motivate the student. We expect that the student will take the examination more seriously if we put a 'price' such as a certificate of achievement.

2.2 User Characteristics

The users of the application will be: Teacher, Student and Admin.

TEACHER :

- **Teachers can log in to the application as a 'teacher'.**
- **Teachers can enter the teacher management section.**
- **Teachers can enter the questions in the question banks.**
- **Teachers have to determine the correct answers of the test.**
- **Teachers can have access to the students' scores.**
- **Teachers can evaluate open questions.**
- **Teachers can see the students' examination time in the teacher management page.**

STUDENT :

- **Students can log in to the application as a 'student'.**
- **Students have to decide in which profile they are interested to take the exam (social exam, science exam).**
- **Students can start the exam when they click the start button.**
- **Students can take the exam within the given time.**
- **After the end of the exam the students will know if they earn a certificate or not.**
- **The students can see their scores and where they answered the questions wrong.**

ADMIN :

- **Admins can log in to the application as an 'admin'.**
- **Admins have access to the data of registered teachers and students.**
- **Admins have access to students' results.**
- **Admins are responsible for the certificates granted in each subject.**

2.3 Assumptions

1. It is assumed that all the students who decide to take the exam have a digital device as PC, laptop, tablet, phone or else.
2. It is assumed that all the students have an internet connection when completing the exam, if not they cannot login, sign up or access the exam. If there is an internet disconnection during the completion of the exam, the exam session is ended and scores will not be saved.
3. It is assumed that the admin,teacher and students will have an email.
4. It is assumed that when registering as an administrator, teacher and student, the information fulfilled is true and valid information.
5. It is assumed that the admin will review and decide if a teacher qualifies for being a part of the program.
6. It is assumed that the questions will be prepared from the teacher.
7. It is assumed that the student will not cheat during the exam, as during an online exam there is no vigilance to supervise/monitor the exam.
8. It is assumed that the teacher and students are in agreement about the entering of the personal information for the registration.
9. It is assumed that the student has knowledge of the program only working and being dependent on the internet connectivity.
10. It is assumed that people who wish to access the website will know how to find the website.
11. It is assumed that people who access the website will be capable of using the website as the website will be friendly to use, will have an easy design, will make the navigation intuitive and will contain the proper information for users to find what they are looking for.
12. It is assumed that the program and website will respect the privacy and confidentiality of the personal data the user inputs.

2.4 Constraints

The primary constraints of this project:

1. The users (admin, teacher, student) should have strong and fast access to the internet.
2. The program and website will be user friendly meaning the interface should be easy to use and to load.
3. There will be a variety of exams in the program.
4. When uploading images for respective exam questions, the size of the image should not exceed the specific size supported by the program.
5. The program and website will be user friendly meaning the interface should be easy to use and to load.
6. The student can have an exam an unlimited number of times, unless it is declared by an administrator that he/she will not be able to take the exam anymore.
7. The exam will be on for a limited time, so the program should display the remaining time for the student to finish the exam.

2.5 Dependencies

Dependencies that affect the requirements:

1. Accounts of admin, student, teacher must have different login credentials or else the registration will not take place.
2. The teacher has to be accepted by the admin, based whether they have a valid qualification or not.
3. The student can only take exams which are available on the program.

4. The certificate can be achieved depending on the exam's score the student has.
5. The program and website can function depending on the internet connection the users have.

3. Requirements

Functional Requirements

Req#	Requirement	Comments			
BR_01	The online examination program, once opened, should have two options: 1. Log in 2. Sign up	The two options are available for whoever is registered in the 'TestMe' program (log in) and for who is not (sing up).			
SIGN UP					
BR_02	The sign up option will allow the first time user to create an account as a student or as a teacher.	The sign up can be completed with the completion of a form: name, surname, email, password, phone number and specify whether they are a teacher or a student. Once signed up, the teacher/ student can always log in through this account.			
LOG IN					
BR_03	The online examination program should have **teacher** login.	The log in teacher will include: teacher username and teacher password. After entering the username and password, the teacher logs in the teacher management section.			

BR_04	The online examination program should have **student** login.	The log in student will include: student username and password. After entering the username and password, the student logs in to the examination page.			
BR_05	The online examination program should have **admin** login.	The log in admin will include: admin username and password. The admin will enter the BTS page (Behind The Scene). He will have access to: teacher's data and student's data.			
Behind The Scene **BTS section**					
BR_06	The online examination program should have a Behind The Scene section.	BTS includes: data of teachers and students, student scores and examination time.	2		
BR_07	The Behind the Scene page should include: Certificate of Achievement page (CoA).	CoA should include certificates for each kind of exam subject the program will have. If the student meets the condition for a certificate, a certificate will automatically be generated after the results have been shown.	~~2~~ 3		
BR_08	Once the student starts the exam, the examination process begins.	After choosing the desired subject,the student is asked for the confirmation of the subject. Then, the student starts the exam and the timer is set. If the student does not complete the exam during the required time, the session times out.			

BR_09	After the examination process ends, the result will appear on the screen.	When the student wants to finish the exam, he/she is asked for confirmation. After the confirmation, the exam will be closed and on the screen the student will see his/her score.			
BR_10	After the results are shown, the students will receive the certificate or not.	Those who have completed 85% of the exam correctly will receive the certificate of achievement.			
Review Section					
BR_11	The online examination program should include a 'Review' section.	After the exam is finished, the students may have access to the review section. This section will contain: the questions and answers of the student's exam, and his/her score.			
Teacher Management Section					
BR_12	The teacher management section will include: 1. the examination marking 2. the students' scores and examination time.	The teacher should declare the correct answers of the exam before the exam is available to the students. This way the program will automatically evaluate the exam. In addition, the teacher can see listed all the students' scores and examination time in the teacher management page.			
BR_13	The online examination program should handle more than one exam at a time.	This said, multiple students can attend an exam at the same time without having any problems.			
Website					

BR_14	The website will represent the idea of the online examination program.	The website will promote and increase the downloads of the app.			
BR_15	The website should contain a login and sign up form.	Admins can login to the website and modify exam rankings, exam dates. Visitors can sign up and create an account so that they can receive updates regarding the exams.			
BR_16	The website should include a calendar with the exam dates.	For those who are not logged in/registered, only half of the calendar will be visible. Visitors have to log in/sign up in order to be able to see the full calendar. This will make sure that all the students will be informed of the exam's timetable.			
BR_17	The website will contain a review section.	The visitor can see the reviews that students have written about the program. The review section will build credibility to the visitors, so that they know our program is trustworthy. The visitor needs to have an account in order to leave a review.			
BR_18	The website should contain a gallery section.	The gallery section will contain all the types certificates our program will offer based on different subjects. The certificates will motivate students to take the exams and get higher scores.			
BR_19					
BR_20					

BR_21					
BR_22					
BR_23					

3.1 Non-Functional Requirements

3.2.1 Product Requirements

3.1.1 User Interface Requirements

//In addition to functions required, describe the characteristics of each interface between the product and its users (e.g., required screen formats/organization, report layouts, menu structures, error and other messages, or function keys).

3.1.2 Usability

- The software should be easy to learn, user friendly and self-explanatory. No special instruction is needed since all users are familiar with how to use browsers in general.
- The software will allow the user to access from any device and achieve their goals quickly.
- The users can return to the interface after some time and start efficiently working with it.
- In the event of possible errors, the software will provide some message on the screen.
- In the event of irrelevant movement, the software will provide a warning message.

3.1.3 Performance

- Application performance is highly reliant on:

  -The Network

  Inconsistent bandwidth, variable contention, and increased latency will all degrade device performance drastically.One of the biggest success risks for most companies is the inconsistency of network access.

  - Application Design

  From the specifications process onwards, performance objectives must be explicitly established.

  Application efficiency is often hampered by inadequate code algorithms at the application layer, SQL queries, and a badly designed network infrastructure.

  -Lack of testing

  Output is impacted by insufficient testing of the application in the current manufacturing context and under differing conditions. It is better and less costly to avoid a crisis in the first place than it is to repair it when it has already happened.

  -User Behavior

  Understanding operation flows is important for avoiding output bottlenecks at the busiest times of the year.

-Lack of Monitoring

Another thing that affects application functionality is the inability to get a full image of application quality, functionality, and real-time use.

-The number of active users

3.1.3.1 Capacity

- Web and desktop applications are going to be stored on a server, which is going to need to have a maximum of 250 MB.
- The database would have a modest level in complexity.
- The number of simultaneous users to be supported: 35
- The application is supposed to operate effectively for all active users.
- Throughput - The number of transactions is directly dependent on the number of users.

3.1.3.2 Availability

- The application will be available at all times.
- Web application will be available at all times.
- It is going to cover any geographical area.
- It is possible that the application will be taken down just for a short period of time in order to upgrade it or to fix unexpected errors.

3.1.3.3 Latency

- The application's latency depends on:
  -Internet connection strength.
  -Size of database (since it may take some time to process and return information, accessing stored data may increase latency)
  -Application should open for at most 2 sec.
  -All modules of the application should load for at most 200 ms

3.1.4 Manageability/Maintainability

3.1.4.1 Monitoring

3.1.4.2 Maintenance

Specify attributes of the system that relate to ease of maintenance. These requirements may relate to modularity, complexity, or interface design. Requirements should not be placed here simply because they are thought to be good design practices.

3.1.4.3 Operations

Specify any normal and special operations required by the user, including:

- periods of interactive operations and periods of unattended operations
- data processing support functions
- backup and recovery operations
- safety considerations and requirements
- disaster recovery and business resumption

3.1.5 System Interface/Integration

Specify the use of other required products (e.g., a database or operating system), and interfaces with other systems (e.g., UWHires package interfaces with PubCookie and ODS, HEPPS system interfaces with Budget system). For each interface, define the interface in terms of message format and content. For well-documented interfaces, simply provide a reference to the documentation.

Outline each interface between the product and the hardware or network components of the system. This includes configuration characteristics (e.g., number of ports, instruction sets), what devices are to be supported, and protocols (e.g., signal handshake protocols).

3.1.5.1 Network and Hardware Interfaces

Specify the logical characteristics of each interface between the product and the hardware or network components of the system. This includes configuration characteristics (e.g., number of ports, instruction sets), what devices are to be supported, and protocols (e.g., signal handshake protocols).

3.1.5.2 Systems Interfaces

Example systems interface requirements:

A. System1-to-System2 Interface

The <external party> will create and send a fixed length text file as an email attachment to System2mail@u.washington.edu to be imported into the System2 system for payroll calculation. This file must be received on EDIT day by 4:00 PM in order to be processed in the EDIT night run. The requirements below document the file specifications, data transfer process, and specific schedule. This file is referred to as "FileName" in this document.

File Structure and Format

A1. The FileName file is a fixed length text file.

A2. The FileName file is an unformatted ASCII file (text-only).

A3. The FileName file contains a batch totals record and several detail records.

File Description: Batch Totals Record

A4. The batch totals record can be placed at the beginning, in the middle, or at the end of the file.

A5. The batch totals record contains the following:

- Record Type (value: XA)
- Process Type (value: A)
- Batch Number (3 digit number assigned by Payroll Dept)
- Origin Code (AIG)
- Total number of detail records
- Total deduction amount

File Description: Detail Records

A6. The FileName file contains a row for each record meeting xxx criteria.

A7. Each row in the FileName file contains the following fields, comma-delimited and encased in double-quotes where the data includes commas or spaces:

- Employee Id
- Record Type
- Process Date (MMDDYY)
- XYG Number
- Element Code
- Amount
- Amount Sign
- Year Flag
- Total Amount
- Total Amt Sign

3.1.6 Security

3.1.6.1 Protection

Specify the factors that will protect the system from malicious or accidental access, modification, disclosure, destruction, or misuse. For example:

- encryption
- activity logging, historical data sets
- restrictions on intermodule communications
- data integrity checks

3.1.6.2 Authorization and Authentication

Specify the Authorization and Authentication factors. Consider using standard tools such as PubCookie.

3.1.7 Data Management

Specify the requirements for any information that is to be placed into a database, including

- types of information used by various functions
- frequency of use
- data access rules
- data entities and relationships
- integrity constraints
- data retention
- valid range, accuracy, and/or tolerance
- units of measure
- data formats
- default or initial values

3.1.8 Standards Compliance

Specify the requirements derived from existing standards, policies, regulations, or laws (e.g., report format, data naming, accounting procedures, audit tracing). For example, this could specify the requirement for software to trace processing activity. Such traces are needed for some applications to meet minimum regulatory or financial standards. An audit trace requirement may, for example, state that all changes to a payroll database must be recorded in a trace file with before and after values.

3.1.9 Portability

If portability is a requirement, specify attributes of the system that relate to the ease of porting the system to other host machines and/or operating systems. For example,

- Percentage of components with host-dependent code;
- Percentage of code that is host dependent;
- Use of a proven portable language;
- Use of a particular compiler or language subset;
- Use of a particular operating system;
- The need for environment-independence - the product must operate the same regardless of operating systems, networks, development or production environments.

3.1.10 Other Non-Functional Requirements

Please provide all necessary non-functional requirements, similar to the requirements explained in the lesson slides or in the textbook.

3.2 Domain Requirements

Everything related to the domain that might be needed in the project shall be mentioned here. Sometimes the domain Requirements might be thought of as part of either functional or non-functional requirements.

4. User Scenarios/Use Cases

Scenario 1:

- The teacher logs in the program.
- The teacher adds questions to the new exam.
- The teacher declares the right answers to the questions.
- The teacher views all the questions.
- If the teacher thinks the exam is ready, he/she publishes it.

Scenario 2:

- The teacher logs in the program.
- The teacher edits the questions of an existing exam.
- The teacher declares the right answers to the questions.
- The teacher views all the questions.
- If the teacher thinks the exam is ready, he/she publishes it.

Scenario 3:

- Teacher logs in the program.
- Teacher deletes the questions which are thought to be unsuitable for the exam.
- Teacher views all the questions.
- If the teacher thinks the exam is ready, he/she publishes it.

Scenario 4:

- The teacher tries to log in the program.
- The teacher inputs an incorrect email or password.
- The teacher receives a message on the screen: “Your email or password is incorrect.”.
- The log in cannot be done.

Scenario 5:

- The student logs in the program.
- He/She chooses which exam to take.
- The student starts the exam.
- The student completes the exam within the exam hours.
- The student’s score appears on the screen.
- The student receives a score which does not fulfill the requirements for the certification exam.
- The student does not receive the certificate.

Scenario 6:

- The student logs in the program.
- He/She chooses which exam to take.
- The student starts the exam.
- The student completes the exam within the exam hours.
- The student’s score appears on the screen.
- The student receives a score which fulfills the requirements for the certification exam.
- The student receives the certificate.

Scenario 7:

- The student logs in the program.
- He/She chooses which exam to take.
- The student starts the exam.
- The student does not complete the exam within the exam hours.
- The student's score appears on the screen.
- The student receives a score which fulfills the requirements for the certification exam.
- The student receives the certificate.

Scenario 8:

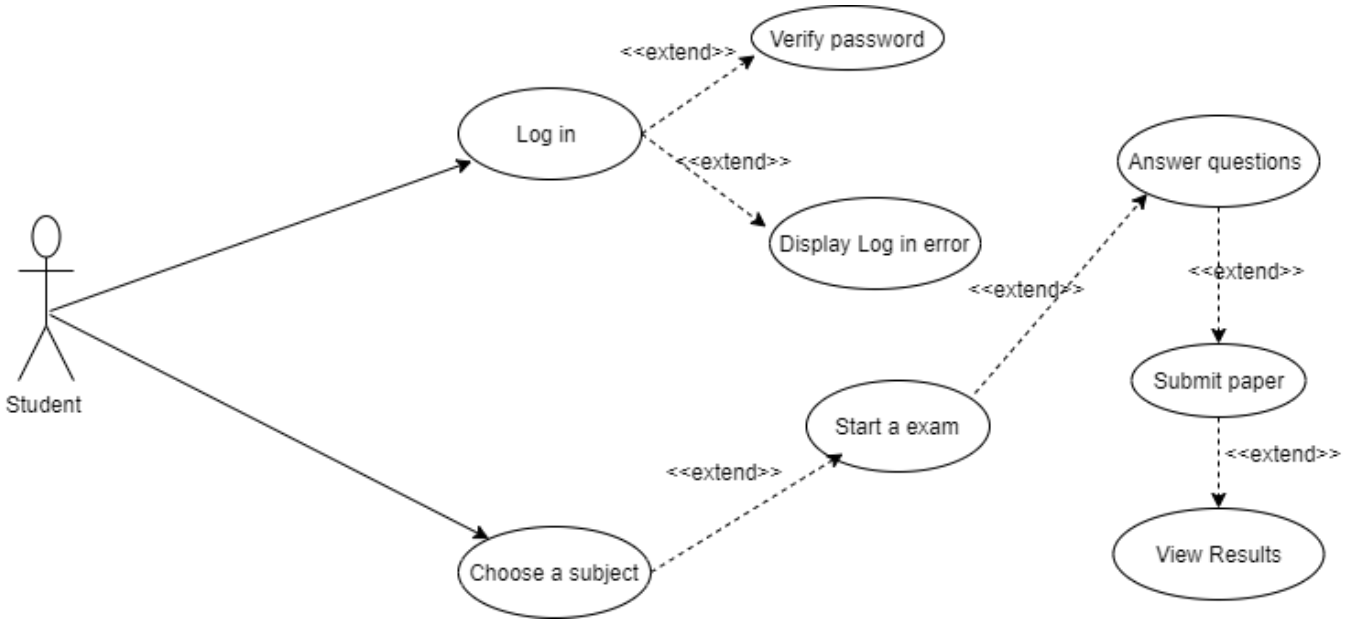
- The student logs in the program.
- He/She chooses which exam to take.
- The student starts the exam.
- The student does not complete the exam within the exam hours.
- The student's score appears on the screen.
- The student receives a score which does not fulfill the requirements for the certification exam.
- The student does not receive the certificate.

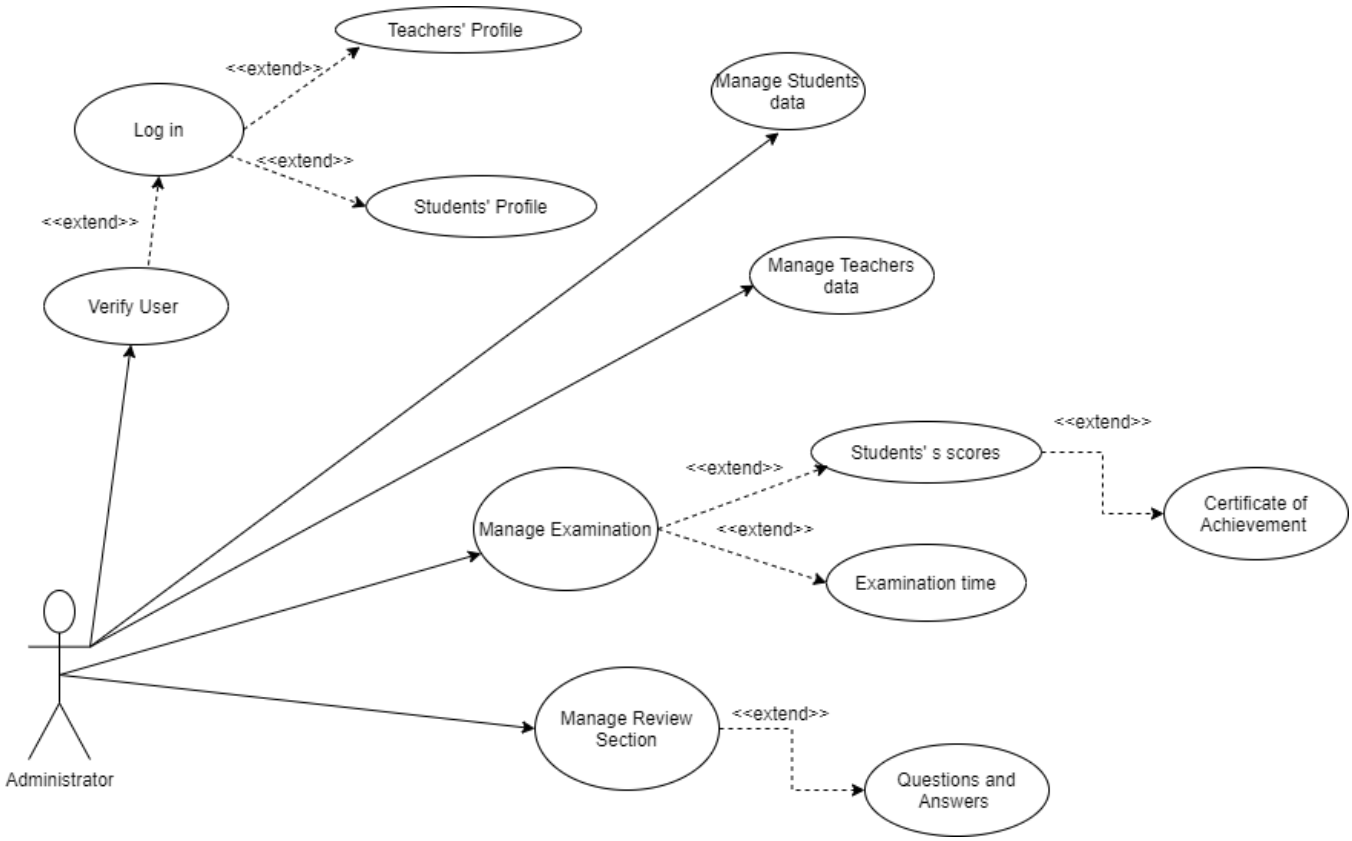
Scenario 9:

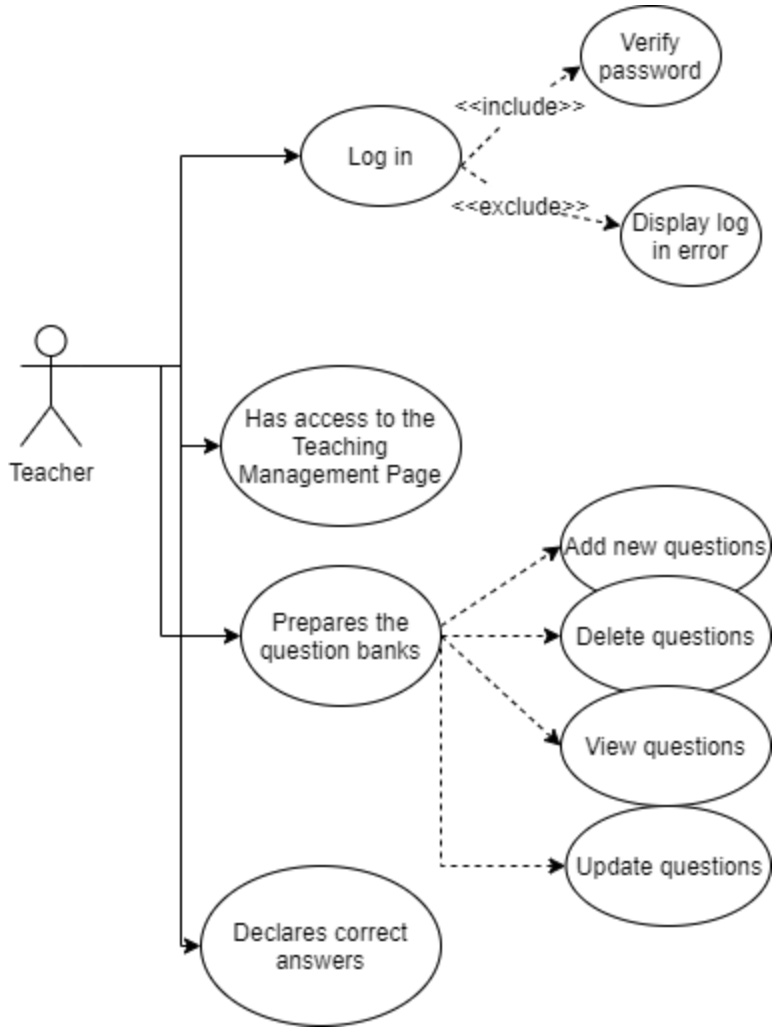
- The student tries to log in the program.
- The student inputs an incorrect email or password.
- The student receives a message on the screen: "Your email or password is incorrect.".
- The log in cannot be done.

Scenario 10:

- The student does not have an account in the program.
- The student chooses the option to sign up.
- The student fulfills all the data required in the respective fields.
- The student registers his/her account.
- The student continues the login process.


Verify password
<<extend>>
Log in
<<extend>>
Display Log in error
Answer questions
<<extend>>
<<extend>>
Submit paper
Student
Start a exam
<<extend>>
<<extend>>
Choose a subject
View Results


Teachers' Profile
<<extend>>
Log in
Manage Students data
<<extend>>
Students' Profile
<<extend>>
Verify User
Manage Teachers data
<<extend>>
Students' s scores
<<extend>>
Manage Examination
Certificate of Achievement
<<extend>>
Examination time
Manage Review Section
<<extend>>
Questions and Answers
Administrator


Verify password
<<include>>
Log in
<<exclude>>
Display log in error
Teacher
Has access to the Teaching Management Page
Add new questions
Prepares the question banks
Delete questions
View questions
Update questions
Declares correct answers