EUROPEAN UNIVERSITY OF LEFKE

FACULTY OF ENGINEERING

Graduation Project I

Computer Assisted Multiple Choice Exam System

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My project is Computer Assisted Multiple Choice Exam System. It is the innovative web application that is going to be developed for changing the way exams are taken and graded, providing a more efficient and convenient experience for both students and teachers at schools, colleges, and universities. With the ability to take exams online and view results and grades immediately after exams finish, this system is certain to give a significant impact on the world of education.

What sets this web application apart from traditional examination methods is its convenience and flexibility. Students can log in and take exams from anywhere, at any time, as long as they have an internet connection. This makes it ideal for distance learning or hybrid learning environments, where students may not be able to physically attend class, especially as the world faced covid-19 pandemics the exam system to be developed would be a best choice to attend exams from the distance.

Teachers are also going to benefit from this system, as it allows them to create and grade exams quickly and easily. Instead of spending hours grading papers, teachers can use the system to view and grade student answers online, by saving time and effort. So, one of the main goals of Computer Assisted Multiple Choice Exam System is that to help for improving the learning experience for students and teachers alike.

Supervisor

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Publish Date

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1.Introduction

1.1 Problem definition

- Problems that arise with locations that are inconvenient: requirements of the exams to travel to other countries, locations that may take long time or even affect students' budget to take the exam.

- Grading of exam papers that takes a significant amount of time and effort from teachers.

- Exam access for students with disabilities or mobility concerns can be difficult.

1. One of the main issues that a computer assisted online exam system can help with is the inconvenience of exam locations for students. Traditional exams require students to travel to a specific location to take an exam, which can be time-consuming and inconvenient, particularly for students who live far from their school, college or university or have issues with transportation. A computer assisted examination system allows students to take exams online from any location who wish to take, with an internet connection, eliminating the need to travel. This can be very beneficial for distance learning or hybrid learning programs, where students cannot come to physically attend class.

2. For teachers, grading exam papers can be a time-consuming task, especially if they have large classes or a high volume of exams to grade. This can take away from other important responsibilities of a teacher's job, such as preparing lesson plans or providing individualized support to students. By allowing teachers with such functionalities of a system, the application can help to speed up this procedure, rather than having to manually grade papers. This can save teachers a significant amount of time and energy, and allow them to focus on other tasks of their job.

3. One problem that an online examination system could solve is the difficulty in providing equal access to exams for students with disabilities or mobility issues. Traditional exams may not be accessible to all students, particularly those with disabilities or other special needs that may prevent them from physically attending an exams' location. An online examination system can help improve access to exams for students with impairments or mobility issues by allowing them to take exams online from a location that is convenient for them. This can assist all students, regardless of physical difficulties, have an equal opportunity to demonstrate their knowledge and skills.

1.2 Goals

- To provide real-time feedback to students as they take the exam, helping them to identify areas of strength and weakness. Providing real-time feedback to students as they take the exam can help them to identify areas of strength and weakness in their understanding of the material.
- To provide a secure and efficient method of administering exams to a large number of students. So, to ensure the integrity of the exam and the fairness of the grading process.
- To reduce the workload of instructors by automating the grading process. Automating the grading process through the use of a computer assisted multiple choice exam system can significantly reduce the workload of instructors, as they will not need to manually grade exams.
- To provide real-time feedback to students on their performance during the exam. With this, students can increase their motivation and engagement with the material. It can also allow students to adjust their studying strategies in real-time if they are struggling with certain concepts.

2. Literature Survey

Compare1: An example of a similar project is the ExamSoft software, which allows instructors to create and deliver exams to students online. A computer assisted multiple choice exam system, will be similar in a way that allowing instructors to make exams to students online, however, my project will allow for more customization of exam questions and answer choices, allowing instructors to create exams that are tailored to the specific needs of their course or program.

Compare2: As I did the research most of the examination systems were similar to each other including the project I chose so for my project to stand out, in my web application there will be results shown right after exams finish to showcase where the students' strengths and weaknesses are that the system will suggest which materials to revise so the next time they could increase their grades.

Compare3: There are several similar projects that have been developed for administering and grading multiple choice exams, however, students tend to have anxiety due to exams, in order to overcome exam related stress of students there will be a practice section in my online examination system where students can prepare for exam and be sure what kind of questions may come up during their exams.

3. Background Information

3.1 Required software

- **MongoDB 4.4:**

- This is a widely used in industry NoSQL database system that is well-suited to storing large amounts of data in a flexible, JSON-like format.

- **React 17:**

  The modern JavaScript library for building user interfaces and single-page applications. The library, React.js, will be used to create the frontend of the web application.

- **Node.js 15:**

  Node.js is a runtime environment for JavaScript that allows developers to build server-side applications using JavaScript as it is fast, lightweight, and easy to use.

3.2 Other software

- **Figma:**

  For designing User Interface prototypes.

- **Bitbucket:**

  Will be used for repository.

4. Modules

4.1 The Administrator Mode

For administrators, the project will include functionalities that help them to manage user accounts, course offerings, and other aspects of the program or institution. Administrators should be able to create and manage user accounts for students, teachers. This could include setting up new accounts, modifying existing accounts, and disabling or deleting accounts as needed.

4.2 The Teacher Mode

For teachers, the project will provide teachers with functionalities such that they can create exams to courses they teach and modify the questions and question types. They will be able to see their students and see their progress in exams. There will be a functionality to give feedback to students by teachers in which course areas they have to work on to get better grades.

4.3 The Student Mode

And for students, in the system students will have their own accounts with credentials to log in for exams. They will have a section where they practise examples related to exam questions before taking their real exam. There will be an option to see their grades along with their performance so they will have idea which areas of course materials they are good at.

5. Risk Analysis

- **Scalability**: One of the main risk issues that may arise regarding the project's scalability. This issue could happen when a high number of users start to use the web application that the system may not handle and as a result bring issues as slow performance and low capacity that the users may lose interest in the application.

- **Security**: There may be several issues related with security like data breaches, unauthorized access, and malware. For protection of data and communications by encoding the data in a way that can only be accessed by those with the appropriate decryption keys I found out that the following tools can be used to overcome these issues such as SSL or HTTPS protocols.

- **Compatibility**: Issues with compatibility can occur when the project is deployed in an environment that does not meet the necessary software or hardware requirements. For instance, if the application was developed in Windows operating system and is being deployed on a Linux operating system there may occur some compatibility problems related with software or hardware, this can lead to errors, bad performance, and system instability. So, it is important to meet the deployment necessary software and hardware, and test the software in different environments.

6. Ethics

- In terms of ethics, the online examination system to be developed will ensure usability ethics with considerations such that the system is user-friendly and intuitive, so that students and teachers can easily use and navigate the system in order to overcome challenges that the user may face by interacting with system's user interface, that's how my system will guarantee the usability of my web application for everyone.

- For privacy, for my system it will reliable in terms of users' personal information. Though my application doesn't have HTTPS/SSL protocol protections, there will be JWT authentication that ensures that every member of the system should have unique usernames and passwords for their respective accounts and no one can access their fellows accounts for any purpose.

- For equity concerned ethics of the project, the computer assisted exam system ensures that all users have equal opportunities to access and use the examination system. Giving access that the examination system is accessible from long distances with internet access can help to promote equity by allowing users to participate in the examination on an equal basis.

- Usability in terms of simplicity, in my system there a will also be a focus on simplicity of the system for it to be easy to use and understand, with clear and intuitive interfaces and controls. So that a project can help to reduce the learning curve for users and can help to increase adoption and satisfaction.

7. Conclusion

As the project will be finished and deployed for usage I am sure that it would help the education world a lot for both teachers and students, and as every human being understood that if some serious environmental disaster world will face people may not have opportunities to visit schools or any institution, remarkably to note it was dangerous for people's lives to visit any places outside of the house during the covid-19 pandemic period. Therefore, in such situations my project would be beneficial to write exams remotely from home. In the future I think will add the integration with other educational systems to increase the functionalities and capabilities my system would give together with other platforms, and as an example I may add an AI language functionality that could help students translate words during their examination sessions for students to better understand the context of the exam and get good grades with the help of it.

7.1 Benefits

a. Benefits to users:

1. Help teachers to organize more tests or exams during study semesters and analyse how good the students are doing with their courses.

2. Help students better their grades by doing practices, and if taken exams compare their strengths and weaknesses.

3. Saves time and energy of both teachers and students regarding exam sessions

b. Benefits to me:

1. Improving my skills in front-end and back-end sides of web development especially modern in-demand tools like React, Node.js, etc.

2. Would be a great application for including it in my portfolio and resume

3. Improvement of my problem-solving skills in programming and in web application development in general

I chose this project because I wanted to build some full stack projects so I found this project interesting to me and in addition I wanted to enhance my skillset in web development because this field is rapidly growing nowadays, and having strong skills can open new opportunities, also I took this project because it helps me to stay up-to-date with skills that I have been working namely MERN stack which includes the tools like MongoDB, Express.js, React.js and Node.js for building the web

applications, and so staying current can help a person remain competitive and relevant in his career. So, I found the project matches up to my plans and desires.

7.2 Future Works

After graduation, I, for sure, will continue working on this project because even myself nowadays use some related software like this to be developed project but they lack some features that I would like to have using it. I am aiming to add more advanced analytics about students' performances for free so student would know which course materials he or she needs to revise and pass the courses with good marks. I am also intending to make it mobile friendly so users could use the software right from their phones or tablets.

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