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A Centralized System for an Effective Student Examination Management

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Course : BSc (Hons) Software Engineering

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Project Aim and Objectives

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Aim: To create a centralised system for an effective management of student examination by ensuring that the students will be able to view and modify their personal details and the course details and as well as view the examination timetables and additionally, estimate their overall grade based on the previously accumulated marks and estimated marks from the future assessments, by gaining an access into the system with the login credentials provided by the university during an enrolment.

Core Objectives (In Brief):

- ✓To identify user requirements by conducting a survey to approximately 20 students at University in a form of questionnaire.
- ✓To store data such as students' personal details, their module marks, course details and admin details in an efficient and secure manner.
- ✓To create functional specifications and features summary document using UML diagrams.
- ✓To implement a web application using a wireframe with consideration of desired user requirements.
- ✓To devise a mathematical formula for estimating student's expected overall programme mark and degree classification.

Background Research

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***Research Question**: "Would the students' life be made easier by a web-based examination management system with the features that allow students to view their examination timetables online and to estimate their overall grade based on the previously accumulated marks and marks estimated for the future assessments?"*

Existing System: The University of Salford currently sends email to students with all the information regarding students' exam timetables, but the University doesn't yet make the timetables available on the web system such as, Blackboard VLE or Student Portal for students to view their exam timetables from their desired location and time.

Problem: It can be a tedious task for students to go through the email inbox and search for email received from the university weeks or months ago about their upcoming examination timetables.

Solution: Building of a web-based system for allowing admin to add and publish exam timetables online.

Requirements, Specification & Design

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- For requirements gathering, **Qualitative Research** was adopted as the project involved surveying students in the form of questionnaire.
- Types of requirements Identified: **Functional**, **Non-functional** and **Usability**
- **Unified Modelling Language** (UML) Diagrams such as usecases, activity and class diagrams were used to visualise the functional requirements

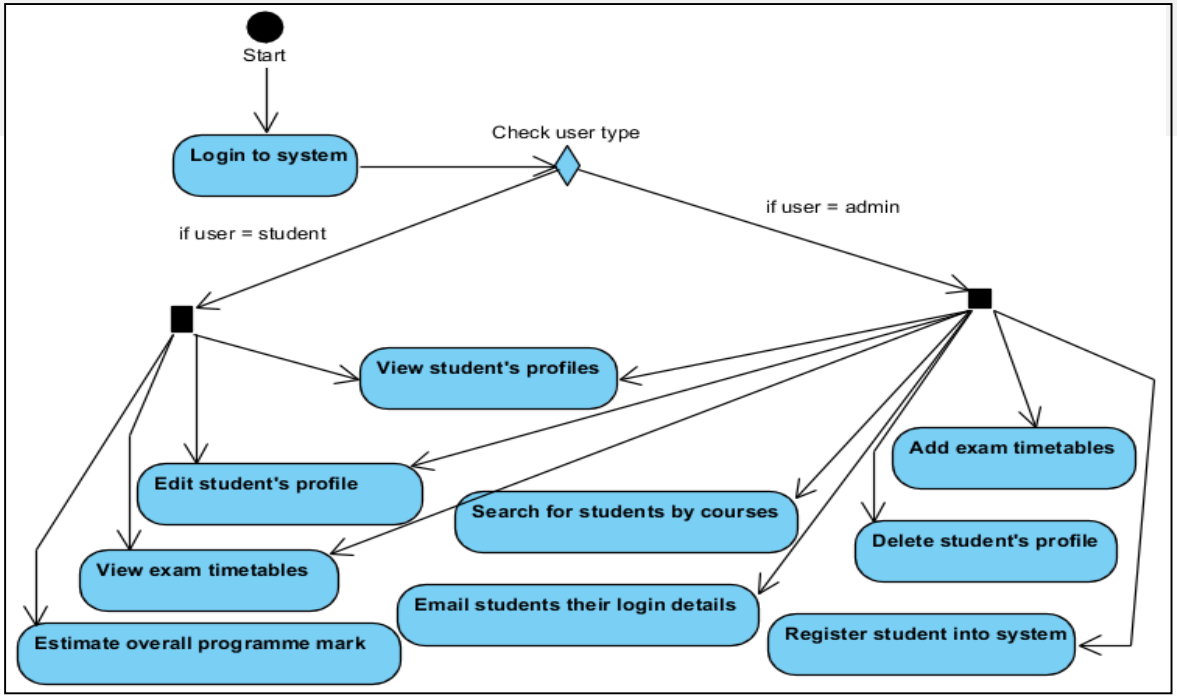

Fig: Visualisation of functional requirements according to user role in the web-based system

Requirements, Specification & Design Continued..

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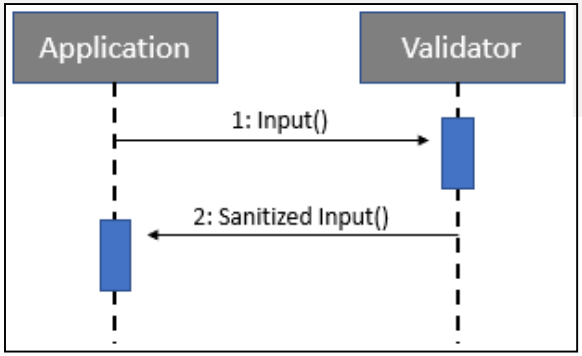
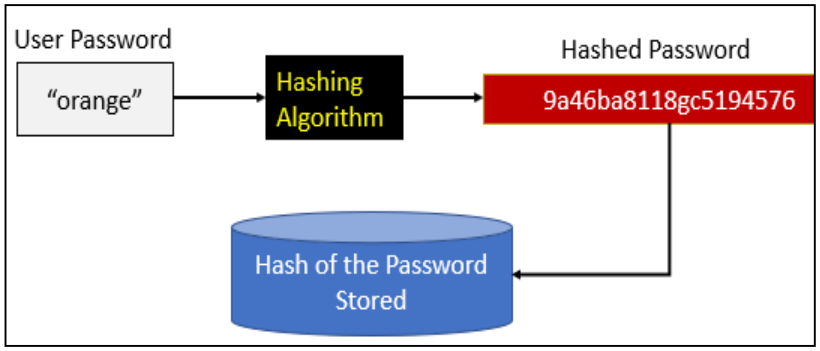
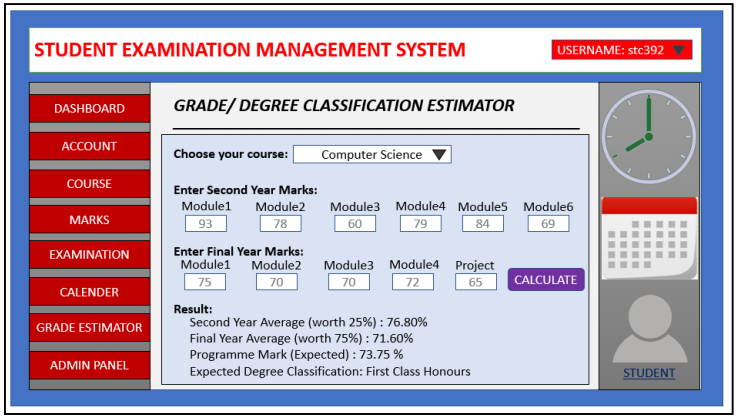
- Due to the system which was going to be developed being web-based, it was imperative that every key aspects and requirements of a system were thought and considered with the **security** in mind.





- The usability requirements of a web-based system were modelled and visualised by creating the **wireframes.**



Development & Implementation

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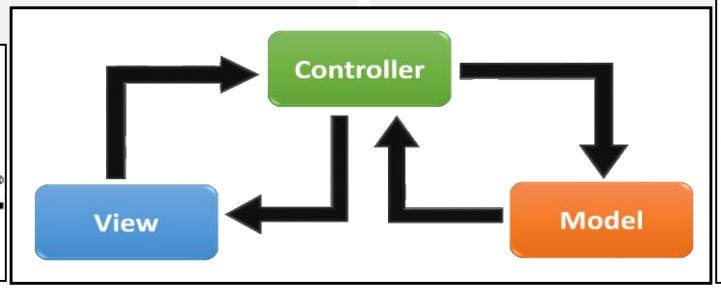
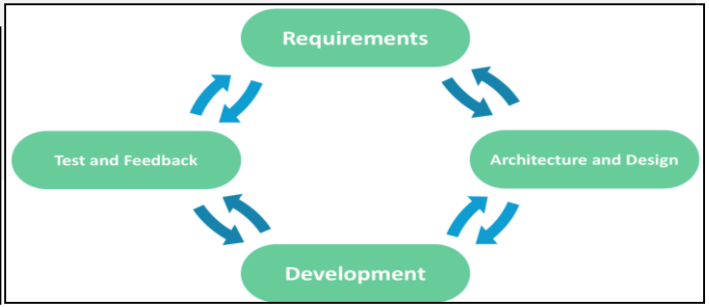
- **Microsoft Visual Studio** was chosen as Integrated Development Environment (IDE) for web-based system.
- **ASP.NET** Framework which supported **MVC** Design Pattern
- **Programming Languages Used**: C#, JavaScript
- **Web Development Technologies Used**: HTML5, CSS3, Bootstrap, Web Services
- Microsoft **SQL** Server Database for storing data

- The web-based system was developed **incrementally** (in **3** increments)
- **Minimum Viable Product** (MVP), with just enough features to satisfy supervisor, was developed in the **first** increment.
- **Increment 1 Goal**: "The first increment focuses on setting up the resources such as Trello board, version control, database to get started with the development work. This increment will also look at the implementation of the student enrolment and student and admin register and login functionalities in order for admin to enrol students to courses and to create their profiles."

Microsoft Visual Studio

Microsoft .NET





Development & Implementation Continued..

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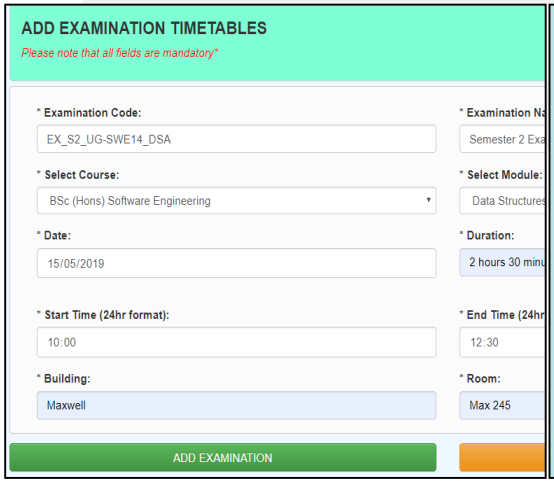
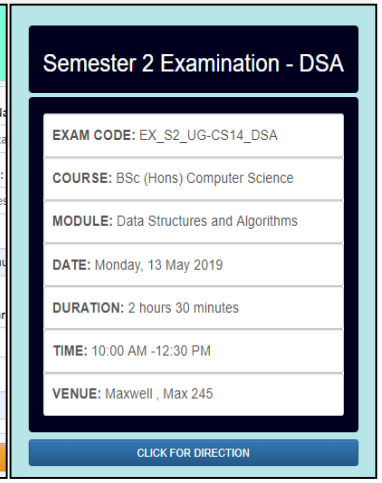
Increment 2

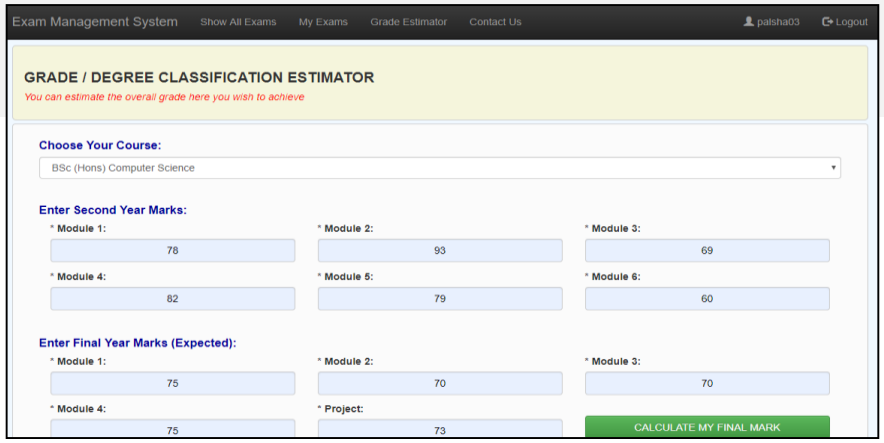
Goal: "The second increment will focus on the management of student examinations which will include the admin functionality for adding exam timetables and publishing them online on the web-based system for the students to view. The other goal of this increment is to restrict the admin features and functions on the system including student registration and adding examinations."





Increment 3 (Final)

Goal: "The main goal of the third and final increment is to focus on creating a grade estimator for students to estimate the overall programme mark and degree class they wish to achieve at the end of their course. Beyond this, the increment will also focus on the implementation of student account update features including profile details update and password reset. This increment will finally focus on the implementation of geolocation for directing students to examination venues."



Testing and Results

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The web-based system was **tested** following various strategies and approaches;

- Unit Testing
- Integration Testing
- End-to-End Testing
- Usability Testing
- Platform-Independence Testing
- Markups Validation

The **results** achieved from a successful completion of a project was no less than what was expected beforehand.

The ability for user (admin / student) to;

✓Login and register student to course and to system

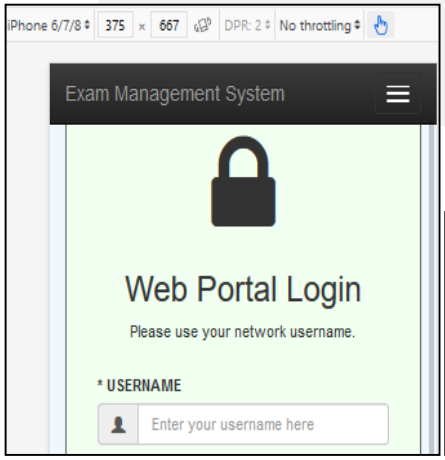
✓View students profiles by their courses

✓View and edit their personal information

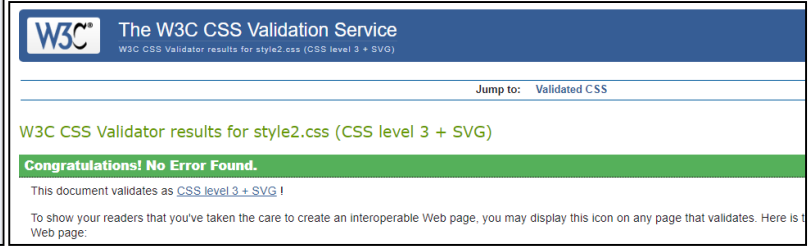
✓Add, publish and view exam timetables

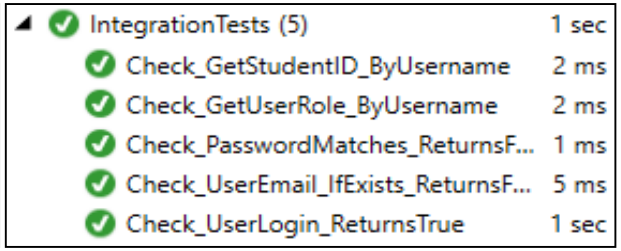
✓Estimate overall programme mark & degree

✓Delete student from the system



No.	Functionality Tested	Date of Exec	Status	Brief Description	Severity
1	Register student into a course and to a web-based system	21/04/2019	Pass	Could register student into a course and to a system by entering their personal information and clicking on a REGISTER button.	High
2	Filter students by course	21/04/2019	Pass	Clicking on the course filters on the navigation bar worked	Low





Critical Evaluation & Conclusions

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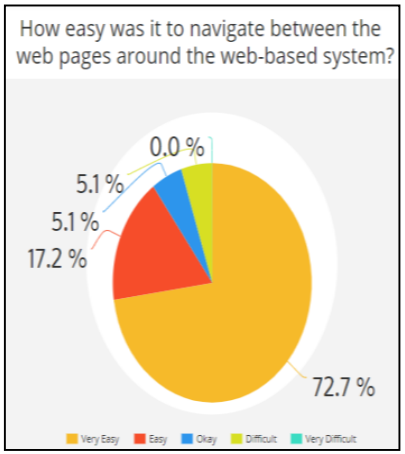
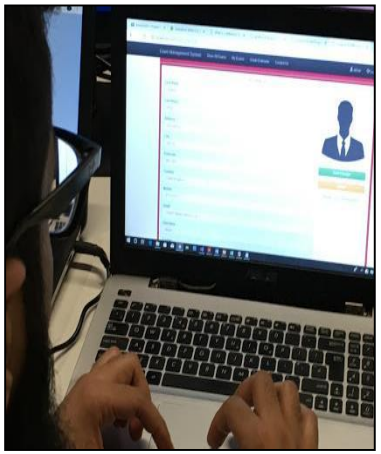
Project Evaluation:

- ✓Project achievements reviewed against it's objectives – all core objectives are fully met.
- ✓Original project Plan reviewed against any deviations – MySQL Workbench replaced by Microsoft SQL Server Database
- ✓The students were recruited for usability testing to critically evaluate the product.





Personal Reflection:

- ✓Opportunity to demonstrate my understanding of principles of software engineering.
- ✓Writing a well-structured technical report according to professional standards undertaking information gathering.
- ✓Time management and project scope
- ✓Technical challenges – struggled due to my lack of knowledge of .NET MVC Framework.

Further work & Improvement:

- ❖Full integration of Geolocation for directing students to examination venues.
- ❖Use of machine-learning techniques for predicting students' grade based on their academic performance
- ❖Feature for displaying course learning materials for students