Multiple Choice Question and Answer Web Application

Project Plan

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Plan

Aims and Objectives

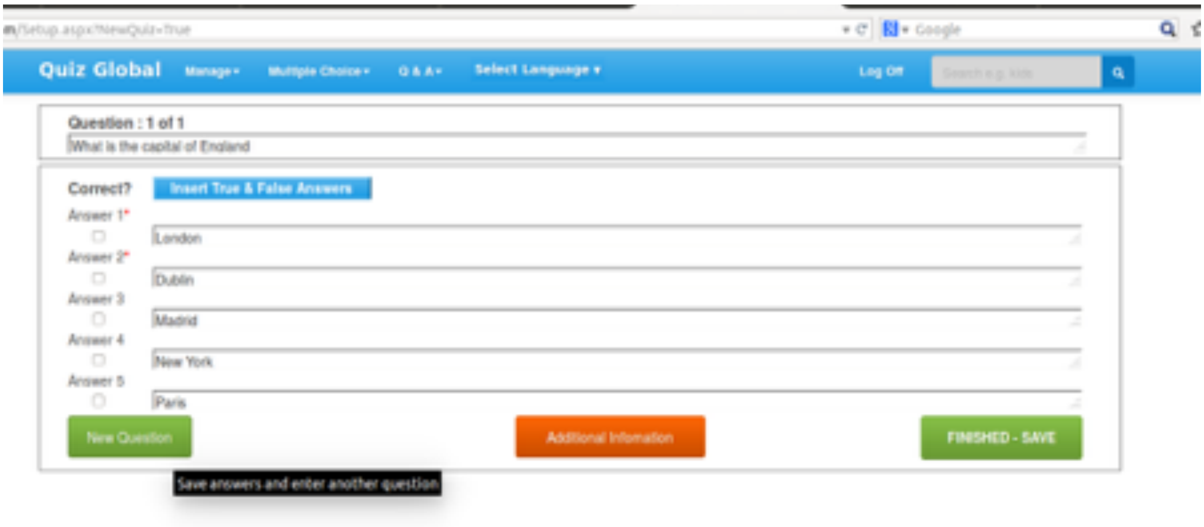
There is a need in teaching institutions for a web app offering lecturers the ability to create fully customisable multiple choice tests for students, gathering statistical data from students who have sat the test.
Therefore my aim is to design and implement a web application allowing teachers/lecturers to create multiple choice quiz allowing the test to be shared with their students to sit and take online.
Immediate feedback on tests carried out will be given upon submission, giving students a score as well as if they have passed or not. Each student must be uniquely identifiable when taking the tests in order for the lecturer to gauge how well each student did.

- To research existing multiple choice web apps, highlighting what they do well and what parts I could improve on and extra features I could include in my web App
- To look into and choose a suitable framework for the multiple choice question and answer web app
- To research effective HCI techniques and methods to implement into the web app
- To analyse and present a list of structured requirements for the multiple choice web app system, highlighting both core and desirable criteria
- To produce a realistic and detailed plan of action and time scales including a Gantt chart
- To produce prototype iterations along the development stage, reflecting upon the structured requirements to keep on track
- Research architectural styles suitable for a web application

The problem found with existing multiple choice web apps are that they appear to be limited and basic in functionality, whereas the ones that have more features tend to be expensive to sign up for and charge quite a bit on a monthly basis.
Also, many of them have in my opinion very badly thought out and implemented HCI. Therefore, an interface that is very usable and user friendly will be an area I give a lot of thought to.
There are a number of ways to implement originality into my software, one of which being incorporating social features allowing users to share quizzes via social networking platforms, increasing the audience the web application reaches. I will aim to provide a greater experience both usability wise and with functionality, HCI techniques and papers by credited industry experts will be analysed in order to gain a wider knowledge of this area.

Existing multiple choice question and answer web applications:

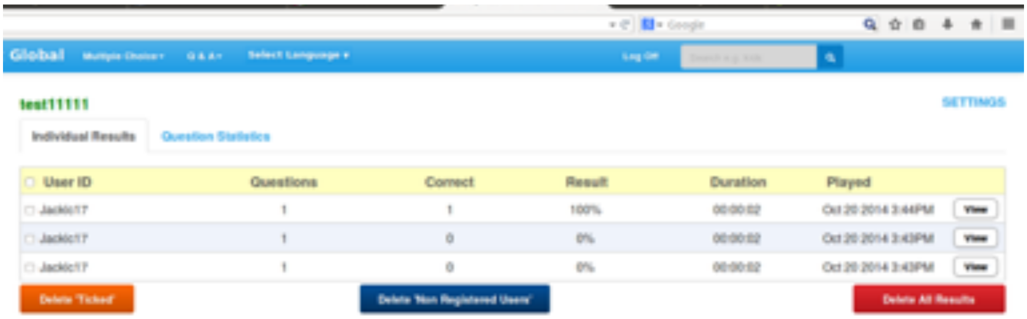
- QuizGlobal (http://www.quizglobal.com)
    - Very unattractive and unintuitive HCI
    - Many distracting advertisements
    - However, the web app allows quiz creators to see a range of statistical data about students that have taken their test



Question : 1 of 1
What is the capital of England

Correct?
Answer 1* □ London
Answer 2* □ Dublin
Answer 3 □ Madrid
Answer 4 □ New York
Answer 5 □ Paris

Creating a quiz question



test11111

□ User ID	Questions	Correct	Result	Duration	Played	
□ Jackic17	1	1	100%	00:00:02	Oct 20 2014 3:44PM	View
□ Jackic17	1	0	0%	00:00:02	Oct 20 2014 3:43PM	View
□ Jackic17	1	0	0%	00:00:02	Oct 20 2014 3:43PM	View

Viewing statistical data from a quiz

The software will have two sides to it, that of a lecturer to create tests and the other being that of a student to sit created tests, submit tests for immediate marking and to then be told how they scored, what questions they got correct and whether or not they passed. The lecturer of the test should then receive data corresponding to that unique student, with the ability to see scores and how each question was answered.
There are challenges I expect to face when carrying out this project, one aspect of which is parsing the questions through the system. Collecting data and results to feed back to the user, the ability for a lecturer to create a test specifying questions and sharing the test with students. Code will be modularised in order to ease the process of maintainability.
A three tier architecture style will be implemented as there a number of benefits that come from adopting this style. One particular that I feel is key for this web app is the ease of scalability. Each tier can be scaled independently. Performance will also benefit, presentation tier can cache requests and network utilisation is minimised and the load is reduced on the application and data tiers

Structured Requirements

Functional Requirements

Core

- Allow administrators to create and upload questions in the quiz
- Support two user types, student and teachers (teacher being an administrator)
- Administrators able to set a pass mark indicating a Pass or Fail
- Have questions appear in a specified order
- Students able to view their quiz score
- Students able to view which questions they got correct/incorrect
- Include true/ false questions
- Multiple correct answers for one question
- Users the ability to log in, either as a student or an administrator
- Allow the administrator to set a specified point weighting for each question
- Each published test has a unique URL so the link can be shared with people who wish to take the created test
- Able to share quizzes created/taken on social networks

Desirable

- The ability for administrators to be able to set a timer for their quiz
- Allow administrators to edit their published quiz (adding/removing questions)
- Password protection for tests created
- The ability Include an answer explanation or hint with any question
- The ability to take offline a currently published quiz

Resources

The nature of the web application requires minimal resources, when the multiple choice question and answer web app is to be released publicly then I would purchase a suitable domain name uniquely identifying the brand of the app.
Depending on the levels of traffic to the app, a judgement would need to be made on how these created quizzes would be stored and how long for.

Quality Attributes

Design Qualities

- Maintainability, code and files should be well structured and linked in order to make system maintenance more smooth and efficient. Development costs kept to a minimum in case of changing requirements.

Run-time Qualities

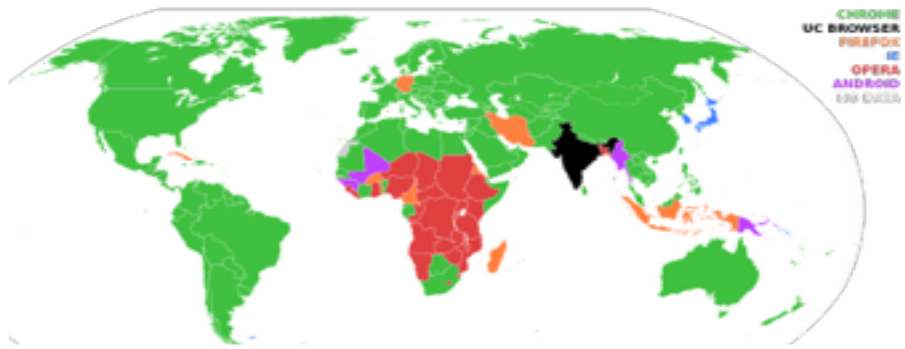
- Availability, the web application having a significantly high up time. If the service is often unavailable for whatever reason then users will spend time trying to find an alternative or not bother using the application all together.
- Reliability, if the software does not work reliably then users will not bother wasting their time with the service and will not return.
- Performance, users should receive feedback in an acceptable time when interacting with the web application. Pages should be navigated and load in the browser within a reasonable response time.
- Security, although the web application to be produced will not store sensitive data for users security is still an aspect to be considered. (https://www.owasp.org/index.php/Main_Page)
- Scalability, we must design and develop Web software applications to be able to grow quickly in terms of both how many users they can service and how many services they provide
- Operability, in the long run it will be expensive to keep a system running if it requires a fair bit of administrative maintenance, therefore it is in the projects interest to keep administration costs down

User Qualities

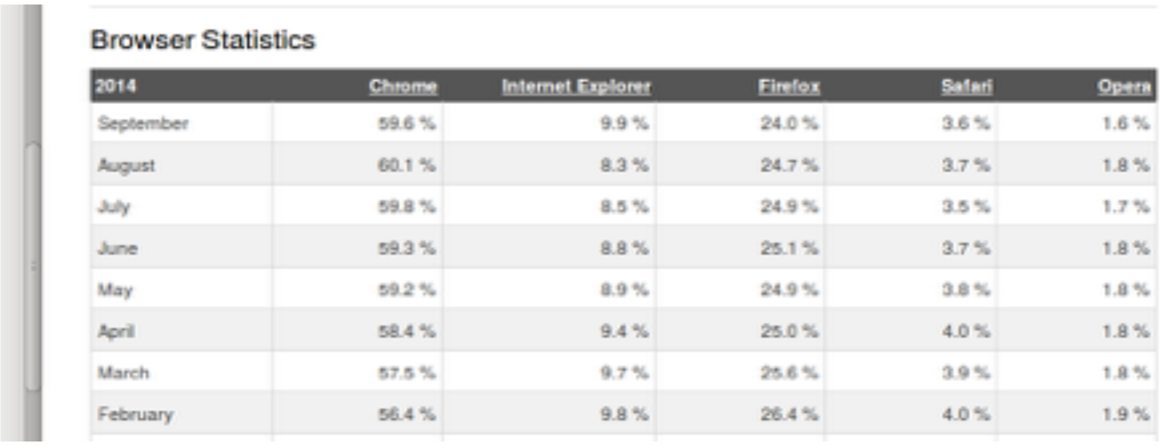
- Usability, the multiple choice web app to be produced must be suitable for the target audience. The target audience in this case being lecturers and students, this group of people are normally sufficiently comfortable working with computers as many use them on a daily basis for work and study.

Design Constraints

The multiple choice question and answer web application that is developed will need to adhere to industry standards, examples of which being following web standards from www.w3.org/standards and checking the mark up validity of web documents.
The web app developed should also run the same if not similarly on all major web browsers, below are some resources found showing the usage of web browsers.



http://en.wikipedia.org/wiki/Usage_share_of_web_browsers



Browser Statistics

2014	Chrome	Internet Explorer	Firefox	Safari	Opera
September	59.6 %	9.9 %	24.0 %	3.6 %	1.6 %
August	60.1 %	8.3 %	24.7 %	3.7 %	1.8 %
July	59.8 %	8.5 %	24.9 %	3.5 %	1.7 %
June	59.3 %	8.8 %	25.1 %	3.7 %	1.8 %
May	59.2 %	8.9 %	24.9 %	3.8 %	1.8 %
April	58.4 %	9.4 %	25.0 %	4.0 %	1.8 %
March	57.5 %	9.7 %	25.6 %	3.9 %	1.8 %
February	56.4 %	9.8 %	26.4 %	4.0 %	1.9 %

http://www.w3schools.com/browsers/browsers_stats.asp

Although this will be a web app, designed to be viewed on a desktop computer screen people still see a websites pages in different view ports, different sized screens etc.
During development these three techniques will be taken into consideration:
- Design flexibly. Account for the fact that viewers will stretch and distort your designs
- Create unique page design or content for full-sized and mobile sites

Planning and Time scales

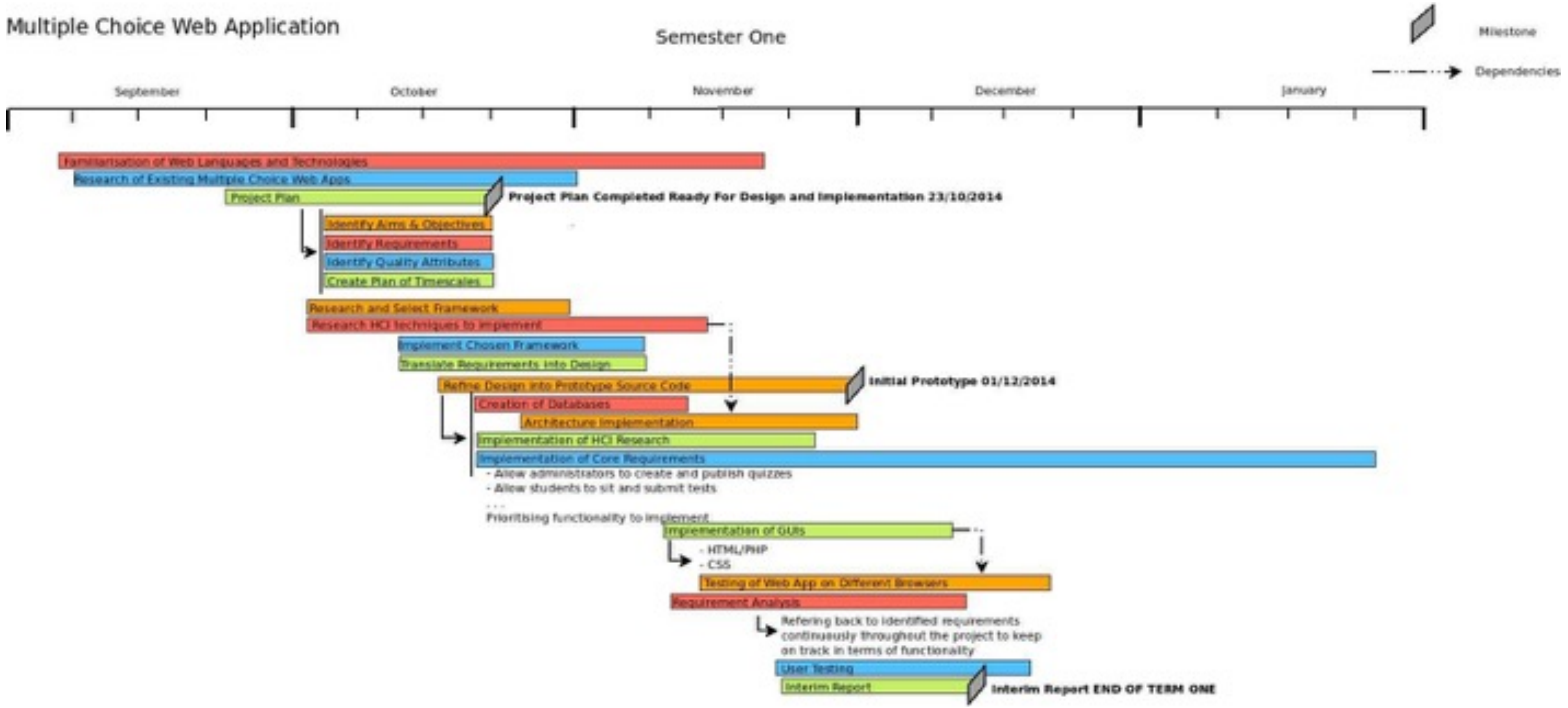
Semester One

SVN updates on progress will be made on a regular basis or when notable progress or changes are made.
Making sure that system development is on track will be a main focus, having a target for each week in terms of what functionality should be implemented and worked towards, the first prototype demonstration is 01/12/2014. By this date many of the core requirements should be ticked off, of course core requirements being implemented are prioritised over desirable functionality. However, having said this if bottlenecks in development start to occur due to a particular core functionality causing time delays for a number of reasons then a decision must be taken whether to carry on or if time would be better invested elsewhere.
During development, fortnightly progress reflections will take place whereby I look back on what has been achieved in the past couple of weeks, whether anything can be ticked off as well as how the next two weeks can be used to best utilise time and resources.
I have produced a detailed yet realistic Gantt chart below, indicating in which order tasks will be worked on as well as how long they are expected to take. Tasks will be undertaken in order of dependency, calculating which tasks need to be completed in order for others to be able to be started.

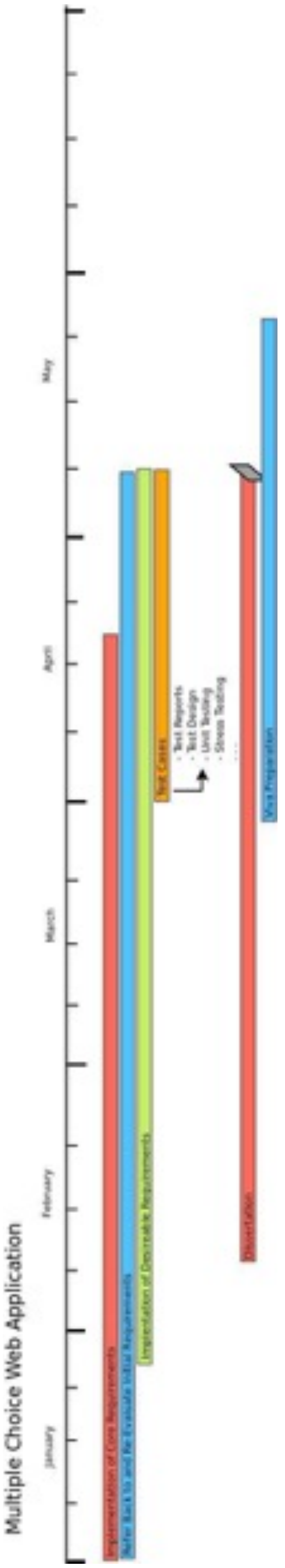
(Gannt charts available in jpg form at https://campus.cs.le.ac.uk/svn/jc506/docs/1_plan/)

Semester Two

Semester two will follow on from where the first semester left off. Focus will be on the project


Multiple Choice Web Application
Semester One
Milestone
Dependencies
September
October
November
December
January
Familiarisation of Web Languages and Technologies
Research of Existing Multiple Choice Web Apps
Project Plan
Project Plan Completed Ready For Design and Implementation 23/10/2014
Identify Aims & Objectives
Identify Requirements
Identify Quality Attributes
Create Plan of Timescales
Research and Select Framework
Research HCI Techniques to Implement
Implement Chosen Framework
Translate Requirements into Design
Refine Design into Prototype Source Code
Initial Prototype 01/12/2014
Creation of Databases
Architecture Implementation
Implementation of HCI Research
Implementation of Core Requirements
- Allow administrators to create and publish quizzes
- Allow students to sit and submit tests
. . .
Prioritising functionality to implement
Implementation of GUIs
- HTML/PHP
- CSS
Testing of Web App on Different Browsers
Requirement Analysis
Refering back to identified requirements continuously throughout the project to keep on track in terms of functionality
User Testing
Interim Report
Interim Report END OF TERM ONE

write up, being that of the dissertation as well as rounding off the software system, implementing further core requirements and also moving onto desirable requirements. If during this time changes to requirements etc. have been made then this will be reflected in code implementation.


Multiple Choice Web Application
January
February
March
April
May
Implementation of Core Requirements
Refer Back to and Re-Evaluate Initial Requirements
Implentation of Desireable Requirements
Test Cases
· Test Reports
· Test Design
· Unit Testing
· Stress Testing
· · ·
Dissertation
Viva Preparation