

Scope Of Work

Preface:

This document addresses the requirements of Exam Questions Database Web-app. The intended audience for this document are the group members, the client (John Brooke), the auditor (Daniel Cowen) and the Unit Co-ordinator (Michael Wise).

Target Audience:

Client, Group members, Auditors

Group-b Members:

Michael James Bleakley
Samuel Eric Lenagan Fairs
Lachlan Alexander Bunney
Chen Liu
Minrui Lu
Joshua Teodros Milambo

MILESTONES

- 20/08 Sprint1 Due→Documentations, front-end framework.
 - 17/09 Sprint2 Due→Implementation of Server-side framework and database.
 - 22/10 Sprint3 Due→Datum inserting, website integration, testing and user, maintenance guide.
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1.0 General Goals

Our goal is to design a website server which stores exam questions, the usage information about each question and allow Users (mainly physics professors) to:

1. Browse, search (base on usage information, keyword), select and export the questions in the server as a zip file for preparation of their future exam paper.
2. Update new questions and usage information to the server.

2.0 Current System

The current system used by our clients is store the questions in a word document, manually update the usage information in that document and pass the document manually between the professors.

3.0 Proposed System

3.1 Overview

Our system is a website server which allows the authorized users to update, browse, search, select, export exam questions and associated information.

3.2 Functional Requirements

1. Client authentication; certain users have restricted accesses to specific questions.
2. Display questions and their usage information in a proper format.
3. Allow searching based on usage information and keywords of questions.
4. Export selected questions in a zip file.
5. Update new questions and usage information.
6. Secure storage of exam questions.

3.3 Nonfunctional Requirements

1. Simple and clear user interface.
2. The theme of the interface matches with the style of the UWA website.
3. Downloadable instruction video showing how to use the website.
3. [More?](#)

3.3.1 User Interface and Human Factors

1. Potential Client:

- a. The primary clients for the website will be the lecturers from physics faculty who search and export questions for the preparation of exam papers.
- b. Administration of physics faculty might also use the website to regularly clear up stored questions and associated information.

2. Design Ideology

Because there might be users that are not as comfortable with the Internet (some senior lecturers), the webpage will be designed in a simple, straightforward style with less than 5 pages where each page has a specific function. This makes the application intuitive and accessible for all users.

3. Protection:

The website will only be visited by authorized lecturers and administrators, so the integrity and professionalism of the questions is not a concern. For added security, the questions that cannot be correctly decoded by the server will not be stored.

The wrong operation of deleting questions will be a potential problem, so the deleting function will only be available to the authorized administrator from the physics faculty.

4. Devices:

The preparation of exam paper is a serious academic process, required to be done on a computer. For this reason the design of our web application will focus on serving computer browsers with large screen and enough processing capability to run AngularJS on the client-side. But the website will also be available for a smartphone browser which is not ideal as the questions are hard to read from such small screen.

3.3.2 Documentation

1. An acceptance test set with the potential audience:
 - a. Team members who use it to test errors, track progress and improve efficiency by analysing test results.
 - b. Auditor using it as a marking schema of our work.
2. Skill audit:
 - a. Team members using it to assist our allocation of work.
 - b. Auditor using it as a marking schema of our work.
3. Risk register:
 - a. Team members use it as a warning of the potential risk that needs to be addressed in the process of designing the website.
 - b. Subsequent administrator of the website using it as a guide to avoid the potential mismanagement of the system.
 - c. Auditor using it as a marking schema of our work.
4. Stories (at different stages):
 - a. Team members using it for better time allocation, better understanding of the next stage, and analysing the completeness of our work.
 - b. The initial client uses it to check completeness at each delivery point.
 - c. Auditor uses it as a marking schema of our work.
5. User instruction:
 - a. For the client to understand how to use the web application.
 - b. Auditor using it as a marking schema of our work.
6. Administrator instruction:
 - a. For the potential administrator of the web application to understand how the web server works and how to maintain and modification the website.
 - b. Auditor using it as a marking schema of our work.
7. Meeting minutes and booked hours spreadsheet:
 - a. For team member to record their work and adjust their work mode.

- b. Potential conflict of the intellectual property in the future.
 - c. Auditor uses it as a marking schema of our work.
8. Reference:
- a. For all website user.
 - b. The reference sources.
9. More?

3.3.3 Hardware Consideration

Server would be run on UWA servers and website would be visit from common computers. Considering the size of physics test bank has not been confirmed by the client yet, memory size and auxiliary storage space are not known.

3.3.4 Performance Characteristics

The process time of all operation on the website should be as short as a regular UWA official website (1-2 second response time) as the website will run on a UWA server. Considering in database schema, files are uploaded as MEDIUMBLOB files. Therefore the largest size of a file would be 16MB. Moreover, on account that the MySQL database we use has the maximum size of 256TB, capacity constraints does not need to be considered.

3.3.5 Error Handling and Extreme Conditions

Input error:

A current operation will be denied if there is an input error and a notice of that input error will be given.

Extreme conditions:

1. Excessive users.
 1. Not very likely to happen as the website is only used by professors from physics school.
2. Excessive questions length.
 1. Length of a question is constrained, and the action of storing oversized questions will be denied.
3. Excessive usage information.
 1. HTML form constrains the length of the input.
4. Database Breaking
 1. A situation in which the Database fails to work or fundamentally breaks. This would have to be controlled / handled through maintaining a regular backup schedule and having people on hand who understand the inner workings of the database

3.3.6 System Interfacing

The input of search action will be text, and it has to be input through the form on the website.

The input of updating questions has to be a zip file containing latex files and associated figures. The update questions must able to be decoded by the server otherwise the updating action will be denied.

The output of browsing questions will be an image on the website.

The output of exporting questions will be latex zip file.

3.3.7 Quality Issues

Database security:

Using MySQL as the database is not a perfect secured solution. However, The server will be coded on java web software which enables future change of database to MS SQL or Oracle when the client has increasing demand for security.

Running time and inspection:

The website will be online 24-7, and we suggest that it should be inspected each semester after delivered.

System failed:

If the website failed, the server could be restarted in 10 minutes. The current input might be lost, but the database will not be affected.

Usability:

The website can be run on all university server as it is coded in html5 and java.

3.3.8 System Modifications

Database:

The size of the database will likely to be extended as the number of questions will continuously increasing.

The type of database is likely to be changed to improve security.

Editing function:

The further editing function of questions might be implemented

Sharing function:

The function of sharing questions by email might be implemented.

3.3.9 Physical Environment

The website will run on the server in physics school, and it will mainly be accessed in office, home of lecturers, administration.

3.3.10 Security Issues

The access of data must be secured as it will be a potential exam question for coming exam.

The website and database will be stored on the server of physics where is highly secured.

3.3.11 Resource Issues

The IT team of UWA should be responsible for the installation, data backing up per semester, accessibility updating and regular maintenance.

3.4 Constraints

The website is programmed in html5, Java, and SQL which can be run and access any browser.

Constrained by coding abilities, latex files and their associated figure files cannot be uploaded separately.

Constrained by code complexity and running performance, users cannot search random words in latex files but latex files' key words.

Temporarily, there are no legacy systems for this project.

3.5 System Model

3.5.1 Scenarios, Use Case Models

Download questions: User login→Main page→input keyword, browsing result, select questions and download selected questions.

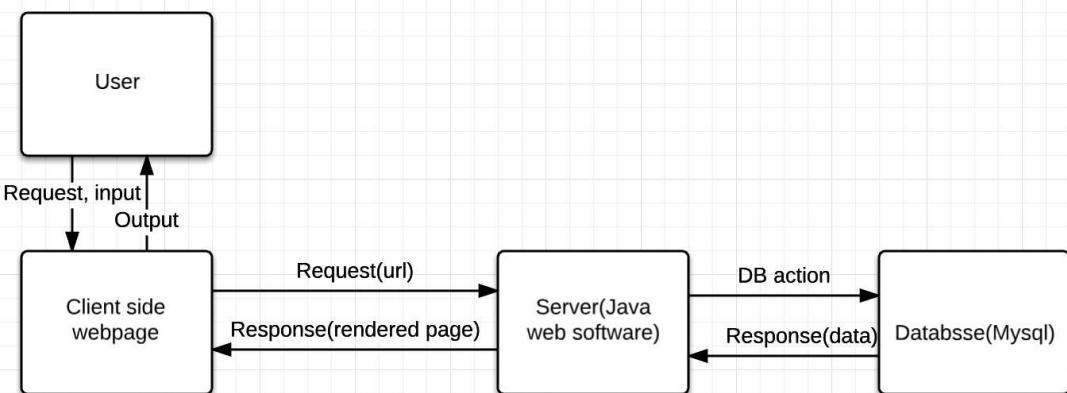
Update questions: User login→Main page→question update page→update questions and key word of questions into database.

Update usage information: User login→Main page→usage update page→ update usage information of questions.

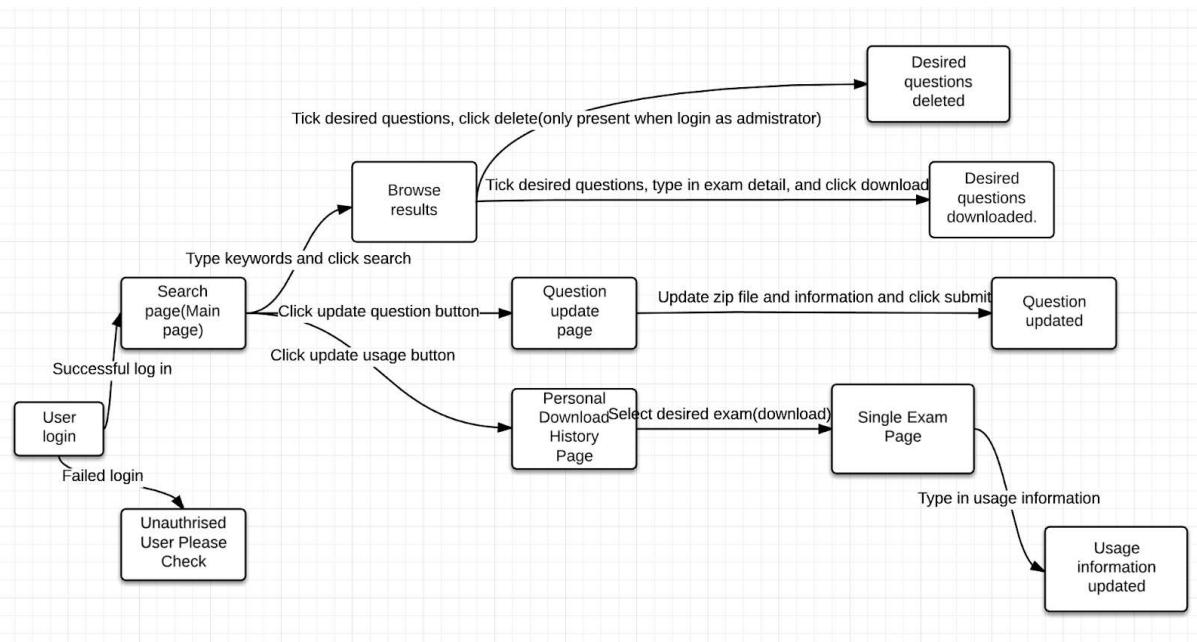
[More?](#)

3.5.2 Use Case Models

3.5.2.1 Actors



3.5.2.2 Use Cases



3.5.3 Object Models

Our plan is to divide the project into three phases: Front-end web-page development, Java based server development and mysql database development, and at different phases we will create and store data in different carrier: javascript to mysql. At this stage, the stable object model is still unclear as our knowledge and requirement of data model will continuously grow and change overtime.

3.5.5 User Interface - Navigational Paths and Screen Mockups

Screen shot?

Project Acceptance Tests

Objectives

The Purpose of this aspect of Sprint 1 is to outline the various tests that the group will complete over the course of the project so that they can document progress and set themselves achievable and realistic goals.

The Completion of the following tests will also allow the group to determine the success of the project at various intervals and at its completion. As you will see, tests one and three relate specifically to the end product developed by the team whereas test two relates to how the team will view project success during the completion of the project.

Tests Summary

1. The Database System
 - a. This includes all relevant aspects such as the storage of documents and how they are accessed
 - b. Intactness of downloaded files.
2. Smaller Aspects to be incrementally Tested
 - a. UI / Front End
 - b. Database
 - c.
3. Extra Work Done by the team on the system
 - a. Due to the nature of the project there is a lot of room for the group to expand on the 'basic' formation of the system
 - b. This work will be done in accordance to what the client (in this case John Brookes) see's as the most valuable to the system
 - c. What the client values and what the group see's as achievable will be weighed up in this test

Testing Strategy

To Conduct both formal and informal tests with the following conditions

- Who
 - Group Members
 - Client - John Brookes
 - Mentor - Ivan Zelina
- When
 - During Meetings with the client
 - When specific aspects of the project are “finished”
- Where
 - Room 461 of Physics (Conference Room)
 - CSSE Labs
 - Other Areas of Campus such as study rooms in the libraries

Test 1 - Major Functionality Test

Test Specification

This test will be a usability test completed by the client. In this test, the client will offer their opinions on the following

1. User Interface
2. Speed of Program
3. Output of the program
4. Ability to input files to the program
5. Other Elements of the program such as
 - a. History input
 - b. Search interface
 - c. **Editing Exam Paper**
 - d. **Exam Paper Download**
6. What aspects of “Extension” they want us to address first
 - a. For example, the ability to upload more than one type of file or the ability for student access

Test Description

This Test would be conducted in a fairly unrestricted manner. The only emphasis that the team would place in the area of specific directions is making sure that the client accesses all areas of the program so that they can provide feedback on how the program works.

The main things that the team will have to provide to the client will be a username and password that allows them to access into the database system. Secondly, if the team notices that the client has missed a key aspect of the program or is misusing the program they should direct the client as they see fit.

Ideally, this test would be carried out in a room that has access to a projector so that the client can carry out the test on a large screen and members of the group can point out specific things (as needed) on the projected image rather than the screen of a small laptop. A room that would be suitable for such a test is the conference room in the physics building on the fourth floor (461) which has been used by the group previously to discuss other matters of the project with the client.

Finally, this aspect would be completed close to the end of sprint two or one week into sprint three. Setting this as a timeline would allow the group to act on any extra functionality that the client suggests or fix any bugs that come as a result of the test.

Test Analysis Report

The main analysis will be recorded in the minutes that relate to the meeting that this test is executed in. However, the main areas to be noted when assessing the clients satisfaction and the completion of the are:

1. Verbal Satisfaction
 - a. The group would have to specifically ask the client what they like, what they would change etc.
2. The Program working without fault in a real world use situation
3. The speed at which the program is realistically usable
 - a. How fast is the search
 - b. How fast is the logic
 - c. Etc.

Test 2 - Small Functionality Tests

Test Specification

This test is a little different to the one previously described as it doesn't have as rigid a testing structure. The main goal of test two is to allow us to keep each other accountable and periodically test how the various aspects of the project are working together

Because our group has a very varied skill set, some members may not be able to physically code (or understand the development of) different aspects of the project. This means that they will have to have input in other ways such as providing various testing scenarios that the original coder may not have thought of.

Test Description

- Members Required:
 - Preferably 3 consisting of the primary coder and two other members who will oversee the testing

- Specific Aspect To be tested
 - Can include by not limited to, front end UI, zipping and unzipping of folders, importing files into the database.
- Testing Schedule
 - Due to the nature of this test various aspects should be ongoing. The tests shouldn't be only at the end of the development of a certain aspect of the project
 - Specifically, the developer should test the program incrementally as they're developing the program and then when they believe the program is finished they should bring in the other two members (assigned by the other members) and test the program again.
- Testing Procedure
 - As the program is being tested the tests that are being run should be outside the bounds of reasonable testing purposes. So the tests that are run are unrealistic and could never occur in a real world environment
 - By Testing in such a way we ensure that the program shouldn't break when the clients tests it as they would in test 1

Test Analysis Report

The Analysis report criteria of this test are

- Tests passed and failed
 - Should be 100% pass ratio
- Speed of Tests
 - Tests should run in a prompt manner
 - This is especially important for search related tasks

Test 3 - Extra Functionality Tests

Test Specification

This test is very similar to how the small functionality tests would occur. The description of this part is almost identical to that of Test two. The major difference of this test is that it occurring specifically depends on the completion of Test 1. Also, the specifics of how the test will be run are dependant on the extra functionality that the client wanted

The major distinctions of how this testing will be run is that the whole group will most likely be involved in the development of these areas due to the fact that when they are completed when everything else is completed. What this will mean is that the group will have multiple people working on it and therefore more people to help with testing (unlike the 3 as depicted in test two).

Finally, this test will also include a similar testing aspect to test one as when the group completes the extra work they will have to present it to the client in a similar way.

N.B For the description and analysis reports of this test refer to the tests two and one in that order

Stories

Preface:

This document addresses the stories of Exam Questions Database Web-app in Scrum agile methodologies. The intended audience for this document are the group members, the client (John Brooke), the auditor (Daniel Cowen) and the Unit Co-ordinator (Michael Wise).

Target Audience:

Client, Group members, Auditors

Group-b Members:

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Client:

John Brooke

1.0 General Goals

Our goal is to design a website server which stores exam questions, the usage information about each question and allow Users (mainly physics professors) to:

1. Browse, search (base on usage information, keywords), select and export the questions to the user as a zip file for preparation of their future exam paper.
2. Upload new questions and their usage information to the server.
3. Upon downloading for a formal use allow professors to update question histories.

2.0 Themes

Note:

- In the project, users are lecturers from physics faculty who are going to make test papers.
- Stories are listed from higher value to lower value under each epic.

2.1 Theme 1 Question Uploading Webpage

2.1.1 Epic: Uploading Latex Files and Their Preview Images

- As a user, I want to upload a question in a zip file in which contains Latex file and associated figure images.
- As a user, I want to have a button to upload zip files.
- As a user, I want uploaded questions can be safely stored in database and not collide with other questions.

2.1.2 Epic: Adding Information of Uploaded Question

- As a user, I want to add keywords for uploaded question, so that other users can get the question by searching the key words.
- As a user, I want to have a text box to type in notes of uploaded question, so that other users can get more information of this question.
- As a user, I want to have a text box to type in short description (usually the first sentence of question), so that other users can have an explicit recognition of the question.
- As a user I want to be able to record the history of usage of each question when I upload it

2.2 Theme 2 Exam Paper Editing Webpage

2.2.1 Epic: Exam Paper Registration

- As a user, I want to have four text boxes to register the new exam information of Institution, Unit, Assessment, and Date.
- As a user, I want to have a text box for additional notes of new exam paper.

2.2.2 Epic: Searching Questions

- As a user, I want to have a search box, so that I can get the wanted questions by searching keywords or other question information.
- As a user, I want to see on the searching result interface, each matched result is along with the question's short description, a button for previewing the question, a button for viewing question history, and a button for adding a question to the cart.
- As a user, I want to see information of institution, unit, assessment usage, date, result statistics, and notes after clicking the history button.

2.2.3 Epic: Question Cart

- As a user, I expect to see for each line, there would be the short description of each question, a button for previewing, a button for viewing history, and a button for removal from cart.
- As a user, I want to have a submit button at the bottom of question cart, so that once click on it, I can download selected questions and corresponding history would be added to database.
- As a user, I want to have an access to change the question order in the exam paper.
- As a user, I expect when I compile all questions into an exam paper, the reference of each question's images would not conflict each other.

- As a user, I want to save my temporarily chosen questions in my account background, so that I can continue editing my exam paper in the future.

2.3 Theme 3 Result Updating Webpage

2.3.1 Epic: Search Box

- As a user, I want to have three dropdown-boxes corresponding to institution, unit, and assessment & date, so that I can filter the targeted exam paper.
- As a user, I want the dropdown-box can be up to date with database.

2.3.2 Epic: Updating Interface

- As a user, I expect on the update interface, each line represents one question, with four columns for the short question description, a button for previewing, a text box for inputting the number of correct students, and a text box for inputting the total number of students.
- As a user, I want that after all results are uploaded, I can have a preview of the whole paper result, with institution, unit, assessment, date, and correctness statistics on each line for each respective question.

3.0 Intermediate Acceptance Criteria for Sprint 2

3.1 Question Uploading Webpage

- Uploaded zip files are stored in database logically. There is no collision when extracting files.
- There is no data loss in the uploading process.

3.2 Exam Paper Editing Webpage

- After searching for keywords, matched questions' short description, preview and history can be shown.
- After clicking add button, the targeted question is added to question cart successfully.
- After clicking the submit button, questions in the question cart are exported correctly into a .zip file together

3.3 Result Updating Webpage

- For each dropdown box, all available choices in database can be shown.
- After clicking dropdown box options, SQL queries return the wanted results, and webpage displays them correctly.
- After updating the exam result, corresponding data are inserted into database correctly.