**Designing the program**

Before beginning the development of the program, I need to design some algorithms and pseudo code.

Here is a basic flow chart outlining the program structure:

GUI Components

Process User input to request from Database

User chosen topic

Selected from menu

Process Data from Database into Questions on GUI Frame

Fetch appropriate questions and answers

Database

Multiple Choice

Checkboxgroup

Calculation or Multiple Choice?

Calculation

Text Field

Start

Is answer correct?

Check Answer

Yes

No

Show which questions were wrong and what to revise

Display total marks

No

Is this the last question?

This needs to be revised

Add marks to score

Yes

End

Some of the main modules of this program are the main menu, where the user chooses a topic to revise, the quiz, where the user is asked questions, and the feedback, where the program show the user’s score and where they need to improve.

In this program, some of the key algorithms are centred on the program interfacing with the database. This will be done using PHP incorporated in the java code. One such algorithm is getting the questions from the database according to topic. To represent the programs, they will have to be used as classes and methods, similarly to object oriented programming.

e.g.

Class Quiz

User inputs topic x

Method Test

Query: All questions with topic x

New Question = question1

New Question = question2

Etc.

Calculation:

Label = question

TextField = user’s answer

Multiple Choice:

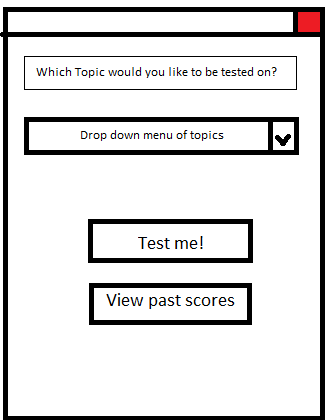
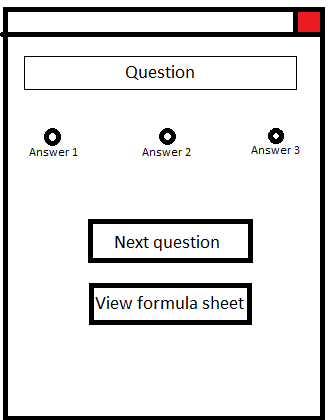
Label = question

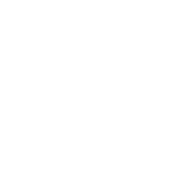
Checkboxgroup = user’s answer

It will return an answer to be checked with the mark scheme.

The user interface is an important part of the design as it enables the user to use the program efficiently and with ease.

Here are the initial designs for the UI.



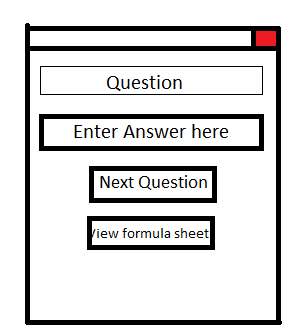


CheckboxGroup

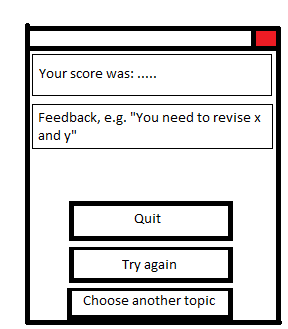
Will open a pdf with the formula sheet

Multiple choice question layout

Main menu, where the user chooses their topic



Calculation question layout



Goes back to menu

Will re-run the test

Closes application

Once the test has finished

One of the main parts of developing this program will be creating a database with all the questions in it. My database will consist of two tables, a questions table and an answers table.

Here is what the database will be like

Question Answer

|  |
| --- |
| QuestionID |
| QuestionNo |
| QuestionSubNo |
| PaperDate |
| QuestionContent |
| QuestionTopic |
| QuestionMarks |
| QuestionType |

|  |
| --- |
| AnswerID |
| AnswerContent |
| AnswerOption1 |
| AnswerOption2 |
| AnswerOption3 |
| AnswerEquation |
| AnswerUnit |

An example of an SQL query that will be used is:

SELECT QuestionContent, FROM Question

WHERE QuestionTopic = “Mechanics”

This will select the suitable questions for that topic. Then, 10 would be chosen at random to use in the quiz.

When testing the software, I will need to have two stages of testing. The first will be white-box testing, where I will ensure every possible input is made into the program.

The second will be beta testing. I will give copies of the program to some users who will use and record their experience so I can make some final changes.

In terms of security, this software does not hold any sensitive data so does not need that type of security. However, there will need to be something to stop the user changing the code of the program, simply so that it can perform its task even if the user attempts to tamper with it. The way I will stop this is to compile the program into a .jar file. This should prevent the user from accessing the code of the program.