

Criterion A

Defining the problem

My client is my classmate in physics class. During our consultation, he told me that he is “struggling with physics” (see appendix). He specified how he “cannot effectively manage time and efficiency” for his study sessions. Therefore, he asked me to design a system for his physics revisions.

Currently, he stated that most of the online revision tools require an expensive membership, thus he couldn’t “find exercises to [his] needs” (see appendix). This limits Mr.x’s ability to revise as he has a restricted amount of practice questions. He wants a system where he feels he has enough resources to feel ready for the tests.

During his process of searching for practice questions, sometimes they are either too hard or too easy. This can affect his efficiency in revising as he will need time to find appropriate questions. With the large amount of revision resources available online, only a small portion are actually useful to Mr.x, thus he wishes to have a system that allows him to quickly find the questions based on his needs.

Moreover, this causes Mr.x difficulties “to know which topic [he] should aim to spend more time on” (see appendix), hence he wants a system that has such a feature for him to know which areas to improve on.

The final problem is that it’s hard for Mr.x “to keep track of [his] progressions” (see appendix). Therefore we agreed to have a system where he could track his progress.

246 words

Rationale for the proposed solution

To solve Mr.x’s problem, we decided to create a quiz app with GUI where it starts off with him selecting the topics he wants to have for the quiz. Then, Mr.x referred to the feature where he could choose the length of the quiz as “that would be perfect” (see appendix). After the quiz,

Mr.x will have practice questions based on his results on the quiz to focus on areas that need improvement which he answers as “helpful for my studies” (see appendix).

This program will successfully help the client as he will be able to easily find practice questions and test his understanding efficiently. However, the number of questions on both the quiz and practice questions will be limited because I will be either gathering them online or hand-make them with my other classmates to store in an Excel file.

I decided to use Java for this project. Java can provide a powerful GUI development framework by using Java Swing, a visually appealing option for creating interactive user interfaces as well as graphs. This would allow an easy to follow GUI of the quiz app for Mr.x. Java also has libraries like Apache POI for Excel file manipulation that are well established and well documented, making it easier to integrate Excel functionality into the app. Lastly, Java is an object-oriented programming language, it would be suitable for the solution because it will provide reusability as the same features will be required to be utilized to carry out different tasks.

254 words

Success criterias

1. The program can access the excel file that store all the questions and their respective solutions
2. Randomized questions for both practice questions and quiz questions
3. 3 pages in total: 1 home page, 1 question page, and 1 result page
4. Pages can be easily navigated using buttons
5. Feature to select out of 8 physics topics for the quiz in the home page
 - a. Kinematics
 - b. Forces and momentum
 - c. Work, power, energy
 - d. Rotational mechanics
 - e. Thermal energy transfers
 - f. Greenhouse effect
 - g. Ideal gas laws

- h. Thermodynamics
6. Feature to choose 1 of 3 possible quiz lengths in terms of time in the home page
 - a. 20 mins
 - b. 40 mins
 - c. 60 mins
 7. Questions are given to the user according to the chosen topics in both quiz and practice questions
 8. User only able to start the quiz if at least 3 topics is selected and a duration is selected in the home page
 9. The retrieved data from the excel file is correctly displayed in the question page
 10. Timer only displays and functions during quiz in the question page
 11. The user can only choose from 4 answer choices with 1 correct answer in the question page
 12. Feature to terminate the quiz or the practice questions whenever the user wants in the question page
 - a. Resets everything
 - b. Brings user back to the home page
 13. User's solutions are checked with the correct solutions for both practice questions and quiz questions once an answer is selected
 14. Correct or wrong answers are displayed (green = correct; red = wrong)
 15. User only able to go to the next question if the correct answer is selected in the question page
 16. Feature that ensures the user does not to get the same question more than once
 17. Feature to show what study topics the user needs improvement on in the result page
 18. Feature to show the user's score from the quiz in the result page
 19. Feature to show the graph of the user's progress in terms of their score in quiz with time on the x-axis and score on the y-axis of the overall progress in the result page
 20. Feature to let the user redo the questions where they've answered incorrectly from the quiz in the practice questions