HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATION AND COMMUNICATION TECHNOLOGY

FEASIBILITY STUDY REPORT

GROUP SOMETHING

Subject: Introduction to software engineering

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I.   Executive summary

The proposed system for teachers of Hanoi University of Science and Technology. The customer is represented by Mr. Trinh Thanh Trung.

Our goal is to develop a question management system that can automatically generate exams for teachers at Hanoi University of Science and Technology. There are two categories of questions : multiple choice that can have multiple answers and written questions with hints for answers. The system will be able to separate them by subjects, chapters, and difficulties, allowing teachers to randomly create an exam with predefined difficulties and chapters, or hand-picked. For the same exams, questions and multiple-choice answers can be shuffled. Finally, teachers can save the exam and export to a file (txt, doc or pdf $\cdots$). We aim to automate the exam creations process.

II.   Preliminary requirement analysis.

1. Application overview

- The goal : The application should be able to automate the exams creation process, either hand-picked or randomly using chosen subject, difficulties and chapters from a predefined question bank.

- Business goal : Through this system, we hope to create a more efficient way to store questions and previously created exams, and furthermore reduce the workload on teachers during exam weeks by replacing manual work with an automated process and user-friendly UI.
- Current business process : Currently, even with the same subject, teachers of different classes still have to manually create their own exams.
- User roles : The system will have only one type of user with access to every feature
- Interaction with other systems: The system will be built from ground-up using existing libraries. The exams generated by this system can be combined with an automatic testing and grading application for students in the future.

2. Features requirements :

2.1. Features declaration :

- The user should be able to view the questions bank at any time, and their subject, chapters, or difficulty
- Questions are divided into 2 categories : Multiple choice questions and written questions. Each question should be provided an answer, with multiple choice questions can have several answers.
- The system allows adding, removing questions or edit existing ones
- Generate an exam with existing questions, randomly or hand-picked, save and export those exams to a file

- View previously generated exams and their subject

   2.2.   Optional features

- The system may have a filter/search for questions, sort by chapter or difficulty feature.
- We may include a log-in system that separate users into different roles and privileges : editing questions database will be allowed to admins only and they will get to manage other users.

   2.3. Scope

What we will provide	What we will not provide
Local database. The system stores questions and exams on the user's computer	The program won't have a cloud database.
Desktop Application	Can't access using web browser
Support for multi-user: Export and import file from specific format	Don't support any other format

- The scope of our system includes question and exams database management (add, edit, delete), and random exam generation

III.   Process to be followed

For this project, the team decided to follow the modified waterfall model. The team chose this method because the project was small in

size and the customer requirements were quite detailed and easy to understand.

Phase

- Requirements phase: The team determines the requirements related to the project, feasibility analysis, project scope, current human resources along with costs, associated risks.
- Design phase: The team creates designs for the product to solve the set requirements. The team will discuss with the customer after presenting the design.
- Implementation phase: Based on the design agreed by both parties, the team begins implementing the system.
- Verification phase: The software will be deployed and tested. If the customer feels unsatisfied, the team will base on the customer's feedback to correct it.
- Deployment phase: Putting the software into use
- Maintenance phase: The team commits to maintaining the project for 12 months. During this time, the team will release patches if there are any problems with the software.

IV.   Suggested deliverables

1. Periodic status reports

- The team will send frequent status report to ensure

2. Periodic presentations

- The presentation will convey the features that we have completed and features that we are working on, to ensure the client of our development process

- We may change our development plan in the near future depending on the client's demand

3. Good faith requirement agreement

- After we've discussed the project's requirement with the client, a requirement agreement shall be presented to the client that states clearly which features and goals our group will provide

4. Documents for use and Mechanics

- We shall provide a document explaining how to use our system and its basic functionalities.

5. Demonstration and client training

- If the client demands training their employees to use the system, we will provide an application demo alongside every periodic presentation and offer further training for the client after the system is finished if required.

V.   Technical feasibility

- Technical requirements :
    o There should be two different types of questions, written question and multiple choice-question that has many answers
    o Separate questions based on subject, difficulty, and chapter
    o Centralized database : a database to save questions and generated exams
    o Retroactive editing of input data : Input data can be edited or deleted after they've been entered
    o Exam generation : Generate exams randomly or hand-picked

      o The ability to export a saved exam into a docx file

- In conclusion, there is a feasible solution to the desired system, which include a shared SQL database and user interface created by Pyqt5 (Python) and export the file into a docx document with Pydocx.

VI.   Visibility

- We aim to maximize the transparency of our system and development process. This will ensure that issues are found early with the client's response and be fixed

1. Communication

- Periodic meetings with the client will be organized to inform the client of our progress. Our group will also have frequent meetings to ensure every member understand their role.

2. Intermediate Deliverables and Presentations

- Live demonstrations : Demonstrating the system's features, user interface

- Presentations : Progress reports in the form of presentations

- Reports : Provides the client with our design documentation, that notes our development process in detail. This will give the client a clear view of the project.

VII.   Risk analysis

1. Time constraints :

- As the system needs to be finished in one semester, the system might not be finished with every guaranteed feature before the course ends

2. Resources risk

- Due to financial constraints, we are using open source and free libraries. And with our limited testing hardware, there might be unpredictable incompabilities with the client's computer.

3. Features risk

- We try to avoid misunderstanding the client's demands

4. Managing risks:

- After analyzing the main risk factors of our projects, we've prepared some counter measures. We shall divide the project into several milestones meeting with the client. These meetings will provide visibility to our development process, allowing the client to test our in progress system and provide feedbacks. Frequent communication will allow us to make changes in the process, should any problem arise.

VIII. Conclusion

- In conclusion, we found that the Exam generation system is feasible in terms of technology, time, and skill of our group. We believe the project's scope and the client's demands can be completed within one semester.