CAPSTONE PROPOSAL SHEET
SECOND SEMESTER 2020 - 2021

Title of the Project: COLLABORATION PLATFORM USING REAL-TIME CODE EDITOR, VIDEO CHAT & TEXT MESSAGING	Name of Proponents: **Jerald Sayson** **Ian Christopher Nellas** **Eugene Mosqueda** **Stephenson Nolasco**

Rationale of the Study:

In this pandemic year, there were a lot of students that divert the attention to users especially on the technology today which is spread globally and it is utilized in their studies such as mobile devices, computers, or laptops to create or research and surf on the internet about the lessons, activity, and assignments that are incomprehensible to the students. Searching for correct and reliable information of what the students need to find is quite hard sometimes and will never be accurate about what the students want to find on the internet. We know how technology evolves and it keeps evolving every few years but in the field of searching for correct ideas, information, and solutions is quite tricky and hard to find sometimes. That is why we develop an easy way to make it more convenient for the students and lessen their burden in finding a solution and giving them correct information to fix their problem.

We created a system that is a web platform for students and self-taught learners especially for those people who are in the field of programming who is looking for an immediate response, answer, and solution for their coding problems. It offers live video chat, text messaging, and a real-time code editor where users and teachers can modify one single editor and can communicate via text, audio, and video chat in one single browser. This will make learning and teaching more fun and easy experience.

Our objective is to provide a live solution for the students and self-taught learners especially to those people who are field of programming that are slowly learning in the field of programming that awaits oftentimes for many hours, days, weeks, and even months for an answer, response or solution online. In addition, we make this kind of system to provide the students and programmers a platform where they can immediately find an answer or solution for coding-related problems via live communication through video chat, text messaging, and real-time code editor. Aside from that, we also want to offer this platform for those people who are passionate about teaching (especially programming) and make money from it.

We motivate ourselves to propose this type of system to help the students, self-taught learners, and specifically those people that are in the field of programming. We want to provide and build an environment where both users can collaborate with each other to solve their code-related issues instantly.

Objectives of the System:

Our main purpose is to create an environment where a user can find a solution to their code or programming related problems instantly through a one on one live collaboration and provide them all the necessary components that are useful for online teaching.

That specifically aims to:

1. lessen the time consumptions of the student searching for internet tutorials or information on their code related problems;

2. hassle-free in finding an answer or solution to their code-related problem or any programming related problems;

3. Make the student became more productive and inspired to learn something new and explore their code further;

4. provide a better quality learning to all the students who take up programming-related courses;

5. solve the student problem on their code and teach them how to organize and use proper syntax and code; and

6. gain an extra income in their free time by helping our users;

Scope and Limitation of the System:

The researchers found out that some of the students struggling with their programming-related problems and they need an effective way to solve their coding problem. The researchers want and aim to provide a solution to this problem with live coding web-based system applications that can do the following:

1. Student Account Accessibility;
    1.1 Registration
    1.2 Login / Logout
    1.3 Show teacher if online
    1.4 Real-time Message/Reply
    1.5 Direct Payment
    1.6 Code-editor
    1.7 Programming language selection
    1.8 Teacher selection
    1.9 Tutor Allocated Time Selection
    1.10 Webcam Navigation On/Off
    1.11 Microphone Navigation On/Off
2. Teacher Account Accessibility;
    2.1 Registration;
    2.2 Login / Logout;
    2.3 Live teaching;
    2.5 Accept/Reject student teaching request;
    2.6 Webcam Navigation On/Off;
    2.7 Microphone Navigation On/Off;
3. Scheduling features;
    3.1 do a scheduling task if the teacher is offline;
    3.2 do a direct real-time scheduling task if the teacher is online.

However, the system is not capable of the following:
1. a huge and complex code;
2. making a mobile application;
3. making a Windows/IOS application;
4. executing different types of programming languages;

Significance of the Study:

This study will be helpful to the following:

Students. The study will provide a system to the students that having problems with their code that they want to fix without waiting. It will help them to easily understand and get the solution to their programming-related problems in no time and less hassle.

Teachers. It will help the teacher who has free time that wants to earn extra income and also improve their mental and logic in teaching. In addition, it also makes them feel happy because their teaching helps a lot of students.

Academic Institution. It will help them to lessen their burden in making the student understand their lessons in regards to curriculum courses related to programming that they offer.

Researchers. This study will give a big help to future researchers on how to give alternate ways on helping the students who are struggling with their programming course they take up.

Sources of Data:

The idea of our data was gathered from a website such as UI design from 1on1.today, Audio Call and Video call from Google Meet, and also the Online Code Editor from the CodePen's website. To make our system more convenient and easy to be developed, we researchers look at an idea and a snip of the code on specific sources such as Google and GitHub.

1. 1on1.today. It is a website used and bases in constructing our system's graphical user interface, along with, web-based applications, modals, buttons, and placement of the text and other elements of the UI designs;
2. Google Meet. It is software where you can work with your group by using chat messaging with the combination of Mic Input, Speaker Output, Camera Input, and Output.;
3. CodePen. It is a platform where the developers and designers will provide and make a snippet of HTML, CSS, JavaScript, and other frameworks, etc.;
4. Google Search Engine. It is a search engine where it provides a lot of information and data basis on what you are looking for, such as codes, images, designs, etc.;

Methods and Techniques

We're planning to use the MERN stack framework in developing this web application since we are knowledgeable in this area, and we already found a lot of resources and references when building this application. Since the technology we choose is MERN, here are some possible methods and techniques that we might use in building this application:

1. Model-View-Control (MVC). We use this software design pattern to develop the whole backend and frontend of our application;
2. Client-Side Rendering (CSR). Since we're going to use React as View in MVC, expected that once the client requests data, the server will respond a JSON/JavaScript type of data to the client's browser, and React will process this data in the browser into information.;

Models:

Models have been used by the researcher to exhibit the reality of our system, to clarify the necessity of the users especially students or any person who doesn't have any idea about our system. Models can use for clarity, explanation, and show the design structure of our system and it also confirms if the system availability is good and analysis of the code meets the standard requirements.

There are different types of diagrams but we choose these two below because we believe that these two will show and explain straightforwardly all the functionality of our system and overall users interaction:

1. 1. Unified Modeling Language;
2. 2. Class Diagram;
3. 3. Use Case Diagram;

Unified Modeling Language. The researchers would apply the Unified Modeling Language (UML) diagrams or representation and notation to exhibit the analysis and corresponding models to our system. Researchers use UML because it provides clarity; it gives and shows all the flow of our applications.

Class Diagram. We, researchers, would also use this type of diagram to organize, give exact and direct insight into our systems. It focuses on the entities that need and required to develop our system.

Use Case Diagram. We would also use this type of diagram to identify, clarify and form an organized system requirements, process, and overview of the system in user interactions.

Tools:
Here are the tools that we're going to use by building the application:
1. MongoDb. It is a cross-platform document-oriented database program and we used this kind of database to store our corresponding users and also to our systems;
2. ExpressJs. We decided to use this framework because it's much easier to create and manage complex routing, middleware and much easier in the handling of requests and responses. This framework makes it easier to organize our application into the MVC architecture;
3. React. This is a huge application that is why we decided to use this library to have a better file organization and we want to separate every functionality of this application into components for us to easily debug and find errors and bugs.;
4. NodeJs. We want to use JavaScript on the server-side to create an API in our application that is why we choose to use NodeJs;
5. Postman. We don't want to use browsers for handling API testing that is why we choose Postman to simplify our API development.
6. Visual Studio Code. There's a lot of source-code editors available on the internet but we decided to choose VS Code because it is stable and there's a ton of plugins and features that we can use to simplify our application development.

Endorsed by: Approved by:

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