Infrastructure University Kuala Lumpur

IUKL . Engineering Your Future

An Interactive Web Application to Learn Coding Online with Real-Time Data Exchange

Background Studies and Outline

Introduction

- TeamCode will a web application that aims to provide an interactive model to existing online learning methods for programming.
- With this application, the instructor will be able to have real-time communication with learners and vice-versa to solve any problems encountered through a flag system.
- Online Learning, when used for practical subjects like programming, produces results inferior to learning the subject in full-time classes thereby failing to fully replicate the classroom interaction.
- The project will implement real-time code editing and communication through text and audio interfaces to replicate classroom interaction.

Problem Statement

- Existing applications used to learn to code online provide fewer features for real-time editing of code.
- Existing applications have fewer models for users to pass on notifications to their instructors by highlighting the point at which they encounter anomalies in their code.
- Existing applications require users to install and configure necessary software before they can learn to code online.
- Fewer systems have diverse accessibility control options such as view only and can edit.

Objectives

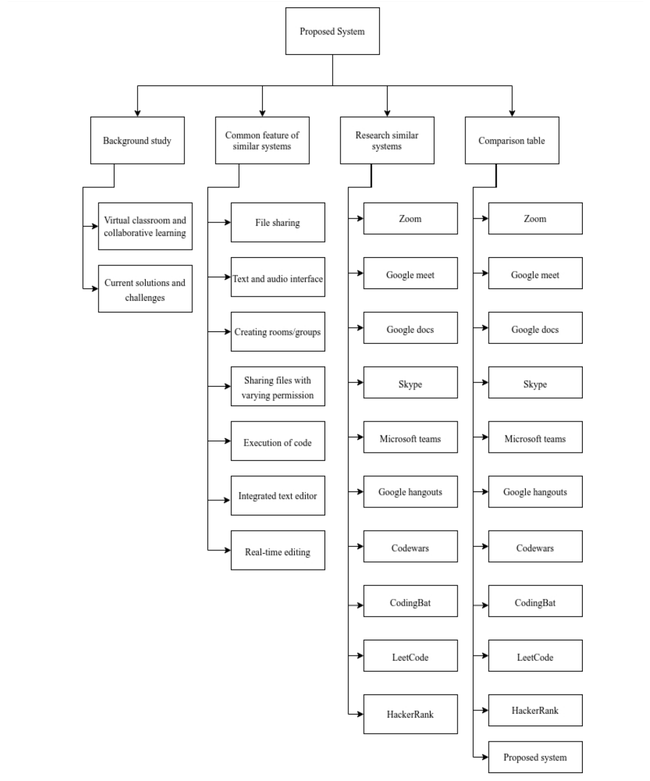
- To create a real-time application using WebRTC and Websockets.
- To provide the feature of real-time editing that an instructor can access to solve a learner's problem.
- To make use of flags with the help of which learners can notify any problem.
- To provide a platform for learning to code without having the need to set up and configure programming environments.
- To create an interface to write and modify code using Monaco editor.
- To execute the written code with Judge0 API (Application Programming Interface) and display the output.
- To create an audio channel of communication between instructors and learners.
- To include diverse control options like can edit and can view within the system.

Scope of Work

User scope	System Scope
Teachers will be able to host a room where Students can join in.	The system will provide users to communicate through text and audio interfaces.
Users will be able to communicate through text and audio interfaces.	The system will allow users to share their code with others with permissions such as can edit and can view.
Users will be able to execute code within the system.	The system will provide users to code online without any previous setup.
Users will be able to share their code with other users in the system with varying permissions.	The system will enable real-time editing of code.
Teachers will be able to edit the code of their Students in real-time.	The system will allow instructors to create a room for learners to join in.

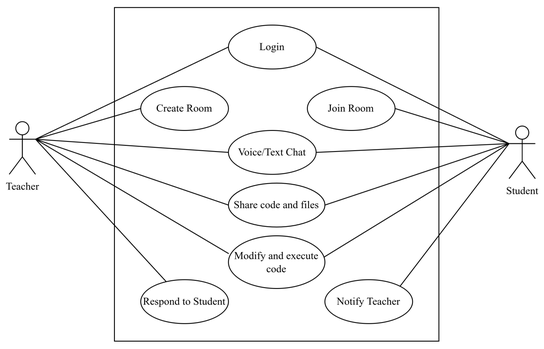
Literature Review

Literature Review Map/ Summary Table

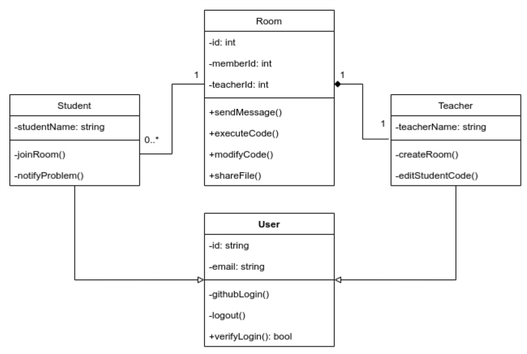


Methodology

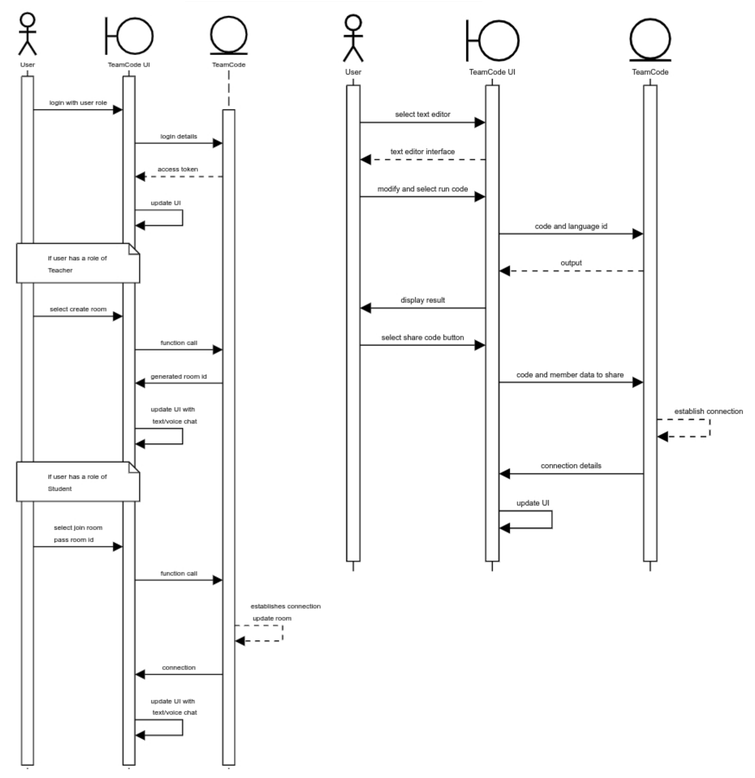
Functional Model



Structure Model



Behavioural Model



Expected Results and Contributions

Expected Results

- Users will be able to communicate through voice/text chat.
- Users will be able to modify and execute code.
- Instructor will be able to use the feature of real-time editing to solve a learner's problem.
- Users will be able to notify any problems during execution of code with Teacher.

Conclusion

There exists a gap between distance learners and face-to-face learners especially in terms of programming subjects and research suggests that interaction plays a major role in the success of distance learning. Synchronous meeting apps help to provide collaboration and interactive elements to online learning while online judge apps provide a platform for users to gain technical knowledge. Taking elements from both these applications TeamCode will provide real-time interaction using WebSockets and a communication channels with an audio interface through WebRTC.

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