Project Statements
High Level Overview
Software Systems Lab, Autumn 2018

Below are a high level overviews of project ideas. More detailed statements will be given later. Some basic features will be expected to be implemented by all, but after that you will be free to build your project according to your interests (but it will be supervised by TAs regularly so that you don't get stuck on implementing unnecessary/too ambitious features). You should choose and stick to one of them. All projects will be of almost the same difficulty, so choose one which is interesting to you and your group.

I Battleship

Battleship is a classic arcade game. It is played by 2 players turn by turn like chess. Only it is (subjectively) more fun. This is a good overview of a simple variant of the game. The project is to implement the game. On a high level you will need to implement the following:

1. the game logic
2. the interaction between the players through a server
3. a simple graphical user interface (GUI)

The choice of frameworks/languages is up to you. We will suggest a few standard ones, though. You are free to add features to the game for better playing experience as much as you want. Some interesting features could be

1. A player pairing page before the game starts
2. Using differently shaped battleships (like L or T)
3. Mainitaning leaderboards
4. Providing chat service between players
5. Implementing a play bot using Reinforcement Learning (for human vs computer game)

Tags: Server Client Design, Databases, GUI, Sockets, Websockets, Web Design

II Progress Tracker

This project is to implement a classroom progress tracking system to help instructors analyse and make real time decisions. The main idea is that progress is tracked as checkpoints defined by the instructor.

The implementation of such a system would involve:

1. Implementation of a webclient, accessible to instructors which allows them to do the following: create a session with the necessary checkpoints; allow real-time view of data related to number of students working on or completed a particular checkpoint, questions that need to be addressed corresponding to a particular checkpoint.
2. Implementation of an android application, accessible to students that collect data regarding the checkpoints passed, checkpoints currently being worked on, questions and sends it to the backend server.
3. Implementation of a backend server that stores and manages all the data corresponding to a session and serves responses to the web client and the android application.

Additional feature that could be worked on is a timeline mode where, after the conclusion of the session, the progress at a particular time during the session can be viewed and statistics of progress across time can be displayed to help instructors gain insight in planning sessions.

Tags: Database Design, Web GUI Design, Server Client Modelling, Data Presentation, Data Collection, Android Design

III Open Cloud

The project is to implement a cloud based file system like google drive or dropbox. The difference being that user has complete control over encryption schema of server. Some of the basic features include

1. Support for multiple clients simultaneously
2. Synchronization across clients upon request
3. Encryption of data on server
    a. Server only has encrypted data, so that if a hacker gets into the server critical information is not exposed
    b. Only your client should be able to decrypt and read information from server
    c. Block level file encryption

Some interesting features would be

1. Automatic sync of files among all clients
2. An android application that does the above

Tags: Sockets, Public Private Encryption Schemes, Server Client Modelling, Android Services