CMPT 371 Spring 2025

Project

This project is to be done in groups of 4 students!

In this project, your group will build an online multiplayer game. The game itself is up to you, though a suggested game called Deny and Conquer is described on the next page.

Game Requirements:

- The game shall be a client-server program. Each player is a client connecting to the server from a remote machine/device.
- The server can be started by any player. All players (including the player who started the session) connect to that server as clients.
- There must be at least one shared object in the game which requires "locking" of that object for concurrency; i.e., only one player at a time can use that object. In the Deny and Conquer game, each white square is a shared object.

Technical Rules:

- You can use any programming language that you like.
- For the frontend, you can use any existing graphics or GUI library or framework. Make your life easy for the frontend as much as possible. Don't overdo the GUI. A simple and functional GUI is enough.
- For the backend (client and server system), you cannot use any existing gaming, client-server, messaging, remote calling, or other middleware or frameworks. Everything must be written from scratch. You must use sockets programming and send application-layer messages directly.

Deliverables:

A project report which includes:

a. Description of the game and your design, including your application-layer messaging scheme. Please show the code snippets where you are:
   i. Opening sockets
   ii. Handling the shared object
b. A list of group members and their individual contribution percentage. Each group member is expected to contribute equally; e.g., 25% for a 4-person group, or 20% for a 5-person group.
c. Commented source code of the client and the server. Alternatively you can include a link to Github or other repositories, though the code still has to be commented.
d. Video of a working demo. Upload the video somewhere and put its link in the final report. The video must be 1 to 2 minutes and show at least 2 players playing the game, and must include the shared object in action.

Marking Scheme:

$$group\ project\ mark = 30\%\ working\ demo\ (as\ seen\ in\ the\ video) + 70\%\ report$$

$$individual\ mark\ (capped\ at\ 100\%) = group\ project\ mark \times individual\ contribution \times size\ of\ group$$

Individual mark is the mark that is given to an individual student as the final mark for the project.

Deny and Conquer

The game board is divided into squares of equal size. The number of squares shall be 8×8. The game is played by multiple players, each having a pen of different colour. The thickness of the pen is the same for all players. The objective is to deny your opponents filling the most number of squares, by taking over as many squares as you can. To take over a square, it must be white. You must then put your pen down (click the mouse button) in that square and scribble, without lifting the pen (hold the mouse button down), until in your judgement at least 50% of the area of the square is coloured. You can then lift your pen (release the mouse button). When you lift your pen, the game engine will turn the colour of that square to your colour, if indeed you coloured at least 50% of the surface of the square. Otherwise, the square will turn white and another player can try taking over it. At the end of the game; i.e., when all squares have been taken over, whoever has the most number of squares will win the game. Tie is also possible. An example is shown in Figure 1.

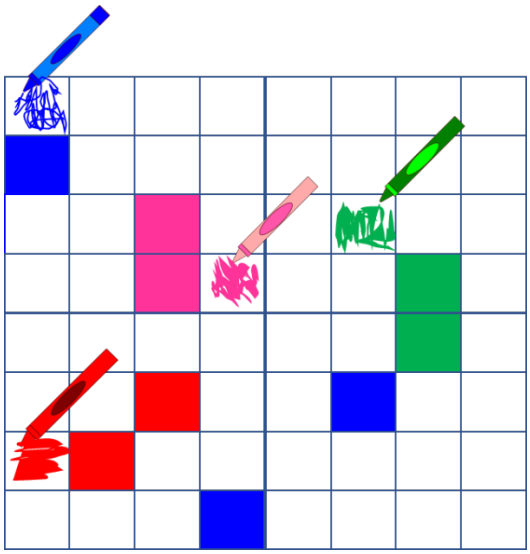

Figure 1. An example gameplay between 4 players in Deny and Conquer.

Game Mechanics:

While a player is scribbling in a square, that square is no longer available to other players. If those other players click in that square, they should not be able to draw anything in it.