Individual Assignment Set #2 on “Multithreading and Networking with Qt” Module

Cross-Platform Application Development

- The lower level networking facilities of Qt Network module (`QTcpServer`, `QTcpSocket`, etc.) must be used to implement communications between application instances.

1. Implement “Tic-tac-toe” game between two human adversaries. The field must be of, at least, 3×3 dimensions. One of the application instances must work as a server; another one — as a client. The right for the first move must be selected randomly on the server side. The communication must be implemented using TCP protocol.

2. Implement “Battleship” game between two human adversaries. The initial board configurations could be loaded from text files without correctness check. More complex solution would employ the GUI allowing players to set initial ship positions and orientations with a mouse and keyboard. One of the application instances must work as a server; another one — as a client. The right for the first move must be selected randomly on the server side. The player who makes a successful move receives the right for the next move. The communication must be implemented using TCP protocol.

3. Implement a simple client-server private chat application which would allow personal one-to-one text conversations. The server must keep a record of currently connected clients (each client must have a unique host-port configuration and a nickname) and send the updated lists to all the clients whenever each client connects or disconnects. The client must be able to get the updated information of currently connected clients and send a message to the specified client via the server.

4. Implement a UDP multicast server transmitting the generated audio signal of some fixed format and the increasing frequency between the specified values within the specified period of time. Implement a client which would be able to connect to this multicast group, receive the signal, and output it to the audio device.

5. Implement a TCP server which would be able to service several clients simultaneously. A client must send a path to a file on the server's local file system. The server must send the contents of this file back to the client or signal an error in this response. The client must save the received file locally or display an error to the user and then disconnect.

6. Implement a TCP server which would be able receive an image from a client, apply a blurring filter from OpenCV libraries, and send the result back to the client. The server must be able to service several clients simultaneously. The client must be able to display the original and resulting images in its main window.