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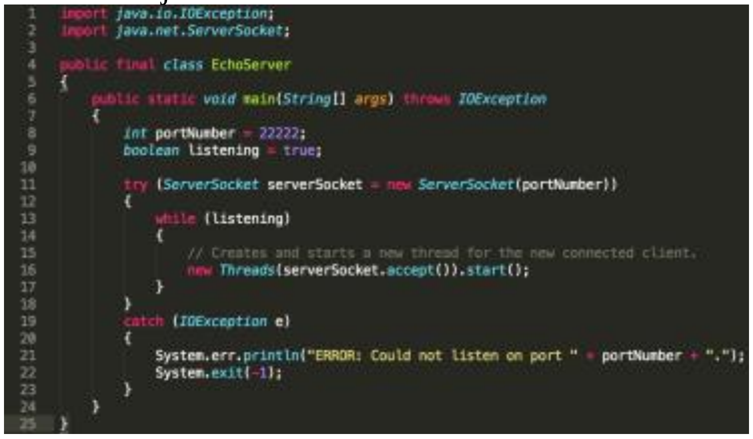
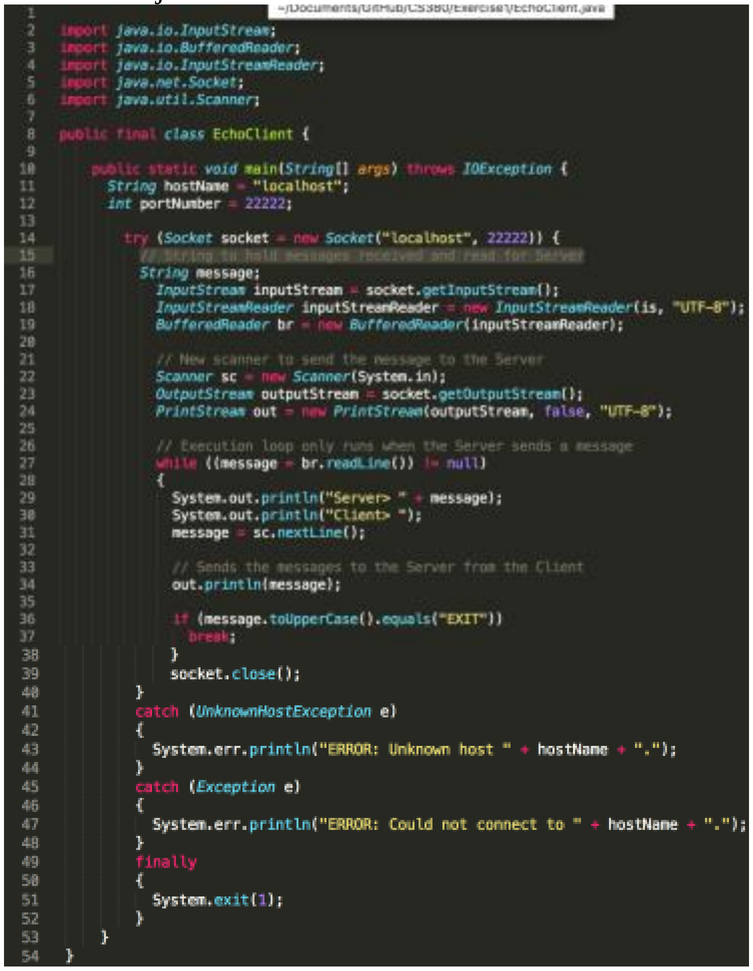
Link to the exercise https://github.com/hvluu/CS380/tree/master/Exercise1

EchoServer.java



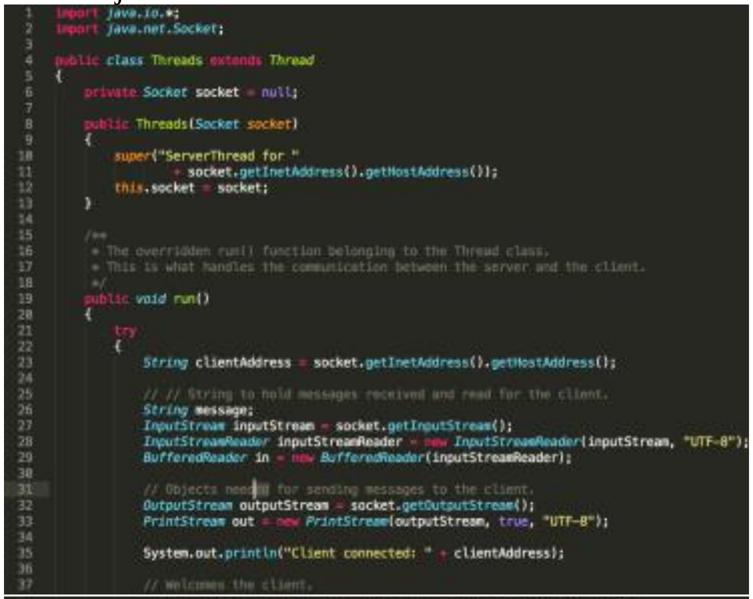
```java
import java.io.IOException;
import java.net.ServerSocket;

public final class EchoServer
{
    public static void main(String[] args) throws IOException
    {
        int portNumber = 22222;
        boolean listening = true;

        try (ServerSocket serverSocket = new ServerSocket(portNumber))
        {
            while (listening)
            {
                // Creates and starts a new thread for the new connected client.
                new Threads(serverSocket.accept()).start();
            }
        }
        catch (IOException e)
        {
            System.err.println("ERROR: Could not listen on port " + portNumber + ".");
            System.exit(-1);
        }
    }
}
```

EchoClient.java

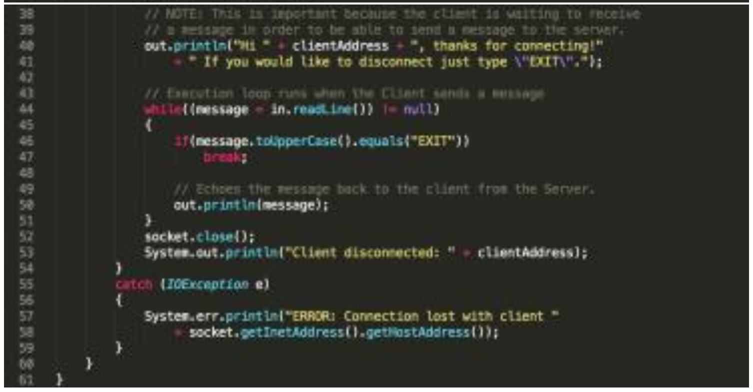


```java
~/Documents/GitHub/CS380/Exercise1/EchoClient.java

import java.io.InputStream;
import java.io.BufferedReader;
import java.io.InputStreamReader;
import java.net.Socket;
import java.util.Scanner;

public final class EchoClient {

    public static void main(String[] args) throws IOException {
      String hostName = "localhost";
      int portNumber = 22222;

        try (Socket socket = new Socket("localhost", 22222)) {
          // String to hold messages received and read for Server
          String message;
            InputStream inputStream = socket.getInputStream();
            InputStreamReader inputStreamReader = new InputStreamReader(is, "UTF-8");
            BufferedReader br = new BufferedReader(inputStreamReader);

            // New scanner to send the message to the Server
            Scanner sc = new Scanner(System.in);
            OutputStream outputStream = socket.getOutputStream();
            PrintStream out = new PrintStream(outputStream, false, "UTF-8");

            // Execution loop only runs when the Server sends a message
            while ((message = br.readLine()) != null)
            {
              System.out.println("Server> " + message);
              System.out.println("Client> ");
              message = sc.nextLine();

              // Sends the messages to the Server from the Client
              out.println(message);

              if (message.toUpperCase().equals("EXIT"))
                break;
            }
            socket.close();
        }
        catch (UnknownHostException e)
        {
          System.err.println("ERROR: Unknown host " + hostName + ".");
        }
        catch (Exception e)
        {
          System.err.println("ERROR: Could not connect to " + hostName + ".");
        }
        finally
        {
          System.exit(1);
        }
    }
}
```

Threads.java



```java
import java.io.*;
import java.net.Socket;

public class Threads extends Thread
{
    private Socket socket = null;

    public Threads(Socket socket)
    {
        super("ServerThread for "
                + socket.getInetAddress().getHostAddress());
        this.socket = socket;
    }

    /**
     * The overridden run() function belonging to the Thread class.
     * This is what handles the communication between the server and the client.
     */
    public void run()
    {
        try
        {
            String clientAddress = socket.getInetAddress().getHostAddress();

            // // String to hold messages received and read for the client.
            String message;
            InputStream inputStream = socket.getInputStream();
            InputStreamReader inputStreamReader = new InputStreamReader(inputStream, "UTF-8");
            BufferedReader in = new BufferedReader(inputStreamReader);

            // Objects needed for sending messages to the client.
            OutputStream outputStream = socket.getOutputStream();
            PrintStream out = new PrintStream(outputStream, true, "UTF-8");

            System.out.println("Client connected: " + clientAddress);

            // Welcomes the client.
```



```java
            // NOTE: This is important because the client is waiting to receive
            // a message in order to be able to send a message to the server.
            out.println("Hi " + clientAddress + ", thanks for connecting!"
                + " If you would like to disconnect just type \"EXIT\".");

            // Execution loop runs when the Client sends a message
            while((message = in.readLine()) != null)
            {
                if(message.toUpperCase().equals("EXIT"))
                    break;

                // Echoes the message back to the client from the Server.
                out.println(message);
            }
            socket.close();
            System.out.println("Client disconnected: " + clientAddress);
        }
        catch (IOException e)
        {
            System.err.println("ERROR: Connection lost with client "
                + socket.getInetAddress().getHostAddress());
        }
    }
}
```