223CCS Lab Mini Project

Student ID:_

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Java GUI-Based Client-Server Application for Currency Conversion

Problem Statement:

Create a Java GUI-based application to implement a **Client-Server** system for converting currency. The system should work as follows:

1. **Server**:
   - Listens for connections on **port 1234**. o Accepts an integer input from the client, representing an amount in **USD**.
   - Converts the USD amount to its equivalent in **SAR** using the conversion rate of **1 USD = 3.75 SAR**.
   - Sends the converted SAR amount back to the client. o Ends the communication when the client sends the value **0** and responds with "Bye".
2. **Client**:
   - Provides a **Graphical User Interface (GUI)** for the user to input the amount in USD. o Displays the converted SAR amount received from the server in a text area.
   - Ends the session when the user inputs **0**, displaying a goodbye message.

Functional Requirements:

1. The **server** must handle continuous client requests until the client sends `0`.
2. The **client GUI** must:
   o Accept USD input from the user. o Display the SAR equivalent sent by the server. o Terminate the session gracefully when `0` is entered.

Figure:

Below is a graphical representation of the problem:

```
sql Copy
code
+--------------------+                            +--------------------+
|   Client GUI       |  Send: USD Amount (int)    |   Server           |
|                    | -------------------------> |   Port: 1234       |
| - Input: USD      |                             | - Convert: USD -> SAR |
| - Display: SAR    | <-------------------------- | - Respond: SAR Amount |
| - Terminate on 0  |    Receive: SAR Amount      | - Say "Bye" on 0   |
+-------------------+                             +--------------------+
```

Design Considerations:

1. **Server**:
   - Implemented using `ServerSocket` to listen on port 1234.
   - Uses a loop to process continuous client requests.
2. **Client**:
   - Designed with a simple GUI using `JFrame`. o Sends user input to the server via `Socket`.
   - Displays the server's response in a `JTextArea`.

Example Interaction:

1. The client sends `10 USD`. o **Server Response**: `37.5 SAR`.
2. The client sends `0`.
   - **Server Response**: `"Bye"` and terminates the session.

Tasks: 1. **Implement the Server**:

   - Write a Java program to handle client connections, perform currency conversion, and terminate upon receiving `0`.
2. **Design the Client GUI**:
   - Develop a Java program with a GUI to input USD values, send them to the server, and display the SAR equivalent.
3. **Submit**:
   - Source code for both the server and client.

Client

```java
package com.mycompany.client;
import javax.swing.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.io.*;
import java.net.*;
```

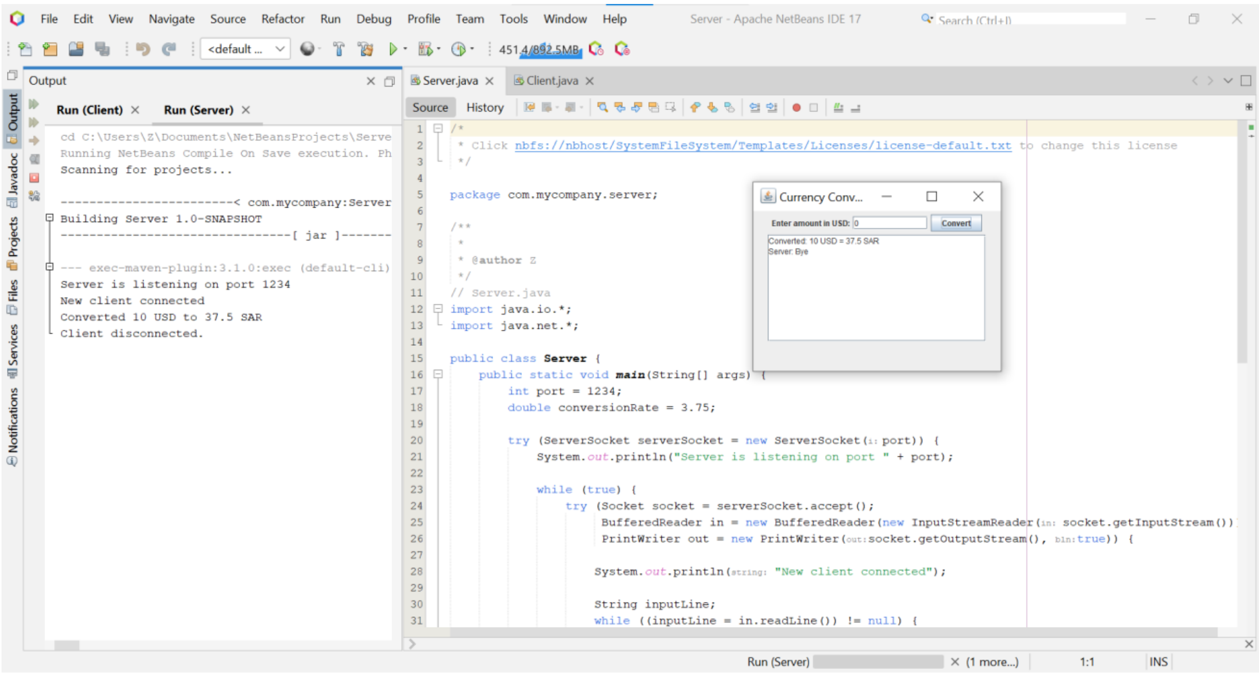
```
public class Client {
    public static void main(String[] args) {
        JFrame frame = new JFrame("Currency Converter (USD to SAR)");
        JTextField inputField = new JTextField(10);
        JButton sendButton = new JButton("Convert");
        JTextArea resultArea = new JTextArea(10, 30);
        resultArea.setEditable(false);

        frame.setLayout(new java.awt.FlowLayout());
        frame.add(new JLabel("Enter amount in USD:"));
        frame.add(inputField);
        frame.add(sendButton);
        frame.add(new JScrollPane(resultArea));

        frame.setSize(400, 300);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setVisible(true);

        sendButton.addActionListener(new ActionListener() {
            Socket socket = null;
            PrintWriter out = null;
            BufferedReader in = null;

            @Override
            public void actionPerformed(ActionEvent e) {
                try {
                    if (socket == null) {
                        socket = new Socket("localhost", 1234);
                        out = new PrintWriter(socket.getOutputStream(), true);
                        in = new BufferedReader(new
InputStreamReader(socket.getInputStream()));
                    }

                    String inputText = inputField.getText();
                    int usd;

                    try {
                        usd = Integer.parseInt(inputText);
                    } catch (NumberFormatException ex) {
                        resultArea.append("Invalid input. Please enter a valid
integer.\n");
                        return;
                    }
                    out.println(usd);
                    String response = in.readLine();

                    if (response.equals("Bye")) {
                        resultArea.append("Server: Bye\n");
                        socket.close();
                        socket = null;
                        return;
                    }

                    resultArea.append("Converted: " + usd + " USD = " + response
+ " SAR\n");

                } catch (IOException ioException) {
                    resultArea.append("Error: " + ioException.getMessage() +
"\n");
                }
            }
        });
    }
}
```

Server:

```
package com.mycompany.server;
import java.io.*;
import java.net.*;

public class Server {
    public static void main(String[] args) {
        int port = 1234;
        double conversionRate = 3.75;

        try (ServerSocket serverSocket = new ServerSocket(port)) {
            System.out.println("Server is listening on port " + port);

            while (true) {
                try (Socket socket = serverSocket.accept();
                     BufferedReader in = new BufferedReader(new
InputStreamReader(socket.getInputStream()));
                     PrintWriter out = new PrintWriter(socket.getOutputStream(),
true)) {
```

```
                    System.out.println("New client connected");

                    String inputLine;
                    while ((inputLine = in.readLine()) != null) {
                        int usd = Integer.parseInt(inputLine);

                        if (usd == 0) {
                            out.println("Bye");
                            System.out.println("Client disconnected.");
                            break;
                        }

                        double sar = usd * conversionRate;
                        out.println(sar);
                        System.out.println("Converted " + usd + " USD to " + sar
+ " SAR");
                    }
                } catch (IOException | NumberFormatException e) {
                    System.out.println("Error handling client: " +
e.getMessage());
                }
            }

        } catch (IOException e) {
            System.out.println("Server exception: " + e.getMessage());
        }
    }
}
```

- A screenshot showing the GUI in action, with interaction logs.



```
cd C:\Users\Z\Documents\NetBeansProjects\Serve
Running NetBeans Compile On Save execution. Ph
Scanning for projects...

-----------------------< com.mycompany:Server
Building Server 1.0-SNAPSHOT
--------------------------------[ jar ]-------

--- exec-maven-plugin:3.1.0:exec (default-cli)
Server is listening on port 1234
New client connected
Converted 10 USD to 37.5 SAR
Client disconnected.
```

Enter amount in USD: 0

```
Converted: 10 USD = 37.5 SAR
Server: Bye
```

```java
/*
 * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
 */

package com.mycompany.server;

/**
 *
 * @author Z
 */
// Server.java
import java.io.*;
import java.net.*;

public class Server {
    public static void main(String[] args) {
        int port = 1234;
        double conversionRate = 3.75;

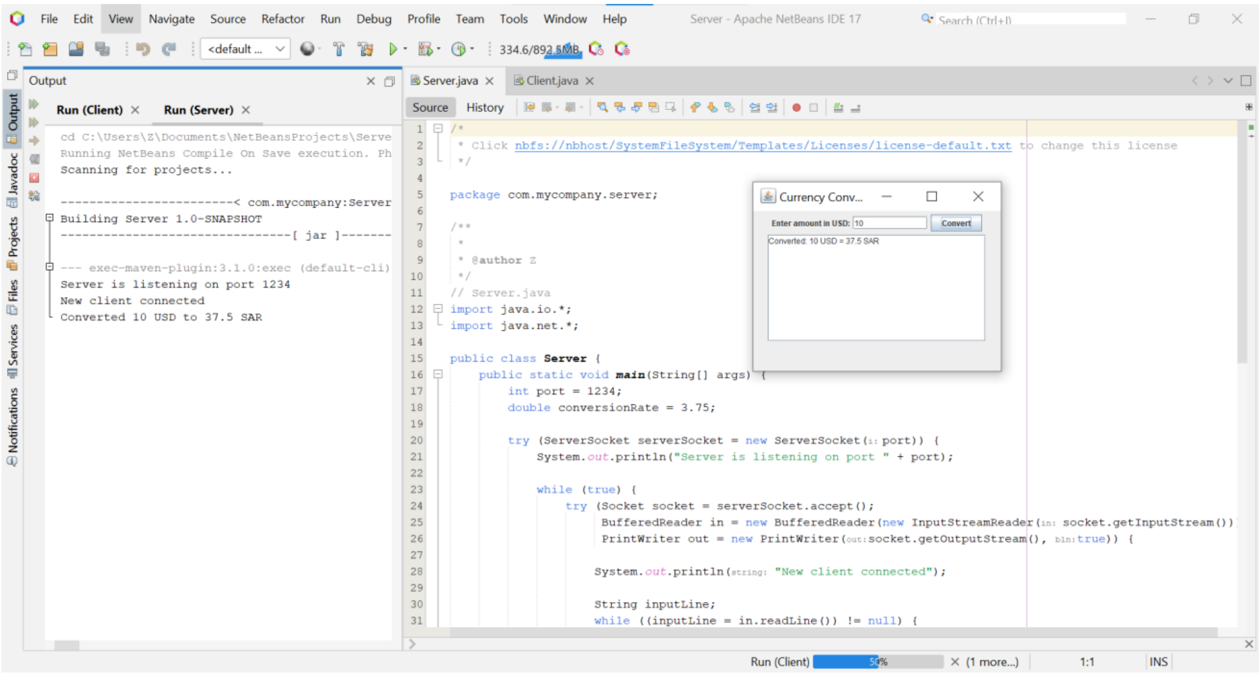
        try (ServerSocket serverSocket = new ServerSocket(i: port)) {
            System.out.println("Server is listening on port " + port);

            while (true) {
                try (Socket socket = serverSocket.accept();
                     BufferedReader in = new BufferedReader(new InputStreamReader(in: socket.getInputStream()))
                     PrintWriter out = new PrintWriter(out:socket.getOutputStream(), bln:true)) {

                    System.out.println(string: "New client connected");

                    String inputLine;
                    while ((inputLine = in.readLine()) != null) {
```

○



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```

Enter amount in USD: 10

```
Converted: 10 USD = 37.5 SAR
```

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