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**. ○ 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. ○ 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. ○ 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:
   ○ Accept USD input from the user. ○ Display the SAR equivalent sent by the server. ○ 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`. ○ Sends user input to the server via `Socket`.
   - Displays the server's response in a `JTextArea`.

Example Interaction:

1. The client sends `10 USD`. ○ **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;
                    }
```

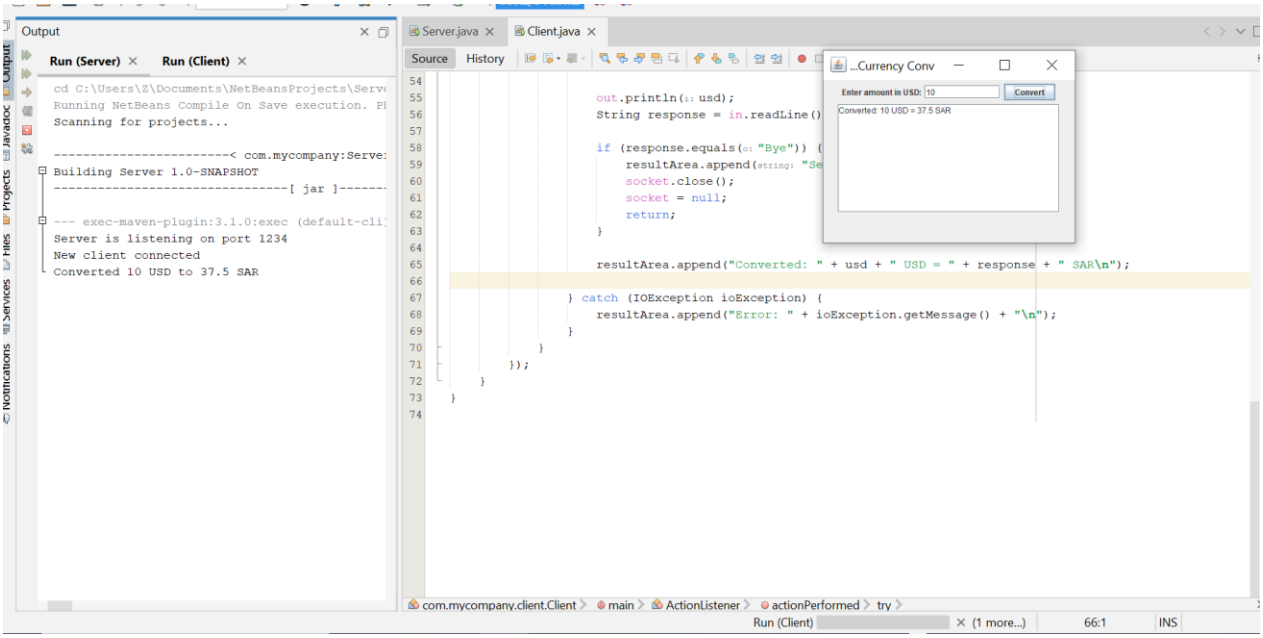
```
                    out.println(usd);
                    String response = in.readLine();

                    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");
                }
            }
        });
    }
}
```

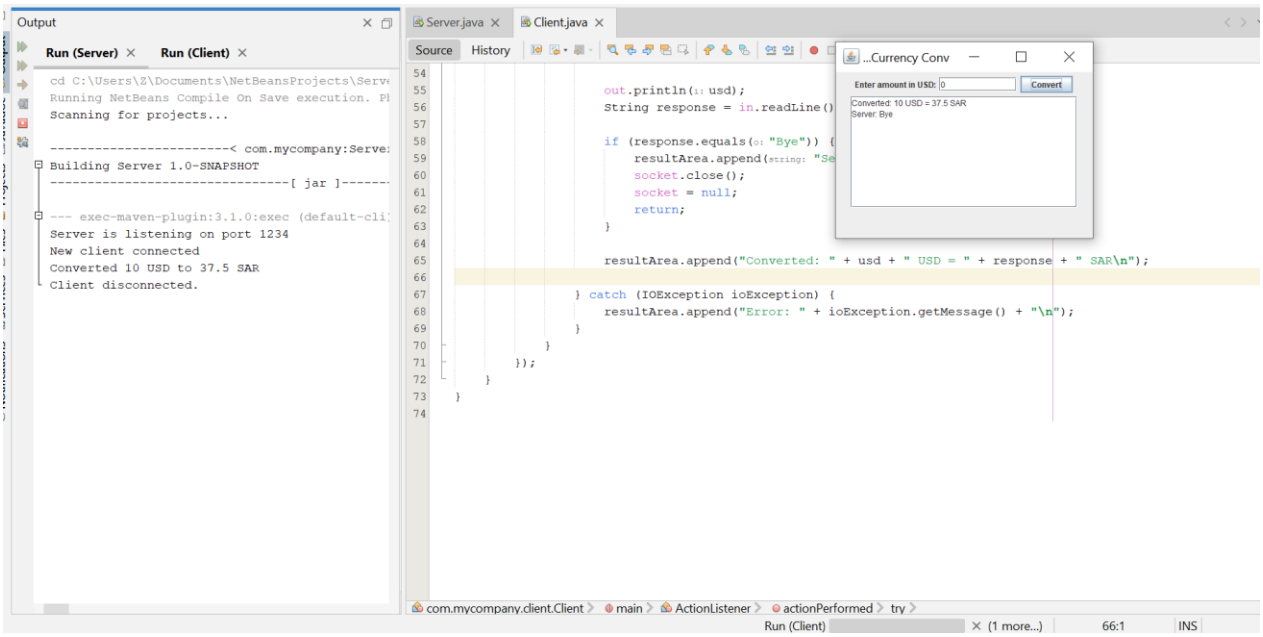
Server:

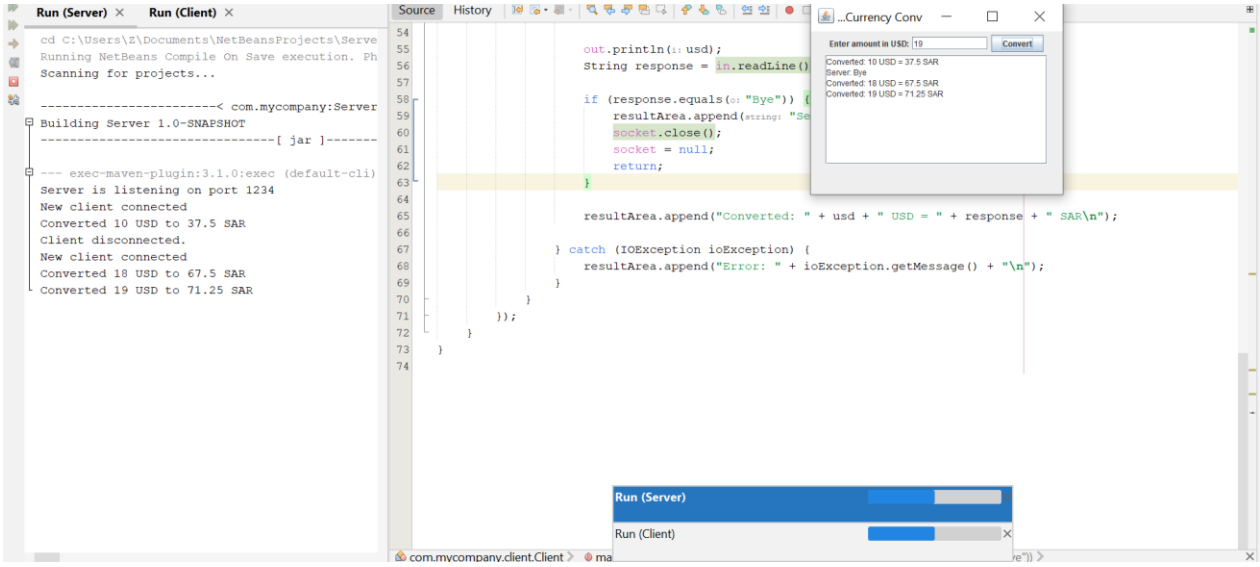
```
package com.mycompany.server;
import java.io.*;
import java.net.*;

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.






Run (Server)
Run (Client)
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
--- 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.
New client connected
Converted 18 USD to 67.5 SAR
Converted 19 USD to 71.25 SAR
Source
History
out.println(usd);
String response = in.readLine()
if (response.equals("Bye")) {
resultArea.append("Se
socket.close();
socket = null;
return;
}
resultArea.append("Converted: " + usd + " USD = " + response + " SAR\n");
} catch (IOException ioException) {
resultArea.append("Error: " + ioException.getMessage() + "\n");
}
});
}
}
...Currency Conv
Enter amount in USD:
19
Convert
Converted: 10 USD = 37.5 SAR
Server: Bye
Converted: 18 USD = 67.5 SAR
Converted: 19 USD = 71.25 SAR
Run (Server)
Run (Client)
com.mycompany.client.Client