Network_Programming_Homework No.2

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Question 1: **Bank ATM Application with TCP Server/Client and Multi-threading**

Project Description:

Build a TCP server and client Bank ATM application using Python. The server should handle multiple client connections simultaneously using multi-threading. The application should allow clients to connect, perform banking operations (such as check balance, deposit, and withdraw), and receive their updated account status upon completion.

Requirements: A. The server should be able to handle multiple client connections concurrently. B. The server should maintain a set of pre-defined bank accounts with balances. C. Each client should connect to the server and authenticate with their account details. D. Clients should be able to perform banking operations: check balance, deposit money, and withdraw money. E. The server should keep track of the account balances for each client. F. At the end of the session, the server should send the final account balance to each client.

Guidelines:

• Use Python's socket module without third-party packages.
• Implement multi-threading to handle multiple client connections concurrently.
• Store the account details and balances on the server side.

Notes:

• Write a brief report describing the design choices you made and any challenges faced during implementation.
• You can choose to create a TCP Server/Client Bank ATM application or any other appropriate application that fulfills all requirements.

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The following code is the server code:

```
import socket
import threading

def Connect():
    server = socket.socket(socket.AF_INET , socket.SOCK_STREAM)
    server.bind(('127.0.0.1' , 44444))
    server.listen(5)
    print("Listening on port 44444")

    while True:
        client_socket, address = server.accept()
        print("Connection from" , address , " is established.")
        client_thread = threading.Thread(target = serveClient , args =
(client_socket,))
        client_thread.start()

def serveClient(client_socket):
    customer_number = client_socket.recv(1024).decode()

    if customer_number in customers:
        client_socket.send(b"Access complete.")
```

```
    else:
        client_socket.sentb(b"Your Account Number is invalid. Connection will be
terminated.")
        client_socket.close()
        return

    while True :
        serviceNum = client_socket.recv(1024).decode()

        if serviceNum == '1' :
            balance = customers[customer_number]
            msg = "YOUR BALANCE IS NOW:  " + str(balance)
            client_socket.send(msg.encode())

        elif serviceNum == '2' :
            amount = int(client_socket.recv(1024).decode())
            customers[customer_number] += amount
            msg = "DEPOSIT SUCCESSFUL. YOUR BALANCE IS NOW:  " +
str(customers[customer_number])
            client_socket.send(msg.encode())

        elif serviceNum == '3' :
            amount = int(client_socket.recv(1024).decode())
            if customers[customer_number] >= amount:
                customers[customer_number] -= amount
                msg = "WITHDRAWAL SUCCESSFUL. YOUR BALANCE IS NOW:  " +
str(customers[customer_number])
                client_socket.send(msg.encode())
            else:
                msg = "INSUFFICIENT FUNDS, PROCCESS CAN'T BE DONE."
                client_socket.send(msg.encode())
        else:
            break

    finalbalance = "THE FINAL BALANCE IS:  " + str(customers[customer_number])
    client_socket.send(finalbalance.encode())
    client_socket.close()


customers = {'00001': 2500 , '00002': 3600 , '00003' : 1800 , '00004' : 6300 ,
'00005' : 5000}
Connect()
```

Execution will open the following terminal:

```
Listening on port 44444
```

The following code is the client code:

```
import socket

def main():
    client = socket.socket(socket.AF_INET , socket.SOCK_STREAM)
    client.connect(('127.0.0.1' , 44444))
    account_number = input("Enter your account number: ")
    client.send(account_number.encode())
    print(client.recv(1024).decode())
    while True:
        print("""Services:
        Press...1...Check Balance.
        Press...2...Deposit.
        Press...3...Withdraw From Balance.
        Press...4...Exit""")
        serviceNum = input(">>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>Enter the
service number:")

        client.send(serviceNum.encode())
        if serviceNum == '1':
            print(client.recv(1024).decode())
        elif serviceNum == '2':
            amount = input("Enter amount: ")
            client.send(amount.encode())
            print(client.recv(1024).decode())
        elif serviceNum == '3':
            amount = input("Enter amount: ")
            client.send(amount.encode())
            print(client.recv(1024).decode())
        else :
            break
    print(client.recv(1024).decode())
    client.close()
if __name__ == "__main__":
    main()
```

Execution will open the following terminal:

```
Enter your account number: 00002
Access complete.
Services:
        Press...1...Check Balance.
        Press...2...Deposit.
        Press...3...Withdraw From Balance.
        Press...4...Exit
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>Enter the service number:
```

Question 2: **Simple Website Project with Python Flask Framework (you have choice to use Django or any Other Deferent Useful Python Project "from provide Project Links")** Create a simple website with multiple pages using Flask, HTML, CSS, and Bootstrap. The website should demonstrate your understanding of web design principles .

Requirements :

G. Set up a local web server using XAMPP, IIS, or Python's built-in server (using Flask) .
H. Apply CSS and Bootstrap to style the website and make it visually appealing .
I. Ensure that the website is responsive and displays correctly on different screen sizes .
J. Implement basic server-side functionality using Flask to handle website features .

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The following project is to design a website with multiple pages using Flask, HTML, CSS, and Bootstrap.
The Flask app file is under the name of app.py

app.py

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```python
from flask import Flask, render_template

app = Flask(__name__)

@app.route('/')
def home():
    return render_template('home.html')

@app.route('/about')
def about():
    return render_template('about.html')

@app.route('/contact')
def contact():
    return render_template('contact.html')

if __name__ == '__main__':
    app.run(debug=True)
```

Three HTML files were attached to the project in the template's directory:

1.Home:

home.html

D: > No. 2 > my_project > templates > home.html

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <link rel="stylesheet" href="{{ url_for('static', filename='styles.css') }}">
    <title>Home</title>
    <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css">
</head>
<body>
    <nav class="navbar navbar-expand-lg navbar-light bg-light">
        <a class="navbar-brand" href="/">Homework No.2</a>
        <div class="collapse navbar-collapse">
            <ul class="navbar-nav ml-auto">
                <li class="nav-item">
                    <a class="nav-link" href="/">Home</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="/about">About</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="/contact">Contact</a>
                </li>
            </ul>
        </div>
    </nav>
    <div class="container">
        <h1 class="mt-5">Welcome to Telecom engineering.</h1>
        <h2 class="mt-5">A path for learning communications' technologies.</h2>
    </div>
</body>.
</html>
```

2.About:

about.html

D: > No. 2 > my_project > templates > about.html

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <link rel="stylesheet" href="{{ url_for('static', filename='styles.css') }}">
    <title>About</title>
    <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css">
</head>
<body>
    <nav class="navbar navbar-expand-lg navbar-light bg-light">
        <a class="navbar-brand" href="/">Homework No.2</a>
        <div class="collapse navbar-collapse">
            <ul class="navbar-nav ml-auto">
                <li class="nav-item">
                    <a class="nav-link" href="/">Home</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="/about">About</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="/contact">Contact</a>
                </li>
            </ul>
        </div>
    </nav>
    <div class="container">
        <h1 class="mt-5">This website is a task for Network Programming.</h1>
    </div>
</body>
</html>
```

3.Contact:

contact.html

D: > No. 2 > my_project > templates > contact.html

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Contact</title>
    <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css">
</head>
<body>
    <nav class="navbar navbar-expand-lg navbar-light bg-light">
        <a class="navbar-brand" href="/">Telecom Engineering</a>
        <div class="collapse navbar-collapse">
            <ul class="navbar-nav ml-auto">
                <li class="nav-item">
                    <a class="nav-link" href="/">Home</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="/about">About</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="/contact">Contact</a>
                </li>
            </ul>
        </div>
    <div class="container">

    <form method="post" action="/contact">
        <div class="form-group">
            <label for="name">Name:</label>
            <input type="text" class="form-control" id="name" name="name" required>
        </div>
        <div class="form-group">
            <label for="email">Email:</label>
            <input type="email" class="form-control" id="email" name="email" required>
        </div>
        <button type="submit" class="btn btn-primary">Submit</button>
    </form>
</div>

    </nav>
    <div class="container">
        <h1 class="mt-5">Let us hear from you. Keep in touch.</h1>
    </div>
</body>
</html>
```

And one CSS file was attached to the project in the static directory:

styles.css

D: > No. 2 > my_project > static > # styles.css > ...

```css
body, ul {
    margin: 0;
    padding: 0;
}
nav {
    background-color: #333;
    color: white;
    padding: 10px;
}
nav ul {
    list-style: none;
    text-align: center;
}
nav ul li {
    display: inline;
    margin-right: 20px;
}
nav ul li a {
    text-decoration: none;
    color: red;
}
h1 {
    text-align: center;
    margin-top: 50px;
    color: rgb(68, 29, 29);
}
p {
    text-align: center;
}
```