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Second Network Programming Homework

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

Answer:

Server Side

```
import socket
import threading

# Pre-defined bank accounts with balances
accounts = {
    '1': 1000,
    '2': 500,
}

def handle_client(client_socket):
    account_number = client_socket.recv(1024).decode()
    if account_number in accounts:
        client_socket.send("Welcome!".encode())
        while True:
            option = client_socket.recv(1024).decode()
            if option.lower() == "c":
                client_socket.send(str(accounts[account_number]).encode())
            elif option.lower() == "d":
                amount = int(client_socket.recv(1024).decode())
                accounts[account_number] += amount
                client_socket.send("Deposit successful".encode())
            elif option.lower() == "w":
                amount = int(client_socket.recv(1024).decode())
                if amount <= accounts[account_number]:
                    accounts[account_number] -= amount
                    client_socket.send("Withdrawal
successful".encode())
```



```
        else:
            client_socket.send("Insufficient funds".encode())
        else:
            break
        # Send final account balance to the client
        client_socket.send(str(accounts[account_number]).encode())
    else:
        client_socket.send("Invalid account! check your number and try
again\n".encode())
        client_socket.close()

# Create a socket object
server_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)

# Bind to address and port
server_address = ('localhost', 12345)
server_socket.bind(server_address)

# Listen for incoming connections
server_socket.listen(5)

print("Server is listening for incoming connections...")

while True:
    # Accept a new connection
    client_socket, client_address = server_socket.accept()
    print(f"New connection from {client_address}")

    # Create a new thread to handle the client
    client_thread = threading.Thread(target=handle_client,
args=(client_socket,))
    client_thread.start()
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  JUPYTER

Windows PowerShell
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PS C:\Users\Techno.Home\Desktop\2\الكيش\فقط> & "C:/Program Files
Server is listening for incoming connections...
New connection from ('127.0.0.1', 62450)
New connection from ('127.0.0.1', 62451)
New connection from ('127.0.0.1', 62500)
[]
```



Client side

```
import socket

# Create a socket object
client_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)

# Connect to the server
server_address = ('localhost', 12345)
client_socket.connect(server_address)

# Send account number to the server for authentication
account_number = input("Enter your account number: ")
client_socket.send(account_number.encode())

# Receive authentication response from the server
response = client_socket.recv(1024).decode()
print(response)

if response == "Welcome!":
    while True:
        option = input("Enter your transaction option:\nc for check
balance\nd for deposit\nw for withdraw\ne for exit\n")
        client_socket.send(option.encode())
        if option.lower() == "d":
            amount = input("enter amount of deposit\n")
            client_socket.send(amount.encode())
        elif option.lower() == "w":
            amount = input("enter amount of withdraw\n")
            client_socket.send(amount.encode())
        if option.lower() == "e":
            break
        else:
            response = client_socket.recv(1024).decode()
            print(response)

# Receive final account balance from the server
final_balance = client_socket.recv(1024).decode()
print(f"Final account balance: {final_balance}")

# Close the socket connection
client_socket.close()
```



```
Administrator: Command Prompt
w for withdraw
e for exit
e
Final account balance: 1200

C:\Users\Techno.Home\Desktop\Πισί %áŧfó>python client1.py
Enter your account number: 1
Welcome!
Enter your transaction option:
c for check balance
d for deposit
w for withdraw
e for exit
c
1200
Enter your transaction option:
c for check balance
d for deposit
w for withdraw
e for exit
d
enter amount of deposit
100
Deposit successful
Enter your transaction option:
c for check balance
d for deposit
w for withdraw
e for exit
w
enter amount of withdrawal
200
Withdrawal successful
Enter your transaction option:
c for check balance
d for deposit
w for withdraw
e for exit
e
Final account balance: 1100

C:\Users\Techno.Home\Desktop\Πισί %áŧfó>
```



Multithreading

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL JUPYTER

Windows PowerShell
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PS C:\Users\Techno.Home\Desktop\ثاني\ثاني> & "C:/Program Files
Server is listening for incoming connections...
New connection from ('127.0.0.1', 62450)
New connection from ('127.0.0.1', 62451)
New connection from ('127.0.0.1', 62500)
█

Windows PowerShell
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PS C:\Users\Techno.Home\Desktop\ثاني\ثاني> cd..
PS C:\Users\Techno.Home\Desktop\ثاني\ثاني> python client1.py
Enter your account number: 2
Welcome!
Enter your transaction option:
c for check balance
d for deposit
w for withdraw
e for exit
c
500
Enter your transaction option:
c for check balance
d for deposit
w for withdraw
e for exit
█
```



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”)

Answer:

we create a python file named app.py which includes flask documentations

Flask file

```
from flask import Flask, render_template

app = Flask(__name__)

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

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

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

A screenshot of a Windows command prompt terminal window. The title bar shows 'Python' and standard window controls. The text in the terminal includes the copyright notice for Microsoft Corporation, the command to run the Flask application, and the output showing the app is serving on http://127.0.0.1:5000. It also includes a warning about using a development server and instructions to press CTRL+C to quit, followed by status messages about the debugger and PIN.



Then we create home page and about page for the website in a folder name
“templates”

home page for the website (index.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="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.
min.css">
  <link rel="stylesheet" href="static\style1.css">
  <title>Home</title>
</head>
<body>
  <nav class="navbar navbar-expand-lg navbar-light bg-light">
    <a class="navbar-brand" href="#">My Website</a>
    <button class="navbar-toggler" type="button" data-
toggle="collapse" data-target="#navbarNav" aria-controls="navbarNav"
aria-expanded="false" aria-label="Toggle navigation">
      <span class="navbar-toggler-icon"></span>
    </button>
    <div class="collapse navbar-collapse" id="navbarNav">
      <ul class="navbar-nav">
        <li class="nav-item active">
          <a class="nav-link" href="/">Home</a>
        </li>
        <li class="nav-item">
          <a class="nav-link" href="/about">About</a>
        </li>
      </ul>
    </div>
  </nav>
  <div class="container mt-3">
    <h1>Welcome to My Website</h1>
    <p>This is the homepage of my website.</p>
  </div>
</body>
</html>
```



About page (about.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="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.
min.css">
  <link rel="stylesheet" href="static/style2.css">
  <title>About</title>
</head>
<body>
  <nav class="navbar navbar-expand-lg navbar-light bg-light">
    <a class="navbar-brand" href="#">My Website</a>
    <button class="navbar-toggler" type="button" data-
toggle="collapse" data-target="#navbarNav" aria-controls="navbarNav"
aria-expanded="false" aria-label="Toggle navigation">
      <span class="navbar-toggler-icon"></span>
    </button>
    <div class="collapse navbar-collapse" id="navbarNav">
      <ul class="navbar-nav">
        <li class="nav-item">
          <a class="nav-link" href="/">Home</a>
        </li>
        <li class="nav-item active">
          <a class="nav-link" href="/about">About</a>
        </li>
      </ul>
    </div>
  </nav>
  <div class="container mt-3">
    <h1>About Us</h1>
    <p>This is the about page of my website.</p>
  </div>
</body>
</html>
```




Then adding some styles using “CSS” by creating a folder named “static” and putting css files in it.

“style1.css” for “index.html”

```
/* Custom styles for the homepage */
body {
    font-family: Arial, sans-serif; /* Set the font family for the
entire page */
    background-color: #f4f4f4; /* Light gray background color for the
entire page */
    margin: 0; /* Remove default margin */
    padding: 0; /* Remove default padding */
}

.container {
    max-width: 800px; /* Limit the width of the container */
    margin: 0 auto; /* Center the container horizontally */
    padding: 20px; /* Add some padding to the container */
    background-color: #fff; /* White background for the container */
    box-shadow: 0 0 10px rgba(0, 0, 0, 0.1); /* Add a subtle shadow to
the container */
}

h1 {
    color: #ff6347; /* Tomato color for the heading */
    margin-bottom: 20px; /* Add some space below the heading */
}

p {
    font-size: 1.2em; /* Larger font size for the paragraph */
    line-height: 1.6; /* Increase the line height for better
readability */
    color: #8a2be2; /* Blue violet color for the paragraph text */
}

a {
    color: #8a2be2; /* Blue violet color for links */
    text-decoration: none; /* Remove underline from links */
}
```



“style2.css” for “about.html”

```
/* Custom styles for the About page */
body {
    font-family: Arial, sans-serif; /* Set the font family for the
entire page */
    background-color: #f4f4f4; /* Light gray background color for the
entire page */
    margin: 0; /* Remove default margin */
    padding: 0; /* Remove default padding */
}

.container {
    max-width: 800px; /* Limit the width of the container */
    margin: 0 auto; /* Center the container horizontally */
    padding: 20px; /* Add some padding to the container */
    background-color: #f9f9f9; /* Light gray background for the
container */
    box-shadow: 0 0 10px rgba(0, 0, 0, 0.1); /* Add a subtle shadow to
the container */
}

h1 {
    color: #e91e63; /* Pink color for the heading */
    margin-bottom: 20px; /* Add some space below the heading */
}

p {
    font-size: 1.2em; /* Larger font size for the paragraph */
    line-height: 1.6; /* Increase the line height for better
readability */
    color: #4caf50; /* Green color for the paragraph text */
}
```

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5th, Network Programming: Homework No1



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اللاذقية – جامعة تشرين
كلية الهندسة الكهربائية والميكانيكية
قسم هندسة الاتصالات والإلكترونيات
السنة الخامسة: وظيفة 2 برمجة شبكات

