LAB REPORT 02

CYBERSECURITY

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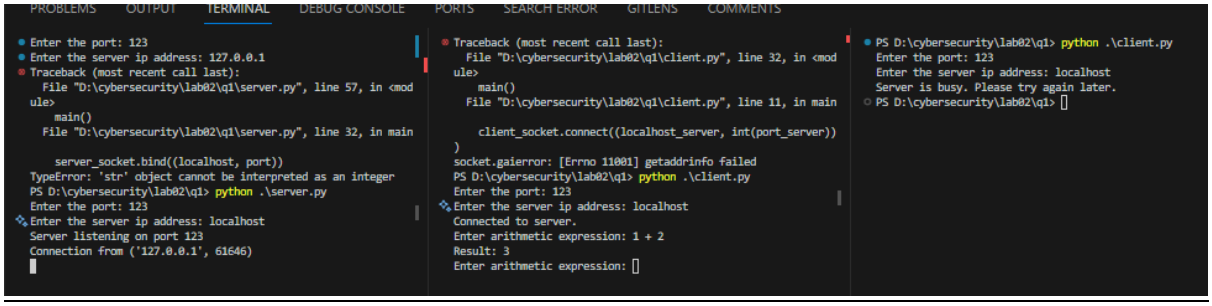
Link for the code files: https://github.com/testgithubtiwari/CyberSecurity-Labs/tree/main/lab02

Question a). Your server program "server1" will be a single process server that can handle only one client at a time. If a second client tries to chat with the server while one client's session is already in progress, the second client's socket operations should see an error.

Solution: *For this question we must check only one condition if server is already connected to a client and any other client is trying to connect to the server then it refuses. I have done with the initialization of a bool variable which will take over the conditions and initially it was false and if a client has successfully connected then it changes to true which stops to connect with another client. I have attached both the codes screenshot client.py and serve.py file and the result which is an error message for the second client if any other client is already connected.*

Screenshot of the codes for both client.py and server.py file and the Output of the screenshot is shown below

Result



Client.py

```python
import socket
import sys

def main():

    port_server = input("Enter the port: ")
    localhost_server=input("Enter the server ip address: ")

    try:
        client_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
        client_socket.connect((localhost_server, int(port_server)))
    except ConnectionRefusedError:
        print("Server is busy. Please try again later.")
        return

    print("Connected to server.")
    try:
        while True:
            expression = input("Enter arithmetic expression: ")
            client_socket.send(expression.encode())
            result = client_socket.recv(1024).decode()
            print("Result:", result)

    except KeyboardInterrupt:      You, 5 minutes ago • Uncommitted changes
        print("Client terminated.")
    except Exception as e:
        print("Error:", e)
    finally:
        client_socket.close()

if __name__ == "__main__":
    main()
```

server.py

```python
import socket
import sys

server_busy_message = "Server busy now. Try again later!"
server_busy = False

You, 4 minutes ago | 1 author (You)
class ServerBusyError(Exception):
    pass

def handle_client_connection(client_socket):
    while True:
        try:
            data = client_socket.recv(1024)
            if not data:
                break
            result = eval(data.decode())
            client_socket.send(str(result).encode())
        except ServerBusyError:
            client_socket.send("ServerBusyError".encode())
            client_socket.close()
            break
        except Exception as e:
            print("Error:", e)
            break
    client_socket.close()

def main():
    global server_busy
    port = input("Enter the port: ")
    localhost=input("Enter the server ip address: ")
    server_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    server_socket.bind((localhost, int(port)))      You, 4 minutes ago • Uncommitted changes
    server_socket.listen(1)
    print(f"Server listening on port {port}")

    while True:
        try:
            client_socket, client_address = server_socket.accept()
            print(f"Connection from {client_address}")
            if server_busy:
                raise ServerBusyError
            else:
                server_busy = True
                handle_client_connection(client_socket)
                server_busy = False

        except KeyboardInterrupt:
            print("Server terminated.")
            break
```

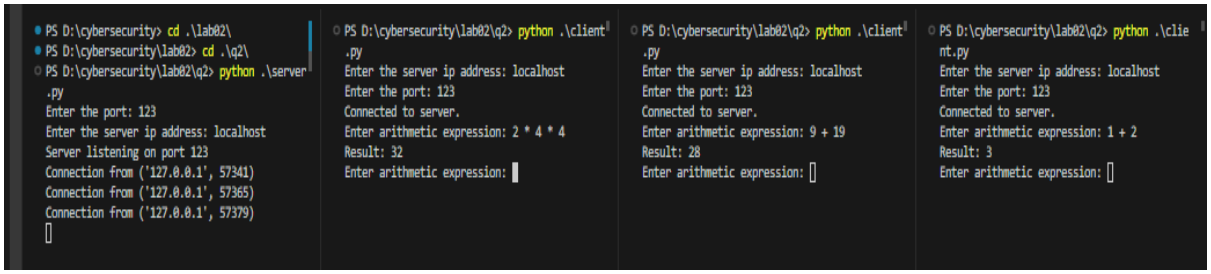
Q2) Question b. Your server program "server2" will be a multi-process or multi-threaded server that will fork a process for every new client it receives. Multiple clients should be able to simultaneously chat with the server.

Solution: *For this we must allowed to as many as client with the server and perform the arithmetic expression to achieve this I have used the process of multiprocessing where each time a client join, I have just started the new process which is like the fork of the process which makes the ongoing process break into two which allowed the other client to join successfully. I have attached the screenshot of the code and the result where I have run the 4 clients simultaneously and gives the correct evaluation of the given arithmetic expression and more thing to evaluate the expression, I have used the python math library eval function which eval a given mathematical expression and return the result as integer.*

client.py

```python
import socket
import sys

def main():
    server_ip = input("Enter the server ip address: ")
    server_port = input("Enter the port: ")

    try:
        client_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
        client_socket.connect((server_ip,int(server_port)))
        print("Connected to server.")
        while True:
            expression = input("Enter arithmetic expression: ")
            client_socket.send(expression.encode())
            result = client_socket.recv(1024).decode()
            print("Result:", result)

    except KeyboardInterrupt:
        print("Client terminated.")
    except Exception as e:
        print("Error:", e)
    finally:
        client_socket.close()

if __name__ == "__main__":
    main()
```

Result



server.py

```python
import socket
import sys
import signal
import multiprocessing

def handle_client_connection(client_socket):
    while True:
        try:
            data = client_socket.recv(1024)
            if not data:
                break
            result = eval(data.decode())
            client_socket.send(str(result).encode())
        except Exception as e:
            print("Error:", e)
            break
    client_socket.close()

def handle_client(client_socket, client_address):
    print(f"Connection from {client_address}")
    handle_client_connection(client_socket)

def main():
    port = int(input("Enter the port: "))
    localhost_server=input("Enter the server ip address: ")
    server_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    server_socket.bind((localhost_server, port))
    server_socket.listen(10)
    print(f"Server listening on port {port}")

    while True:
        try:
            client_socket, client_address = server_socket.accept()
            process = multiprocessing.Process(target=handle_client, args=(client_socket, client_address))
            process.start()
            client_socket.close()

        except KeyboardInterrupt:
            print("Server terminated.")
            break
        except Exception as e:
            print("Error:", e)
            break
    server_socket.close()

if __name__ == "__main__":
    main()
```