

Answer the following questions:

1. (10 points) Suppose you run the TCP client without starting the server. What happens exactly and why?

The client sends back an error message stating that the server cannot be found. Simply put, as there is no server to receive the request and acknowledgment of the client. It simply resets until the server can be found

2. (10 points) What is a local host, and how is it used to develop networked applications?

The local host is the current client making the request to the server of another network, it can test out server and network connections on its own by making a part of the original client into a self-contained server that can be communicated with.

3. (Research question- 5points) what a `time.sleep()` does in python?

It is used to add in delay functions to code in python, once the specified time in the code has passed, the rest of the code executes

4. (10 points) Explain in brief about the following system call in python:

a. `bind()`

Connects the hosts address and port to a new socket.

b. `connect()`

Initiates a connection to the TCP server

c. `send()`

Data is sent between the server and the client

d. `recv()`

Data is retrieved between the server and the client

e. `accept()`

Allows the server to accept the clients signals without input and waits for a valid connection

5. (15 points) Write a simple socket program in python to have one client and one server communicating with each other, using a secure chat system. Submit the screenshot for both the scripts and outputs (4 screenshots), in a word or pdf file.

The image displays two screenshots of a PyCharm IDE, showing the implementation of a simple chat server and client using Python sockets.

**Top Screenshot: Server Sequel.py**

```
1 #15/4/2024
2 #server.py
3 import socket
4
5 soc2 = socket.socket()
6 soc2.bind(("localhost", 2000))
7
8 soc2.listen(3)
9 print("Listening in for potential connections.....")
10
11 conn, client_addr = soc2.accept()
12 print("Connection with the client has been successful:", client_addr)
13
14 while True:
15     message = input("put in your message please!")
16
17     if message == "Exit":
18         conn.send("Goodbye, Chat Room!".encode())
19         break
20     conn.send(message.encode()) #If message is not exit, then it is sent to the server
21
22 message = conn.recv(2048).decode() #The server receives a message sent by the client
23 print("Client:", message) #This will print the message received
```

**Bottom Screenshot: Client Sequel.py**

```
1 #Client.py
2 #15/4/2024
3
4 import socket
5
6 soc2 = socket.socket()
7 soc2.connect(("localhost", 2000)) #Sends a connection request to the server
8
9 while True:
10     message = soc2.recv(2048).decode() #Receives the message sent by the server and saves it into a variable named #message
11     print("Server:", message) #Prints the received message
12
13     message = input("Enter the message:") #Client gets a message sent to the server
14
15     if message == "Exit": #Checks if the client wants to exit
16         soc2.send("Client has disconnected...".encode()) #Sends the exit message to the server
17         break
18     soc2.send(message.encode()) #If message isn't "Exit", sends away message to the server!
```

The image displays two screenshots of a PyCharm IDE window, showing the development and execution of a Python socket-based server and client.

**Top Screenshot: Server Sequel.py**

The code in `ServerSequel.py` is as follows:

```
1 #server.py
2 import socket
3
4 soc2 = socket.socket()
5 soc2.bind(("localhost", 2000))
6
7 soc2.listen(3)
8 print("Listening in for potential connections.....")
9
10 conn, client_addr = soc2.accept()
11 print("Connection with the client has been successful:", client_addr)
12
13 while True:
14     message = input("put in your message please!")
15
16     if message == "Exit":
17         conn.send("Goodbye, Chat Room!".encode())
18         break
```

The Run console shows the following output:

```
C:\Users\fezza\PycharmProjects\pythonProject\venv\Scripts\python.exe C:\Users\fezza\PycharmProjects\pythonProject\ServerSequel.py
Listening in for potential connections.....
Connection with the client has been successful: ('127.0.0.1', 56890)
put in your message please!: Hello
Client: Yes?
put in your message please!: Cheese
Client: Client has disconnected...
put in your message please!:
```

**Bottom Screenshot: Client Sequel.py**

The code in `ClientSequel.py` is as follows:

```
1 import socket
2
3 soc2 = socket.socket()
4 soc2.connect(("localhost", 2000)) #Sends a connection request to the server
5
6 while True:
7     message = soc2.recv(2048).decode() #Receives the message sent by the server and saves it into a variable named #message
8     print("Server:", message) #Prints the received message
9
10     message = input("Enter the message.:") #Client gets a message sent to the server
11
12     if message == "Exit": #Checks if the client wants to exit
13         soc2.send("Client has disconnected...".encode()) #Sends the exit message to the server
14         break
15
16 soc2.send(message.encode()) #If message isn't "Exit", sends away message to the server!
```

The Run console shows the following output:

```
C:\Users\fezza\PycharmProjects\pythonProject\venv\Scripts\python.exe C:\Users\fezza\PycharmProjects\pythonProject\ClientSequel.py
Server: Hello!
Enter the message.: Yes
Server: Cheese
Enter the message.: Exit
Process finished with exit code 0
```