
COMPUTER NETWORKS ASSIGNMENT-3

Rajneesh Kumar

Roll no: 2001CS53

REPORT

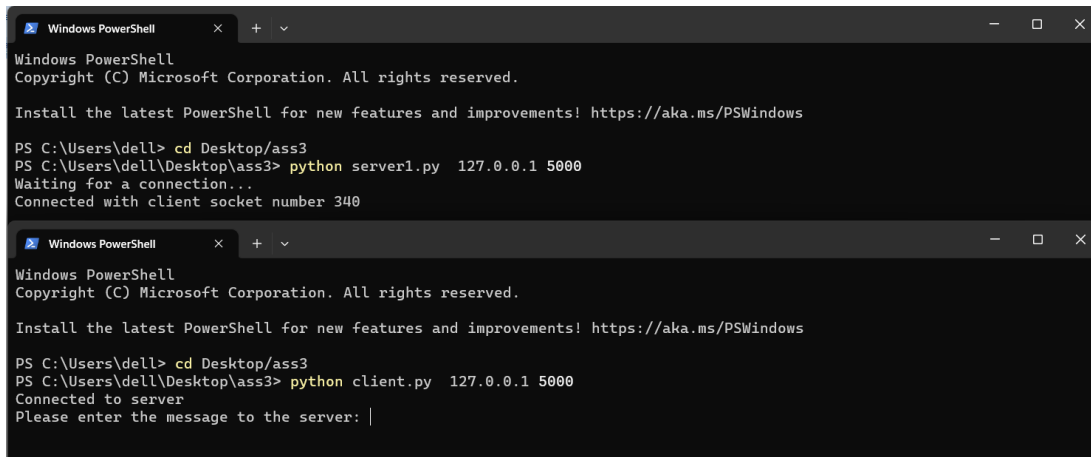
1) Client:

A Python code for a TCP client that connects to a server using the socket library. The code takes two arguments from the command line, the IP address of the server and the port number to connect to. If the user does not provide these two arguments, the code prints a usage message and exits.

The code creates a socket and attempts to connect to the server using the IP address and port number provided. If the connection is successful, it enters into a loop where it prompts the user to enter a message to send to the server, sends the message to the server, receives a response from the server, and prints it on the screen. It then prompts the user whether to continue or exit.

If the connection to the server fails or the server is currently connected to another client, the code prints an error message and exits.

Finally, the code closes the socket when the loop ends or when the user decides to exit.



```
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PS C:\Users\dell> cd Desktop/ass3
PS C:\Users\dell\Desktop\ass3> python server1.py 127.0.0.1 5000
Waiting for a connection...
Connected with client socket number 340

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PS C:\Users\dell> cd Desktop/ass3
PS C:\Users\dell\Desktop\ass3> python client.py 127.0.0.1 5000
Connected to server
Please enter the message to the server: |
```

This is a sample of how we connect client to a server

2) Server1

a TCP server that listens for incoming connections from clients using the socket library. The code takes two arguments from the command line, the IP address of the server and the port number to bind to.

The code creates a socket object and binds it to the IP address and port number provided. It then enters into a loop where it waits for incoming connections from clients using the `accept()` method. Once a connection is established, it prints a message indicating the client socket number.

The server then enters into another loop where it waits for messages from the connected client. It receives the message, evaluates it as an arithmetic expression, and sends the result back to the client. If the input is invalid, it sends an error message back to the client.

If there's an error, the code closes the client socket and breaks the inner loop. When the client disconnects, it prints a message indicating the client socket number that disconnected.

Finally, the code closes the server socket when the loop ends.

```
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PS C:\Users\dell> cd Desktop/ass3
PS C:\Users\dell\Desktop\ass3> python server1.py 127.0.0.1 5000
Waiting for a connection...
Connected with client socket number 340
Client socket 340 sent message: 3*5+8

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PS C:\Users\dell> cd Desktop/ass3
PS C:\Users\dell\Desktop\ass3> python client.py 127.0.0.1 5000
Connected to server
Please enter the message to the server: 3*5+8
Server replied: 23
Do you wish to continue? Y/N |
```

a sample of how we connect client to server1

3) Server2

The difference between server1 and server2 is it can handle multiple connections at the same time

```
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PS C:\Users\dell> python server2.py 127.0.0.1 5000
C:\Users\dell\AppData\Local\Programs\Python\Python310\python.exe: can't open file 'C:\Users\dell\server2.py': [Errno 2] No such file or directory
PS C:\Users\dell> cd Desktop/ass3
PS C:\Users\dell\Desktop\ass3> python server2.py 127.0.0.1 5000
Server is listening on 127.0.0.1:5000
Connected with client socket number 10162
Client socket 10162 sent message: 3*4
Sending reply: 12
Connected with client socket number 10167
Client socket 10167 sent message: 5*67
Sending reply: 335

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PS C:\Users\dell> cd Desktop/ass3
PS C:\Users\dell\Desktop\ass3> python client.py 127.0.0.1 5000
Connected to server
Please enter the message to the server: 3*4
Server replied: 12
Do you wish to continue? Y/N |

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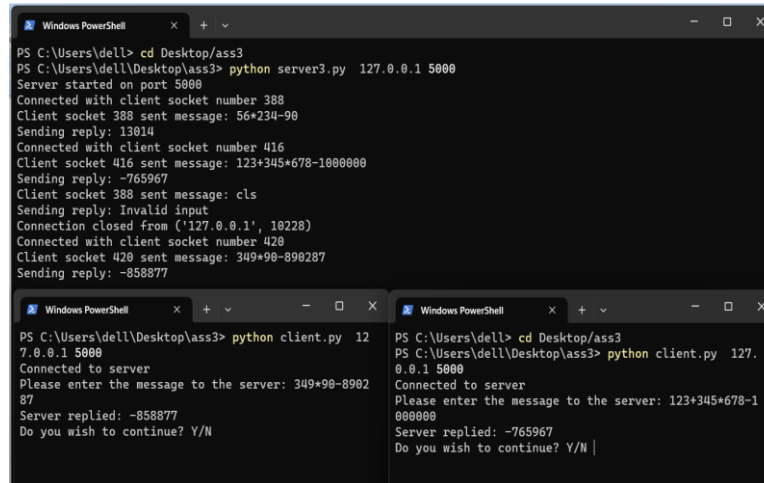
PS C:\Users\dell> cd Desktop/ass3
PS C:\Users\dell\Desktop\ass3> python client.py 127.0.0.1 5000
Connected to server
Please enter the message to the server: 5*67
Server replied: 335
Do you wish to continue? Y/N |
```

server 2 can connect to multiple clients simultaneously

4) Server3:

it's functionality is same as previous servers, It listens for incoming TCP connections on a specified host and port. It uses the select module to multiplex between sockets and handle incoming data from multiple clients simultaneously. When a new client connects, the server adds its socket to a list of sockets

to monitor. When a client sends data, the server parses the arithmetic expression, evaluates it, and sends the result back to the client. If the client disconnects, the server removes its socket from the list and closes the connection. If an exceptional condition occurs on a socket, such as a timeout or a socket error, the server also removes the socket from the list and closes the connection.



```
PS C:\Users\dell> cd Desktop/ass3
PS C:\Users\dell\Desktop\ass3> python server3.py 127.0.0.1 5000
Server started on port 5000
Connected with client socket number 388
Client socket 388 sent message: 56*234-90
Sending reply: 13014
Connected with client socket number 416
Client socket 416 sent message: 123+345*678-1000000
Sending reply: -765967
Client socket 388 sent message: cls
Sending reply: Invalid input
Connection closed from ('127.0.0.1', 10228)
Connected with client socket number 420
Client socket 420 sent message: 349*90-890287
Sending reply: -858877

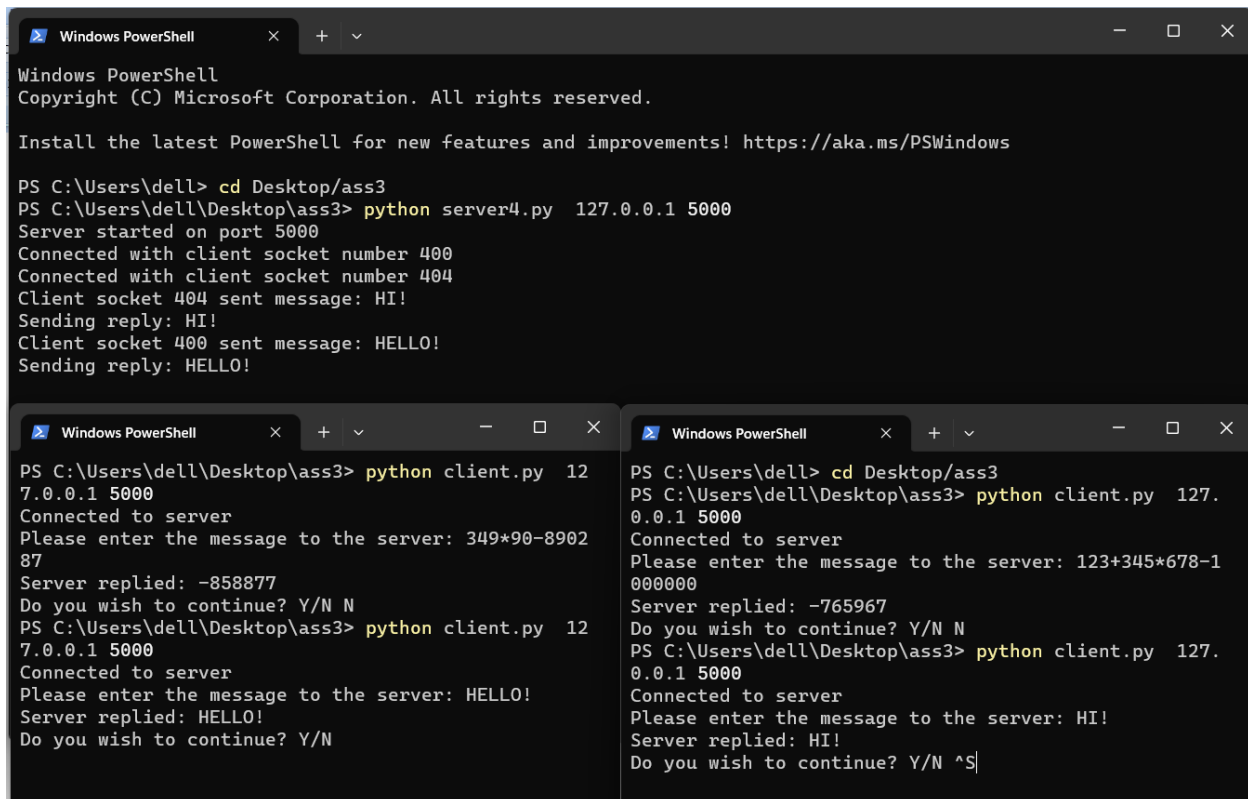
PS C:\Users\dell\Desktop\ass3> python client.py 127.0.0.1 5000
Connected to server
Please enter the message to the server: 349*90-890287
Server replied: -858877
Do you wish to continue? Y/N

PS C:\Users\dell\Desktop\ass3> python client.py 127.0.0.1 5000
Connected to server
Please enter the message to the server: 123+345*678-1000000
Server replied: -765967
Do you wish to continue? Y/N |
```

Server 3

5) Server4:

It echoes the same input to the clients and it can handle multiple clients at a time.



```
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PS C:\Users\dell> cd Desktop/ass3
PS C:\Users\dell\Desktop\ass3> python server4.py 127.0.0.1 5000
Server started on port 5000
Connected with client socket number 400
Connected with client socket number 404
Client socket 404 sent message: HI!
Sending reply: HI!
Client socket 400 sent message: HELLO!
Sending reply: HELLO!

PS C:\Users\dell\Desktop\ass3> python client.py 127.0.0.1 5000
Connected to server
Please enter the message to the server: 349*90-890287
Server replied: -858877
Do you wish to continue? Y/N N
PS C:\Users\dell\Desktop\ass3> python client.py 127.0.0.1 5000
Connected to server
Please enter the message to the server: HELLO!
Server replied: HELLO!
Do you wish to continue? Y/N

PS C:\Users\dell\Desktop\ass3> python client.py 127.0.0.1 5000
Connected to server
Please enter the message to the server: HI!
Server replied: HI!
Do you wish to continue? Y/N ^$|
```

Server 4 replying to the client with same input message

