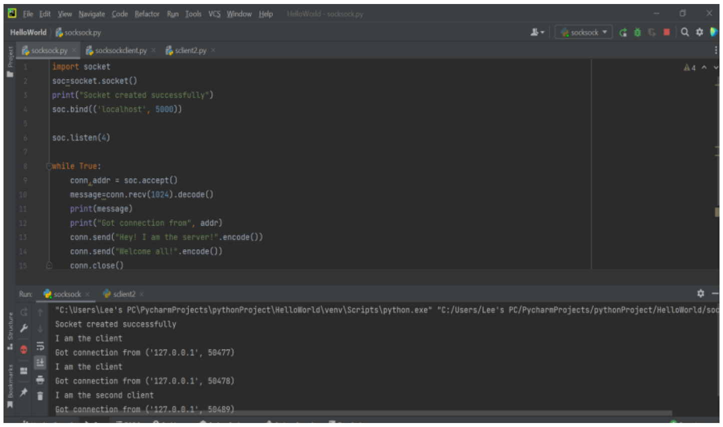
1. If you run a TCP client without the server, there will be an error, because there was never a connection established with the server.

2. Localhost is the computer or hostname that is currently in use to run a program and serves as a virtual server. It is used to develop networked applications because it allows developers to test their applications without a connection to the web to do so.

3. The time.sleep() function adds a delay in the execution of a program.

4. a. bind()- connects a port number and IP address to a socket
    a. connect() - connects a TCP-based client socket to a TCP-based server socket.
    b. send()- sends data from one socket to another
    c. recv() - receive messages from another socket
    d. accept() - accepts an incoming connection request from a TCP client.

5

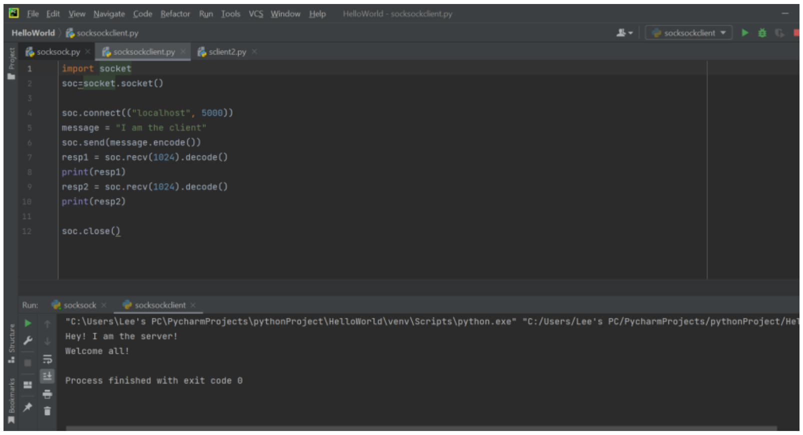


```
import socket
soc=socket.socket()
print("Socket created successfully")
soc.bind(('localhost', 5000))

soc.listen(4)

while True:
    conn,addr = soc.accept()
    message=conn.recv(1024).decode()
    print(message)
    print("Got connection from", addr)
    conn.send("Hey! I am the server!".encode())
    conn.send("Welcome all!".encode())
    conn.close()
```

```
"C:\Users\Lee's PC\PycharmProjects\pythonProject\HelloWorld\venv\Scripts\python.exe" "C:/Users/Lee's PC/PycharmProjects/pythonProject/HelloWorld/soc
Socket created successfully
I am the client
Got connection from ('127.0.0.1', 50477)
I am the client
Got connection from ('127.0.0.1', 50478)
I am the second client
Got connection from ('127.0.0.1', 50489)
```



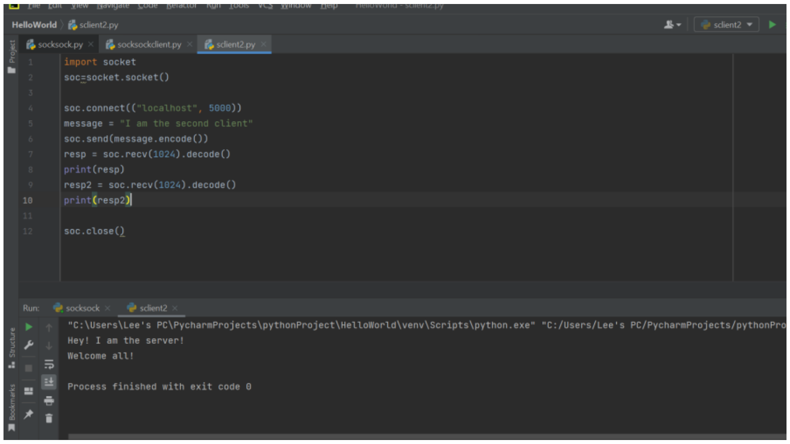
```
import socket
soc=socket.socket()

soc.connect(("localhost", 5000))
message = "I am the client"
soc.send(message.encode())
resp1 = soc.recv(1024).decode()
print(resp1)
resp2 = soc.recv(1024).decode()
print(resp2)

soc.close()
```

```
"C:\Users\Lee's PC\PycharmProjects\pythonProject\HelloWorld\venv\Scripts\python.exe" "C:/Users/Lee's PC/PycharmProjects/pythonProject/Hel
Hey! I am the server!
Welcome all!

Process finished with exit code 0
```



```python
import socket
soc=socket.socket()

soc.connect(("localhost", 5000))
message = "I am the second client"
soc.send(message.encode())
resp = soc.recv(1024).decode()
print(resp)
resp2 = soc.recv(1024).decode()
print(resp2)

soc.close()
```

```
"C:\Users\Lee's PC\PycharmProjects\pythonProject\HelloWorld\venv\Scripts\python.exe" "C:/Users/Lee's PC/PycharmProjects/pythonPro
Hey! I am the server!
Welcome all!

Process finished with exit code 0
```