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DS Lab – 4 16/3/2021

Examples (Lab Exercises follow them)

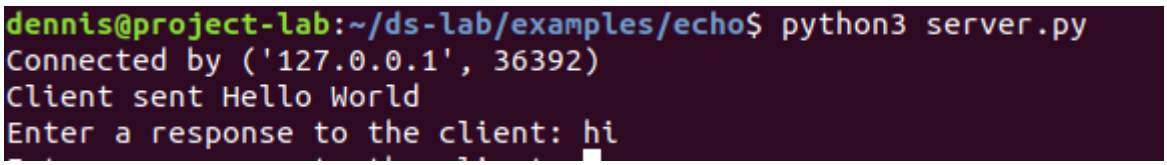
EX1. Echo server

Client:

```
import socket

HOST = '127.0.0.1'
PORT = 2053

with socket.socket(socket.AF_INET, socket.SOCK_STREAM) as s:
        s.connect((HOST, PORT))
        s.sendall(b"Hello World")

        data = s.recv(1024)
        print(f"Received {data.decode()}")
```

Server:

```
import socket

HOST = '127.0.0.1'
PORT = 2053

with socket.socket(socket.AF_INET, socket.SOCK_STREAM) as s:
        s.bind((HOST, PORT))
        s.listen()

        conn, addr = s.accept()

        with conn:
                print(f"Connected by {addr}")
                while True:
                        data = conn.recv(1024)
                        if data:
                                print(f"Client sent {data.decode()}")

                        resp = input("Enter a response to the client: ")
                        if not data:
                                break

                        conn.sendall(resp.encode())
        conn.close()
```



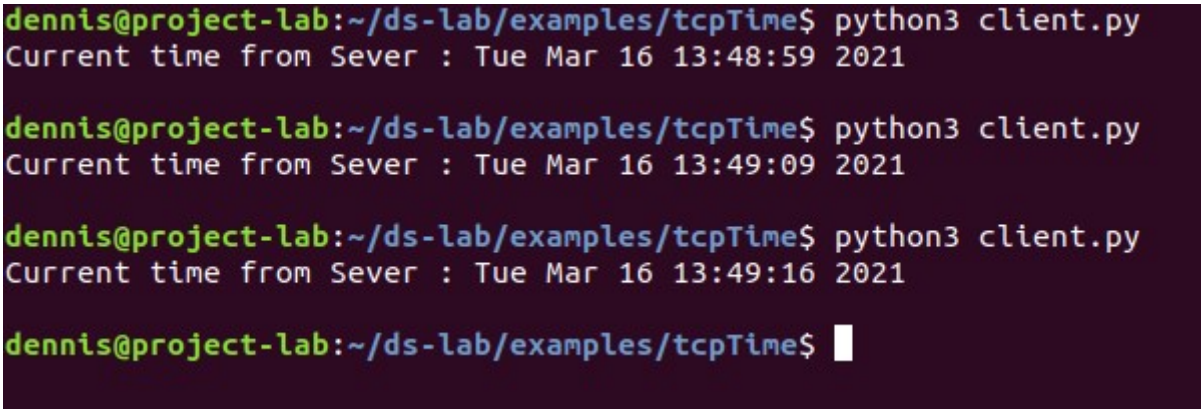
EX2. TCP TIME
client

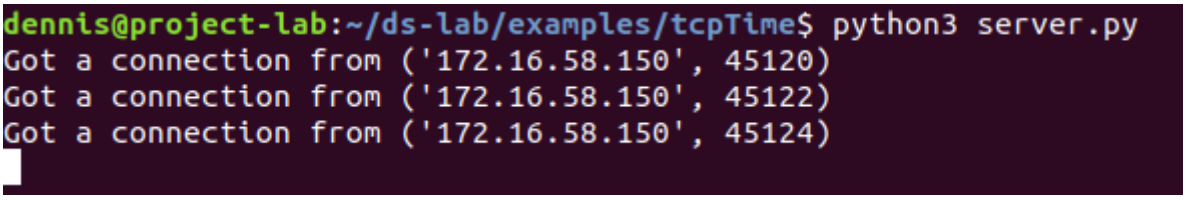
```
import socket

# create a socket object
s = socket.socket(socket.AF_INET, socket.SOCK_STREAM)

# get local machine name
host = socket.gethostname()
port = 9991

# connection to hostname on the port.
s.connect((host, port))

# Receive no more than 1024 bytes
tm = s.recv(1024)
print('Current time from Sever :', tm.decode())

s.close()
```

Server:

```
import socket
import time

# create a socket object
serversocket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
```

```
# get local machine name
host = socket.gethostname()
port = 9991

# bind to the port
serversocket.bind((host, port))

# queue up to 5 requests
serversocket.listen(5)

while True:
        # establish a connection
        clientsocket,addr = serversocket.accept()
        print("Got a connection from %s" % str(addr))

        currentTime = time.ctime(time.time()) + "\r\n"
        clientsocket.send(currentTime.encode('ascii'))

        clientsocket.close()
```





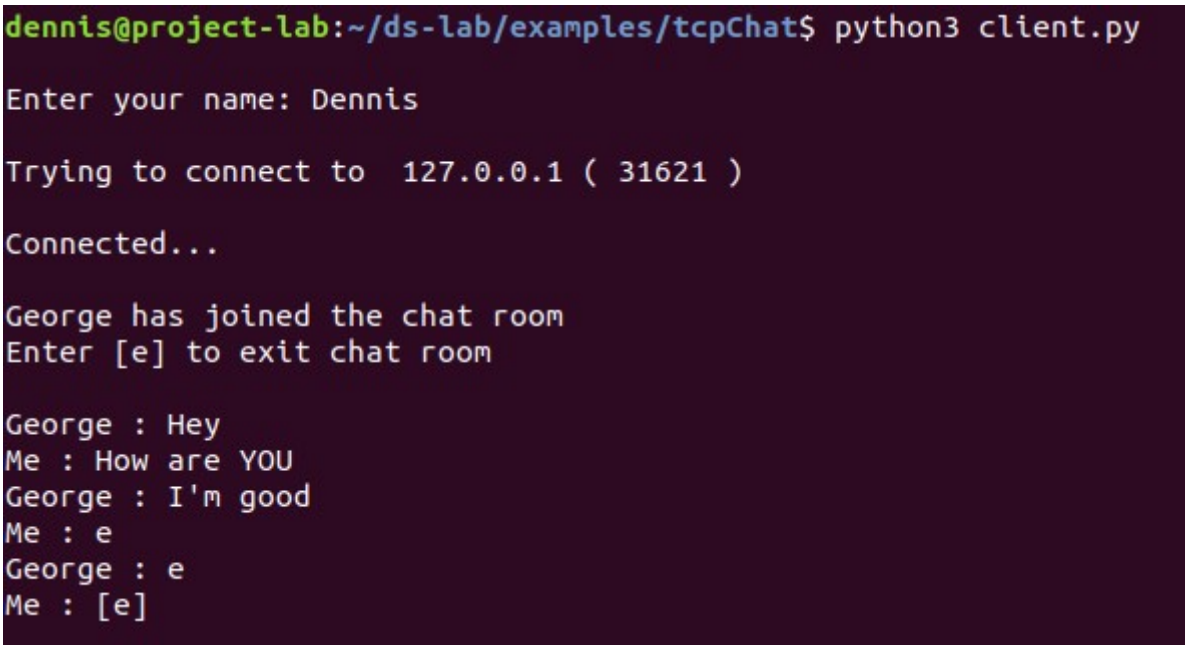
EX3.TCP CHAT
client:

```
import socket

HOST = '127.0.0.1'
PORT = 31621
s = socket.socket()

name = input(str("\nEnter your name: "))

print("\nTrying to connect to ", HOST, "(", PORT, ")\n")
s.connect((HOST, PORT))
print("Connected...\n")

s.send(name.encode())

s_name = s.recv(1024)
s_name = s_name.decode()
print(s_name, "has joined the chat room\nEnter [e] to exit chat room\n")

while True:
        message = s.recv(1024)
        message = message.decode()
        print(s_name, ":", message)

        message = input(str("Me : "))

        if message == "[e]":
                message = "Left chat room!"
                s.send(message.encode())
                print("\n")
                break

        s.send(message.encode())
```

server:

```
import socket

HOST = '127.0.0.1'
PORT = 31621

s = socket.socket()
s.bind((HOST, PORT))

s.listen()
print("\nWaiting for incoming connections...\n")

conn, addr = s.accept()
print("Received connection from ", addr[0], "(", addr[1], ")\n")
```

```
s_name = conn.recv(1024)

s_name = s_name.decode()
print(s_name, "has connected to the chat room\nEnter [e] to exit chat room\n")

name = input(str("Enter your name: "))
conn.send(name.encode())

while True:
        message = input(str("Me : "))

        if message == "[e]":
                message = "Left chat room!"
                conn.send(message.encode())
                print("\n")
                break

        conn.send(message.encode())
        message = conn.recv(1024)
        message = message.decode()
        print(s_name, ":", message)
```



```
dennis@project-lab:~/ds-lab/examples/tcpChat$ python3 server.py

Waiting for incoming connections...

Received connection from  127.0.0.1 ( 34558 )

Dennis has connected to the chat room
Enter [e] to exit chat room

Enter your name: George
Me : Hey
Dennis : How are YOU
Me : I'm good
Dennis : e
Me : e
Dennis : Left chat room!
Me : [e]
```

EX4. Concurrent Server

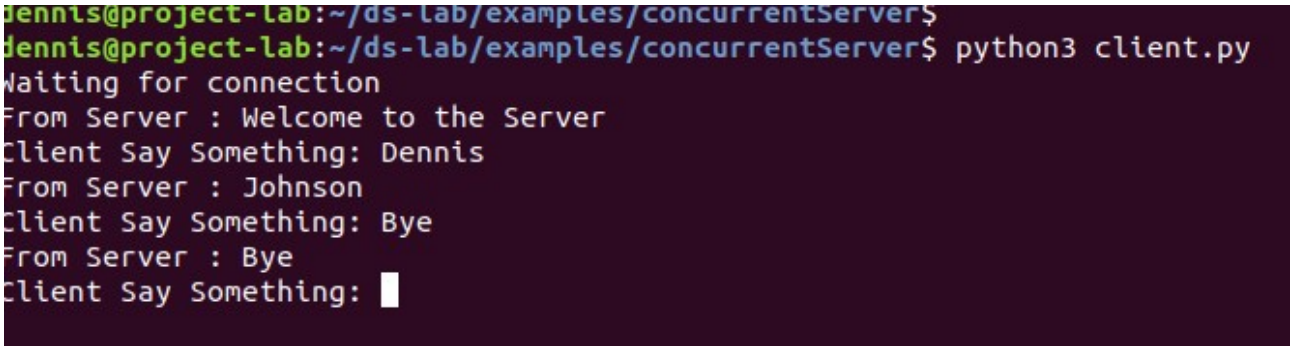
client:

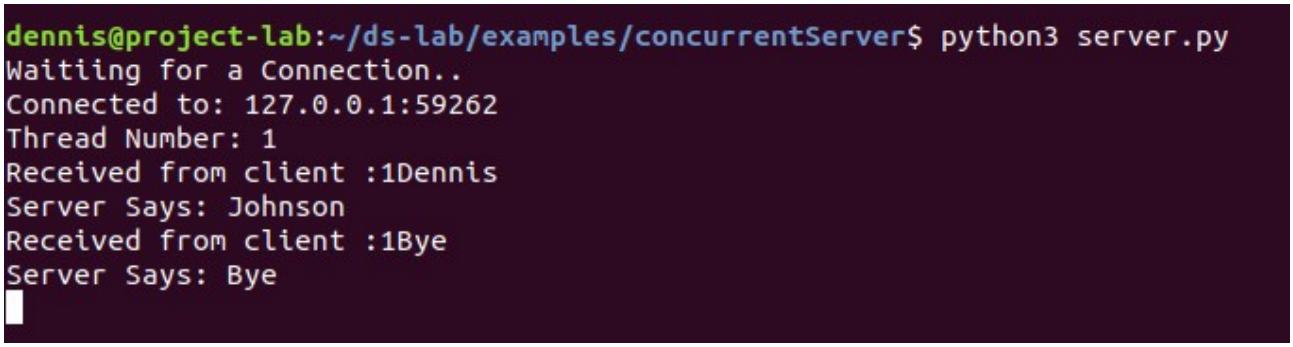
```
import socket

ClientSocket = socket.socket()

host = '127.0.0.1'
port = 11596

print('Waiting for connection')
try:
	ClientSocket.connect((host, port))
except socket.error as e:
	print(str(e))

Response = ClientSocket.recv(1024)
print('From Server : ' + Response.decode())

while True:
	Input = input('Client Say Something: ')
	ClientSocket.send(str.encode(Input))
	Response = ClientSocket.recv(1024)
	print('From Server : ' + Response.decode())

ClientSocket.close()
```

server:

```
import socket
```

```
ClientSocket = socket.socket()

host = '127.0.0.1'
port = 11596

print('Waiting for connection')
try:
	ClientSocket.connect((host, port))
except socket.error as e:
	print(str(e))

Response = ClientSocket.recv(1024)
print('From Server : ' + Response.decode())

while True:
	Input = input('Client Say Something: ')
	ClientSocket.send(str.encode(Input))
	Response = ClientSocket.recv(1024)
	print('From Server : ' + Response.decode())

ClientSocket.close()
```





LAB EXERCISES:

1.UDP Time
client:

```
import socket

# create a socket object
s = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)

# get local machine name
host = socket.gethostname()
port = 9991

# Receive no more than 1024 bytes
msg = "Send me the time"
s.sendto(msg.encode(), (host, port))
tm, addr = s.recvfrom(1024)
print('Current time from Sever :', tm.decode())
s.close()
```

server:

```
import socket
import time

# create a socket object
serversocket = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)

# get local machine name
host = socket.gethostname()
port = 9991

# bind to the port
serversocket.bind((host, port))

while True:
        data, addr = serversocket.recvfrom(1024)

        if not data:
                continue

        print(data.decode(), addr)
        currentTime = time.ctime(time.time()) + "\r\n"
        serversocket.sendto(currentTime.encode('ascii'), addr)
serversocket.close()
```

```
dennis@project-lab:~/ds-lab/lab4/udpTime$ python3 client.py
Current time from Sever : Tue Mar 16 14:46:21 2021

dennis@project-lab:~/ds-lab/lab4/udpTime$ python3 client.py
Current time from Sever : Tue Mar 16 14:46:46 2021
```

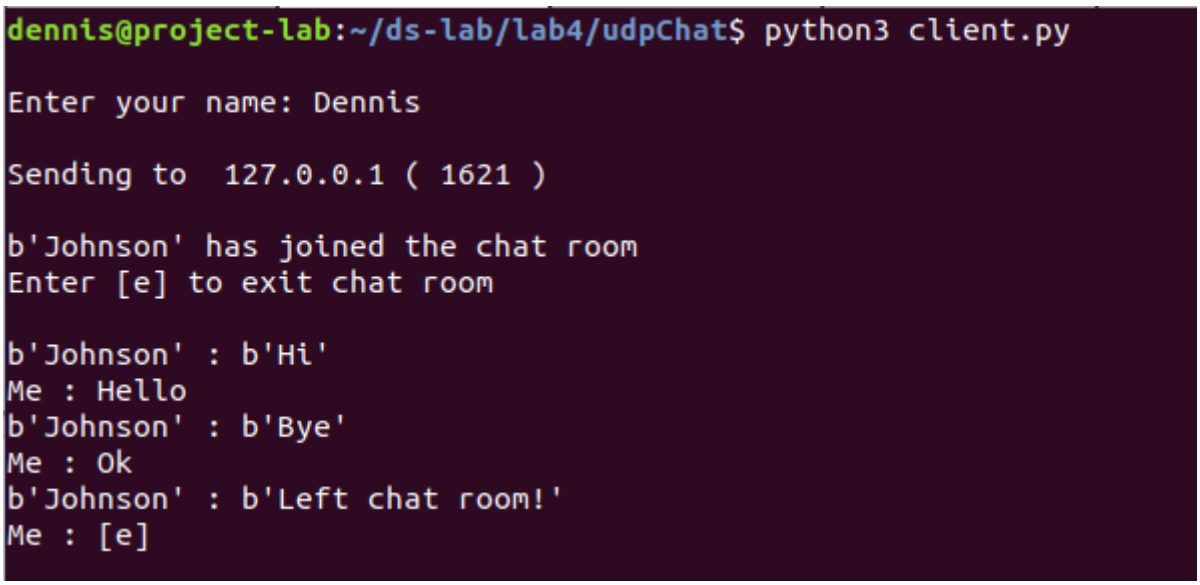
```
dennis@project-lab:~/ds-lab/lab4/udpTime$ python3 server.py
Send me the time ('172.16.58.150', 43606)
Send me the time ('172.16.58.150', 35870)
```

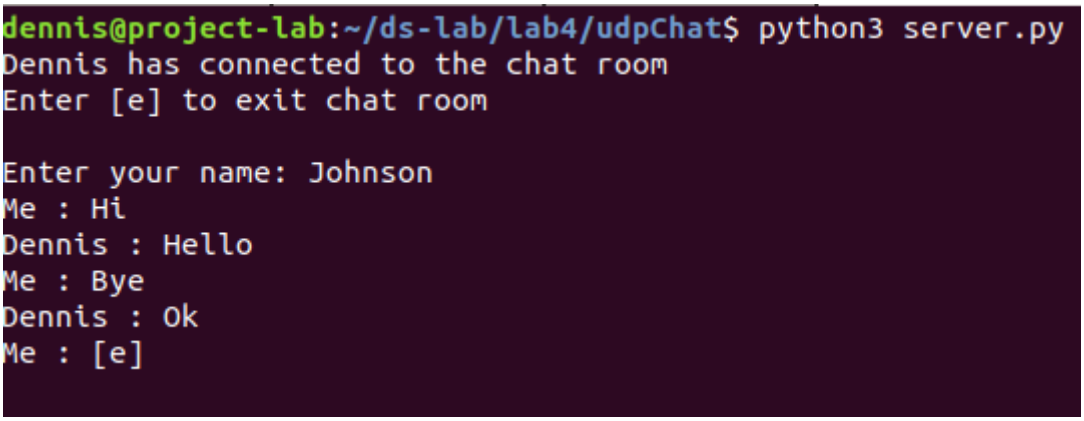
2.UDP Chat
client:

```
import socket

HOST = '127.0.0.1'
PORT = 1621
s = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)

name = input(str("\nEnter your name: "))

print("\nSending to ", HOST, "(", PORT, ")\n")
s.sendto(name.encode(), (HOST, PORT))

s_name, addr = s.recvfrom(1024)
print(s_name, "has joined the chat room\nEnter [e] to exit chat room\n")

while True:
        message, addr = s.recvfrom(1024)
        print(s_name, ":", message)

        message = input(str("Me : "))

        if message == "[e]":
                message = "Left chat room!"
                s.sendto(message.encode(), addr)
                print("\n")
                break

        s.sendto(message.encode(), addr)
```

server:

```
import socket

HOST = '127.0.0.1'
PORT = 1621

s = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
s.bind((HOST, PORT))

s_name, addr = s.recvfrom(1024)

s_name = s_name.decode()
print(s_name, "has connected to the chat room\nEnter [e] to exit chat room\n")

name = input(str("Enter your name: "))
s.sendto(name.encode(), addr)

while True:
        message = input(str("Me : "))

        if message == "[e]":
                message = "Left chat room!"
                s.sendto(message.encode(), addr)
                print("\n")
                break

        s.sendto(message.encode(), addr)
        message, addr = s.recvfrom(1024)
        message = message.decode()
        print(s_name, ":", message)
```





3.P2P TCP Chat

client

```
import socket

HOST = '172.16.58.131'
PORT = 2053
s = socket.socket()

name = input(str("\nEnter your name: "))

print("\nTrying to connect to ", HOST, "(", PORT, ")\n")
s.connect((HOST, PORT))
print("Connected...\n")

s.send(name.encode())

s_name = s.recv(1024)
s_name = s_name.decode()
print(s_name, "has joined the chat room\nEnter [e] to exit chat room\n")

while True:
        message = s.recv(1024)
        message = message.decode()
        print(s_name, ":", message)

        message = input(str("Me : "))

        if message == "[e]":
                message = "Left chat room!"
                s.send(message.encode())
                print("\n")
```

```
            break

        s.send(message.encode())
```

server: (used server code implementation of the server computer insteead)

```
import socket

HOST = '127.0.0.1'
PORT = 31621

s = socket.socket()
s.bind((HOST, PORT))

s.listen()
print("\nWaiting for incoming connections...\n")

conn, addr = s.accept()
print("Received connection from ", addr[0], "(", addr[1], ")\n")

s_name = conn.recv(1024)

s_name = s_name.decode()
print(s_name, "has connected to the chat room\nEnter [e] to exit chat room\n")

name = input(str("Enter your name: "))
conn.send(name.encode())

while True:
        message = input(str("Me : "))

        if message == "[e]":
                message = "Left chat room!"
                conn.send(message.encode())
                print("\n")
                break

        conn.send(message.encode())
        message = conn.recv(1024)
        message = message.decode()
        print(s_name, ":", message)
```

```
dennis@project-lab:~/ds-lab/examples/p2p$ python3 client.py

Enter your name: Dennis

Trying to connect to  172.16.58.131 ( 2053 )

Connected...

hi man has joined the chat room
Enter [e] to exit chat room
```

```
180905002@project-lab:~/Desktop/180905002_DSLab/Lab4$ python3 qst3_server.py
#####Server is listening#####
1 .Server received:  Dennis
Type some text to send=>hi man
2 .Server sent: hi man
#####Server is listening#####
```