Lab4 – Socket Programming

Lab Report

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Q1: What is the output when running this python program? Screen capture the executing result.

Answer:
The output is ```
stocket successfully created
the socket has successfully connected to google
```

```
~/L/Cl/OneDrive-P/HK/2/Sem 2/COMP23/La/Lab4  /opt/homebrew/bin/python3 "/Users/davidjiang/Library/CloudStorage/OneDrive-Personal/HKPolyU/2 Broadening Year/Sem 2/COMP2322 - Computer Networking/Lab & Tut/Lab4/GoogleClient.py"
socket successfully created
the socket has successfully connected to google
```

Q2: What are the outputs when running these python programs? Screen capture the executing result.

Answer:
Server:
socket successfully created
socket binded to 12345
socket is listening
Client:
from server: thank you for connecting
Server:
got connection from ('127.0.0.1', 50371)

```
~/L/Cl/OneDrive-P/HK/2/Sem 2/COMP23/La/Lab4  /opt/homebrew/bin/python3 "/Users/davidjiang/Library/CloudStorage/OneDrive-Personal/HKPolyU/2 Broadening Year/Sem 2/COMP2322 - Computer Networking/Lab & Tut/Lab4/TCPServer.py"
socket successfully created
socket binded to 12345
socket is listening
got connection from ('127.0.0.1', 50371)
```

```
~/L/Cl/OneDrive-P/HK/2/Sem 2/COMP2322 - Computer Networking/Lab & Tut/Lab4  /opt/homebrew/bin/python3 "/Users/davidjiang/Library/CloudStorage/OneDrive-Personal/HKPolyU/2 Broadening Year/Sem 2/COMP2322 - Computer Networking/Lab & Tut/Lab4/TCPClient.py"
from server: thank you for connecting
```

Q3: Modify the Python program “TCPClient.py”. Use a new socket port number for the client’s connected socket to the server socket. You need to use 5-digit number “3xxxx” as your new socket port number, where “xxxx” is the last four digits of your student ID. Your program needs to print out the TCP connection (TCP socket’s four tuples) established between the client and server processes. Run the Python programs in two separated window terminals and screen capture the executing result. Attach your modified program code

Answer:
Client Code:
```

Q3TCPClient.py > ...

```python
# import the socket library
import socket
# create a socket object
clientSocket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
# define the server's name and port on which you want to connect
serverName = '127.0.0.1'
serverPort = 12345
# connect to the server
clientPort = 33962
clientSocket.bind(('', clientPort))

clientSocket.connect((serverName, serverPort))
# receive data from the server and decode to get the string.
sentence = clientSocket.recv(1024).decode()
print ("from server:", sentence)
# close the connection
clientSocket.close()
```

Server Code:

Q4TCPServer.py > ...

```python
# import the socket library
import socket
# create a socket object
serverSocket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
print("socket successfully created")
# reserve a port=12345 on your computer
serverPort = 12345
# bind to the port
# we have not typed any ip in the ip field, instead we have inputted an empty string.
# this makes the server listen to requests coming from other computers on the network
serverSocket.bind(('', serverPort))
print("socket binded to %s" % (serverPort))
# put the socket into listening mode
serverSocket.listen(5)
print("socket is listening")
# a forever loop until we interrupt it or an error occurs
while True:
    # establish connection with client.
    connectionSocket, addr = serverSocket.accept()
    print('got connection from', addr)
    # send a message to the client, using encode() to send byte type

    passwd = connectionSocket.recv(1024).decode()

    if (passwd == '3962'):
        sentence = 'Your password is correct!'
    else:
        sentence = 'Your password is incorrect!'
    connectionSocket.send(sentence.encode())
    # close the connection with the client
    connectionSocket.close()
    break
```

Output:

```
~/L/Cl/OneDrive-P/HK/2/Sem 2/COMP23/La/Lab4  /opt/homebrew/bin/python3 "/Users/davidjiang/Library/CloudStorage/OneDrive-Personal/HKPolyU/2 Br
oadening Year/Sem 2/COMP2322 - Computer Networking/Lab & Tut/Lab4/Q3TCPServer.py"
socket successfully created
socket binded to 12345
socket is listening
got connection from ('127.0.0.1', 33962)
```

```
~/L/Cl/OneDrive-P/HK/2/Sem 2/COMP23/La/Lab4  /opt/homebrew/bin/python3 "/Users/davidjiang/Library/CloudStorage/OneDrive-Personal/HKPolyU/2 Br
oadening Year/Sem 2/COMP2322 - Computer Networking/Lab & Tut/Lab4/Q3TCPClient.py"
from server: thank you for connecting
```

Q4: Modify the Python programs “TCPClient.py” and “TCPServer.py”. Add a function to allow the client user to input the string of 4-digit number “xxxx” as the password to the server process, where “xxxx” is the last four digits of your student ID. When the user inputs correct 4-digit number, the server process will send a message of “Your password is correct!” to the client process; otherwise, the server process will send a message of “Your password is incorrect!” to the client process. Run the Python programs in two separated window terminals and screen capture the executing result. Attach your modified program codes.

Answer:

Server Code:

Q4TCPServer.py > ...

```python
# import the socket library
import socket
# create a socket object
serverSocket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
print("socket successfully created")
# reserve a port=12345 on your computer
serverPort = 12345
# bind to the port
# we have not typed any ip in the ip field, instead we have inputted an empty string.
# this makes the server listen to requests coming from other computers on the network
serverSocket.bind(('', serverPort))
print("socket binded to %s" % (serverPort))
# put the socket into listening mode
serverSocket.listen(5)
print("socket is listening")
# a forever loop until we interrupt it or an error occurs
while True:
    # establish connection with client.
    connectionSocket, addr = serverSocket.accept()
    print('got connection from', addr)
    # send a message to the client, using encode() to send byte type

    passwd = connectionSocket.recv(1024).decode()

    if (passwd == '3962'):
        sentence = 'Your password is correct!'
    else:
        sentence = 'Your password is incorrect!'
    connectionSocket.send(sentence.encode())
    # close the connection with the client
    connectionSocket.close()
    break

```

Client Code:

Q4TCPClient.py > ...

```python
# import the socket library
import socket
# create a socket object
clientSocket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
# define the server's name and port on which you want to connect
serverName = '127.0.0.1'
serverPort = 12345
# connect to the server
clientSocket.connect((serverName, serverPort))
# receive data from the server and decode to get the string.
# password = 3962
password = input("Please input password: ")
clientSocket.send(str(password).encode())
sentence = clientSocket.recv(1024).decode()
print ("from server:", sentence)
# close the connection
clientSocket.close()
```

Output:

```
~/L/Cl/OneDrive-P/HK/2/Sem 2/COMP23/La/Lab4  /opt/homebrew/bin/python3 "/Users/davidjiang/Library/CloudStorage/OneDrive-Personal/HKPolyU/2 Br
oadening Year/Sem 2/COMP2322 - Computer Networking/Lab & Tut/Lab4/Q4TCPServer.py"
socket successfully created
socket binded to 12345
socket is listening
got connection from ('127.0.0.1', 53217)
```

```
~/L/Cl/OneDrive-P/HK/2/Sem 2/COMP23/La/Lab4  /opt/homebrew/bin/python3 "/Users/davidjiang/Library/CloudStorage/OneDrive-Personal/HKPolyU/2 Br
oadening Year/Sem 2/COMP2322 - Computer Networking/Lab & Tut/Lab4/Q4TCPClient.py"
Please input password: 3962
from server: Your password is correct!
```

```
~/L/Cl/OneDrive-P/HK/2/Sem 2/COMP23/La/Lab4  /opt/homebrew/bin/python3 "/Users/davidjiang/Library/CloudStorage/OneDrive-Personal/HKPolyU/2 Br
oadening Year/Sem 2/COMP2322 - Computer Networking/Lab & Tut/Lab4/Q4TCPClient.py"
Please input password: 3963
from server: Your password is incorrect!
```