

UMKC

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Network Architecture 1

2019 Fall Individual Project1

Part 2

a)

SERVER:

```
var net = require('net');
var server = net.createServer();
server.on('connection', handleConnection);
server.listen(8080, '10.151.1.146', function() {
  console.log('Your server is now listening to %j', server.address());
});
server.maxConnections = 1;
function handleConnection(c)
{
  var Addr = c.remoteAddress + ':' + c.remotePort;
  console.log('You have a new client connection from the ipaddress %s', Addr);
  c.setEncoding('utf8');
  c.on('data', onConnData);
  c.once('close', onConnClose);
  c.on('error', onConnError);

function onConnData(d)
{
  console.log('You are getting data from %s: %j', Addr, d);
  if (d == "exit")
  {
    c.write(d);
    server.close();
  }
}

function onConnClose()
{
  console.log('Your connection from the client %s closed', Addr);
}

function onConnError(e)
{
  console.log('There is an error %s connection: %s', Addr, e.message);
}
}
```

CLIENT:

```
import sys
import select
import socket
# randomly take some buffer size and port number
name_host = '10.151.1.146'
size_buffer = 1024
port_no = 8080
if __name__ == "__main__":
    soc = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    #checking the connection of the system
    try:
        soc.connect((name_host, port_no))
    except:
        print ('The connection for the system is not available to proceed!!!!')
        sys.exit()

    print ('Your connection is ready now....')
    #Checking the data connection
    while True:
        Listsocket = [sys.stdin, soc]
        readings, _, _ = select.select(Listsocket, [], [])

        for socket in readings:
            if socket == soc:
                data_rec = socket.recv(size_buffer)
                if not data_rec:
                    print ('\nNo data received and disconnected from the server!!!!')
                    sys.exit()
                elif data_rec.decode() == "exit":
                    print ("And the connection got closed!!!!")
                    sys.exit()
                else:
                    print(data_rec.decode())
            else:
                #User giving the message
                msg = input()
                soc.send(msg.encode("utf8"))

soc.close()
```

The client code is same for all the questions.

Ip address of localhost 10.151.1.146:

```
Command Prompt
Microsoft Windows [Version 10.0.18362.418]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\geeta>ipconfig

Windows IP Configuration

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::1140:ea23:aeda:e660%45
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

Wireless LAN adapter Local Area Connection* 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . : kc.umkc.edu
    Link-local IPv6 Address . . . . . : fe80::79ff:74e5:d6d0:5dc4%13
    IPv4 Address. . . . . : 10.151.1.146
    Subnet Mask . . . . . : 255.255.254.0
    Default Gateway . . . . . : 10.151.1.254

Ethernet adapter Bluetooth Network Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

C:\Users\geeta>
```

Starting the server:

```
C:\Windows\System32\cmd.exe - node gm3xb-part2-a-server-gm3xb.js
Microsoft Windows [Version 10.0.18362.418]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\geeta\Desktop>node gm3xb-part2-a-server-gm3xb.js
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
```

Starting the client:

```
Terminal
Thu 17:22
geetanjali@geetanjali-VirtualBox: ~/Desktop

File Edit View Search Terminal Help
geetanjali@geetanjali-VirtualBox:~$ cd Desktop
geetanjali@geetanjali-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
```

Sending messages from client:

```
geetanjali@geetanjali-VirtualBox: ~/Desktop
File Edit View Search Terminal Help
geetanjali@geetanjali-VirtualBox:~$ cd Desktop
geetanjali@geetanjali-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
Hi from Client
Good evening
exit
And the connection got closed!!!!
geetanjali@geetanjali-VirtualBox:~/Desktop$
```

Server-side connection establishment and receiving messages:

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.18362.418]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\geeta\Desktop>node gm3xb-part2-a-server-gm3xb.js
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
You have a new client connection from the ipaddress 10.151.1.146:63093
You are getting data from 10.151.1.146:63093: "Hi from Client"
You are getting data from 10.151.1.146:63093: "Good evening"
You are getting data from 10.151.1.146:63093: "exit"
Your connection from the client 10.151.1.146:63093 closed

C:\Users\geeta\Desktop>
```

Here, the connection gets closed when we give exit and the maximum number of connections are 1.

b)

SERVER:

```
var net = require('net');
var server = net.createServer();
server.on('connection', handleConnection);
server.listen(8080, '10.151.1.146', function() {
  console.log('Your server is now listening to %j', server.address());
});
server.maxConnections = 1;
function handleConnection(c)
{
  var Addr = c.remoteAddress + ':' + c.remotePort;
  console.log('You have a new client connection from the ipaddress %s', Addr);
  c.setEncoding('utf8');
  c.on('data', onConnData);
  c.once('close', onConnClose);
  c.on('error', onConnError);

function onConnData(d)
{
  console.log('You are getting data from %s: %j', Addr, d);
  if (d == "exit")
  {
    c.write(d);
  }
}

function onConnClose()
{
  console.log('Your connection from the client %s closed', Addr);
}

function onConnError(e)
{
  console.log('Error in %s connection: %s', Addr, e.message);
}
}
```

CLIENT:

```
import sys
import select
import socket
# randomly take some buffer size and port number
name_host = '10.151.1.146'
size_buffer = 1024
port_no = 8080
if __name__ == "__main__":
    soc = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    #checking the connection of the system
    try:
        soc.connect((name_host, port_no))
    except:
        print ('The connection for the system is not available to proceed!!!!')
        sys.exit()

    print ('Your connection is ready now....')
    #Checking the data connection
    while True:
        Listsocket = [sys.stdin, soc]
        readings, _, _ = select.select(Listsocket, [], [])

        for socket in readings:
            if socket == soc:
                data_rec = socket.recv(size_buffer)
                if not data_rec:
                    print ('\nNo data received and disconnected from the server!!!!')
                    sys.exit()
                elif data_rec.decode() == "exit":
                    print ("And the connection got closed!!!!")
                    sys.exit()
                else:
                    print(data_rec.decode())
            else:
                #User giving the message
                msg = input()
                soc.send(msg.encode("utf8"))

soc.close()
```

Server starting

C:\Windows\System32\cmd.exe - node gm3xb-part2-b-server-gm3xb.js

```
C:\Users\geeta\Desktop>node gm3xb-part2-b-server-gm3xb.js
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
```

Client starting and sending messages:

```
geetanjali@geetanjali-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
Hello from Client1
Good Evening
exit
And the connection got closed!!!!
geetanjali@geetanjali-VirtualBox:~/Desktop$
```

Here, the client-1 connection is closed.

Server side the messages are received, and the connection is closed for client-1 when exit given. But, the server connection is still open such that the other clients gets connected.

```
C:\Windows\System32\cmd.exe - node gm3xb-part2-b-server-gm3xb.js

C:\Users\geeta\Desktop>node gm3xb-part2-b-server-gm3xb.js
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
You have a new client connection from the ipaddress 10.151.1.146:63211
You are getting data from 10.151.1.146:63211: "Hello from Client1"
You are getting data from 10.151.1.146:63211: "Good Evening"
You are getting data from 10.151.1.146:63211: "exit"
Your connection from the client 10.151.1.146:63211 closed
```


Now, another client is open to connect.

We are sending another connection from another client.

```
les  Terminal ▾ Thu 18:01
bhashitha@bhashitha-VirtualBox: ~/Desktop


File Edit View Search Terminal Help
bhashitha@bhashitha-VirtualBox:~$ cd Desktop
bhashitha@bhashitha-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
Good evening from Client2
Hi
exit
And the connection got closed!!!!
bhashitha@bhashitha-VirtualBox:~/Desktop$
```


Server receiving the second client connection

 C:\Windows\System32\cmd.exe - node gm3xb-part2-b-server-gm3xb.js

```
C:\Users\geeta\Desktop>node gm3xb-part2-b-server-gm3xb.js
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
You have a new client connection from the ipaddress 10.151.1.146:63211
You are getting data from 10.151.1.146:63211: "Hello from Client1"
You are getting data from 10.151.1.146:63211: "Good Evening"
You are getting data from 10.151.1.146:63211: "exit"
Your connection from the client 10.151.1.146:63211 closed
You have a new client connection from the ipaddress 10.151.3.106:58158
```

Messages are displayed

 C:\Windows\System32\cmd.exe - node gm3xb-part2-b-server-gm3xb.js

```
C:\Users\geeta\Desktop>node gm3xb-part2-b-server-gm3xb.js
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
You have a new client connection from the ipaddress 10.151.1.146:63211
You are getting data from 10.151.1.146:63211: "Hello from Client1"
You are getting data from 10.151.1.146:63211: "Good Evening"
You are getting data from 10.151.1.146:63211: "exit"
Your connection from the client 10.151.1.146:63211 closed
You have a new client connection from the ipaddress 10.151.3.106:58158
You are getting data from 10.151.3.106:58158: "Good evening from Client2"
You are getting data from 10.151.3.106:58158: "Hi"
You are getting data from 10.151.3.106:58158: "exit"
Your connection from the client 10.151.3.106:58158 closed
```

Still the connection here is open for clients to be connected.

c)

SERVER:

```
var net = require('net');
var sockets = [];
var server = net.createServer(function(socket)
{
  sockets.push(socket);
});
server.on('connection', handleConnection);
server.listen(8080, '10.151.1.146', function()
{
  console.log('Your server is now listening to %j', server.address());
});
function handleConnection(c)
{
  var Addr = c.remoteAddress + ':' + c.remotePort;
  console.log('You have a new client connection from the ipaddress %s', Addr);
  c.setEncoding('utf8');
  c.on('data', onConnData);
  c.once('close', onConnClose);
  c.on('error', onConnError);

function onConnData(d)
{
  console.log('You are getting data from %s: %j', Addr, d);
  if (d == "exit")
  {
    c.write(d);
  }
}

function onConnClose()
{
  console.log('Your connection from the client %s closed', Addr);
}

function onConnError(e)
{
  console.log('Error in %s connection: %s', Addr, e.message);
}
}
```

CLIENT:

```
import sys
import select
import socket
# randomly take some buffer size and port number
name_host = '10.151.1.146'
size_buffer = 1024
port_no = 8080
if __name__ == "__main__":
    soc = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    #checking the connection of the system
    try:
        soc.connect((name_host, port_no))
    except:
        print ('The connection for the system is not available to proceed!!!!')
        sys.exit()

    print ('Your connection is ready now....')
    #Checking the data connection
    while True:
        Listsocket = [sys.stdin, soc]
        readings, _, _ = select.select(Listsocket, [], [])

        for socket in readings:
            if socket == soc:
                data_rec = socket.recv(size_buffer)
                if not data_rec:
                    print ('\nNo data received and disconnected from the server!!!!')
                    sys.exit()
                elif data_rec.decode() == "exit":
                    print ("And the connection got closed!!!!")
                    sys.exit()
                else:
                    print(data_rec.decode())
            else:
                #User giving the message
                msg = input()
                soc.send(msg.encode("utf8"))

soc.close()
```

Server starting

```
C:\Windows\System32\cmd.exe - node gm3xb-part2-c-server-gm3xb.js
C:\Users\geeta\Desktop>node gm3xb-part2-c-server-gm3xb.js
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
```

Client-1 connecting

```
And the connection got closed!!!!
geetanjali@geetanjali-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
```

Client-2 connecting

```
ies  Terminal ▾ Thu 18:07
bhashitha@bhashitha-VirtualBox: ~/Desktop
File Edit View Search Terminal Help
bhashitha@bhashitha-VirtualBox:~$ cd Desktop
bhashitha@bhashitha-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
```

Messages sending from Client-1 and 2 randomly

```
And the connection got closed!!!!
geetanjali@geetanjali-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
Hi from Client1
Good evening
Bye from Client2
exit
And the connection got closed!!!!
geetanjali@geetanjali-VirtualBox:~/Desktop$
```

```
bhashitha@bhashitha-VirtualBox:~$ cd Desktop
bhashitha@bhashitha-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
Hello from Client2
Good evening
Hello
exit
And the connection got closed!!!!
bhashitha@bhashitha-VirtualBox:~/Desktop$
```

Server receiving messages from different clients and closes when given exit but the server is still open for other client connections.

```
C:\Windows\System32\cmd.exe - node gm3xb-part2-c-server-gm3xb.js
C:\Users\geeta\Desktop>node gm3xb-part2-c-server-gm3xb.js
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
You have a new client connection from the ipaddress 10.151.1.146:63256
You have a new client connection from the ipaddress 10.151.3.106:58191
You are getting data from 10.151.1.146:63256: "Hi from Client1"
You are getting data from 10.151.3.106:58191: "Hello from Client2"
You are getting data from 10.151.1.146:63256: "Good evening"
You are getting data from 10.151.3.106:58191: "Good evening"
You are getting data from 10.151.3.106:58191: "Hello"
You are getting data from 10.151.3.106:58191: "exit"
Your connection from the client 10.151.3.106:58191 closed
You are getting data from 10.151.1.146:63256: "Bye from Client2"
You are getting data from 10.151.1.146:63256: "exit"
Your connection from the client 10.151.1.146:63256 closed
```

Here, any number of connections can be given when the existing client connections are already running, and the messages will be displayed in order which are given from different servers.

d)

SERVER:

```
var net = require('net');
var sockets = [];
var server = net.createServer(function(socket)
{
  sockets.push(socket);
});
server.on('connection', handleConnection);
server.listen(8080, '10.151.1.146', function()
{
  console.log('Your server is now listening to %j', server.address());
});
function handleConnection(c)
{
  var Addr = c.remoteAddress + ':' + c.remotePort;
  console.log('You have a new client connection from the ipaddress %s', Addr);
  c.setEncoding('utf8');
  c.on('data', onConnData);
  c.once('close', onConnClose);
  c.on('error', onConnError);

function onConnData(d)
{
  console.log('You are getting data from %s: %j', Addr, d);
  for (var i = 0; i < sockets.length; i++)
  {
    if (sockets[i] === c) continue;
    sockets[i].write(d.toString());
  }
}

function onConnClose()
{
  console.log('Your connection from the client %s closed', Addr);
}

function onConnError(e)
{
  console.log('Error %s connection: %s', Addr, e.message);
}
}
```

CLIENT:

```
import sys
import select
import socket
# randomly take some buffer size and port number
name_host = '10.151.1.146'
size_buffer = 1024
port_no = 8080
if __name__ == "__main__":
    soc = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    #checking the connection of the system
    try:
        soc.connect((name_host, port_no))
    except:
        print ('The connection for the system is not available to proceed!!!!')
        sys.exit()

    print ('Your connection is ready now....')
    #Checking the data connection
    while True:
        Listsocket = [sys.stdin, soc]
        readings, _, _ = select.select(Listsocket, [], [])

        for socket in readings:
            if socket == soc:
                data_rec = socket.recv(size_buffer)
                if not data_rec:
                    print ('\nNo data received and disconnected from the server!!!!')
                    sys.exit()
                elif data_rec.decode() == "exit":
                    print ("And the connection got closed!!!!")
                    sys.exit()
                else:
                    print(data_rec.decode())
            else:
                #User giving the message
                msg = input()
                soc.send(msg.encode("utf8"))

soc.close()
```

Server starting:

```
C:\Windows\System32\cmd.exe - node gm3xb-part2-d-server-gm3xb.js
C:\Users\geeta\Desktop>node gm3xb-part2-d-server-gm3xb.js
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
```

Client 1 started and given a message

```
geetanjali@geetanjali-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
Hi from Client1
```

Client 2 started and message in client 1 is displayed in both Client 2 and server.

```
bhashitha@bhashitha-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
Hi from Client1
```

```
C:\Windows\System32\cmd.exe - node gm3xb-part2-d-server-gm3xb.js
C:\Users\geeta\Desktop>node gm3xb-part2-d-server-gm3xb.js
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
You have a new client connection from the ipaddress 10.151.1.146:63263
You have a new client connection from the ipaddress 10.151.3.106:58203
You are getting data from 10.151.1.146:63263: "Hi from Client1"
```

Client 2 given a message

```
bhashitha@bhashitha-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
Hi from Client1
Hi from Client2
```

Message will be displayed in both Client 1 and server

```
geetanjali@geetanjali-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
Hi from Client1
Hi from Client2
```



```
C:\Windows\System32\cmd.exe - node gm3xb-part2-d-server-gm3xb.js
```

```
C:\Users\geeta\Desktop>node gm3xb-part2-d-server-gm3xb.js
```

```
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
```

```
You have a new client connection from the ipaddress 10.151.1.146:63263
```

```
You have a new client connection from the ipaddress 10.151.3.106:58203
```

```
You are getting data from 10.151.1.146:63263: "Hi from Client1"
```

```
You are getting data from 10.151.3.106:58203: "Hi from Client2"
```

Random messages giving in both the clients

```
geetanjali@geetanjali-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
```

```
Your connection is ready now....
```

```
Hi from Client1
```

```
Hi from Client2
```

```
Bye from Client1
```

```
bhashitha@bhashitha-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
```

```
Your connection is ready now....
```

```
Hi from Client1
```

```
Hi from Client2
```

```
Bye from Client1
```

```
bhashitha@bhashitha-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
```

```
Your connection is ready now....
```

```
Hi from Client1
```

```
Hi from Client2
```

```
Bye from Client1
```

```
Bye from Client2
```

```
geetanjali@geetanjali-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
```

```
Your connection is ready now....
```

```
Hi from Client1
```

```
Hi from Client2
```

```
Bye from Client1
```

```
Bye from Client2
```

Server receiving the messages from clients

```
C:\Windows\System32\cmd.exe - node gm3xb-part2-d-server-gm3xb.js
C:\Users\geeta\Desktop>node gm3xb-part2-d-server-gm3xb.js
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
You have a new client connection from the ipaddress 10.151.1.146:63263
You have a new client connection from the ipaddress 10.151.3.106:58203
You are getting data from 10.151.1.146:63263: "Hi from Client1"
You are getting data from 10.151.3.106:58203: "Hi from Client2"
You are getting data from 10.151.1.146:63263: "Bye from Client1"
You are getting data from 10.151.3.106:58203: "Bye from Client2"
```

Client 2 exits

```
bhashitha@bhashitha-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
Hi from Client1
Hi from Client2
Bye from Client1
Bye from Client2
exit
```

```
geetanjali@geetanjali-VirtualBox:~/Desktop$ python3 gm3xb-part2-a-client-gm3xb.py
Your connection is ready now....
Hi from Client1
Hi from Client2
Bye from Client1
Bye from Client2
And the connection got closed!!!!
geetanjali@geetanjali-VirtualBox:~/Desktop$
```

The client 1 also gets exit.

```
C:\Windows\System32\cmd.exe - node gm3xb-part2-d-server-gm3xb.js
C:\Users\geeta\Desktop>node gm3xb-part2-d-server-gm3xb.js
Your server is now listening to {"address":"10.151.1.146","family":"IPv4","port":8080}
You have a new client connection from the ipaddress 10.151.1.146:63263
You have a new client connection from the ipaddress 10.151.3.106:58203
You are getting data from 10.151.1.146:63263: "Hi from Client1"
You are getting data from 10.151.3.106:58203: "Hi from Client2"
You are getting data from 10.151.1.146:63263: "Bye from Client1"
You are getting data from 10.151.3.106:58203: "Bye from Client2"
You are getting data from 10.151.3.106:58203: "exit"
Your connection from the client 10.151.1.146:63263 closed
Your connection from the client 10.151.3.106:58203 closed
```

Both the clients get closes then.

e)

Both the client and server are implemented in two different languages.

For client we have used Python and for server we have used Node.js

Drive Link:

<https://drive.google.com/drive/u/1/folders/1tT57lFeMRotzJr6GsyEL9P5OdyJCgBo9>