

Assignment 6

COMPUTER NETWORK

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ROLL - CSE22017

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1. Write a UDP socket program (in C/C++/Java/Python) to establish connection between client and server. The client program will send a message to the server and the server program will display the message.

Server.py ==>

```
import socket

def udp_server():
    host = "127.0.0.1" # Localhost
    port = 12345 # Server port

    server_socket = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
    server_socket.bind((host, port))

    print(f"Server listening on {host}:{port}...")

    while True:
        data, addr = server_socket.recvfrom(1024) # Receive message
        message = data.decode()
        print(f"Received from {addr}: {message}")

        if message.lower() == "bye":
            print("Client disconnected. Exiting...")
            break

    server_socket.close()

udp_server()
```

Client.py ==>

```
import socket

def udp_client():
    host = "127.0.0.1"
    port = 12345
    server_address = (host, port)

    client_socket = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)

    while True:
        message = input("Enter message (type 'bye' to exit): ")
        client_socket.sendto(message.encode(), server_address)
```

```

if message.lower() == "bye":
    print("Exiting client...")
    break

client_socket.close()

udp_client()

```

Output ==>

The image shows two side-by-side macOS Terminal windows. The left window, titled 'Ass6 -- zsh - 74x38', represents the server. It displays the following log:

```

Last login: Sun Mar  9 13:15:48 on ttys000
/Users/anik/.zshrc:2: unmatched "
anik@ANIKs-MacBook-Air Ass6 % nano server1.py
anik@ANIKs-MacBook-Air Ass6 % python3 server1.py
Server listening on 127.0.0.1:112345...
Received from ('127.0.0.1', 56648): IIIT
Received from ('127.0.0.1', 56648): HI
Received from ('127.0.0.1', 56648): BYE
Client disconnected. Exiting...
anik@ANIKs-MacBook-Air Ass6 %

```

The right window, titled 'Ass6 -- zsh - 75x40', represents the client. It shows the client interacting with the server:

```

Last login: Mon Mar  3 23:10:38 on ttys000
/Users/anik/.zshrc:2: unmatched "
anik@ANIKs-MacBook-Air Ass6 % nano client1.py
anik@ANIKs-MacBook-Air Ass6 % python3 client1.py
Enter message (type 'bye' to exit): IIIT
Enter message (type 'bye' to exit): HI
Enter message (type 'bye' to exit): BYE
Exiting client...
anik@ANIKs-MacBook-Air Ass6 %

```

Both windows show the date and time at the top right: 'Sun Mar 9 1:18 PM' and 'Mon Mar 3 23:10:38'. The Mac OS X dock is visible at the bottom of the screen.

2. Write a UDP socket program where client sends a message (string) to server; server echo back the characters at even position if length of the string is even otherwise echo back the characters at odd position. This process continues until the client sends 'bye'.

Server.py ==>

```

import socket

def udp_server():
    host = "127.0.0.1"
    port = 12346

    server_socket = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
    server_socket.bind((host, port))

    print(f"Server listening on {host}:{port}...")

    while True:
        data, addr = server_socket.recvfrom(1024)
        message = data.decode()

        if message.lower() == "bye":
            print("Client disconnected. Exiting...")
            break

        if len(message) % 2 == 0:
            response = message[1::2] # Even index characters
        else:
            response = message[0::2] # Odd index characters

        server_socket.sendto(response.encode(), addr)

    server_socket.close()

udp_server()

```

Client.py ==>

```

import socket

def udp_client():
    host = "127.0.0.1"
    port = 12346
    server_address = (host, port)

    client_socket = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)

    while True:
        message = input("Enter message (type 'bye' to exit): ")
        client_socket.sendto(message.encode(), server_address)

        if message.lower() == "bye":
            print("Exiting client...")
            break

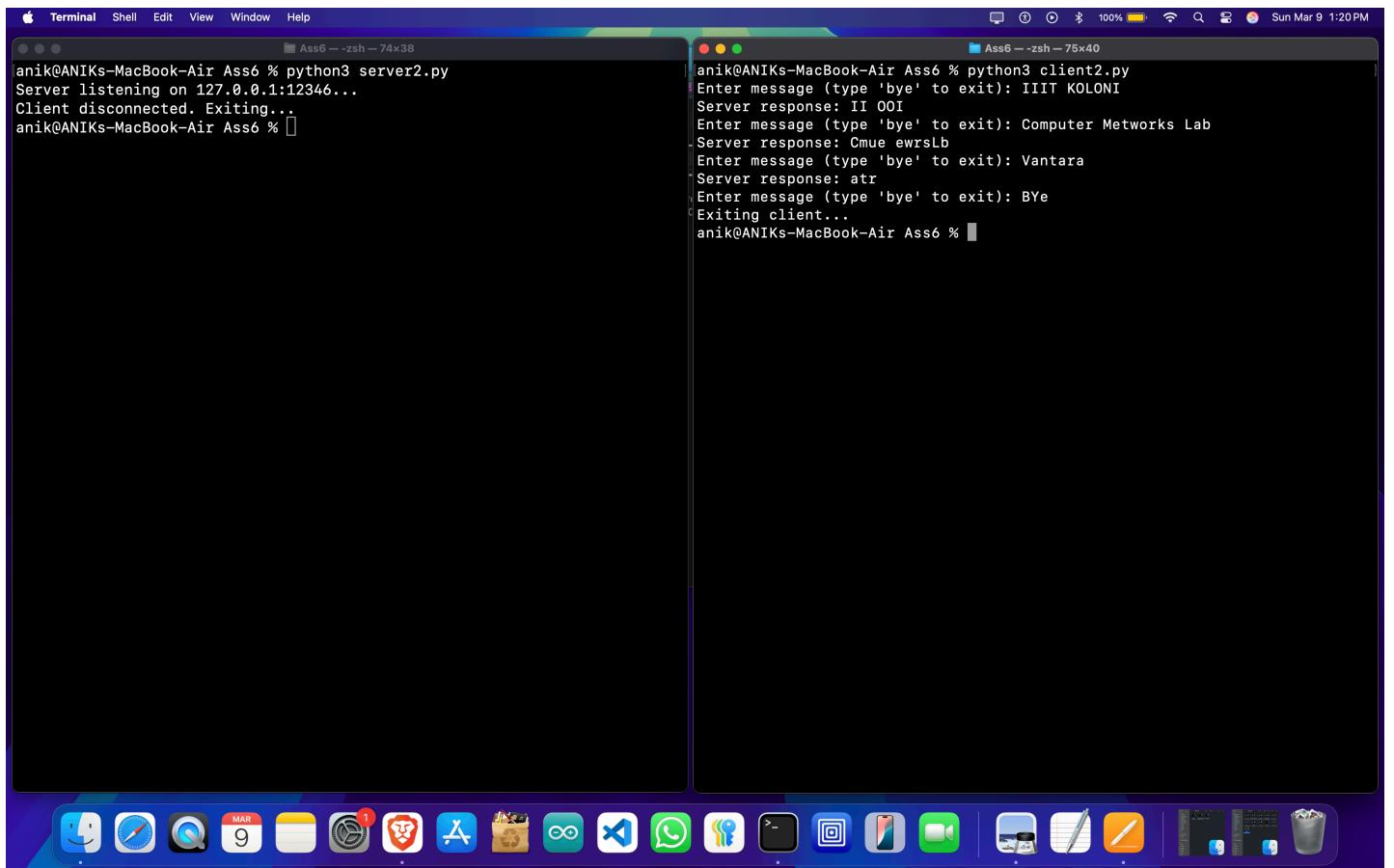
        data, _ = client_socket.recvfrom(1024)
        print(f"Server response: {data.decode()}")

    client_socket.close()

udp_client()

```

Output ==>



3. Write a UDP socket program (in C/C++/Java/Python) to establish connection between client and server. The client program will send a set of binary values to the server and the server program will return the number of 1s present in the data received. Client will display the value send by the server. The communication between client and server will continue until the client sends a ‘Quit’ message to the server.

Server.py ==>

```
import socket

def count_ones(binary_string):
    return binary_string.count("1")

def udp_server():
    host = "127.0.0.1"
    port = 12347

    server_socket = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
    server_socket.bind((host, port))
```

```
print(f"Server listening on {host}:{port}...")  
  
while True:  
    data, addr = server_socket.recvfrom(1024)  
    message = data.decode()  
  
    if message.lower() == "quit":  
        print("Client disconnected. Exiting...")  
        break  
  
    num_ones = count_ones(message)  
    server_socket.sendto(str(num_ones).encode(), addr)  
  
server_socket.close()  
  
udp_server()
```

Client.py ==>

```
import socket  
  
def udp_client():  
    host = "127.0.0.1"  
    port = 12347  
    server_address = (host, port)  
  
    client_socket = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)  
  
    while True:  
        message = input("Enter binary string (type 'Quit' to exit): ")  
        client_socket.sendto(message.encode(), server_address)  
  
        if message.lower() == "quit":  
            print("Exiting client...")  
            break  
  
        data, _ = client_socket.recvfrom(1024)  
        print(f"Server response: Number of 1s = {data.decode()}")  
  
    client_socket.close()  
  
udp_client()
```

Output ==>

The image shows two Terminal windows running on a Mac OS X desktop. The left window, titled 'Ass6 -- zsh -- 74x38', contains the output of the server3.py script. It prints "Server listening on 127.0.0.1:12347...", followed by "Client disconnected. Exiting...", and ends with "anik@ANIKs-MacBook-Air Ass6 %". The right window, titled 'Ass6 -- zsh -- 75x40', contains the output of the client3.py script. It prompts the user to "Enter binary string (type 'Quit' to exit):" and receives the input "7439702148". It then prints "Server response: Number of 1s = 1". This interaction repeats with inputs "101001010", "Server response: Number of 1s = 4", "111222111", "Server response: Number of 1s = 6", and finally "QUIT", which triggers "Exiting client...". Both windows have their title bars and status bars visible at the top, and the Mac OS X dock with various application icons is visible at the bottom.

```
anik@ANIKs-MacBook-Air Ass6 % python3 server3.py
Server listening on 127.0.0.1:12347...
Client disconnected. Exiting...
anik@ANIKs-MacBook-Air Ass6 %

anik@ANIKs-MacBook-Air Ass6 % python3 client3.py
Enter binary string (type 'Quit' to exit): 7439702148
Server response: Number of 1s = 1
Enter binary string (type 'Quit' to exit): 101001010
Server response: Number of 1s = 4
Enter binary string (type 'Quit' to exit): 111222111
Server response: Number of 1s = 6
Enter binary string (type 'Quit' to exit): QUIT
Exiting client...
anik@ANIKs-MacBook-Air Ass6 %
```