Receiver :-

```
import socket
import select  # Importing the select module
from datetime import datetime

def receive_message(host, ports):
    connections = []

    for port in ports:
        s = socket.socket(socket.AF_INET,
socket.SOCK_STREAM)
        s.bind((host, port))
        s.listen()
        print(f"Listening for connections on port
{port}...")
        connections.append(s)

    print("Receiver\t\tReceived\tSender's
time\tReceiver's time\t\tDifference\tBandwidth
(Mbps)")

print("-----------------------------------------
-----------------------------------------------
-----------------------------------------------
---------")

    while True:
```

```
        readable, _, _ = select.select(connections,
[], [])

        for sock in readable:
            conn, addr = sock.accept()
            #print(f"Connected by {addr}")

            data = conn.recv(1024)
            if data:
                receiving_time =
datetime.now().strftime('%H:%M:%S:%f')[:-3]  #
Remove microseconds
                combined_message = data.decode()
                message, sender_time =
combined_message.split("||")  # Splitting message
and sender's time
                sending_time =
datetime.strptime(sender_time,
'%H:%M:%S:%f').strftime('%H:%M:%S:%f')[:-3]  #
Remove microseconds
                time_difference =
(datetime.strptime(receiving_time, '%H:%M:%S:%f') -
datetime.strptime(sending_time,
'%H:%M:%S:%f')).total_seconds() * 1000
                if time_difference < 1:  # Ensure
time difference is at least 1 millisecond
                    time_difference = 1
```

```
                bandwidth = len(message) /
time_difference * 8 / 1e6  # Mbps


print(f"{addr}\t{message}\t{sending_time}\t{receivi
ng_time}\t\t{time_difference}\t\t{bandwidth:.2f}")
            else:
                print("Error: No data received.")

if __name__ == "__main__":
    HOST = 'localhost'
    PORTS = [12345, 12346, 12347, 12348]  #
Different port numbers for each sender
    receive_message(HOST, PORTS)
```

SENDER1 :-

```
import socket
from datetime import datetime

def send_message(host, port):
    with socket.socket(socket.AF_INET,
socket.SOCK_STREAM) as s:
        s.connect((host, port))
        message = input("Enter message to send: ")
        current_time =
datetime.now().strftime('%H:%M:%S:%f')[:-3]  #
Extracting time up to milliseconds
```

```
        combined_message =
f"{message}||{current_time}"  # Combining message
and current time
        s.sendall(combined_message.encode())

if __name__ == "__main__":
    HOST = 'localhost'
    PORT = 12345  # Port number can be any
available port
    send_message(HOST, PORT)
```

SENDER2:-

```
import socket
from datetime import datetime

def send_message(host, port):
    with socket.socket(socket.AF_INET,
socket.SOCK_STREAM) as s:
        s.connect((host, port))
        message = input("Enter message to send: ")
        current_time =
datetime.now().strftime('%H:%M:%S:%f')[:-3]  #
Extracting time up to milliseconds
        combined_message =
f"{message}||{current_time}"  # Combining message
and current time
        s.sendall(combined_message.encode())
```

```
if __name__ == "__main__":
    HOST = 'localhost'
    PORT = 12346  # Port number can be any
available port
    send_message(HOST, PORT)
```

SENDER3:-

```
import socket
from datetime import datetime

def send_message(host, port):
    with socket.socket(socket.AF_INET,
socket.SOCK_STREAM) as s:
        s.connect((host, port))
        message = input("Enter message to send: ")
        current_time =
datetime.now().strftime('%H:%M:%S:%f')[:-3]  #
Extracting time up to milliseconds
        combined_message =
f"{message}||{current_time}"  # Combining message
and current time
        s.sendall(combined_message.encode())

if __name__ == "__main__":
    HOST = 'localhost'
```

```
    PORT = 12347  # Port number can be any
available port
    send_message(HOST, PORT)
```

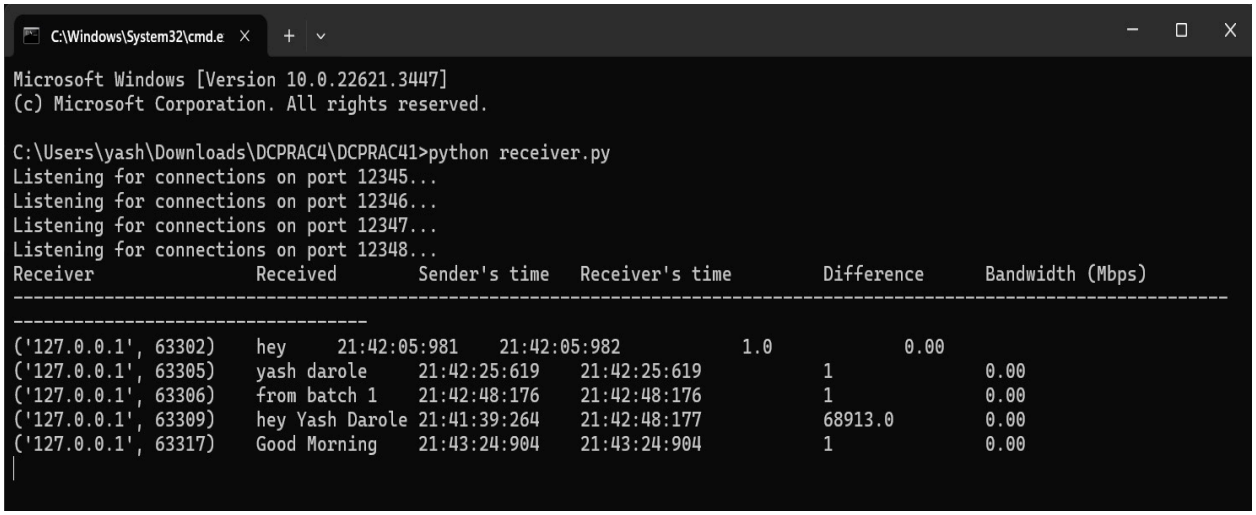
SENDER4:-

```
import socket
from datetime import datetime

def send_message(host, port):
    with socket.socket(socket.AF_INET,
socket.SOCK_STREAM) as s:
        s.connect((host, port))
        message = input("Enter message to send: ")
        current_time =
datetime.now().strftime('%H:%M:%S:%f')[:-3]  #
Extracting time up to milliseconds
        combined_message =
f"{message}||{current_time}"  # Combining message
and current time
        s.sendall(combined_message.encode())

if __name__ == "__main__":
    HOST = 'localhost'
    PORT = 12348  # Port number can be any
available port
    send_message(HOST, PORT)
```

OUTPUT:-


C:\Windows\System32\cmd.e
Microsoft Windows [Version 10.0.22621.3447]
(c) Microsoft Corporation. All rights reserved.
C:\Users\yash\Downloads\DCPRAC4\DCPRAC41>python receiver.py
Listening for connections on port 12345...
Listening for connections on port 12346...
Listening for connections on port 12347...
Listening for connections on port 12348...
Receiver Received Sender's time Receiver's time Difference Bandwidth (Mbps)
('127.0.0.1', 63302) hey 21:42:05:981 21:42:05:982 1.0 0.00
('127.0.0.1', 63305) yash darole 21:42:25:619 21:42:25:619 1 0.00
('127.0.0.1', 63306) from batch 1 21:42:48:176 21:42:48:176 1 0.00
('127.0.0.1', 63309) hey Yash Darole 21:41:39:264 21:42:48:177 68913.0 0.00
('127.0.0.1', 63317) Good Morning 21:43:24:904 21:43:24:904 1 0.00