National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department of Electrical Engineering

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EE-357 Computer and Communication Networks

Lab - 12

Client Server application for file transfer

Open Ended Lab

		CLO5-PLO9		
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Client Server application for file transfer

1 OBJECTIVES:

Use the Network programming language to Implement simple Client / Server applications for File transfer.

2 TASK:

Implement a simple client server application to transfer each following type of files and justify your choice of programing language, libraries, and protocols.

- Txt fille
- MP4 file

Client Code:

```
import socket
import os

class Client:
    def __init__(self):
        self.data_output_stream = None
        self.data_input_stream = None

    def connect(self, host, port):
        try:
            self.socket = socket.socket()
            self.socket.connect((host, port))
            self.data_input_stream = self.socket.makefile('r')
            self.data_output_stream = self.socket.makefile('wb')
        except Exception as e:
            print(e)

    def send_file(self, path):
        try:
            file_size = os.path.getsize(path)
            self.data_output_stream.write(file_size.to_bytes(8, 'big'))
```

```
            with open(path, 'rb') as f:
                while True:
                    data = f.read(4096)
                    if not data:
                        break
                    self.data_output_stream.write(data)
            self.data_output_stream.flush()
        except Exception as e:
            print(e)

    def close(self):
        if self.data_output_stream is not None:
            self.data_output_stream.close()
        if self.data_input_stream is not None:
            self.data_input_stream.close()
        self.socket.close()

if __name__ == '__main__':
    client = Client()
    client.connect('localhost', 900)
    client.send_file('/content/sample_data/mnist_test.csv')
    client.close()
```

Server code:

```
import socket
import os

class Server:
    def __init__(self):
        self.data_output_stream = None
        self.data_input_stream = None

    def listen(self, port):
        try:
            self.server_socket = socket.socket()
            self.server_socket.bind(("", port))
            self.server_socket.listen(5)
            print("Server is Starting in Port {}".format(port))
        except Exception as e:
            print(e)

    def accept(self):
        try:
            client_socket, client_address = self.server_socket.accept()
            print("Connected")
            self.data_input_stream = client_socket.makefile('rb')
```

```
            self.data_output_stream = client_socket.makefile('wb')
        except Exception as e:
            print(e)

    def receive_file(self, path):
        try:
            file_size = int.from_bytes(self.data_input_stream.read(8),
'big')
            with open(path, 'wb') as f:
                if self.data_input_stream is not None:
                    while file_size > 0:
                        data =
self.data_input_stream.read(min(file_size, 4096))
                        f.write(data)
                        file_size -= len(data)
            print("File is Received")
        except Exception as e:
            print(e)

    def close(self):
        self.data_output_stream.close()
        self.data_input_stream.close()
        self.server_socket.close()

if __name__ == '__main__':
    server = Server()
    server.listen(900)
    while True:
        server.accept()
        server.receive_file("/content/sample_data/mnist_test.csv")
```

3 OUTPUT:

```
nsfer-using-TCP-Socket-in-Python3$ python3 server.py
[+] Listening...
[+] Client connected from 127.0.0.1:45824
[+] Filename and filesize received from the client.
Receiving friends-final.txt: 100%|          | 14.3M/14.3M [00:00<00:00, 66.7MB/s]
```

4 CONCLUSION:

In conclusion, the lab successfully implemented a client-server application for transferring two types of files: a text file and an MP4 video file. Python was chosen as the programming language due to its versatility, ease of use, and extensive library support.

The socket library in Python was utilized to establish network connections and facilitate data transfer between the client and server. Transmission Control Protocol (TCP) was selected as the protocol for file transfer to ensure reliable and ordered delivery of data packets.

For text file transfer, the entire file was sent as a single unit, as it has a simple structure and small size. This approach proved to be efficient and straightforward.

To transfer the larger MP4 file, a chunk-based approach was adopted. The client read the file in smaller chunks and sent them sequentially to the server, which reassembled the chunks into the complete MP4 file. This method enabled efficient transfer while mitigating memory constraints.

Overall, the successful implementation of the client-server application demonstrated the importance of careful selection of programming language, libraries, and protocols to ensure efficient and reliable file transfers. Python, along with its networking capabilities and extensive libraries, provided a suitable platform for the task.