SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

Department of Electronics and Communication Engineering

Laboratory Report Cover Sheet

18ECC303J – COMPUTER COMMUNICATION NETWORKS

EVEN SEM 2022-23

Name   :

Reg No   :

Section   :

Venue   :

Experiment title   :

PARTICULARS	MAX MARKS	MARKS OBTAINED
Pre lab & Post lab	10	
Lab performance	15	
Record	05	
Viva	10	
Total	**40**	

Report Verification

Staff Name:

Signature with date:

10.Create a Socket (TCP&UDP) between two computers and enable file transfer between them.

10.1Introduction

The purpose of this lab is to introduce you the concept of socket programming, TCP connection establishment, and Session management. In this lab you will be able to establish a socket connection between two computers and use it to reliably transfer a file.

10.2Hardware Requirement

Two computers with Net Sim software

10.3Background

File transfer uses the client –server paradigm. The server waits passively listening for requests from a client. After servicing the request, the server resumes listening. The client is usually interactive and accepts commands specifying the file name, whether to or from the server, username and password etc.

File transfer is a session oriented task. It has three phases:

10.3.1 Session establishment: Setup a logical connection between client and server.

10.3.2 Data transfer: the file is transferred to /from the server, with appropriate error checking.

10.3.3 Session termination: the files are closed and the logical connection taken down.

Three phases are described in detail below.

Session Establishment

This involves several steps.

1. Setup of a transport layer connection with the server. This is usually TCP.
2. Sending username and password to the server for authentication
3. Checking the file permissions on both ends. E.g to send a file F, the local file F must exist and be readable by the user, and the remote file F must be writable by the user. In case "no overwrite mode" is specified, the remote file F must not exist.

4. Negotiating session parameters such as the file type (text or binary) and block size.

Data Transfer

The sender reads the file one segment at a time and sends it on the TCP connection. The segment size may be large, e.g. 10s to 100s of KB. Note that some TCP implementations may limit the size of each segment, say to 64 KB. TCP provides reliable data transfer. However, it may abruptly close the connection without delivering the data to the remote application. To handle such situations, the file transfer receiver send an ACK to the sender after successfully writing the data to the destination file.

Session Termination
This may be initiated by either side. The initiator closes its local files and sends a disconnect request to the other side. The other party closes its file and responds with a disconnect confirm. Each side closes its TCP socket. The server resumes listening for connect requests.
A session may be terminated normally after successful transfer of the file or abnormally after incomplete transfer such as due to network failure. In the latter case, the receiver should delete the incomplete file so that it is not inadvertently used.

Error Handling
For any operation where an ACK is expected, the sender starts a timer. In case of expiry of the timer, the operation may be retried or is aborted and an error indication returned.

10.4Pre lab questions

1. What is socket programming?

2. What are the phases involved in file transfer?

3. List the features of TCP model.

4. What is DHCP?

5. Give the IP address range of class A, B, C, D.

10.5 Procedure

Initial set-up:

Copy and paste **FTPGui** folder in **C:** and **SocketFTP.exe** file in **C:\Lantrain\bin**

Connect the Ethernet (RJ-45) ports of two PCs with the supplied swap cable.

Since these 2 PCs are connected and there is no DHCP so to assign IP address, setup two PCs

IP address and gateway as follows

1st PC:

IP address	:	192.168.0.1
Gateway	:	192.168.0.1

2nd PC:

IP address	:	192.168.0.2
Gateway	:	192.168.0.2

Check if there is a connection between them by opening a browser and typing the other PCs IP address. The other PCs Directory structure will be displayed in the browser and this is the indication that the connection is established between the PCs.

Procedure:

1. Double click on SocketFTP icon from the desktop.

2. Setup username, password, server ip address, and server port no in the application.

FTPGui

FTP Application

☑ FTPServer   ☐ FTPClient

Username   [   ]

Password   [   ]

Confirm Password   [   ]

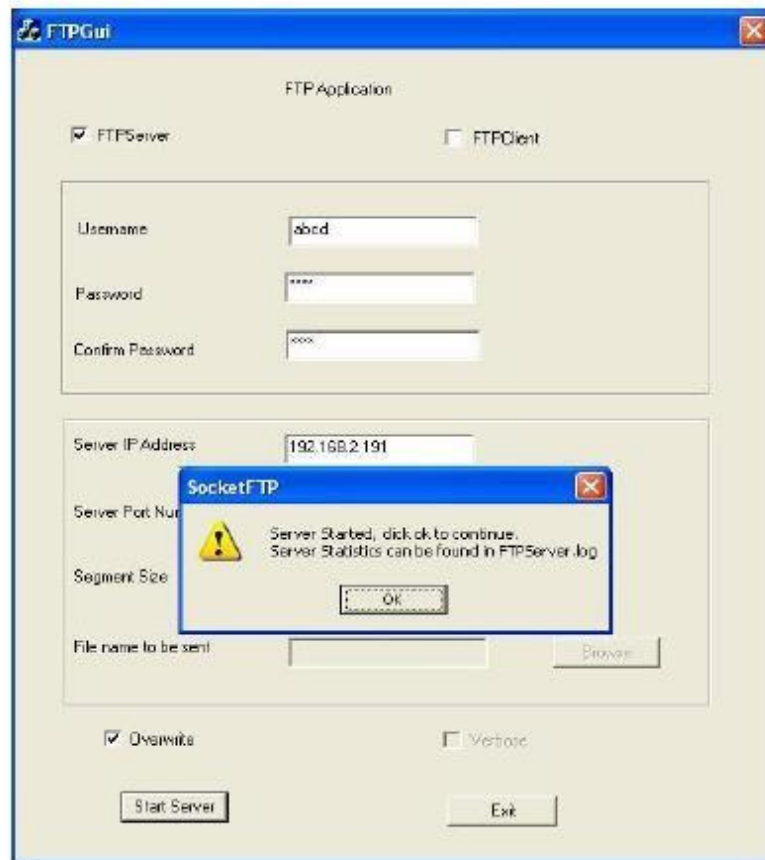Server IP Address   [   ]

Server Port Number   [0   ]

Segment Size   [0   ]

File name to be sent   [   ]   Browse

☑ Overwrite   ☐ Verbose

[Start Server]   [Exit]

FTPGui

FTP Application

☑ FTPServer   ☐ FTPClient

Username   [abcd   ]

Password   [****   ]

Confirm Password   [****   ]

Server IP Address   [192.168.2.191   ]

Server Port Number   [2000   ]

Segment Size   [0   ]

File name to be sent   [   ]   Browse

☑ Overwrite   ☐ Verbose

[Start Server]   [Exit]
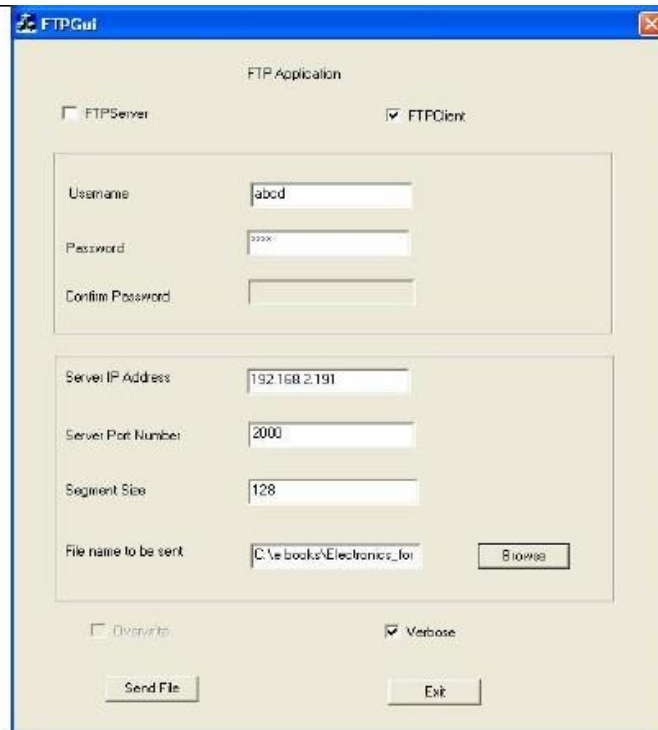
3. Ensure that the **FTPServer** and **Overwrite** check boxes are checked.

4. Click **Start Server** button.

5. Click ok to continue.

6. Open FTP client in another PC.

7. Check the **FTPClient** and **Verbose** check box.

8. Give the same username, password, server ip address, port number and segment size (say 128 or 256 or 1024) and specify the file that has to be sent.

9. Click **Send File**.

10. Now you could find your file in **C:\FTPGui** of the server.

Exercises:

✓ In this exercise, you will verify the various features of the server. In each case, select a file F and proceed as directed. Note the reason for failure (if any)

✓ Give the correct username but wrong password.

✓ Give the wrong username but correct password.

✓ Give the correct username and password and transfer the file. Now, repeat with overwrite mode turned off.

✓ Using the file manager on the server, make the file F read-only. Now, on the client turn overwrite mode on and transfer the file.

✓ Specify the wrong server IP address and port number.

✓ Select a file of size at least 1MB, set verbose mode on and send it to the server. Note the time taken and compute, throughput = file size/time taken. Repeat the experiment with verbose mode off. Compare the throughputs and explain the difference.

✓ With verbose mode off, compute the throughput for files of size 1B, 1000 B, 10 KB, 1 MB, and 10 MB. Explain the differences. (Note: it will help to plot a graph of throughput versus file size, with a logarithmic x-axis).

✓ Start a transfer of a large file with verbose mode on. Immediately unplug the Ethernet cable. After couple of seconds plug the cable back. Compute the throughput. Now repeat, except do not plug in the cable. Note the time taken for the client to time out and give up.

1.4 Post lab questions

1. What is the difference between TCP and UDP protocol?

2. What are the timers available in TCP?

3. What do you mean by socket address?

4. Give the port numbers of TCP and UDP.

5. Given the IP address: 192.168.0.1. Identify the range and net id.

RESULT:

Thus a socket connection between two computers is established and file is transferred.