Network Design Proposal for a LAN

Submitted in fulfillment of the
requirement of

Computer Communication

Lab By

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CERTIFICATE

This is to certify that Computer Communication Lab Mini Project entitled Submitted by "**Network Design Proposal for a LAN"** Submitted by k.bhargavi(RA2111003011931),sai sharmili(RA2111003011024), madan prasad(RA2111003011006),anwesha(RA2111003011000),jai harish(RA2111003010997) , for the partial fulfillment of the requirement for Semester IV Subject of Computer Communication Lab to the SRM Institute of Science and Technology, is a bonafide work carried out during Semester IV in Academic Year 2021-2022.

SIGNATURE

Akshya J

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CINTEL

SRM Institute of Science and Technology

Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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ABSTRACT

Computer Networks have become an integral part of our present- day society. Most companies depend on the proper functioning of their networks for communication, e-business, administrations, etc. The Local Area Network (LAN) is the most basic and important computer network that can be used for interconnection with Wide Area Networks. It is used for resource sharing between equipment's such as mass storage media, mainframe computers or minicomputers, and high-speed printers. Here, LAN serves as the access vehicle for an Intranet or the Internet. In view of this, system managers need professional tools to help them with the design and maintenance of LANs.

1. PROBLEM DEFINITION

A simulation tool offers a way to predict the impact on the network of a hardware upgrade, a change in topology, an increase in traffic load or the use of a new application. So, we have designed a LAN of an organization using Cisco Packet Tracer. The study provides an insight into various concepts such as topology design, IP address configuration and how to send information in form of packets in a single network and the use of Virtual Local Area Networks (VLANs) to separate the traffic generated by different departments.

2. OBJECTIVE

The Objectives of the "Network Design Proposal for a LAN" are:

- To study topology
- To design topology of the organization (For example: College) •
  To study IP Addressing, Subnetting
- To connect Switches and PCs using the Copper Cross-Over (Similar devices)/Copper Straight-through (Dissimilar devices) Cables
- To configure the IP Addresses of the PCs
- To simulate how to send information between the connected users (devices) and the use of VLANs to separate the traffic generated by different users or pathways

3. LIMITATIONS OF THE PROJECT

Some of the limitations of the project "Network Design for a LAN" are:

- As the number of users increase, the designing of networks become harder. It can become annoying and hard to find and fix the errors.
- Some entities must be manually turned on to function. This includes the port status of routers and switches.

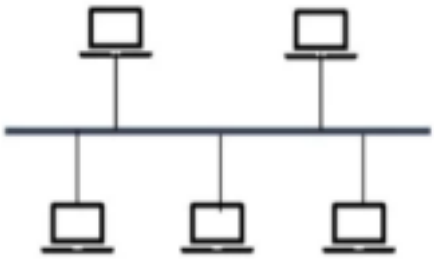
4. THEORETICAL BACKGROUND

The theoretical concepts of some of the components used in my project are given below:

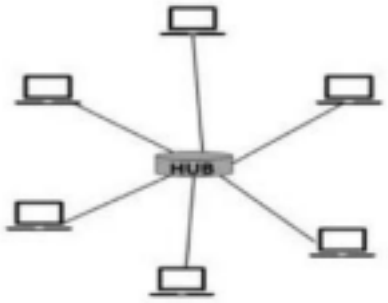
4.1 Network Topology

Network Topology describes the physical and logical appearance and interconnection between arrangement of computers, cables, and other components in a data communication network and how it can be used for taking a packet from one device and sending it through the network to another device on a different network. The different types of network topologies are Bus Topology, Star Topology, Mesh Topology, Ring Topology and Hybrid Topology.

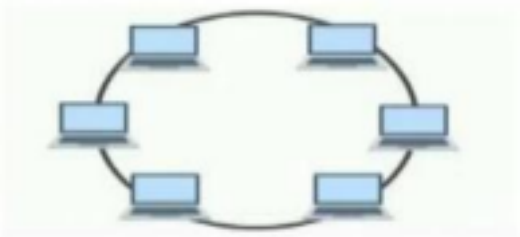
i) Bus Topology- It uses a single backbone cable that is terminated at both the ends. All the hosts connect directly to this backbone.



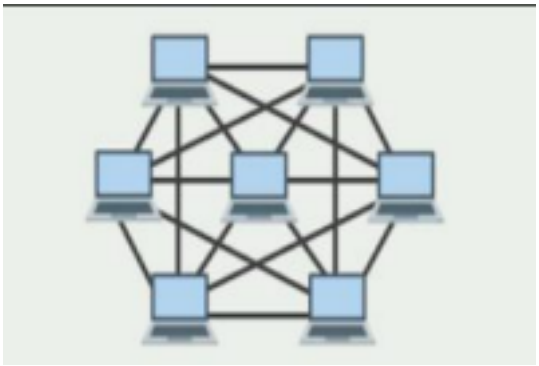
ii) Star Topology- Each device is connected to a central device called hub. If any device wants to send data to another device, it must first send data to the hub, and then the hub transmits the data to the designated device.



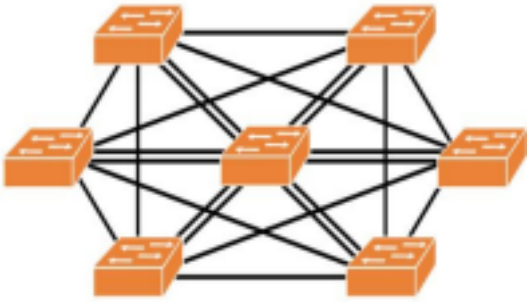
iii) Ring Topology- Each device is connected with two devices on either side of it, thus forming a ring. If a device wants to send data to another device, it first sends the data in one direction. Each device in the ring has a repeater. If the received data is intended for other device, then the repeater forwards the data until the intended device receives it.



iv) Mesh Topology- Ever device is connected to every other device on the network through a dedicated point-to-point link. Let's say we have 'n' devices in the network. Then, each device must be connected with (n-1) devices of the network and the number of links in the topology would be n(n-1)/2.



v) Hybrid Topology- It is the combination of two or more topology.



4.2 Communication Media

Network devices are connected using a medium. This medium can be wired or wireless. The wired form of Communication medium includes the Cables. They can be either Coaxial, Twisted pair or Optic Fiber. The wireless media can be air by using radio waves.

i) Coaxial Cable- This cable consists of two conductors. One is an inner insulated conductor, and the other is sometimes made of a metallic foil or woven wire.

ii) Twisted Pair Cable- This is the most popular LAN media type in use today. Individual insulated copper strands are intertwined into a twisted pair cable.

iii) Optic Fiber Cable- It uses light instead of electricity which makes fiber optics immune to EMI.

iv) Wireless- Wireless clients gain access to a wired network by communicating via radio waves with a wireless access point (AP). The access point is then hardwired to a LAN. All wireless devices connecting to the same AP are considered to be on the same shared network segment.

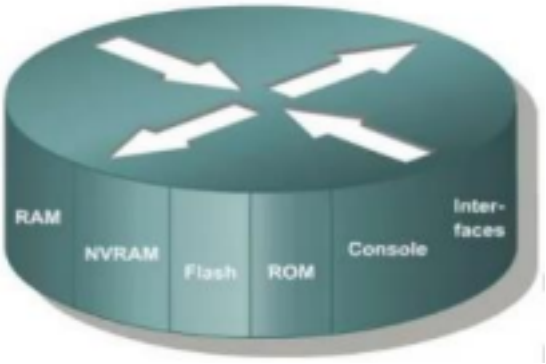
4.3 Networking Devices

Equipment that connects directly to a network segment is called a Device. These devices are classified into 2 types:

- End- user devices- It includes devices such as computers, printers, scanners, and other devices that provide services directly to the user.

• Network devices- It includes the devices that connect the end- user devices together to allow them to communicate. Some of them are Repeaters, Hub, Switch, Bridge, Router, etc.

i) Router- It is a special type of computer that perform specific functions. They can regenerate signals, concentrate multiple connections, convert data transmission formats, and manage data transfers. In this project, we use Router 1941.



ii) Switch- They are Data Link Layer Devices that can determine whether data should remain on a LAN or not. Each switch port has a unique MAC address. Switch 2960 IOS15 is used in this project.

4.4 Routing Protocols

The set of defined rules used by routers to communicate between source and destination are called Routing Protocols. They determine how the data gets to its destination in the easiest and fastest way possible. Some of the Routing Protocols include:

- Routing Information Protocol (RIP)- It is a dynamic routing protocol that uses hop count as a routing metric to find the best path between the source and destination. It is a distance- vector routing protocol. RIP has two versions: RIPv1 and RIPv2. RIP v1 helps determine the network paths based on IP destination and the hop count journey. It also interacts with the network by broadcasting its IP table to all routers connected with the network. RIP v2 is a little more sophisticated as it sends its routing table on to a multicast address.
- Open Shortest Path First (OSPF)- It is a link- state routing protocol that is used to find the best path between the source and destination router using its own shortest path first (SPF) algorithm, that is, Dijkstra Algorithm. This protocol is very secure, as it can authenticate protocol changes to keep data secure.
- Enhanced Interior Gateway Routing Protocol (EIGRP)- It is a dynamic

routing protocol used to find the best path between any two- layer 3 devices to deliver the packet. It is a hybrid routing protocol that provides routing protocols, distance vector, and link- state routing protocols.

4.5 IP Addressing

Using the IP Address of the destination network, a router can deliver a packet to the connected network. When the packet arrives at a router connected to the destination network, the router uses an IP address to locate the computer connected to that network. Accordingly, every IP address has two parts.

The first part identifies the system's network address and the second part, called the host part, identifies which machine is on the network.

IP Addresses are divided into classes to define the large, medium, and small networks.

Class A addresses are assigned to larger networks.

Class B addresses are used for medium- sized networks.

Class C addresses are used for small networks.

Address Class	Number of Networks	Number of Host per Network
A	126 *	16,777,216
B	16, 384	65,535
C	2,097,152	254
D (Multicast)	N/A	N/A

Address Class	Value in First Octet
A	1-126
B	128-191
C	192-223
D	224-239
E	240-255

4.6 Subnetting

Subnetting is the process of stealing bits from the host part of an IP Address to divide the larger network into smaller sub- networks called subnets. After subnetting, subnet host fields are created. An IP address is always reserved to identify the subnet and the broadcast address within the subnet. Subnet addresses include the subnet field and host field.

A Subnet Mask is a 32- bit value that allows the recipient of an IP packet to distinguish the network ID portion from the host ID portion of the IP address.

Classes of IP	Default Subnet Mask
A	255.0.0.0
B	255.255.0.0
C	255.255.255.0

5. DEVELOPMENT OF LAN SIMULATION MODEL

The LAN model has been developed for a University (organization). Four typical departments of a university have been chosen, that is, University Main Block, Exam Cell, Library Department and Lab Department. Each department has a router and 2 switches. To these switches, a total of 18 PCs (users) are connected using Copper Straight- through Cable. The switches and router are also connected using a Copper Straight- through Cable. To one switch, a server containing the files and resources is attached using a Copper Straight- through Cable. At the end, all the four departments are connected, that is, routers are connected using Serial DCE cables with RIP v1 configuration.

5.1 DESIGN

I have designed the network step -by- step for all the four departments.

5.1.1 Network 1- University Main Block

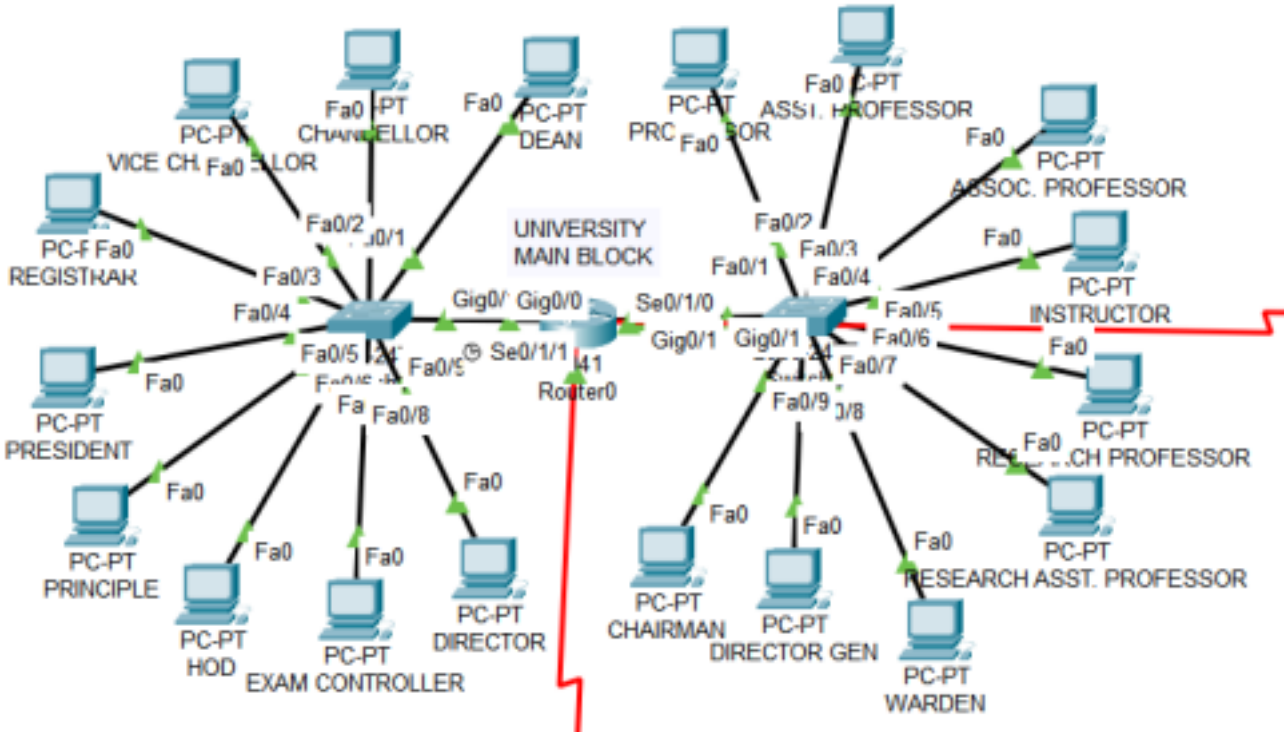
There are two switches connected to 9 PCs on each side, through a Copper Straight through Cable. The users include Dean, Chancellor, Vice Chancellor, Registrar, President, Principle, HOD, Exam Controller, Director, Chairman, Director General, Warden, Research Assistant Professor, Research Professor, Instructor, Assistant Professor, Associate Professor and Professor. A Router is connected to both the switches using a Copper Straight- through Cable. Appropriate IP Addresses are chosen for the PCs and Router, thus completing the connection of the first network.

The components used in Network 1 are:

DEVICES	REQUIRED NOS
PCs	18
Switch 2960 IOS15	2
Router 1941	1
Copper Straight- through Cables	20
Serial DCE	2

For computers to communicate in the network, they must have the same IP address. The IP Addresses for the first network are given in the following table:

DEVICE	INTERFACE	IP ADDRESS	SUBNET MASK	GATEWAY
Dean	Fa0/1 (Switch 1)	192.168.1.2	255.255.255.0	192.168.1.1
Chancellor	Fa0/2 (Switch 1)	192.168.1.3	255.255.255.0	192.168.1.1
Vice Chancellor	Fa0/3 (Switch 1)	192.168.1.4	255.255.255.0	192.168.1.1
Registrar	Fa0/4 (Switch 1)	192.168.1.5	255.255.255.0	192.168.1.1
President	Fa0/5 (Switch 1)	192.168.1.6	255.255.255.0	192.168.1.1
Principle	Fa0/6 (Switch 1)	192.168.1.7	255.255.255.0	192.168.1.1
HOD	Fa0/7 (Switch 1)	192.168.1.8	255.255.255.0	192.168.1.1
Exam Controller	Fa0/8 (Switch 1)	192.168.1.9	255.255.255.0	192.168.1.1
Director	Fa0/9 (Switch 1)	192.168.1.10	255.255.255.0	192.168.1.1
Chairman	Fa0/9 (Switch 2)	192.168.2.10	255.255.255.0	192.168.2.1
Director Gen	Fa0/8 (Switch 2)	192.168.2.9	255.255.255.0	192.168.2.1
Warden	Fa0/7 (Switch 2)	192.168.2.8	255.255.255.0	192.168.2.1
Research Asst. Professor	Fa0/6 (Switch 2)	192.168.2.7	255.255.255.0	192.168.2.1
Research Professor	Fa0/5 (Switch 2)	192.168.2.6	255.255.255.0	192.168.2.1
Instructor	Fa0/4 (Switch 2)	192.168.2.5	255.255.255.0	192.168.2.1
Assoc. Professor	Fa0/3 (Switch 2)	192.168.2.4	255.255.255.0	192.168.2.1
Asst. Professor	Fa0/2 (Switch 2)	192.168.2.3	255.255.255.0	192.168.2.1
Professor	Fa0/1 (Switch 2)	192.168.2.2	255.255.255.0	192.168.2.1
Router0	GigabitEthernet0/0	192.168.1.1	255.255.255.0	-
Router0	GigabitEthernet0/1	192.168.2.1	255.255.255.0	-
Router0	Serial0/1/0	192.168.9.1	255.255.255.0	-
Router0	Serial0/1/1	192.168.10.1	255.255.255.0	-


UNIVERSITY
MAIN BLOCK
PC-PT
REGISTRAR
PC-PT
PRESIDENT
PC-PT
PRINCIPLE
PC-PT
HOD
PC-PT
EXAM CONTROLLER
PC-PT
DIRECTOR
PC-PT
DEAN
PC-PT
INSTRUCTOR
PC-PT
ASSOC. PROFESSOR
PC-PT
CHAIRMAN
PC-PT
DIRECTOR GEN
PC-PT
WARDEN
PC-PT
RESEARCH ASST. PROFESSOR
Router0
Fa0
Fa0/1
Fa0/2
Fa0/3
Fa0/4
Fa0/5
Fa0/6
Fa0/7
Fa0/8
Fa0/9
Gig0/0
Gig0/1
Se0/1/0
Se0/1/1

5.1.2 Network 2- Exam Cell

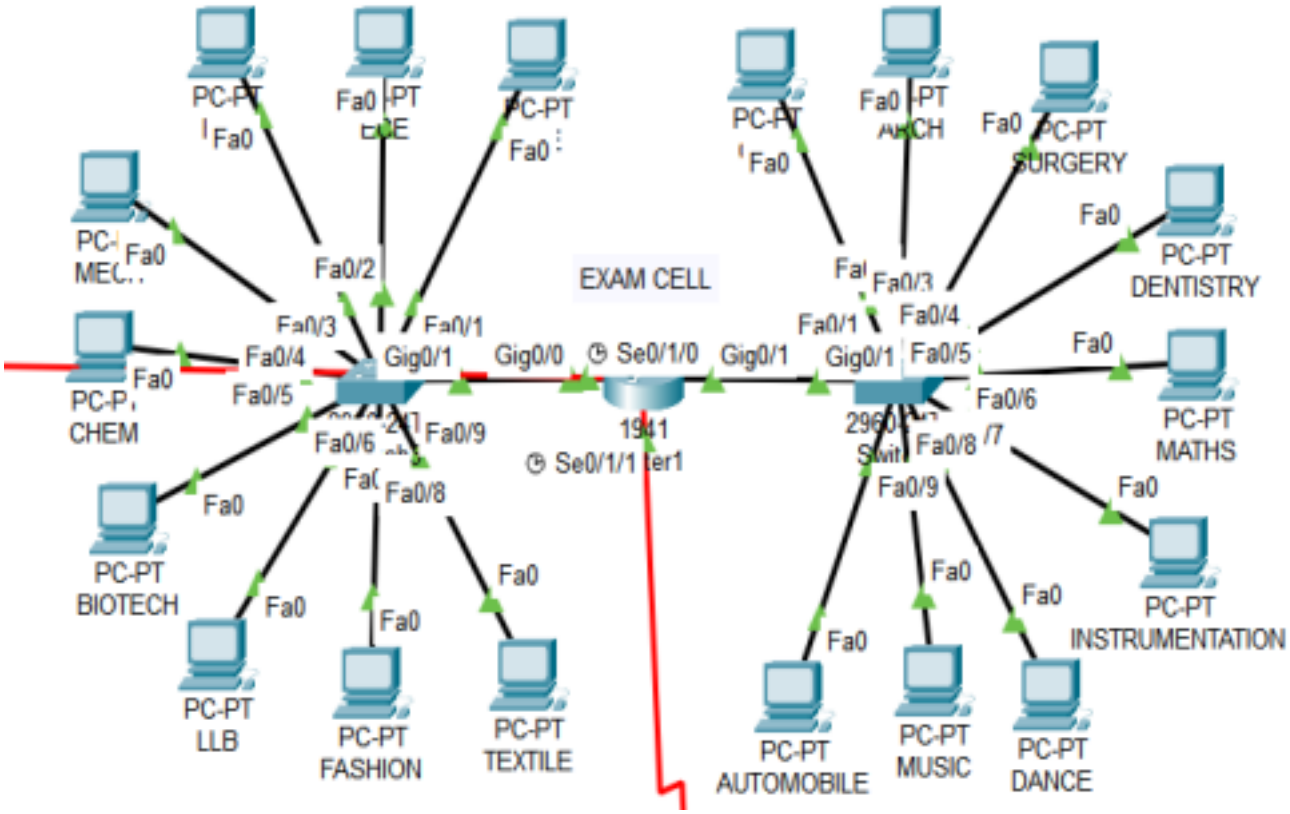
There are two switches connected to 9 PCs on each side, through a Copper Straight through Cable. The users include CSE, ECE, EEE, MECH, CHEM, BIOTECH, LLB, FASHION, TEXTILE, AUTOMOBILE, MUSIC, DANCE, INSTRUMENTATION, MATHS, DENTISTRY, SURGERY, ARCH and CIVIL. A Router is connected to both the switches using a Copper Straight- through Cable. Appropriate IP Addresses are chosen for the PCs and Router, thus completing the connection of the second network.

The components used in Network 2 are:

DEVICES	REQUIRED NOS
PCs	18
Switch 2960 IOS15	2
Router 1941	1
Copper Straight- through Cables	20
Serial DCE	2

For computers to communicate in the network, they must have the same IP address. The IP Addresses for the first network are given in the following table:

DEVICE	INTERFACE	IP ADDRESS	SUBNET MASK	GATEWAY
CSE	Fa0/1 (Switch 3)	192.168.3.2	255.255.255.0	192.168.3.1
ECE	Fa0/2 (Switch 3)	192.168.3.3	255.255.255.0	192.168.3.1
EEE	Fa0/3 (Switch 3)	192.168.3.4	255.255.255.0	192.168.3.1
MECH	Fa0/4 (Switch 3)	192.168.3.5	255.255.255.0	192.168.3.1
CHEM	Fa0/5 (Switch 3)	192.168.3.6	255.255.255.0	192.168.3.1
BIOTECH	Fa0/6 (Switch 3)	192.168.3.7	255.255.255.0	192.168.3.1
LLB	Fa0/7 (Switch 3)	192.168.3.8	255.255.255.0	192.168.3.1
FASHION	Fa0/8 (Switch 3)	192.168.3.9	255.255.255.0	192.168.3.1
TEXTILE	Fa0/9 (Switch 3)	192.168.3.10	255.255.255.0	192.168.3.1
AUTOMOBILE	Fa0/9 (Switch 4)	192.168.4.10	255.255.255.0	192.168.4.1
MUSIC	Fa0/8 (Switch 4)	192.168.4.9	255.255.255.0	192.168.4.1
DANCE	Fa0/7 (Switch 4)	192.168.4.8	255.255.255.0	192.168.4.1
INSTRUMEN TA TION	Fa0/6 (Switch 4)	192.168.4.7	255.255.255.0	192.168.4.1
MATHS	Fa0/5 (Switch 4)	192.168.4.6	255.255.255.0	192.168.4.1
DENTISTRY	Fa0/4 (Switch 4)	192.168.4.5	255.255.255.0	192.168.4.1
SURGERY	Fa0/3 (Switch 4)	192.168.4.4	255.255.255.0	192.168.4.1
ARCH	Fa0/2 (Switch 4)	192.168.4.3	255.255.255.0	192.168.4.1
CIVIL	Fa0/1 (Switch 4)	192.168.4.2	255.255.255.0	192.168.4.1
Router1	GigabitEthernet0/0	192.168.3.1	255.255.255.0	-
Router1	GigabitEthernet0/1	192.168.4.1	255.255.255.0	-
Router1	Serial0/1/0	192.168.9.2	255.255.255.0	-
Router1	Serial0/1/1	192.168.11.1	255.255.255.0	-


PC-PT
Fa0
Fa0/2
EXAM CELL
Fa0/3
Fa0/1
Fa0/4
Gig0/1
Gig0/0
Se0/1/0
Gig0/1
Fa0/5
Fa0/6
Fa0/9
Fa0/8
1941
Se0/1/1
PC-PT
CHEM
PC-PT
BIOTECH
PC-PT
LLB
PC-PT
FASHION
PC-PT
TEXTILE
PC-PT
AUTOMOBILE
PC-PT
MUSIC
PC-PT
DANCE
PC-PT
INSTRUMENTATION
PC-PT
MATHS
PC-PT
DENTISTRY
PC-PT
SURGERY

5.1.3 Network 3- Library Department

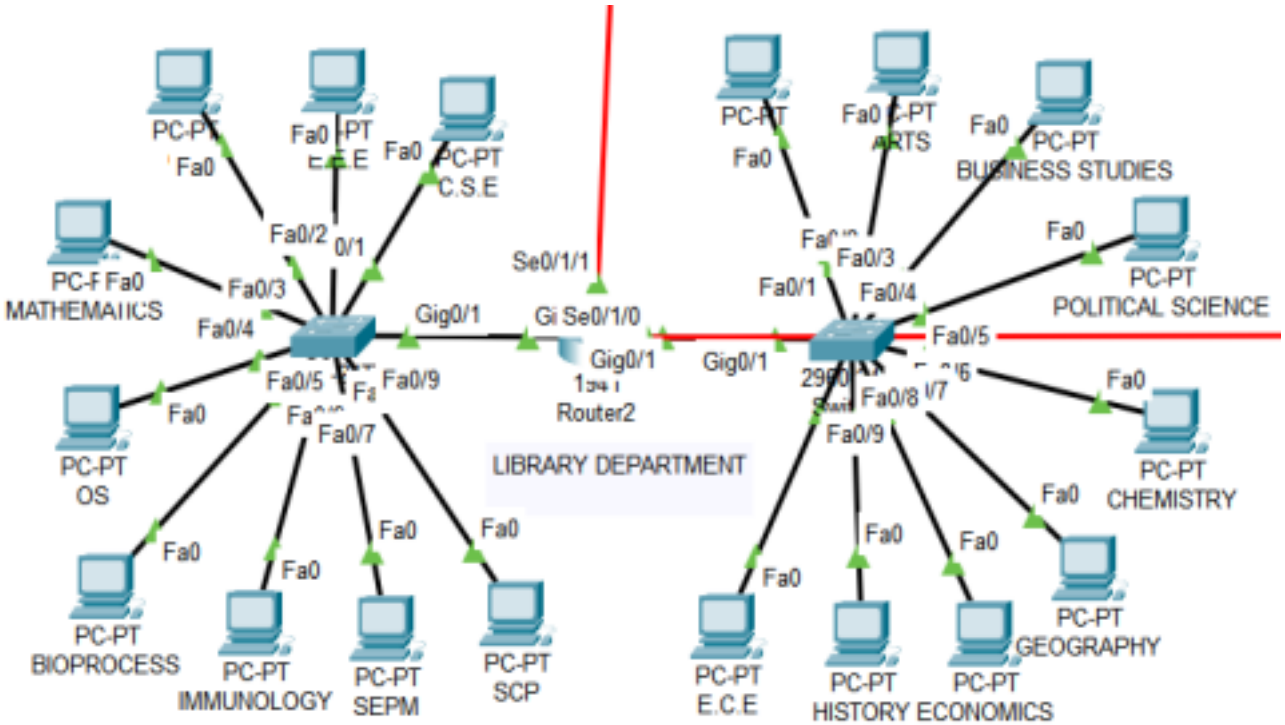
There are two switches connected to 9 PCs on each side, through a Copper Straight through Cable. The users include C.S.E, E.E.E, CC, MATHEMATICS, OS, BIOPROCESS, IMMUNOLOGY, SEPM, SCP, E.C.E, HISTORY, ECONOMICS, GEOGRAPHY, CHEMISTRY, POLITICAL SCIENCE, BUSINESS STUDIES, ARTS and LAW. A Router is connected to both the switches using a Copper Straight- through Cable. Appropriate IP Addresses are chosen for the PCs and Router, thus completing the connection of the third network.

The components used in Network 3 are:

DEVICES	REQUIRED NOS
PCs	18
Switch 2960 IOS15	2
Router 1941	1
Copper Straight- through Cables	20
Serial DCE	2

For computers to communicate in the network, they must have the same IP address. The IP Addresses for the first network are given in the following table:

DEVICE	INTERFACE	IP ADDRESS	SUBNET MASK	GATEWAY
C.S.E	Fa0/1 (Switch 5)	192.168.5.2	255.255.255.0	192.168.5.1
E.E.E	Fa0/2 (Switch 5)	192.168.5.3	255.255.255.0	192.168.5.1
CC	Fa0/3 (Switch 5)	192.168.5.4	255.255.255.0	192.168.5.1
MATHEMATICS	Fa0/4 (Switch 5)	192.168.5.5	255.255.255.0	192.168.5.1
OS	Fa0/5 (Switch 5)	192.168.5.6	255.255.255.0	192.168.5.1
BIOPROCESS	Fa0/6 (Switch 5)	192.168.5.7	255.255.255.0	192.168.5.1
IMMUNOLOGY	Fa0/7 (Switch 5)	192.168.5.8	255.255.255.0	192.168.5.1
SEPM	Fa0/8 (Switch 5)	192.168.5.9	255.255.255.0	192.168.5.1
SCP	Fa0/9 (Switch 5)	192.168.5.10	255.255.255.0	192.168.5.1
E.C.E	Fa0/9 (Switch 6)	192.168.6.10	255.255.255.0	192.168.6.1
HISTORY	Fa0/8 (Switch 6)	192.168.6.9	255.255.255.0	192.168.6.1
ECONOMICS	Fa0/7 (Switch 6)	192.168.6.8	255.255.255.0	192.168.6.1
GEOGRAPHY	Fa0/6 (Switch 6)	192.168.6.7	255.255.255.0	192.168.6.1
CHEMISTRY	Fa0/5 (Switch 6)	192.168.6.6	255.255.255.0	192.168.6.1
POLITICAL SCIENCE	Fa0/4 (Switch 6)	192.168.6.5	255.255.255.0	192.168.6.1
BUSINESS STUDIES	Fa0/3 (Switch 6)	192.168.6.4	255.255.255.0	192.168.6.1
ARTS	Fa0/2 (Switch 6)	192.168.6.3	255.255.255.0	192.168.6.1
LAW	Fa0/1 (Switch 6)	192.168.6.2	255.255.255.0	192.168.6.1
Router2	GigabitEthernet0/0	192.168.5.1	255.255.255.0	-
Router2	GigabitEthernet0/1	192.168.6.1	255.255.255.0	-
Router2	Serial0/1/0	192.168.12.1	255.255.255.0	-
Router2	Serial0/1/1	192.168.10.2	255.255.255.0	-


PC-PT
Fa0
Fa0/2
0/1
C.S.E
Fa0
PC-PT
MATHEMATICS
Fa0/3
Fa0/4
Gig0/1
Se0/1/1
Se0/1/0
Gig0/1
Router2
Fa0/5
Fa0/9
Fa0/7
PC-PT
OS
LIBRARY DEPARTMENT
PC-PT
BIOPROCESS
PC-PT
IMMUNOLOGY
PC-PT
SEPM
PC-PT
SCP
Fa0/1
Fa0/3
Fa0/4
Fa0/5
Fa0/8
Fa0/9
PC-PT
BUSINESS STUDIES
PC-PT
POLITICAL SCIENCE
PC-PT
CHEMISTRY
PC-PT
GEOGRAPHY
PC-PT
E.C.E
PC-PT
HISTORY
PC-PT
ECONOMICS

5.1.4 Network 4- Lab Department

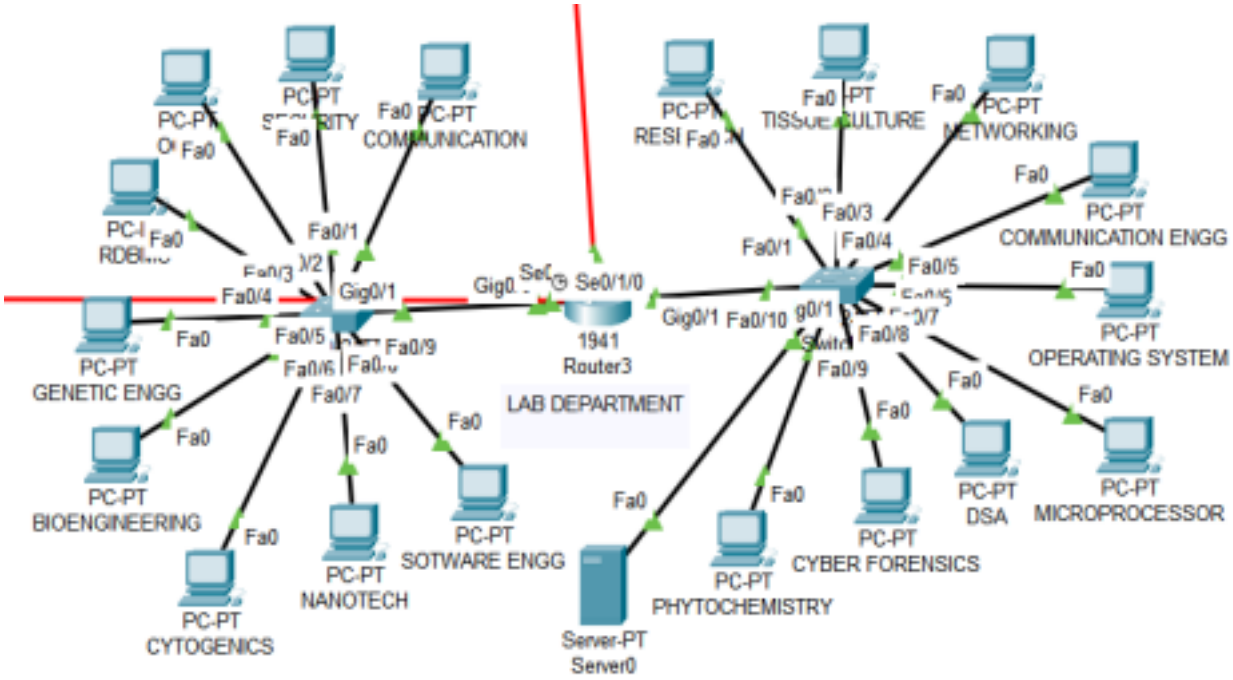
There are two switches connected to 9 PCs on each side, through a Copper Straight through Cable. The users include Communication, Security, OODP, RDBMS, Genetic Engg, Bioengineering, Cytogenics, Nanotech, Software Engineering, Phytochemistry, Cyber Forensics, DSA, Microprocessor, Operating System, Communication Engg, Networking, Tissue Culture and Research. A Router is connected to both the switches using a Copper Straight- through Cable. A Server is attached to the switch for sharing and storing files. Appropriate IP Addresses are chosen for the PCs and Router, thus completing the connection of the third network.

The components used in Network 3 are:

DEVICES	REQUIRED NOS
PCs	18
Switch 2960 IOS15	2
Router 1941	1
Copper Straight- through Cables	20
Serial DCE	2
Server- PT	1

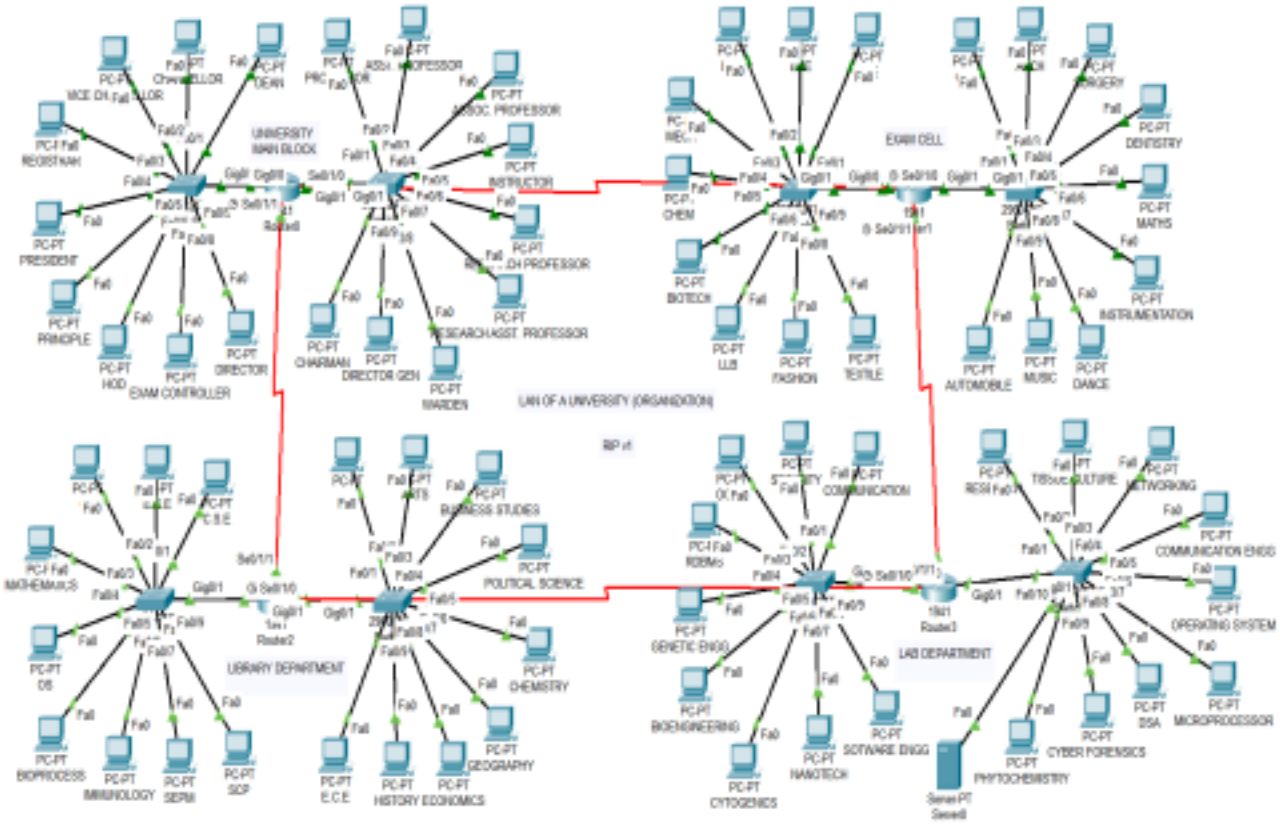
For computers to communicate in the network, they must have the same IP address. The IP Addresses for the first network are given in the following table:

DEVICE	INTERFACE	IP ADDRESS	SUBNET MASK	GATEWAY
Communication	Fa0/1 (Switch 7)	192.168.7.2	255.255.255.0	192.168.7.1
Security	Fa0/2 (Switch 7)	192.168.7.3	255.255.255.0	192.168.7.1
OS	Fa0/3 (Switch 7)	192.168.7.4	255.255.255.0	192.168.7.1
RDBMS	Fa0/4 (Switch 7)	192.168.7.5	255.255.255.0	192.168.7.1
Genetic Engg	Fa0/5 (Switch 7)	192.168.7.6	255.255.255.0	192.168.7.1
Bioengineering	Fa0/6 (Switch 7)	192.168.7.7	255.255.255.0	192.168.7.1
Cytogenics	Fa0/7 (Switch 7)	192.168.7.8	255.255.255.0	192.168.7.1
Nanotech	Fa0/8 (Switch 7)	192.168.7.9	255.255.255.0	192.168.7.1
Software Engg	Fa0/9 (Switch 7)	192.168.7.10	255.255.255.0	192.168.7.1
Phytochemistry	Fa0/9 (Switch 8)	192.168.8.10	255.255.255.0	192.168.8.1
Cyber Forensics	Fa0/8 (Switch 8)	192.168.8.9	255.255.255.0	192.168.8.1
DSA	Fa0/7 (Switch 8)	192.168.8.8	255.255.255.0	192.168.8.1
Microprocessor	Fa0/6 (Switch 8)	192.168.8.7	255.255.255.0	192.168.8.1
Operating System	Fa0/5 (Switch 8)	192.168.8.6	255.255.255.0	192.168.8.1
Communication Engg	Fa0/4 (Switch 8)	192.168.8.5	255.255.255.0	192.168.8.1
Networking	Fa0/3 (Switch 8)	192.168.8.4	255.255.255.0	192.168.8.1
Tissue Culture	Fa0/2 (Switch 8)	192.168.8.3	255.255.255.0	192.168.8.1
Research	Fa0/1 (Switch 8)	192.168.8.2	255.255.255.0	192.168.8.1
Router3	GigabitEthernet0/0	192.168.7.1	255.255.255.0	-
Router3	GigabitEthernet0/1	192.168.8.1	255.255.255.0	-
Router3	Serial0/1/0	192.168.12.2	255.255.255.0	-
Router3	Serial0/1/1	192.168.11.2	255.255.255.0	-
Server	Fa0/10 (Switch 8)	192.168.8.11	255.255.255.0	192.168.8.1


PC-PT
COMMUNICATION
PC-PT
RESI
PC-PT
TISSUE CULTURE
PC-PT
NETWORKING
PC-PT
COMMUNICATION ENGG
PC-PT
OPERATING SYSTEM
PC-PT
GENETIC ENGG
PC-PT
BIOENGINEERING
PC-PT
CYTOGENICS
PC-PT
NANOTECH
PC-PT
SOTWARE ENGG
1941
Router3
LAB DEPARTMENT
Server-PT
Server0
PC-PT
PHYTOCHEMISTRY
PC-PT
CYBER FORENSICS
PC-PT
DSA
PC-PT
MICROPROCESSOR
Gig0/1
Se0/1/0
Fa0/1
Fa0/3
Fa0/4
Fa0/5
Fa0/6
Fa0/7
Fa0/8
Fa0/9
Fa0/10
Fa0

5.2 NETWORK DESIGN

All the four departments, that is, University Main Block, Exam Cell, Library Department and Lab Department are connected through their routers via the RIP v1. The final network is given below:



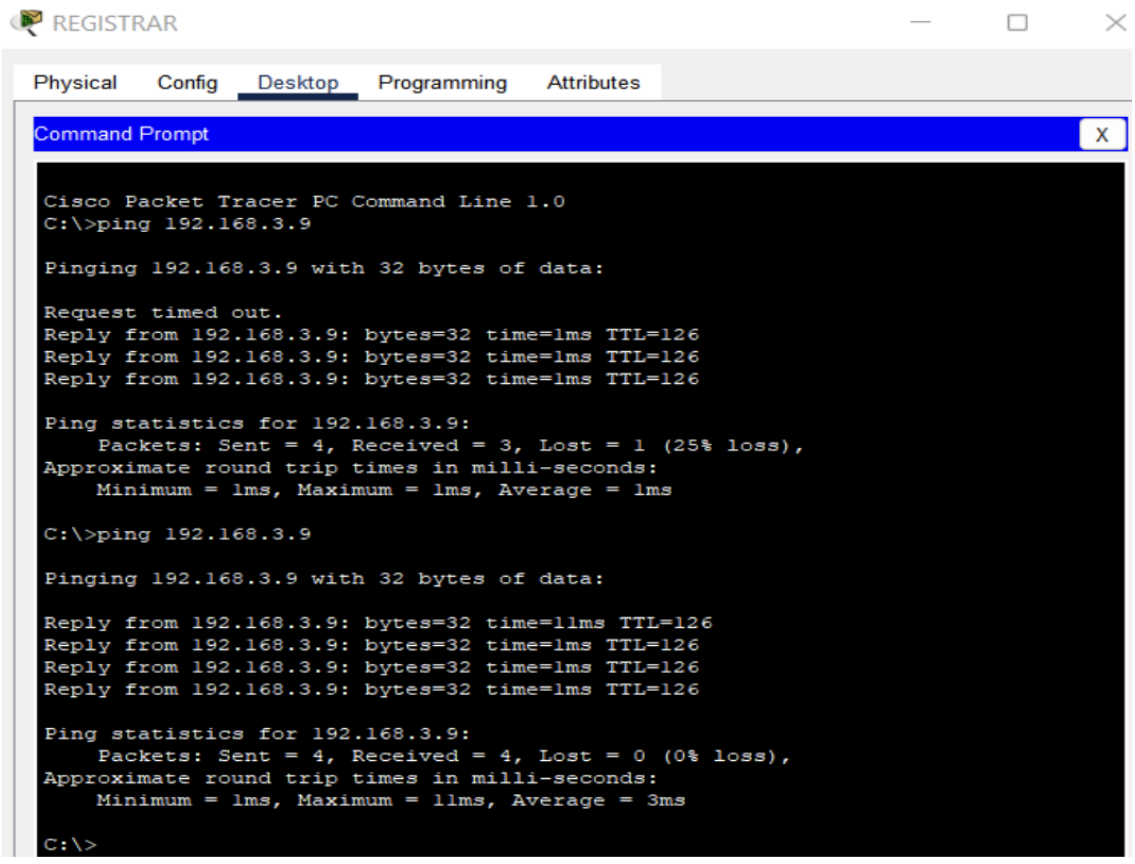
6. TESTING AND RESULTS

After the LAN has been designed, we must check the connectivity between the users belonging to different departments. Also, the connection with the server must be checked.

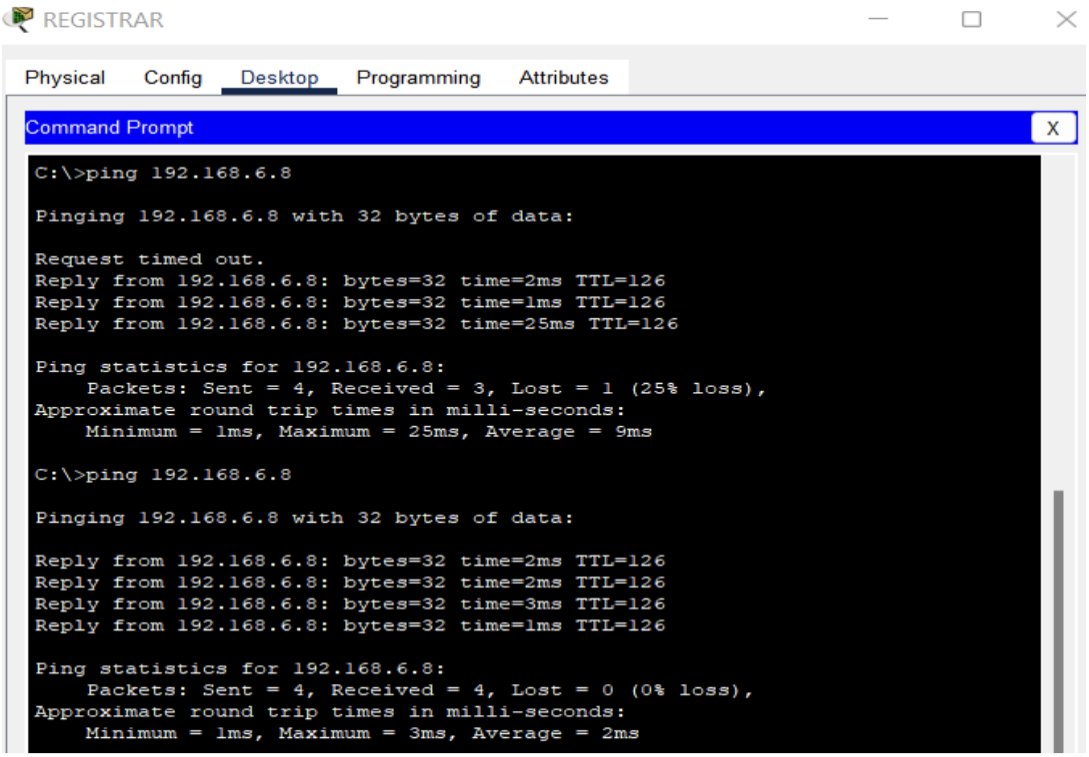
6.1 PING TEST

Network connectivity and communication can be tested using a ping command. It is a Command Prompt command used to test the ability of the source computer to reach a specified destination computer.

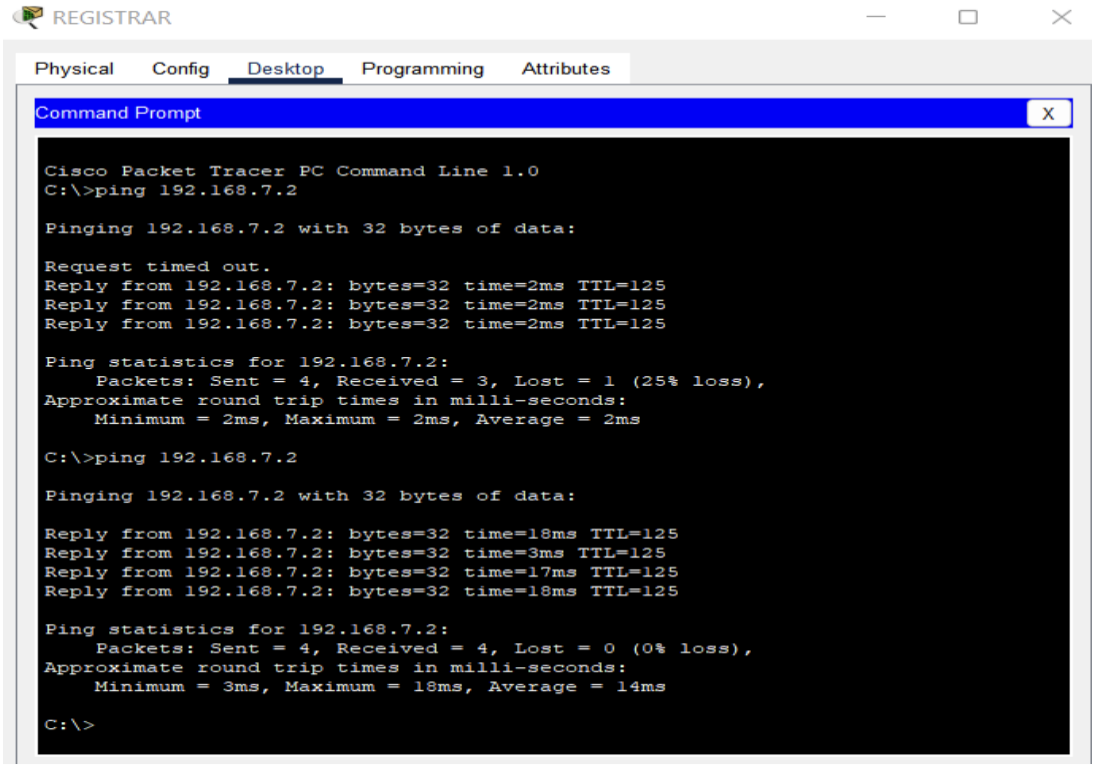
6.1.1 Network 1



Registrar's PC (University Main Block) to Fashion's PC (Exam Cell)

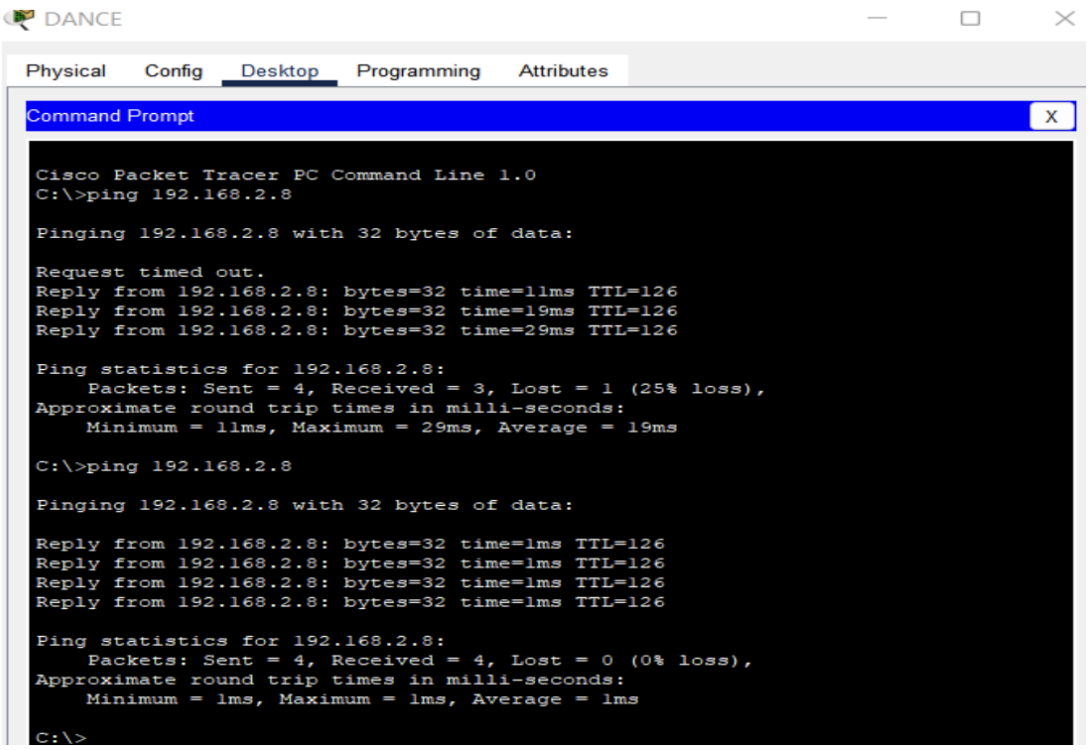


Registrar's PC (University Main Block) to Economic PC (Library Dept)

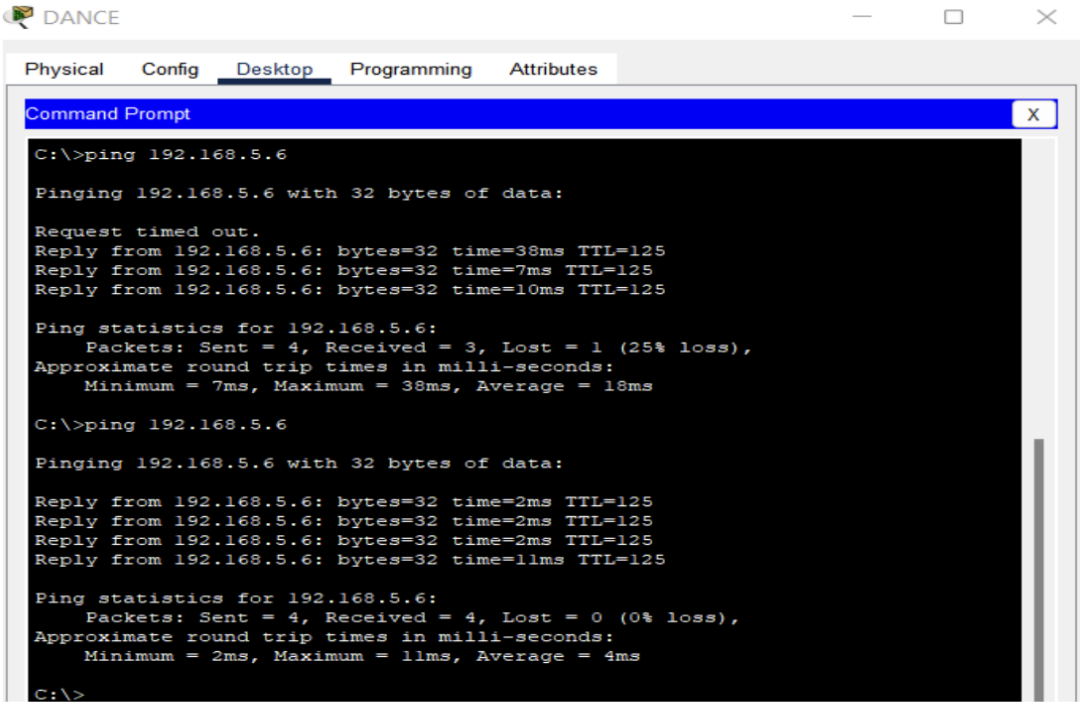


Registrar's PC (University Main Block) to Communication PC (Library Dept)

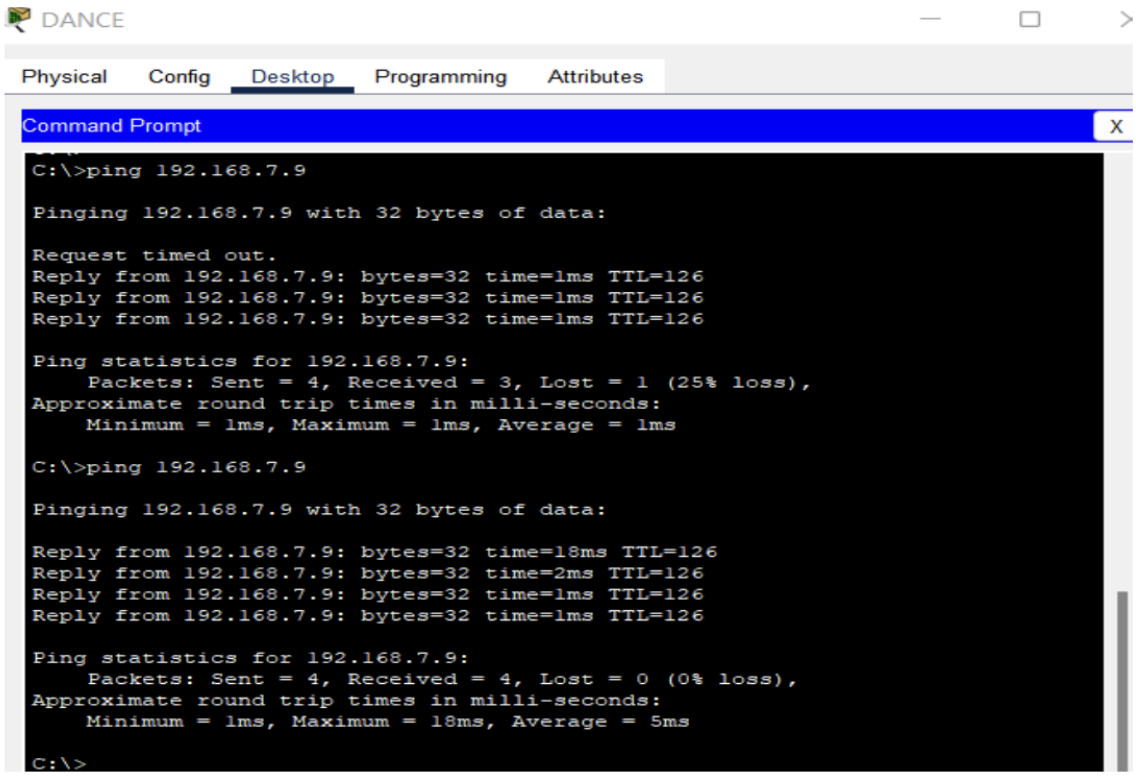
6.1.2 Network 2



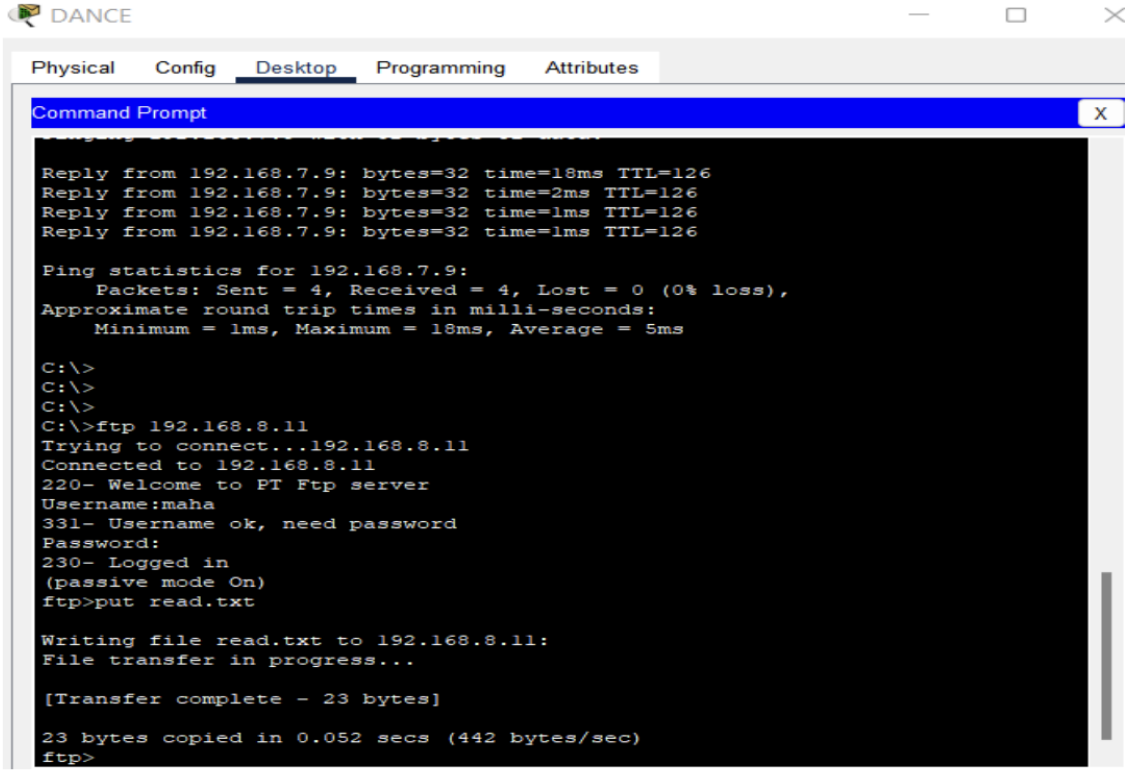
Dance PC (Exam Cell) to Warden's PC (University Main Block)



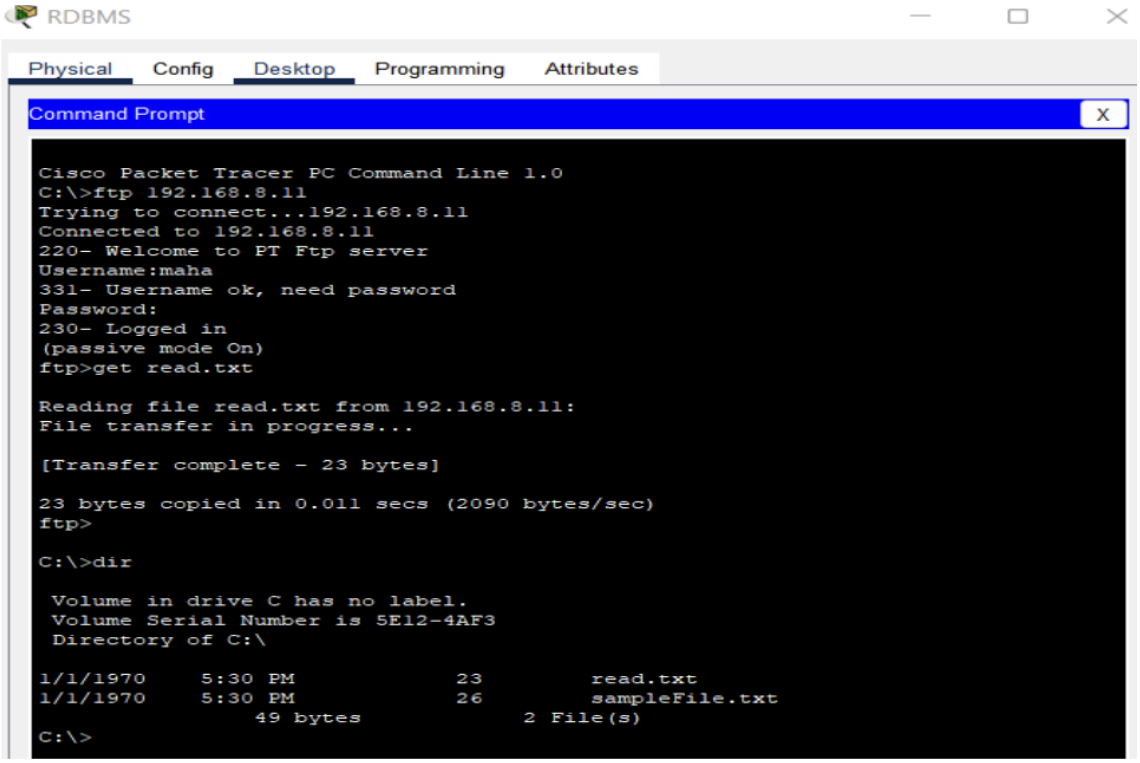
Dance PC (Exam Cell) to OS's PC (Library Dept)



Dance PC (Exam Cell) to Nanotech's PC (Lab Dept)

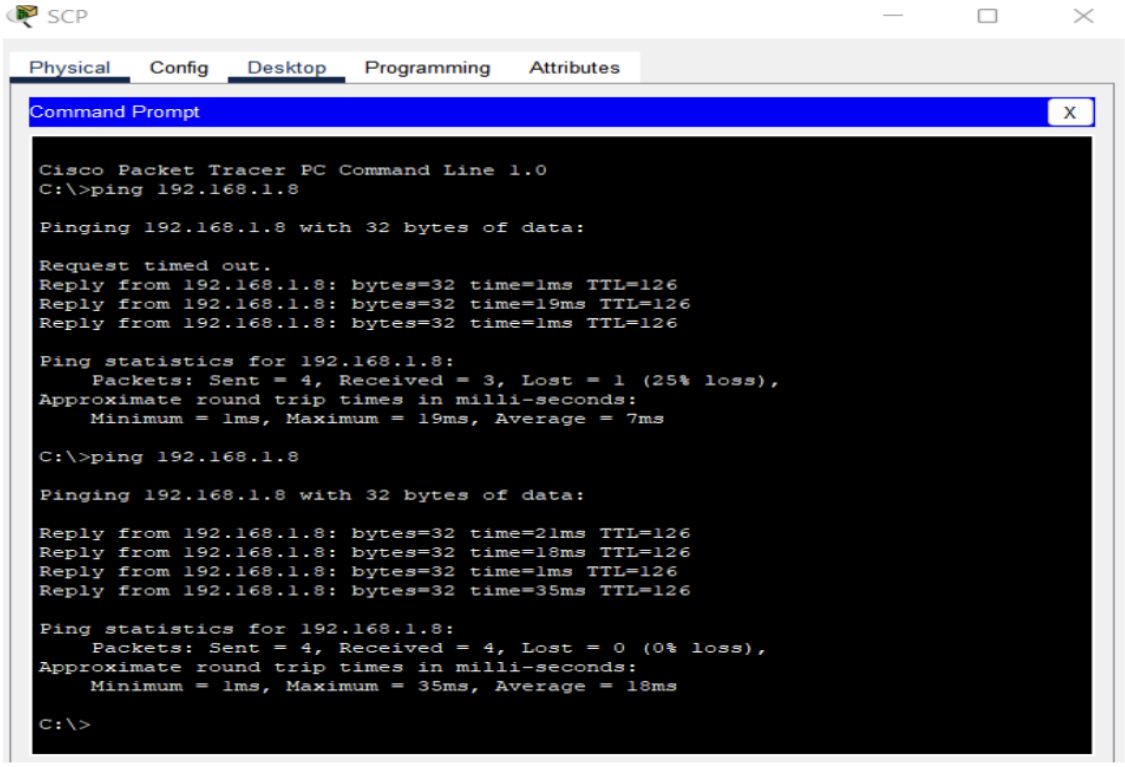


FTP using Dance's PC (Exam Cell) via Server

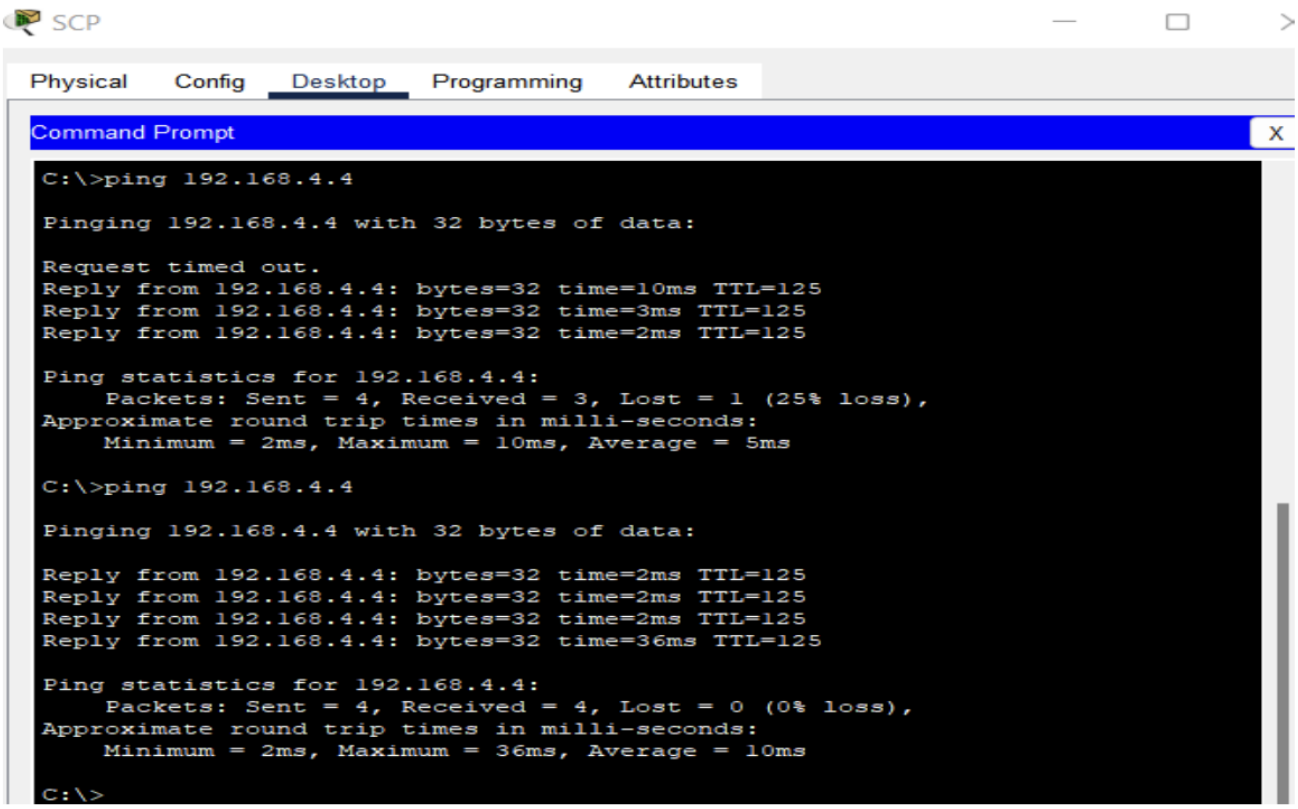


RDBMS PC (Lab Dept) getting the uploaded file from Dance's PC

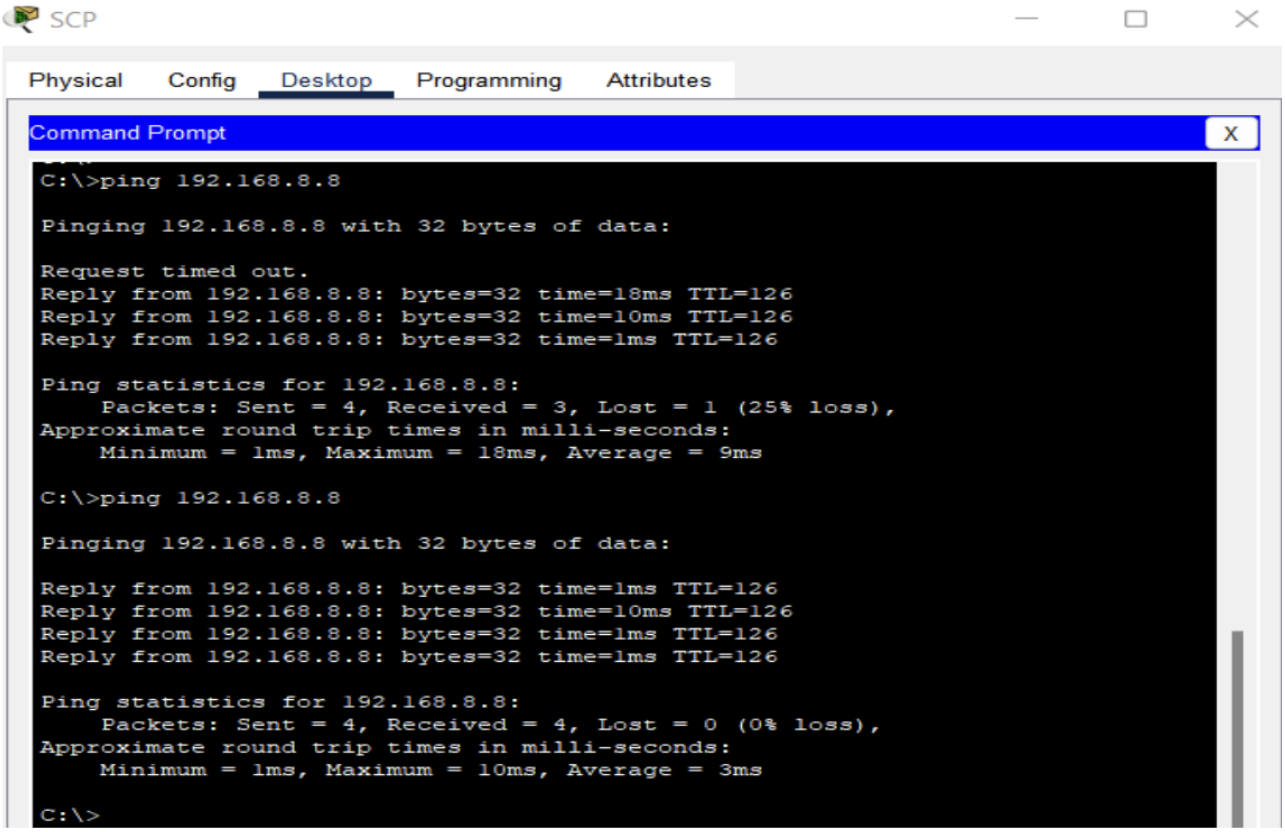
6.1.3 Network 3



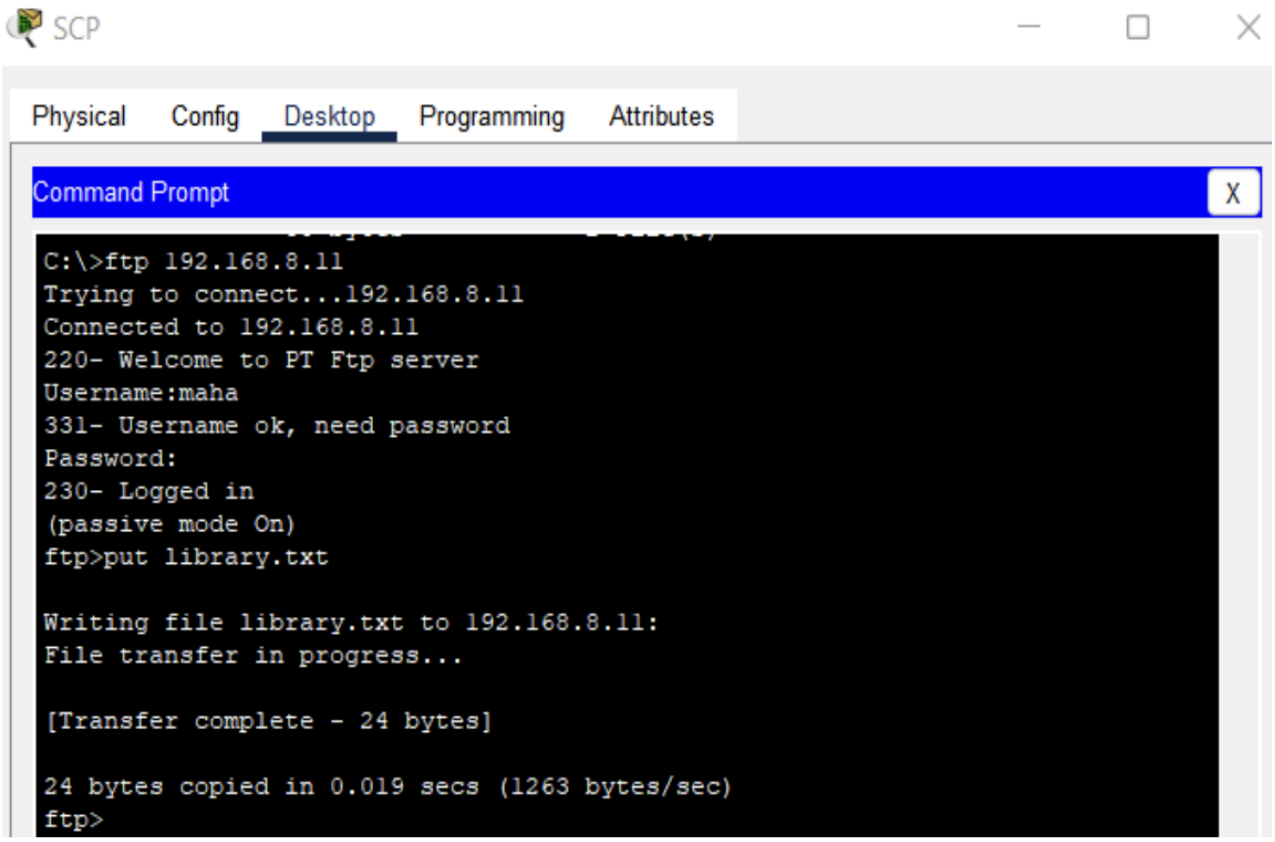
SCP PC (Library Dept) to HOD's PC (University Main Block)



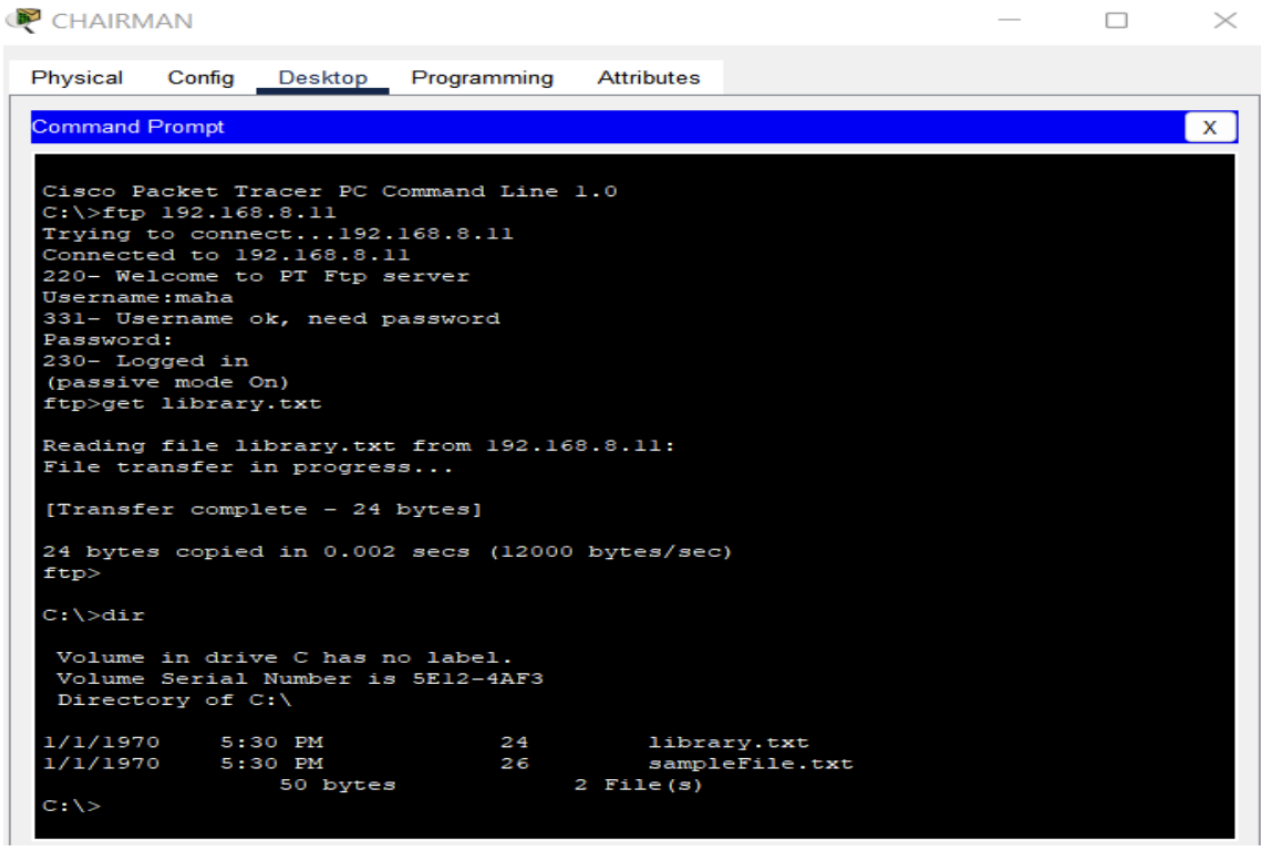
SCP PC (Library Dept) to Surgery's PC (Exam Cell)



SCP PC (Library Dept) to DSA's PC (Lab Dept)

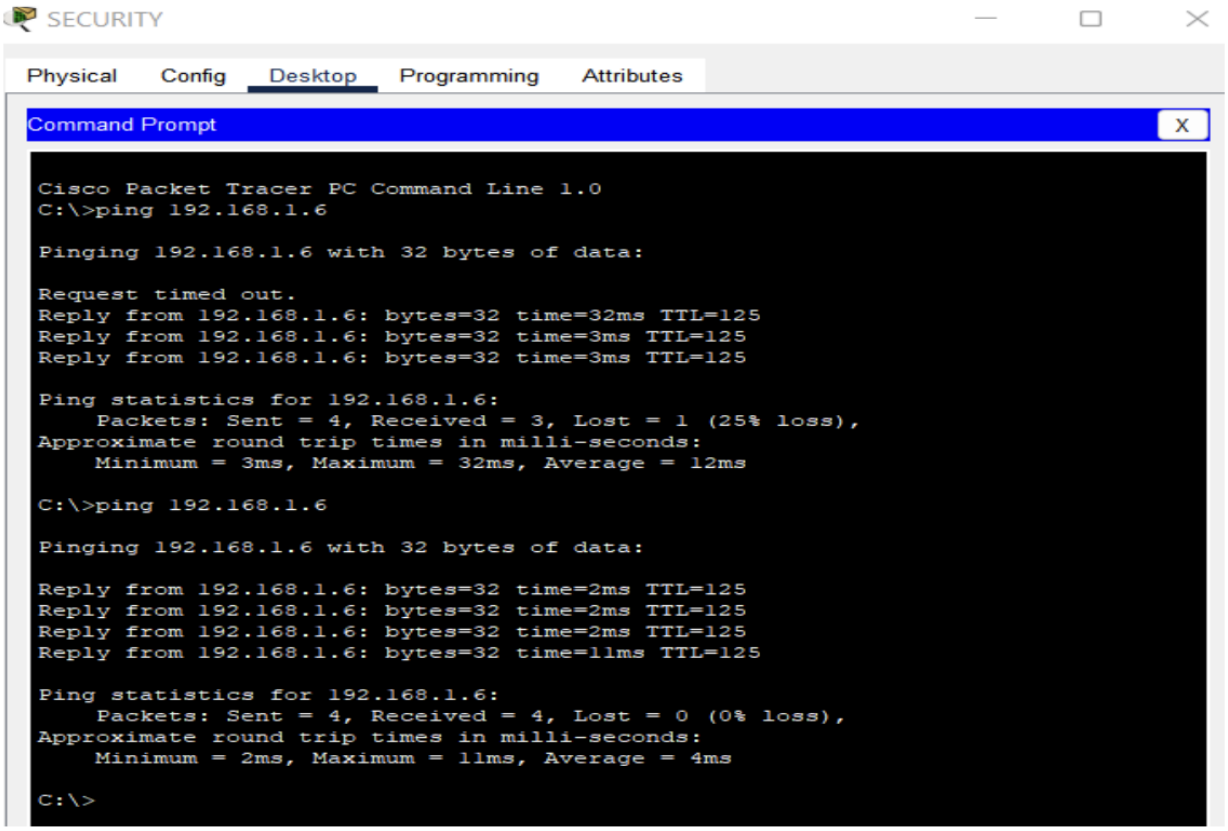


FTP using SCP's PC (Library Dept) via Server

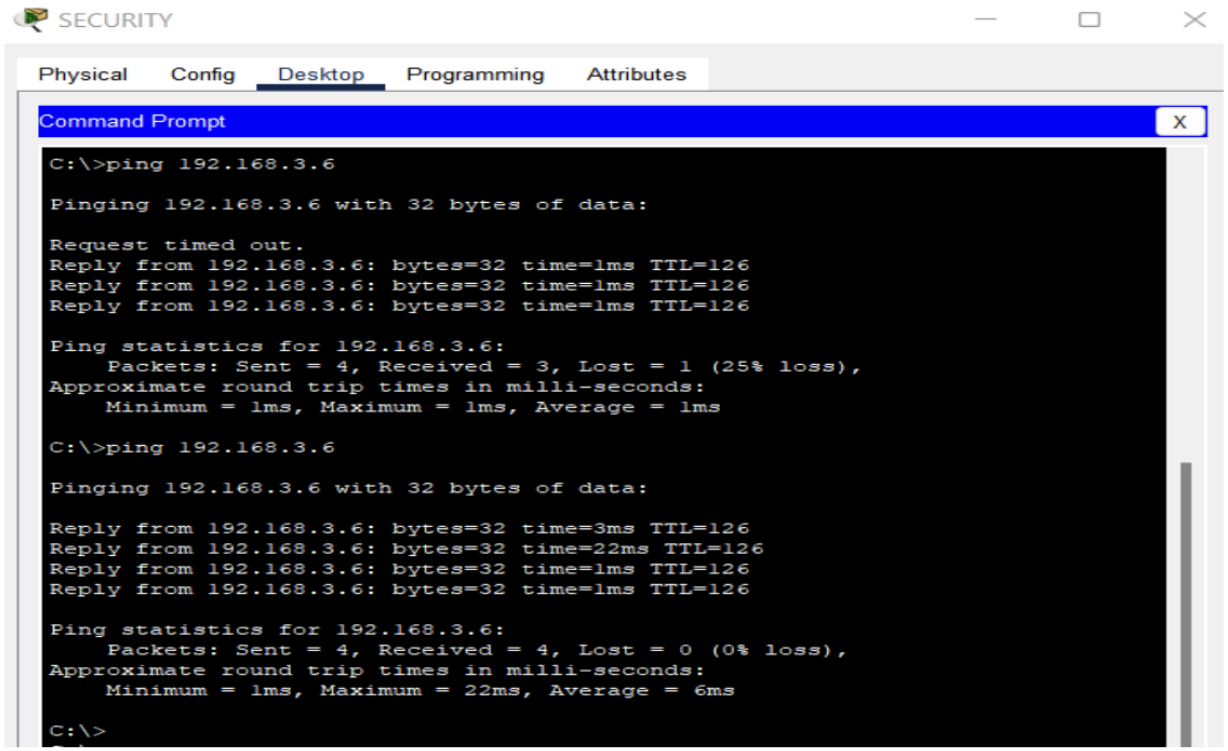


Chairman's PC (University Main Block) getting the uploaded file from SCP's PC

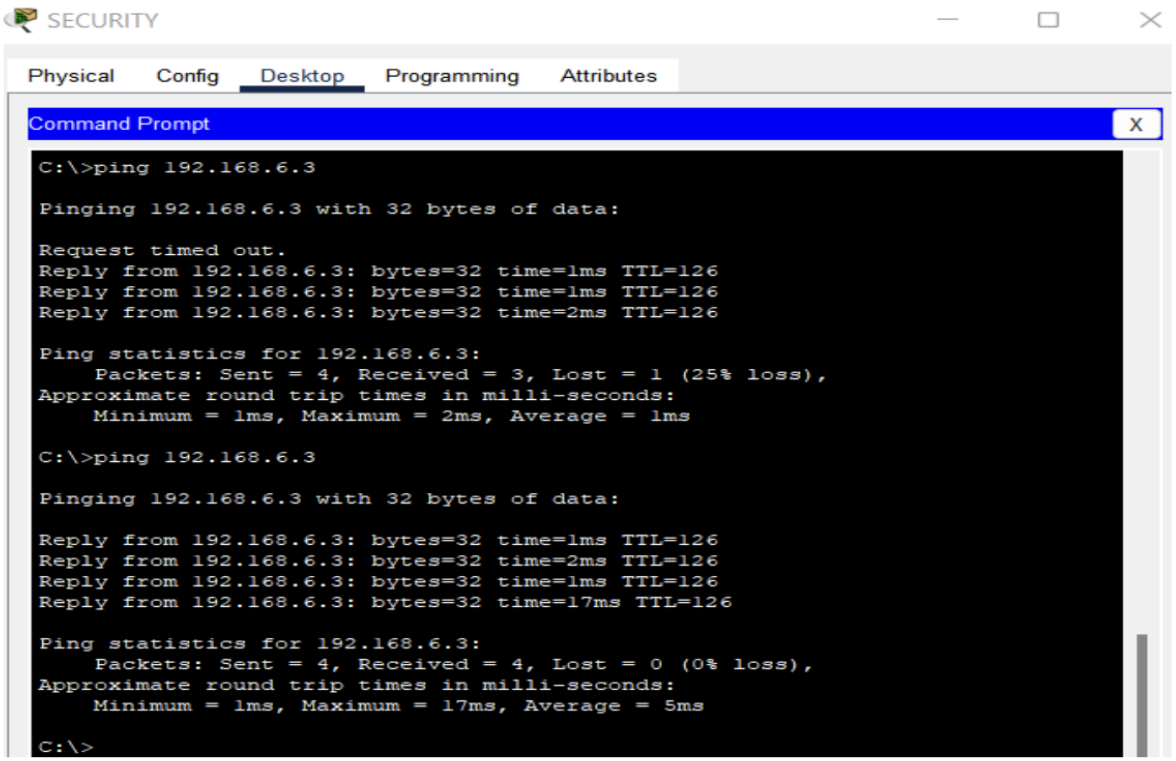
6.1.4 Network 4



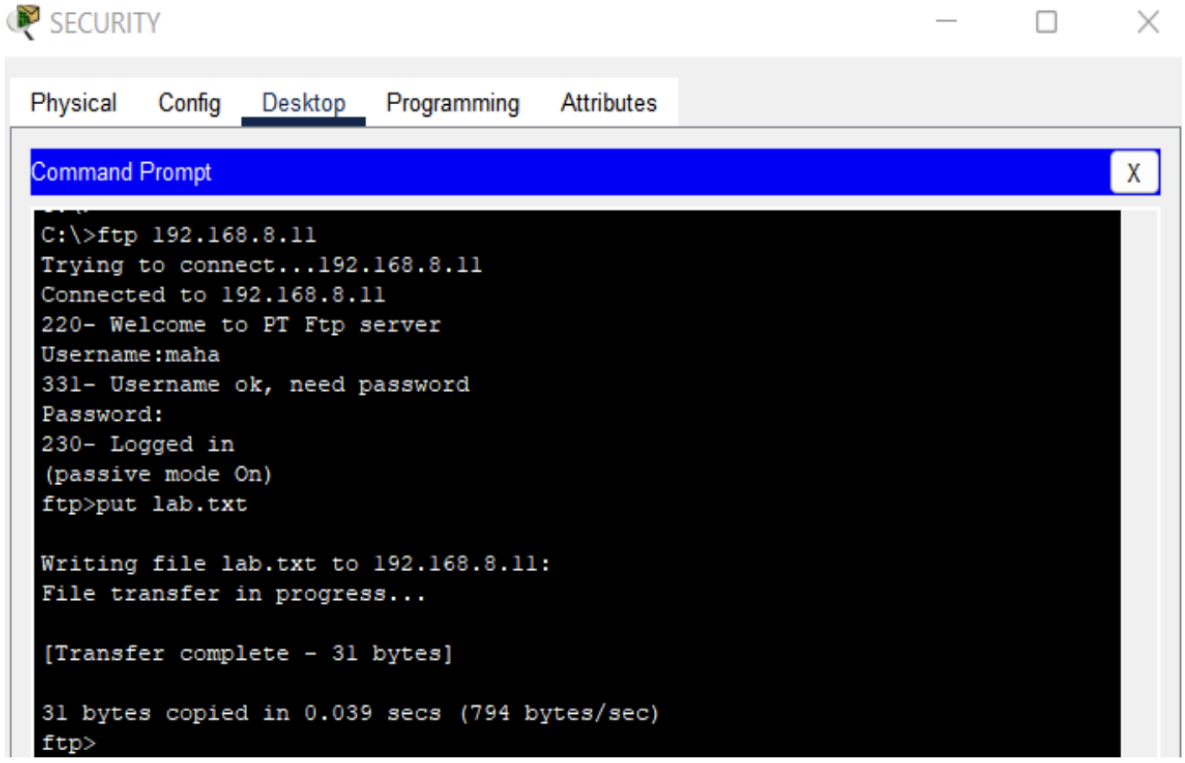
Security PC (Lab Dept) to President's PC (University Main Block)



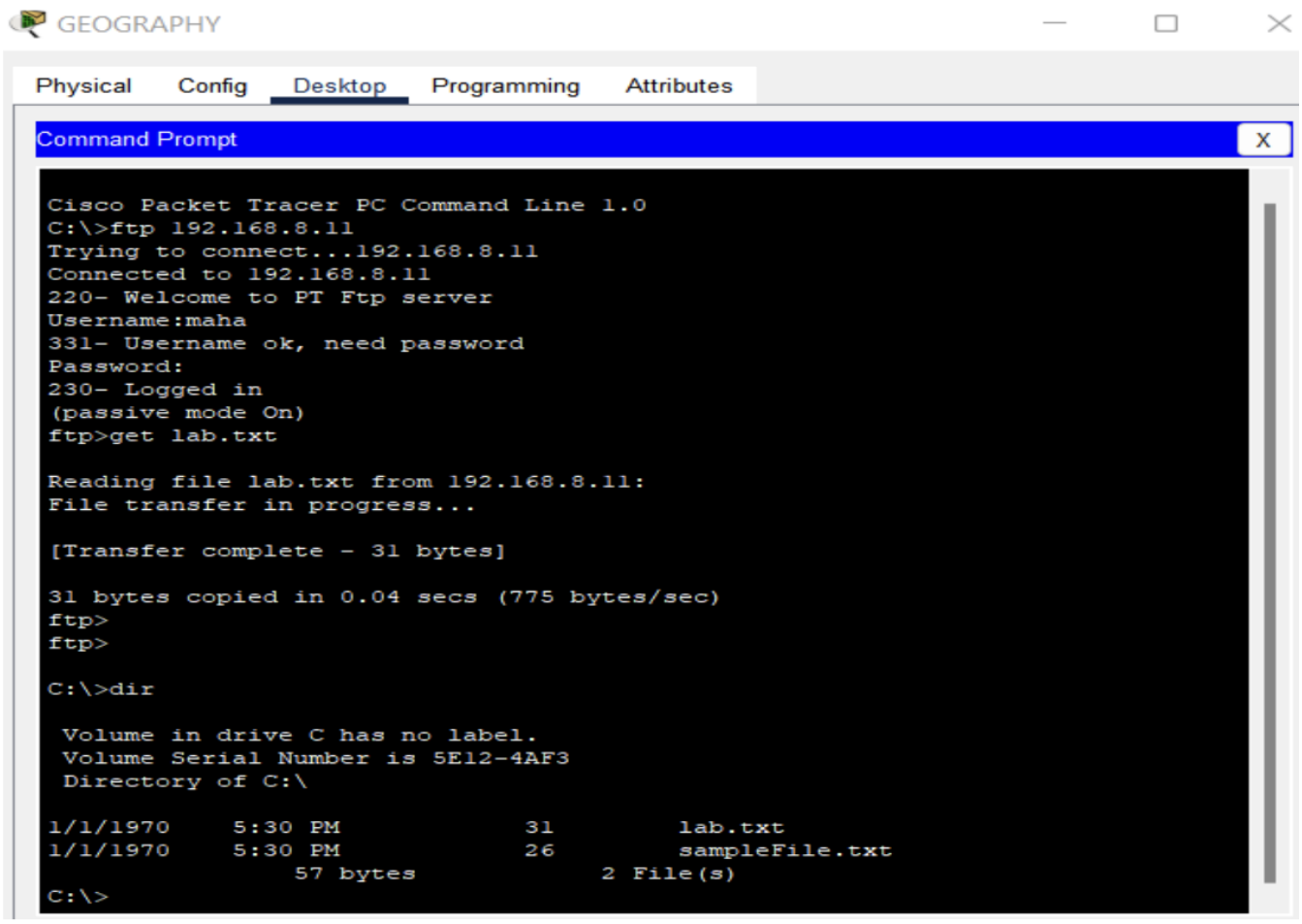
Security PC (Lab Dept) to Chem's PC (Exam Cell)



Security PC (Lab Dept) to Art's PC (Library Dept)



FTP using Security PC (Lab Dept) via Server



Geography's PC (Library Dept) getting the uploaded file from Security's PC

7. CONCLUSION

My project consists of a Local Area Network (LAN) that uses both the wired and wireless topology, using Cisco Packet Tracer. Every component, from the PC to router to switch to server, plays an important role in establishing proper connection. It is also noteworthy that the LAN can be further developed, and additional functionalities can be added to increase support and coverage. The procedures provide a veritable approach for the design of LANs for end-to-end IP network connectivity for next generation network (NGN) architecture implementations.

8. REFERENCES

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2) https:// www.slideshare.net/abhishekkumar5947/design-and-simulation-of local-area-network-using-cisco-packet-tracer

3) https:// study-ccna.com/routing-protocols/

4) https:// www.geeksforgeeks.org/routing-information-protocol-rip/ 5) https:// www.geeksforgeeks.org/eigrp-fundamentals/?ref=lbp 6) https:// www.cisco.com/c/en_in/products/switches/what-is-a-lan-local-area network.html