DATA COMMUNICATION AND COMPUTER NETWORKS

PROJECT REPORT

HOSPITAL NETWORKING SYSTEM

SUBMITTED TO: PF. MANPREET SINGH

SUBMITTED BY:

HARKIRAT KAUR	**HIMA GANDHI**
BTECH D2ITA2	**BTECH D2ITA3**
1921036/1905334	**1921041/1905339**

ACKNOWLEDGEMENT

We would like to express our special thanks of gratitude to our teacher (PF. MANPREET SINGH) who gave us the golden opportunity to do this wonderful project on the topic (HOSPITAL NETWROKING), which also helped us in doing a lot of Research and we came to know about a lot of things ,we are really thankful to him.
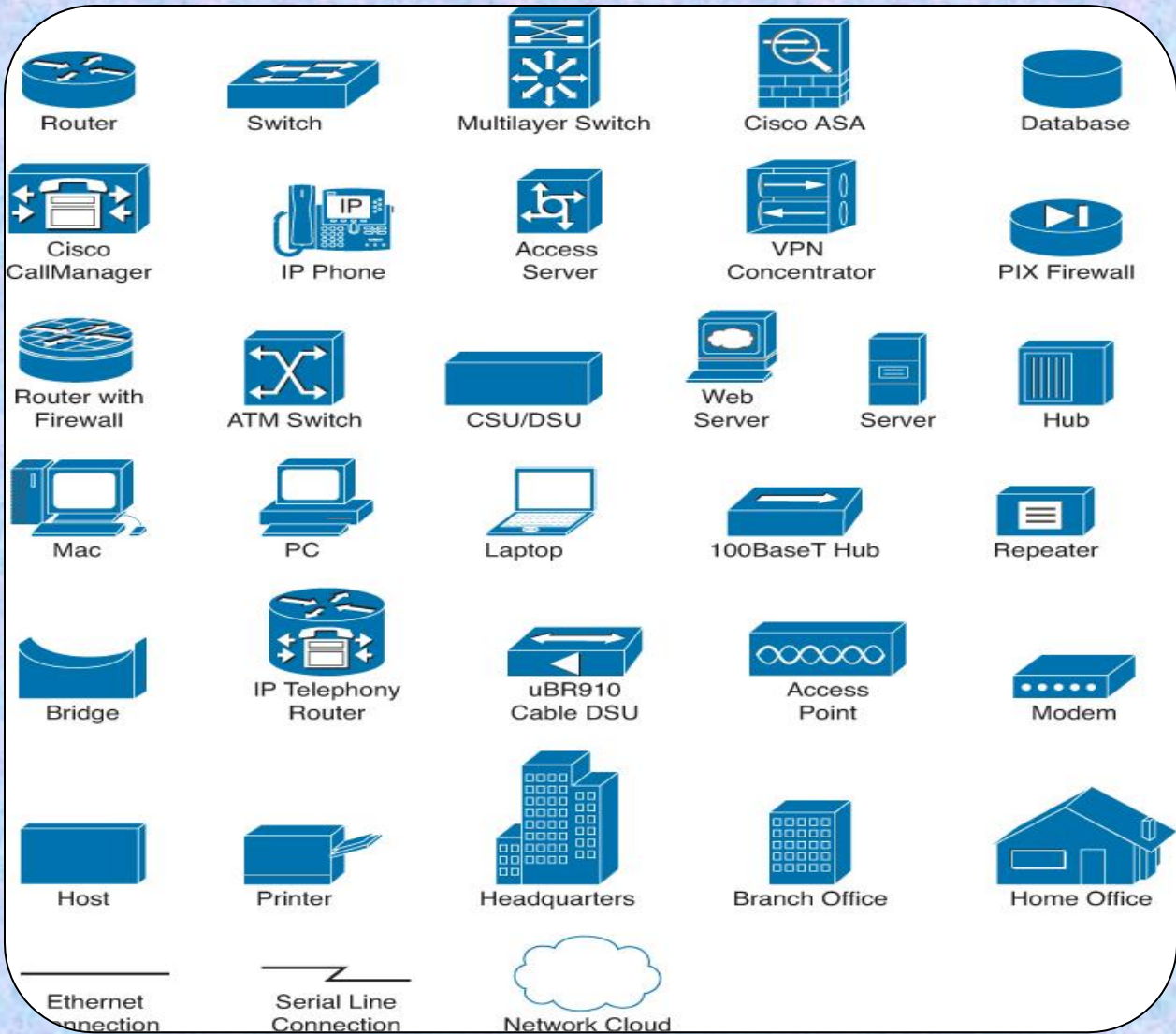
ABSTRACT

This project proposes hospital networking system. It consists of three routers connected with five switches. The switches are further connected with computers. It basically shows connectivity in a local area network. The routers and switches are all interconnected and the main router here is the one in reception. When given commands it shows all the working . we have shown connections in laboratory, dispensary, doctor rooms, nursing and patient department.

TABLE OF CONTENTS

NETWORK DEVICES SYMBOLS

Router	Switch	Multilayer Switch	Cisco ASA	Database
Cisco CallManager	IP Phone	Access Server	VPN Concentrator	PIX Firewall
Router with Firewall	ATM Switch	CSU/DSU	Web Server	Server	Hub
Mac	PC	Laptop	100BaseT Hub	Repeater
Bridge	IP Telephony Router	uBR910 Cable DSU	Access Point	Modem
Host	Printer	Headquarters	Branch Office	Home Office
Ethernet Connection	Serial Line Connection	Network Cloud		

OPERATIONS PERFORMED AND PLATFORM USED

1. CONNECTIVITY IN LOCAL AREA NETWORK

2. NETWORK IP ADDRESS

3. NETWORKING COMMANDS

4. ROUTER CONFIGURATION

5. SWITCH CONFIGURATION

PLATFORM USED: CISCO PACKET TRACER

Basic information:

What is a switch?

A network switch is networking hardware that connects devices on a computer network by using packet switching to receive and forward data to the destination device. A network switch is a multiport network bridge that uses MAC addresses to forward data at the data link layer of the OSI model.

What is a router?

A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet. Data sent through the internet, such as a web page or email, is in the form of data packets. A router is connected to two or more data lines from different IP networks.

ROUTER VERSUS SWITCH

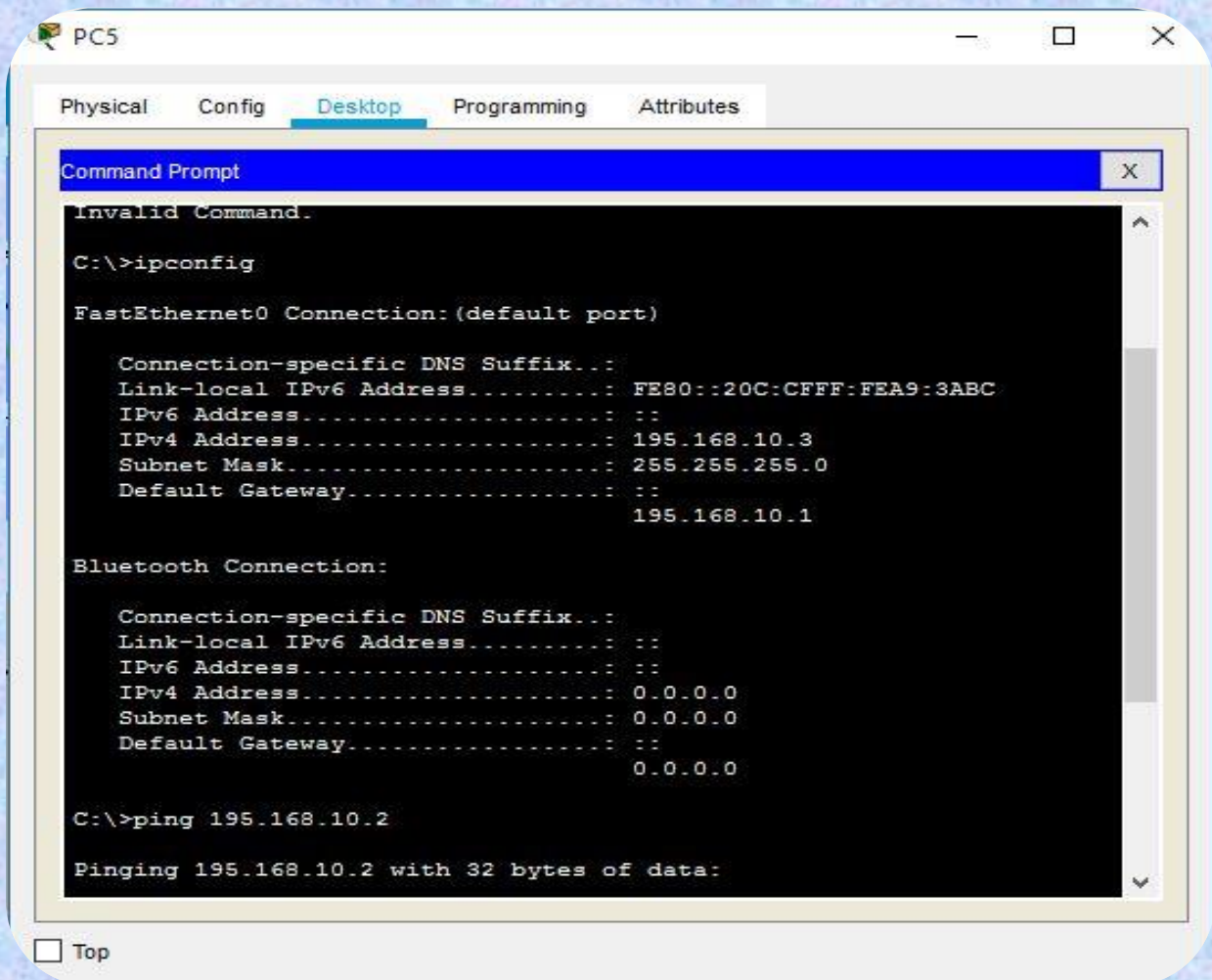| ROUTER	SWITCH
A networking device that forwards data packets between computer networks	A networking device that uses packet switching to receive, process and forward data to the destination device
Routes data from one network to another and connects different networks together	Creates a network by connecting several devices together and allows the exchange of data within its own network or the LAN
Stores IP addresses in a routing table and maintains it	Stores MAC addresses in the Mac address table or the Content Addressable Table (CAM table)
Uses IP address for data transmission	Uses MAC address for data transmission
Takes routing decisions faster	Not fast as a router
Works in network layer of the OSI model (layer 3)	Works in data link layer of the OSI model (layer 2)

WORKING OF THE PROJECT

Step1: Network connection

It is a local area network.The main router (router0) is at the reception of the hospital which is connected with 2 routers and a switch named doctor switch. Router1 is connected with two switches in departments named dispensary and laboratory. Router2 is connected with switches in patients and nursing departments. Further we have pcs connected with all switches.
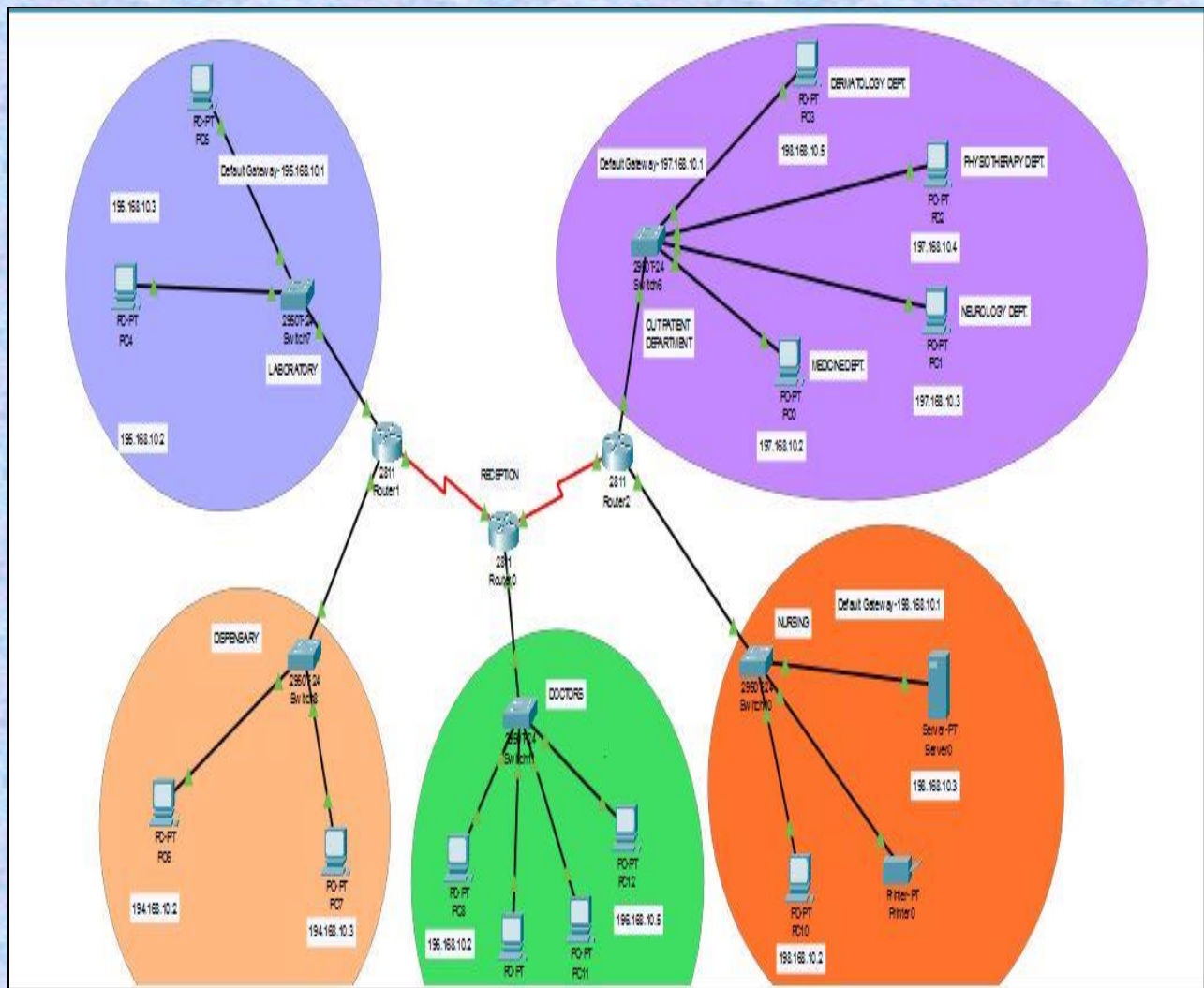
Step2: give all the pcs their respective ip addresses.Clicking on a pc >go to the desktop >command prompts> give the ipconfig command: we will get the information regarding that pc. Then give ping ip address command : our pc will be connected with the other pc.

PC5 — □ ✕

| Physical | Config | Desktop | Programming | Attributes |

Command Prompt   X

```
Invalid Command.

C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix..:
    Link-local IPv6 Address.........: FE80::20C:CFFF:FEA9:3ABC
    IPv6 Address....................: ::
    IPv4 Address....................: 195.168.10.3
    Subnet Mask.....................: 255.255.255.0
    Default Gateway.................: ::
                                      195.168.10.1

Bluetooth Connection:

    Connection-specific DNS Suffix..:
    Link-local IPv6 Address.........: ::
    IPv6 Address....................: ::
    IPv4 Address....................: 0.0.0.0
    Subnet Mask.....................: 0.0.0.0
    Default Gateway.................: ::
                                      0.0.0.0

C:\>ping 195.168.10.2

Pinging 195.168.10.2 with 32 bytes of data:
```

☐ Top

☐ Job

PC5

Physical · Config · **Desktop** · Programming · Attributes

Command Prompt

```
Bluetooth Connection:

    Connection-specific DNS Suffix..:
    Link-local IPv6 Address.........: ::
    IPv6 Address....................: ::
    IPv4 Address....................: 0.0.0.0
    Subnet Mask.....................: 0.0.0.0
    Default Gateway.................: ::
                                      0.0.0.0

C:\>ping 195.168.10.2

Pinging 195.168.10.2 with 32 bytes of data:

Reply from 195.168.10.2: bytes=32 time=1ms TTL=128
Reply from 195.168.10.2: bytes=32 time<1ms TTL=128
Reply from 195.168.10.2: bytes=32 time<1ms TTL=128
Reply from 195.168.10.2: bytes=32 time=2ms TTL=128

Ping statistics for 195.168.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>
C:\>
```

PC0

Physical · Config · **Desktop** · Programming · Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix..:
    Link-local IPv6 Address.........: FE80::230:F2FF:FE1B:B9B
    IPv6 Address....................: ::
    IPv4 Address....................: 197.168.10.2
    Subnet Mask.....................: 255.255.255.0
    Default Gateway.................: ::
                                      197.168.10.1

Bluetooth Connection:

    Connection-specific DNS Suffix..:
    Link-local IPv6 Address.........: ::
    IPv6 Address....................: ::
    IPv4 Address....................: 0.0.0.0
    Subnet Mask.....................: 0.0.0.0
    Default Gateway.................: ::
                                      0.0.0.0

C:\>ping 198.168.10.2

Pinging 198.168.10.2 with 32 bytes of data:

Request timed out.
Reply from 198.168.10.2: bytes=32 time=4ms TTL=127
Reply from 198.168.10.2: bytes=32 time<1ms TTL=127
Reply from 198.168.10.2: bytes=32 time<1ms TTL=127

Ping statistics for 198.168.10.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 4ms, Average = 1ms

C:\>
```

Step3: Router configuration: Select a router > go to the CLI and give the commands.

Router >en

Router >en Router #config t

Router(config) #hostnameRouter0

Router0(config) #

R1(config) #do sh ip int br

We will get an output here as shown in figures.

Router0 (config) #int fastethernet0/0

Router0(config if) #no sh

Router0(config if) #

R1(config if) #do sh ip int br

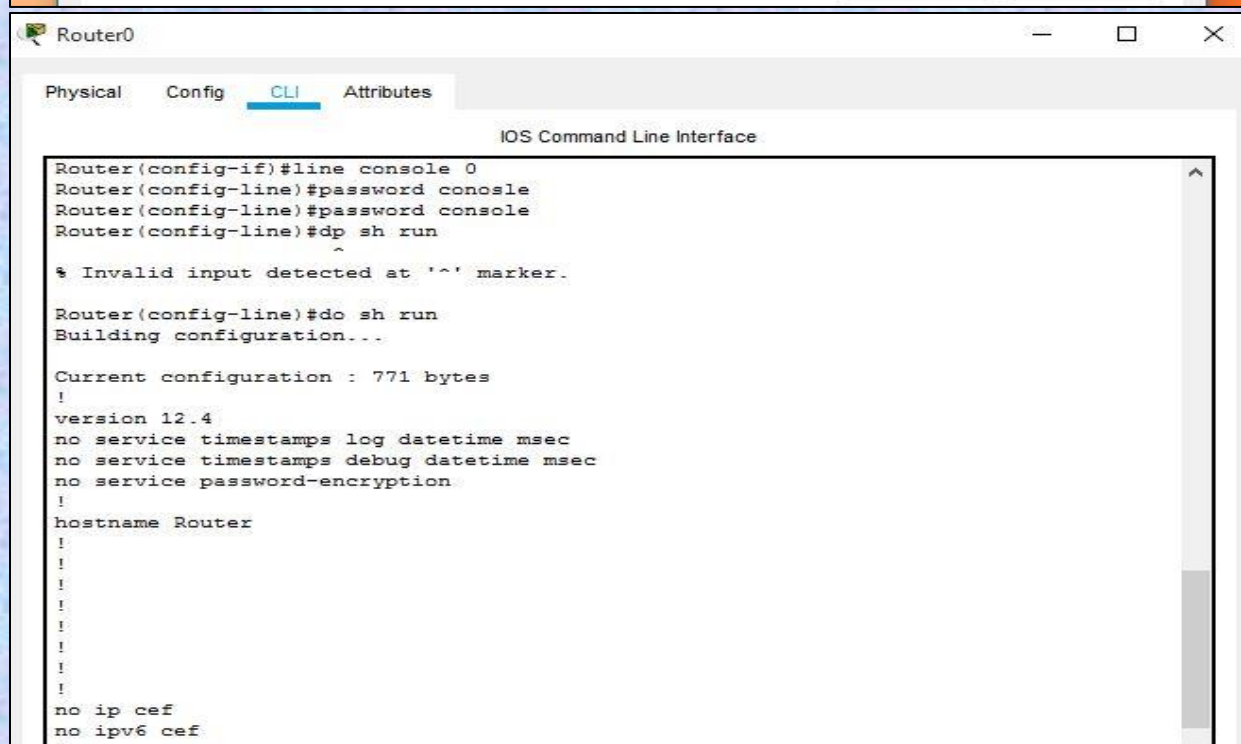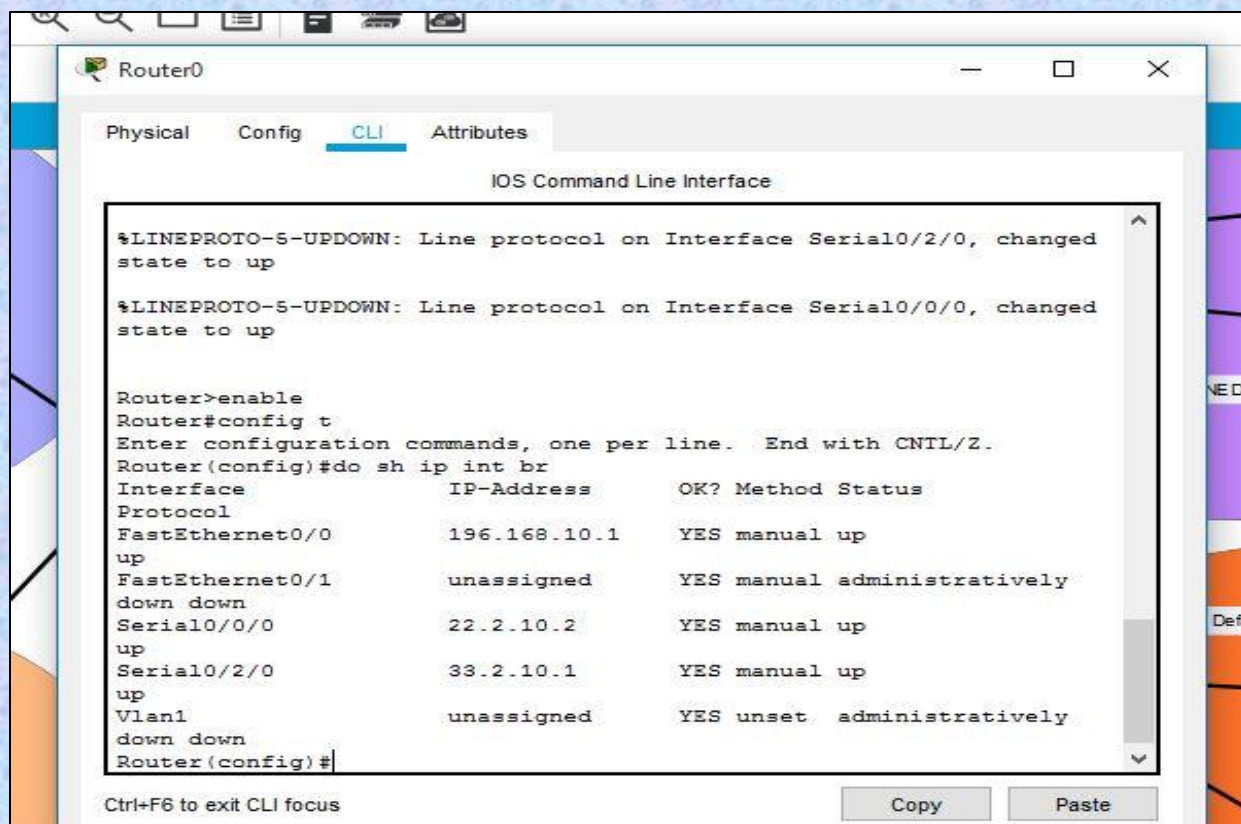Output as shown in figure.

To set console password

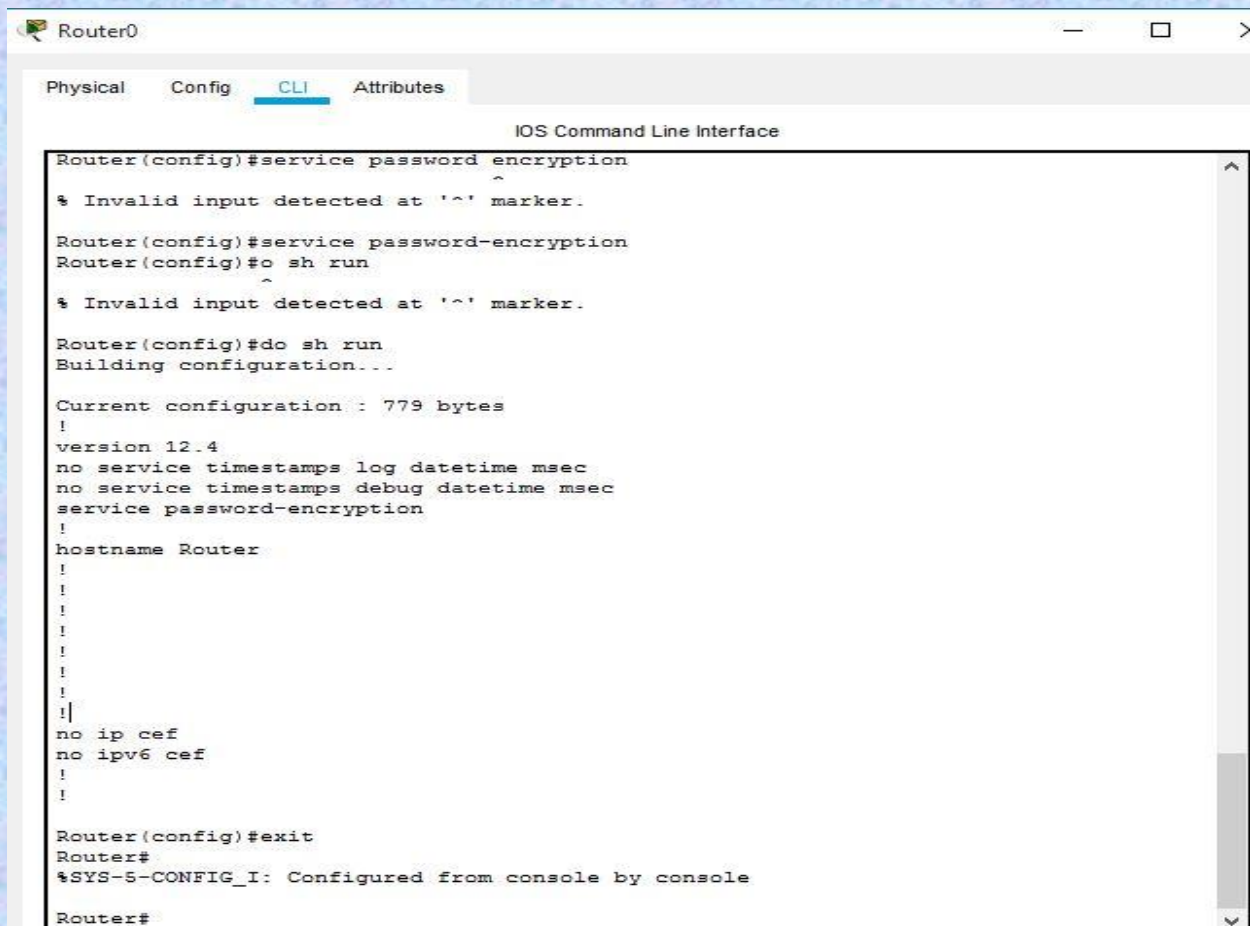Router0(config if) #line console0

Router0(config line) #password console

Router0(config line) #do sh run

Building configuration. . . as shown in pictures.

Then encrypt password and buils the configuration ….end result configured console by console.

Router0

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/2/0, changed
state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up


Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#do sh ip int br
Interface              IP-Address      OK? Method Status
Protocol
FastEthernet0/0        196.168.10.1    YES manual up
up
FastEthernet0/1        unassigned      YES manual administratively
down down
Serial0/0/0            22.2.10.2       YES manual up
up
Serial0/2/0            33.2.10.1       YES manual up
up
Vlan1                  unassigned      YES unset  administratively
down down
Router(config)#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

Router0

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
Router(config-if)#line console 0
Router(config-line)#password conosle
Router(config-line)#password console
Router(config-line)#dp sh run
                    ^
% Invalid input detected at '^' marker.

Router(config-line)#do sh run
Building configuration...

Current configuration : 771 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
no ip cef
no ipv6 cef
```

Router0 — □ ×

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Router(config)#service password encryption
                                 ^
% Invalid input detected at '^' marker.

Router(config)#service password-encryption
Router(config)#o sh run
               ^
% Invalid input detected at '^' marker.

Router(config)#do sh run
Building configuration...

Current configuration : 779 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!

Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

Step 4:Switch configuration – select a switch >give commands in CLI as shown in figures:

Switch>

To enter the privilege mode

Switch >en

HOSTNAME

Switch#configure t

Switch(config) #host name hospital

hospital (config) #

SETUP A BANNER

hospital (config) #banner ?

hospital (config) #banner motd? hospital(config)

#banner motd & Enter TEXT message. End with the character' &'.

Switch in laboratory &

hospital (config) #^ Z

hospital # exit

hospital >

CONSOLE PASSWORD

hospital (config) #do show run

! ! line con0 !

Line vty04 login

hospital (config) #end

hospital # %SYS5CONFIG_I : Configured from console by console

hospital #exit

hospital >en

hospital #config t

hospital(config) #l i necon0

hospital(config line) #password hospital

```
Switch( config line) #^ Z

Switch# %SYS5CONFIG_I : Configured from console by
console

Switch# exit

Switch con0 is now available

Press RETURN to get started.

Switch>

Switch>en

Switch#config t

Enter configuration commands, one per line.end with CNTL/
Z.

Switch( config) #line con0 Switch( config line) #login

Switch( config line) #exit Switch( config) #exit Switch#
%SYS5CONFIG_I : Configured from console by console

Switch# exit

Switch con0 is now available

Press RETURN to get started.

User Access Verification

Password:
```

Switch7 — □ ×

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
Switch>en
Switch#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname hospital
hospital(config)#banner?
banner
hospital(config)#banner motd?
motd
hospital(config)#banner motd
% Incomplete command.
hospital(config)#banner motd?
motd
hospital(config)#banner motd &
Enter TEXT message.  End with the character '&'.
switch in laboratory &

hospital(config)#^Z
hospital#
%SYS-5-CONFIG_I: Configured from console by console

hospital#exit
```

Switch7 — □ ×
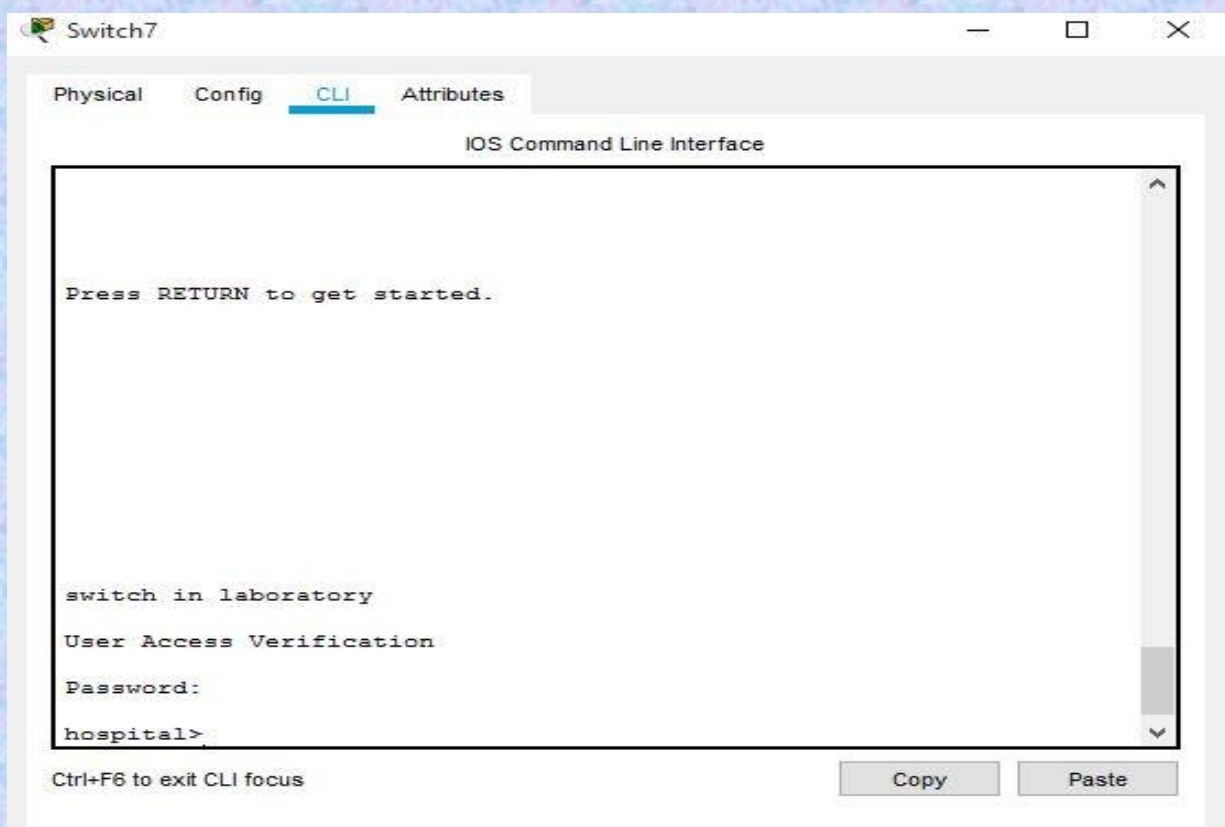
Physical | Config | CLI | Attributes
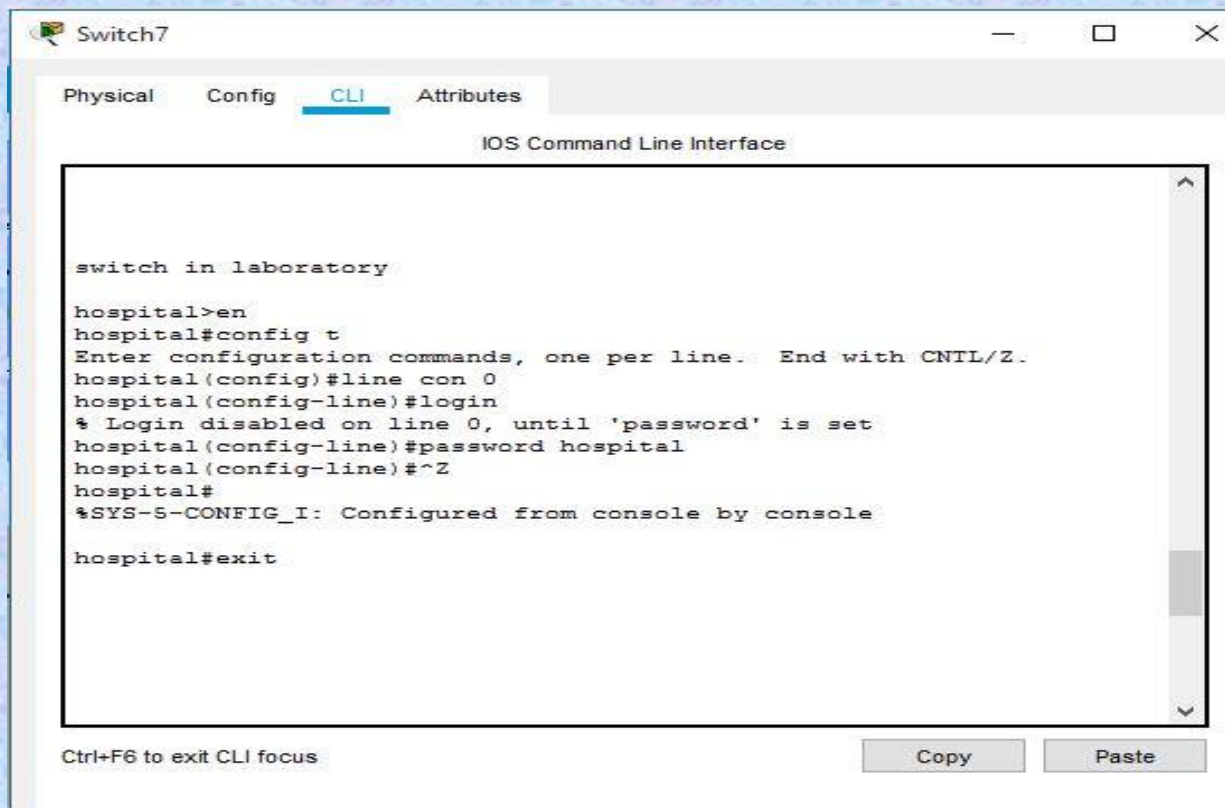
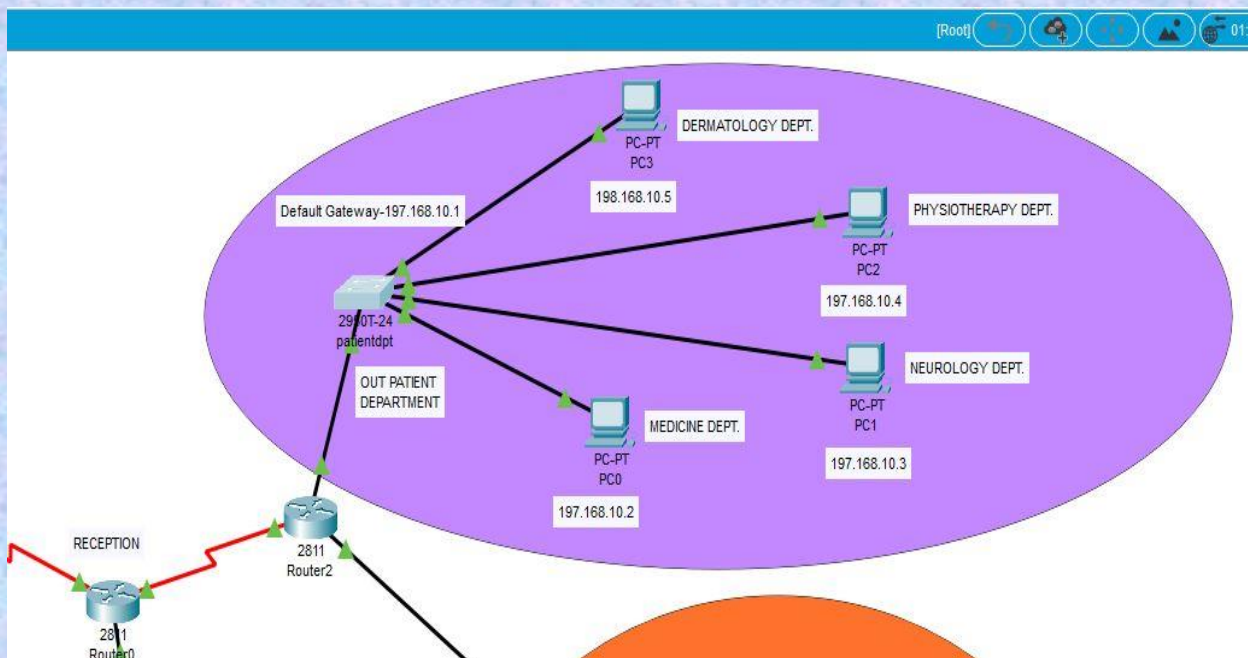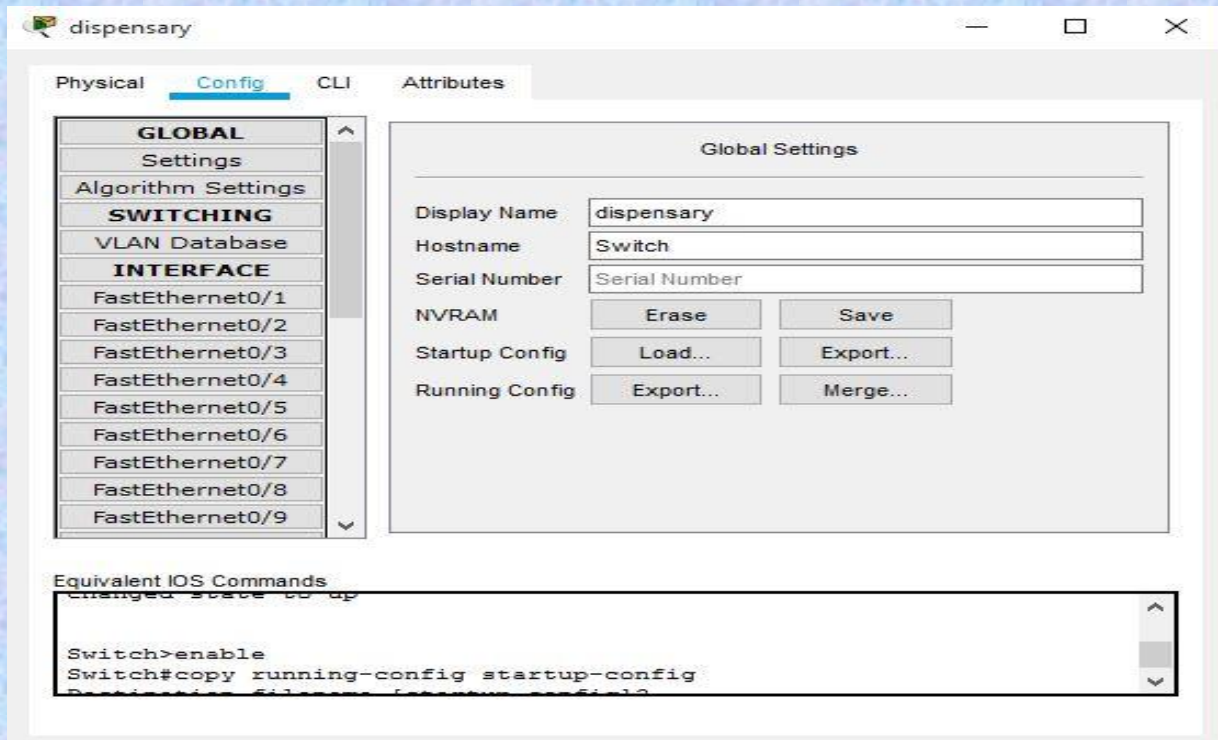IOS Command Line Interface

```
hospital con0 is now available




Press RETURN to get started.






switch in laboratory

hospital>en
hospital#config t
```

Switch7 — □ ×

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
switch in laboratory

hospital>en
hospital#config t
Enter configuration commands, one per line.  End with CNTL/Z.
hospital(config)#line con 0
hospital(config-line)#login
% Login disabled on line 0, until 'password' is set
hospital(config-line)#password hospital
hospital(config-line)#^Z
hospital#
%SYS-5-CONFIG_I: Configured from console by console

hospital#exit
```

Ctrl+F6 to exit CLI focus   Copy   Paste

Switch7 — □ ×

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Press RETURN to get started.




switch in laboratory

User Access Verification

Password:

hospital>
```

Ctrl+F6 to exit CLI focus   Copy   Paste

We can also change the switch and router display names.

Here we have given the switch a display name i.e. patientdpt.

Conclusion : Connectivity of LAN is shown and it works very well. It makes star topology. The configuration commands are giving output and one pc is connecting with another. Thus all the network, router and switch commands are working which shows the networking connections are correct. Hence, our hospital networking system project is a success ☺.

Also we have gained a lot of knowledge from this project like devices, connections, topologies, cisco packet tracer working and configuration commands.

Attachment :

Hospitalproject.pkt

References : Wikipedia and youtube