Experiment No.:2

| TITLE: Study Cisco Router Configuration Command using Cisco packet tracer |

_____AIM: To study basic Cisco Router configuration Commands

Expected Outcome of Experiment:

CO:

Elaborate various network layer services and protocols in wired and wireless technology

Illustrate Network routing protocol working principles in wired and wireless technology.

_____Books/ Journals/ Websites referred:

1. S. Tanenbaum, "Computer Networks", Pearson Education, Fourth Edition
2. Forouzan, "Data Communications and Networking", TMH, Fourth Edition

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Pre Lab/ Prior Concepts: Basics of Routing and Cisco Packet Tracer

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New Concepts to be learned: Different Modes of Operation of Cisco router

Cisco IOS Modes of Operation:
- The Cisco IOS software provides access to several different command modes. Each command mode provides a different group of related commands.
- For security purposes, the Cisco IOS software provides two levels of

access to commands:

- o   User mode
- o   Privileged mode

- The unprivileged user mode is called user EXEC mode. The privileged mode is called privileged EXEC mode and requires a password. The commands available in user EXEC mode are a subset of the commands available in privileged EXEC mode.

- The following table describes some of the most commonly used modes, how to enter the modes, and the resulting prompts. The prompt helps you identify which mode you are in and, therefore, which commands are available to you

Modes of Operation	Usage	How to enter the mode	Prompt
User EXEC	Change terminal settings on a temporary basis, perform basic tests, and list system information.	First level accessed.	Router>
Privileged EXEC	System administration, set operating parameters.	From user EXEC mode, enter enable password command	Router#
Global Config	Modify configuration that affect the system as a whole.	From privileged EXEC, enter configure terminal.	Router(config)#
Interface Config	Modify the operation of an interface.	From global mode, enter interface type number.	Router(config-if)#
Setup	Create the initial configuration.	From privileged EXEC mode, enter command	Prompted dialog

		setup.	

User EXEC Mode:

When you are connected to the router, you are started in user EXEC mode. The user EXEC commands are a subset of the privileged EXEC commands.

Privileged EXEC Mode:

Privileged commands include the following:

• Configure – Changes the software configuration.

• Debug – Display process and hardware event messages.

• Setup – Enter configuration information at the prompts.

 Enter the command disable to exit from the privileged EXEC mode and return to user EXEC mode.
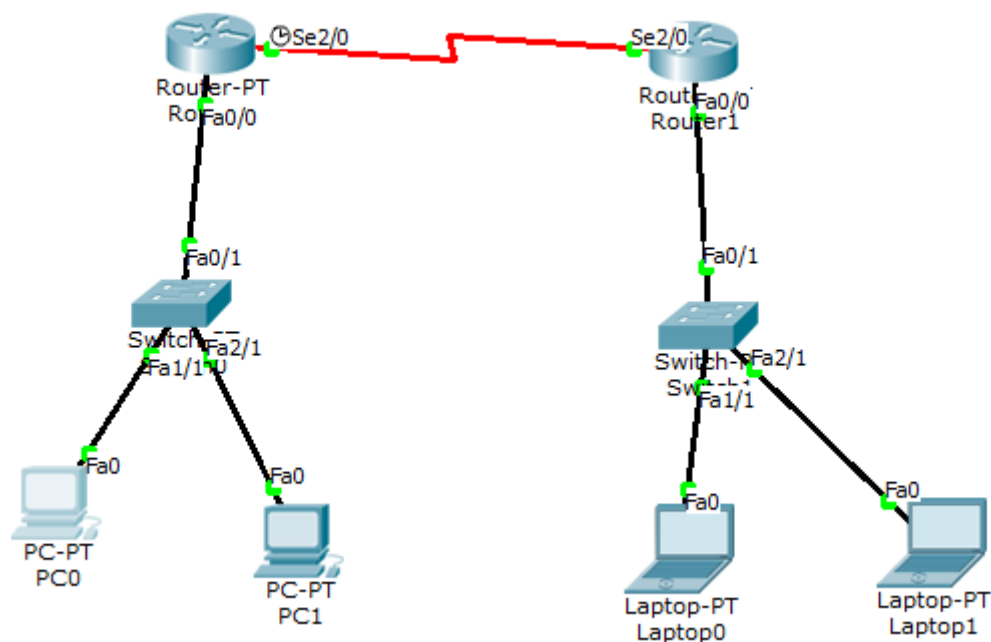
Configuration Mode:

Configuration mode has a set of submodes that you use for modifying interface settings, routing protocol settings, line settings, and so forth. Use caution with configuration mode because all changes you enter take effect immediately.

To enter configuration mode, enter the command configure terminal and exit by pressing Ctrl-Z.

Note: Almost every configuration command also has a no form. In general, use the no form to disable a feature or function. Use the command without the keyword no to re-enable a disabled feature or to enable a feature that is disabled by default. For example, IP routing is enabled by default. To disable IP routing, enter the no ip routing command and enter ip routing to re-enable it.

IMPLEMENTATION: (printout of code)

Scenario 1:

Router 0:
Router>en
Router#config t
Enter configuration commands, one per line.
Router(config)#interface fa
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 100.10.10.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state
to up

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

Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface se
Router(config)#interface serial 2/0

```
Router(config-if)#ip address 150.10.0.1 255.255.0.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
```

Router 1:

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fa
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 180.0.0.1 255.255.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state
to up

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

Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface se
Router(config)#interface serial 2/0
Router(config-if)#ip address 150.10.0.2 255.255.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config-if)#
```

Creating router table entries:

Router 0:

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip route 180.0.0.0 255.255.0.0 se
Router(config)#ip route 180.0.0.0 255.255.0.0 serial 2/0
Router(config)#
```

Routing Table for Router0

Type	Network	Port	Next Hop IP	Metric
C	100.0.0.0/8	FastEthernet0/0	---	0/0
C	150.10.0.0/16	Serial2/0	---	0/0
S	180.0.0.0/16	Serial2/0	---	1/0

Router 1:

Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 100.0.0.0 255.0.0.0 se
Router(config)#ip route 100.0.0.0 255.0.0.0 serial 2/0
Router(config)#

Routing Table for Router1

Type	Network	Port	Next Hop IP	Metric
C	150.10.0.0/16	Serial2/0	---	0/0
C	180.0.0.0/16	FastEthernet0/0	---	0/0
S	100.0.0.0/8	Serial2/0	---	1/0

Output:

```
Packet Tracer PC Command Line 1.0
PC>ipconfig

FastEthernet0 Connection:(default port)
Link-local IPv6 Address..........: FE80::202:16FF:FE07:3530
IP Address.......................: 100.10.10.2
Subnet Mask......................: 255.0.0.0
Default Gateway..................: 100.10.10.1

PC>ping 180.0.0.2

Pinging 180.0.0.2 with 32 bytes of data:

Reply from 180.0.0.2: bytes=32 time=9ms TTL=126
Reply from 180.0.0.2: bytes=32 time=7ms TTL=126
Reply from 180.0.0.2: bytes=32 time=1ms TTL=126
Reply from 180.0.0.2: bytes=32 time=8ms TTL=126

Ping statistics for 180.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 9ms, Average = 6ms

PC>
```
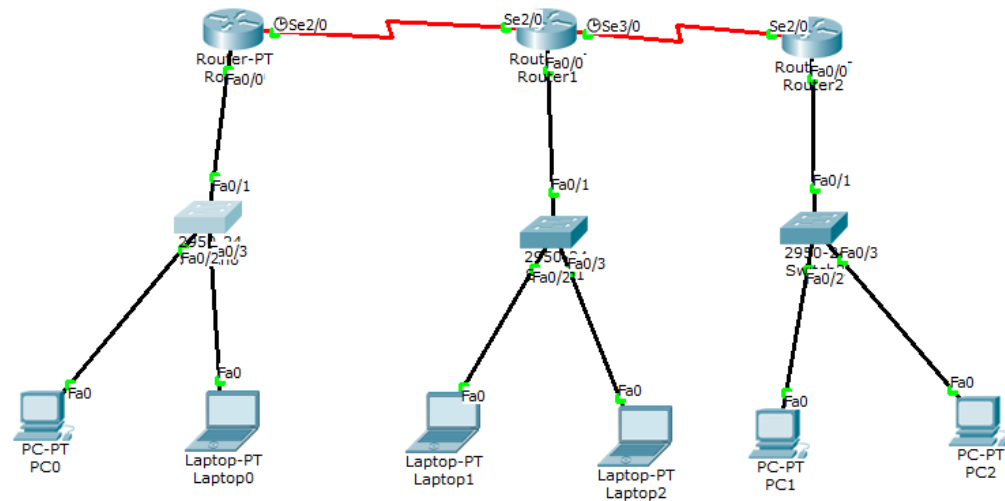
Scenario 2:

Router 0:

Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 153.10.10.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state
to up
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface se
Router(config)#interface serial 2/0
Router(config-if)#ip address 130.10.0.1 255.255.0.0

Router 1:

Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 100.10.0.1 255.255.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state
to up

Router(config-if)#^Z

```
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface se
Router(config)#interface serial 2/0
Router(config-if)#ip address 130.10.0.2 255.255.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up


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

Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface se
Router(config)#interface serial 3/0
Router(config-if)#ip address 180.2.1.2 255.255.0.0
Router(config-if)#no shutdown
```

Router 2:

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fa
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 50.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state
to up

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

Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface se
Router(config)#interface serial 2/0
Router(config-if)#ip address 180.2.1.1 255.255.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up
```

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Creating entries in routing table:

Router 0:
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 100.10.0.0 255.255.0.0 serial 2/0
Router(config)#ip route 50.0.0.0 255.0.0.0 se
Router(config)#ip route 50.0.0.0 255.0.0.0 serial 2/0
Router(config)#

Routing Table for Router0

Type	Network	Port	Next Hop IP	Metric
C	130.10.0.0/16	Serial2/0	---	0/0
C	153.10.10.0/24	FastEthernet0/0	---	0/0
S	100.10.0.0/16	Serial2/0	---	1/0
S	50.0.0.0/8	Serial2/0	---	1/0

Router 1:
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 153.10.10.0 255.255.255.0 se
Router(config)#ip route 153.10.10.0 255.255.255.0 serial 2/0
Router(config)#ip route 50.0.0.0 255.0.0.0 se
Router(config)#ip route 50.0.0.0 255.0.0.0 serial 3/0

Routing Table for Router1

Type	Network	Port	Next Hop IP	Metric
C	100.10.0.0/16	FastEthernet0/0	---	0/0
C	130.10.0.0/16	Serial2/0	---	0/0
C	180.2.0.0/16	Serial3/0	---	0/0
S	153.10.10.0/24	Serial2/0	---	1/0
S	50.0.0.0/8	Serial3/0	---	1/0

Router 2:
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 100.10.0.0 255.255.0.0 se
Router(config)#ip route 100.10.0.0 255.255.0.0 serial 2/0
Router(config)#ip route 153.10.10.0 255.255.255.0 serial 2/0
Router(config)#

Routing Table for Router2

Type	Network	Port	Next Hop IP	Metric
C	180.2.0.0/16	Serial2/0	---	0/0
C	50.0.0.0/8	FastEthernet0/0	---	0/0
S	100.10.0.0/16	Serial2/0	---	1/0
S	153.10.10.0/24	Serial2/0	---	1/0

Output:

Interaction between network 3 and 1

```
Pinging 50.0.0.1 with 32 bytes of data:

Request timed out.
Reply from 50.0.0.1: bytes=32 time=8ms TTL=125
Reply from 50.0.0.1: bytes=32 time=9ms TTL=125
Reply from 50.0.0.1: bytes=32 time=9ms TTL=125

Ping statistics for 50.0.0.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 8ms, Maximum = 9ms, Average = 8ms

PC>ping 50.0.0.1

Pinging 50.0.0.1 with 32 bytes of data:

Reply from 50.0.0.1: bytes=32 time=2ms TTL=125
Reply from 50.0.0.1: bytes=32 time=8ms TTL=125
Reply from 50.0.0.1: bytes=32 time=9ms TTL=125
Reply from 50.0.0.1: bytes=32 time=10ms TTL=125

Ping statistics for 50.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 10ms, Average = 7ms
```

Interaction between network 2 and 3

```
PC>ping 50.0.0.1

Pinging 50.0.0.1 with 32 bytes of data:

Reply from 50.0.0.1: bytes=32 time=1ms TTL=126
Reply from 50.0.0.1: bytes=32 time=2ms TTL=126
Reply from 50.0.0.1: bytes=32 time=1ms TTL=126
Reply from 50.0.0.1: bytes=32 time=1ms TTL=126

Ping statistics for 50.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

Interaction between network 2 and 1

```
Pinging 100.10.0.1 with 32 bytes of data:

Request timed out.
Reply from 100.10.0.1: bytes=32 time=2ms TTL=126
Reply from 100.10.0.1: bytes=32 time=6ms TTL=126
Reply from 100.10.0.1: bytes=32 time=6ms TTL=126

Ping statistics for 100.10.0.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 6ms, Average = 4ms

PC>ping 100.10.0.1

Pinging 100.10.0.1 with 32 bytes of data:

Reply from 100.10.0.1: bytes=32 time=2ms TTL=126
Reply from 100.10.0.1: bytes=32 time=1ms TTL=126
Reply from 100.10.0.1: bytes=32 time=1ms TTL=126
Reply from 100.10.0.1: bytes=32 time=1ms TTL=126

Ping statistics for 100.10.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

CONCLUSION:

Static routing for both switch and router were studied sucessfully.

Date: _____   Signature of faculty in-charge