Lab Manual for Computer and Communication Network
LAB-6
(Configuration of Routers and switches using command line interface)

Contents

Lab 06: Introduction of Command Line Interface

1. Introduction:

1.1 Command line interface:

Packet tracer is a network simulator used for configuring and creating the virtual cisco devices and network. There is also some other similar software but Cisco IOS output will be same on all simulators.

To configure any device in packet tracer you are required to open or access its CLI. You can do it by clicking any device and then navigating to CLI tab. Once you are at CLI you can perform all Cisco Commands here.

Cisco IOS supports numerous command modes which can be practice with packet tracer, followings are the main command modes of cisco CLI with specific commands to navigate from one mode to other.

IOS commands are not case sensitive it means that you can use them in uppercase, lowercase, or mixed case, but passwords are case sensitive. Therefore, make sure you type it in correctly. In any mode, you can obtain a list of commands available on that mode by entering a question mark (?).

1.2 Router:

In technical terms, a router is a Layer 3 network gateway device, meaning that it connects two or more networks and that the router operates at the network layer of the OSI model. Routers contain a processor (CPU), several kinds of digital memory, and input-output (I/O) interfaces. They function as special-purpose computers, one that does not require a keyboard or display.

1.3 Switch:

A network switch (also called switching hub, bridging hub, officially MAC bridge[1]) is a computer networking device that connects devices together on a computer network by using packet switching to receive, process, and forward data to the destination device.

A network switch is a multiport network bridge that uses hardware addresses to process and forward data at the data link layer (layer 2) of the OSI model. Some switches can also process data at the network layer (layer 3) by additionally incorporating routing functionality. Such switches are commonly known as layer-3 switches or multilayer switches.

1.4 Hub:

A hub, also called a network hub, is a common connection point for devices in a network. Hubs are devices commonly used to connect segments of a LAN. The hub contains

multiple ports. When a packetarrives at one port, it is copied to the other ports so that all segments of the LAN can see all packets.

2. Tools required:

- CISCO Packet tracer

3. Objective of the Experiment:

After completing this Lab student should able to:

- Configure router in cisco packet tracer.
- Set password and hostname of router.
- Set password and hostname of switch.
- Use the command line interface in cisco packet tracer.
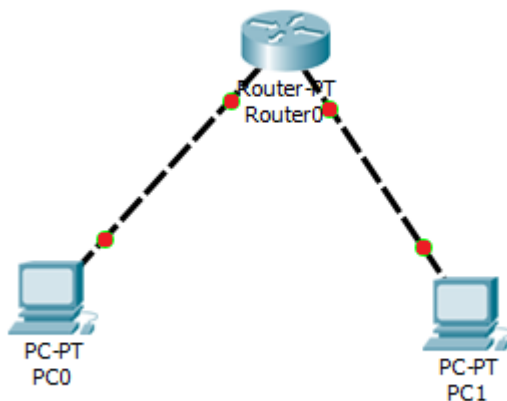
4. Modes of router in command line interface:

| Mode	Symbol	How to access this mode	Command for leaving this mode
User EXEC Mode	Router >	Default mode after booting. Press enter for accessing this.	Use exit command
Privileged EXEC mode	Router #	Use enable command from user exec mode for entering into this mode	exit
Global Configuration mode	Router(config)#	Use configure terminal command from privileged exec mode	Exit or Ctrl+Z for user EXEC mode
Interface Configuration	Router(config-if)#	Use interface <interface name+number> command from global configuration mode	Use exit command to return in global mode
ROMMON	ROMMON >	Enter reload command from privileged exec mode. Press CTRL + C key combination during the first 60 seconds of booting process.	Use exit command.

5. Walk-through Tasks:

5.1 Creating a topology in which one router is connected with two pc's and configure the router using command line interface:

For creating this topology, you have to do following steps:
1- Click on the network devices tab and add a generic router.
2- Click on the End devices to add two pc's in work space.
3- Click on the connections and connect PC0 with router using copper cross wire.
4- Connect pc1 with router using copper cross wire.
5- Until now you will see topology like this in your work space:

6- Connection lights are red because until now router is not configured.
7- To configure router, click on the router you see a window where you have to press CLI tab to open command line interface which will look like:
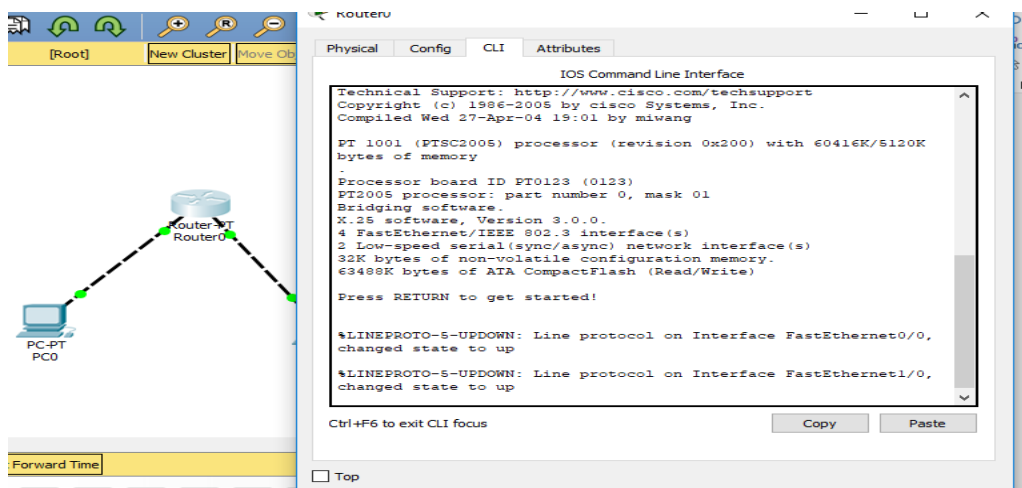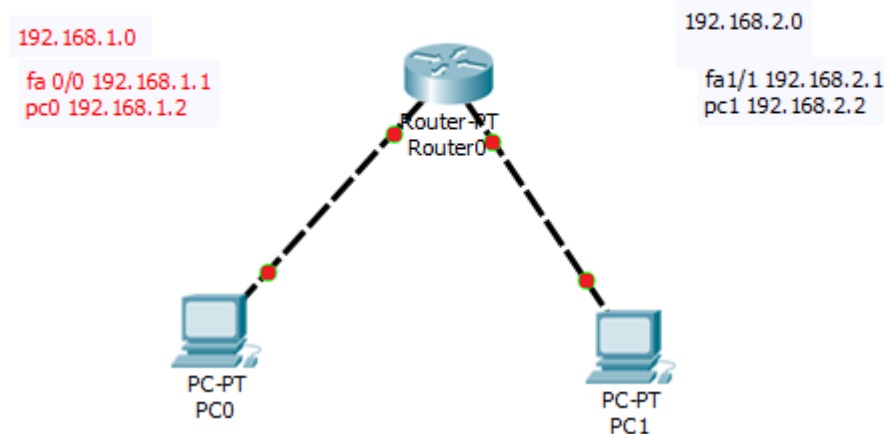

8- Press enter in command line interface.
9- Write **En** or **enable** command to get privileged for router configuration and press enter.
10- Write **config t** or **configure terminal** command for get into configuration mode.
```
Router(config)#hostname HR-Router
HR-Router(config)#
```
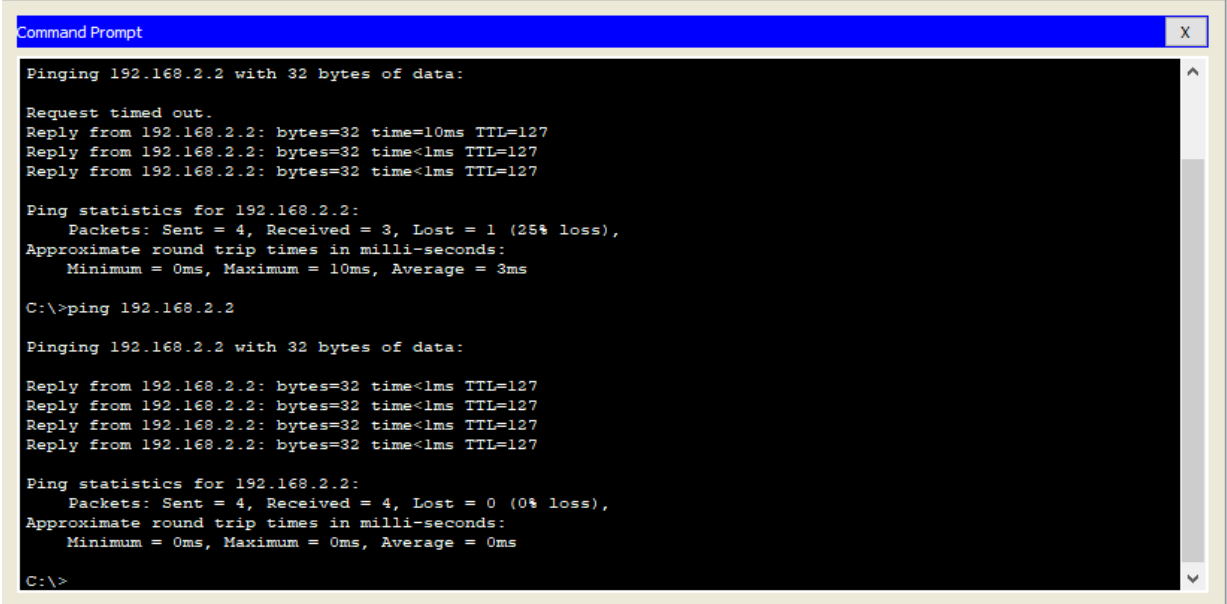11- Write command **hostname Give your hostname** and press enter for changing the name of router.

12- Now before you configure the interfaces of routers, add note on your workspace on both sides of the router indicating IP address, Subnet mask and default gateway, which will look like:

192.168.1.0

fa 0/0 192.168.1.1
pc0 192.168.1.2

192.168.2.0

fa1/1 192.168.2.1
pc1 192.168.2.2

Router-PT
Router0

PC-PT
PC0

PC-PT
PC1

13- Open CLI and write command **interface fastEthernet 0/0** for telling interface of router you want to configure.
14- Then write command **ip add 192.168.1.1 255.255.255.0**to provide IP address along with subnet mask of the interface.
15- Write command **no shut, press enter and exit** for doing the state of the interface in upstate, after this red light of this interface should turn to green one.
16- Configuration of the CLI will look like this:

| Physical | Config | CLI | Attributes |

IOS Command Line Interface

```
Routerhamza(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

Routerhamza(config-if)#exit
Routerhamza(config)# int fa 0/1
%Invalid interface type and number
Routerhamza(config)# int fa0/1
%Invalid interface type and number
Routerhamza(config)# int fa1/0
Routerhamza(config-if)#ip add 192.168.2.1 255.255.0

% Invalid input detected at '^' marker.

Routerhamza(config-if)#ip add 192.168.2.1 255.255.255.0
Routerhamza(config-if)#no shut

Routerhamza(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0,
changed state to up
```

Ctrl+F6 to exit CLI focus   Copy   Paste

17- Do the same thing for other interface which is fa1/0 to configure it by using above commands.
18- Write command **Copy run start** to save configuration of the router.
19- Now when you have done this, both of the interfaces lights should turn to green.
20- After when you have configured interfaces, now you have to configure both of the Pc's using proper IP addresses, subnet masks and default gateway.
21- For testing this topology, you have to do ping from any one of the PC's IP address to others PC's Ip address as follow by going into command prompt of the

22- Above here you can see ping is successful which shows your topology is correctly configured.

5.2 Setting up password in router:

For setting login password in router you have to write following commands:
1- Click on the router and open CLI of the router.
2- Come to privileged mode by writing command **En.**
3- Come in configuration setting by writing command **config t**.
4- Write command **line console 0** and press enter to make cursor to came on initial line.
5- Write command **Password** give your password and press enter.
6- Write command **login** and press enter.
7- Write command **exit**and press enter.
8- Write command **vty 0 4**and press enter.
9- Write command **Password** give your password and press enter.
10- Write command **login** and press enter.
11- Write command **exit** and press enter, to come out of line settings of the router and again write **exit**command to get out of privileged mode.
12- Here when you press enter, you will see login password, where you have to give password to proceed futher.

5.3 Setting up secret password in router:
For setting secret password in router you have to write following commands:
1- Click on the router and open CLI of the router.
2- Come to privileged mode by writing command **En.**
3- Come in configuration setting by writing command **config t**.
4- Write command **enable secret**give your password and press enter.
5- Write command **exit** and press enter.
6- This will set the privileged mode password which also encrypted, which can be seen using command **Show running-config.**
7- Write command **Copy run start** to save your configurations.

5.4 Setting up banner while login in router:
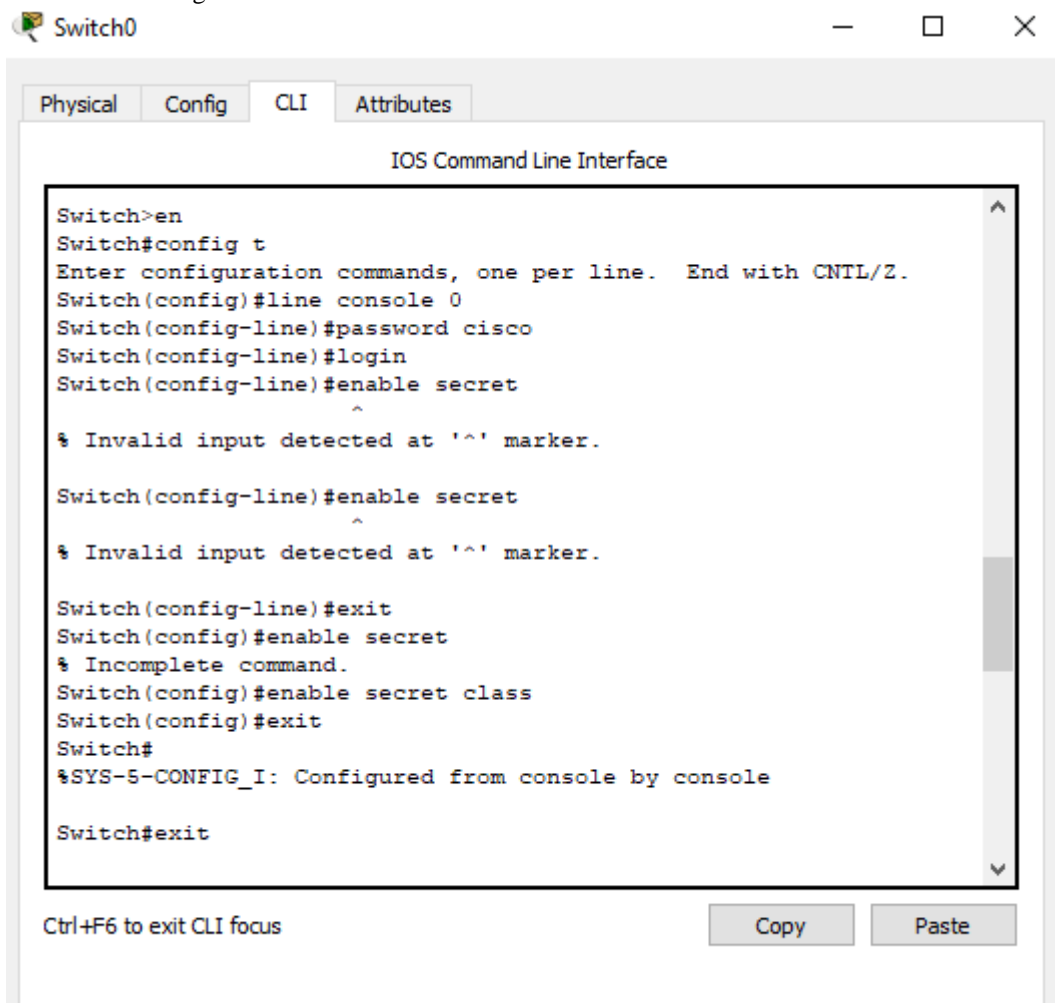For setting up any message before you give password in form of banner of some welcome note or some

instruction you can done it by executing commands:

1- Click on the router and open CLI of the router.
2- Come to privileged mode by writing command **En.**
3- Come in configuration setting by writing command **config t**.
4- Write command **Banner motd # Your message#.**
5- Write command **Exit**and press enter.

5.5 Setting up password and secret password in switch:

For setting up password and secret password in switch, you have to execute these commands:

1- Click on the switch and open CLI of the router.
2- Come to privileged mode by writing command **En.**
3- Come in configuration setting by writing command **config t**.
4- Write command **line console 0** and press enter to make cursor to came on initial line.
5- Write command **Password** give your password and press enter.
6- Write command **login** and press enter.
7- Write command **exit**and press enter.
8- Come in configuration setting by writing command **config t**.
9- Write command **enable secret**give your password and press enter.
10- Write command **Copy run start** to save your configurations.
11- You switch setting will shows like this:

6. **Evaluation tasks:**

6.1 Task 1:

Construct a network topology which have one router connected with 3 computers and assign them proper IP addresses, subnet mask and default gateways, configure router using command line interface and ping one PC to other and show the results.

6.2 Task 2:

Give hostname to the router with your name like "Muhammad ALI", apply login password on the router and also enable secret password to it, show banner of "NO ACCESS" before login on the router, after doing this show the results.

6.3 Task 3:

Construct a network topology which have one router connected with 5 computers and assign them proper IP addresses, subnet mask and default gateways, configure router using command line interface and ping one PC to other and show the results.

6.3 Task 4:

Construct a network topology which have one router connected with 3 computers and assign them proper IP addresses, subnet mask and default gateways, and also connect one switch, which is further connected to 5 PC's, enable password on router as well as switch, also implement some kind of banner on it and show the results.