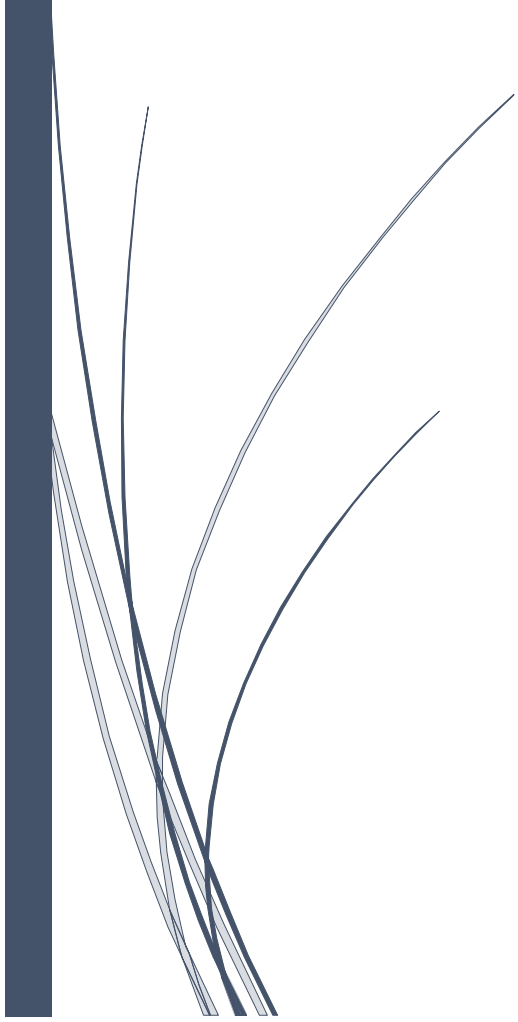
Practical of Network Fundamentals

Computer Dept. 3rd Stage



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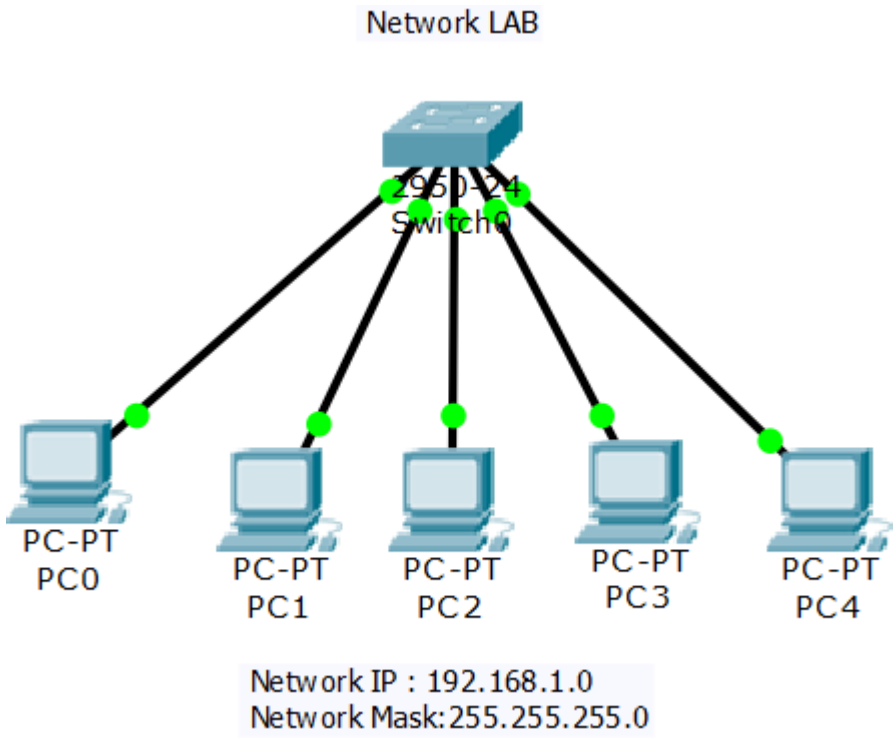
2023-2024

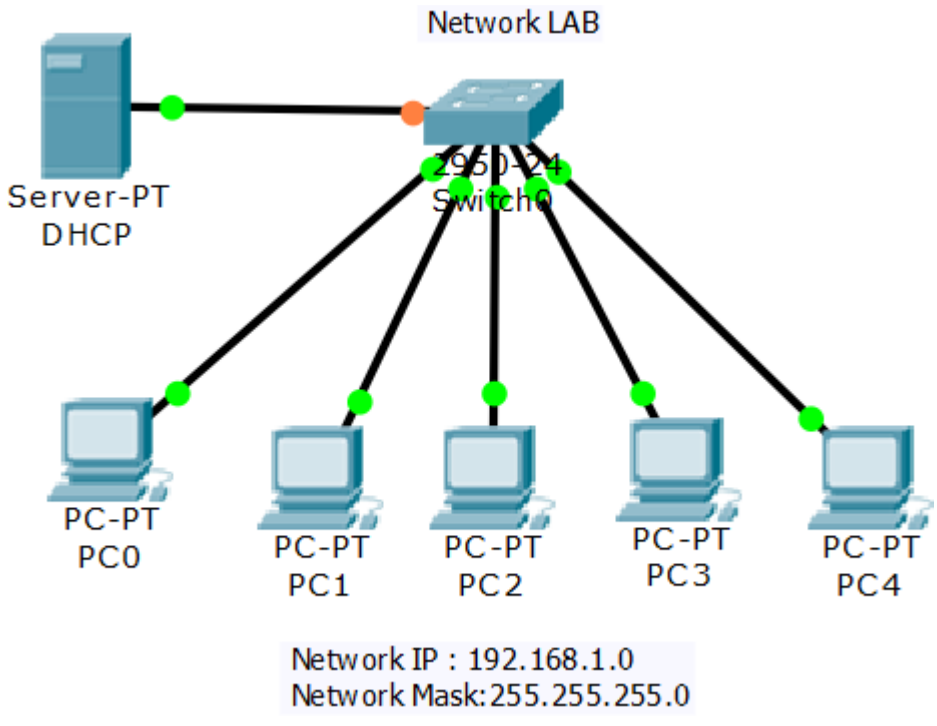
Lab 1

Packet Tracer: Introduction to Packet Tracer Interfaces.

Creating & Configuring a simple LAN Topology.



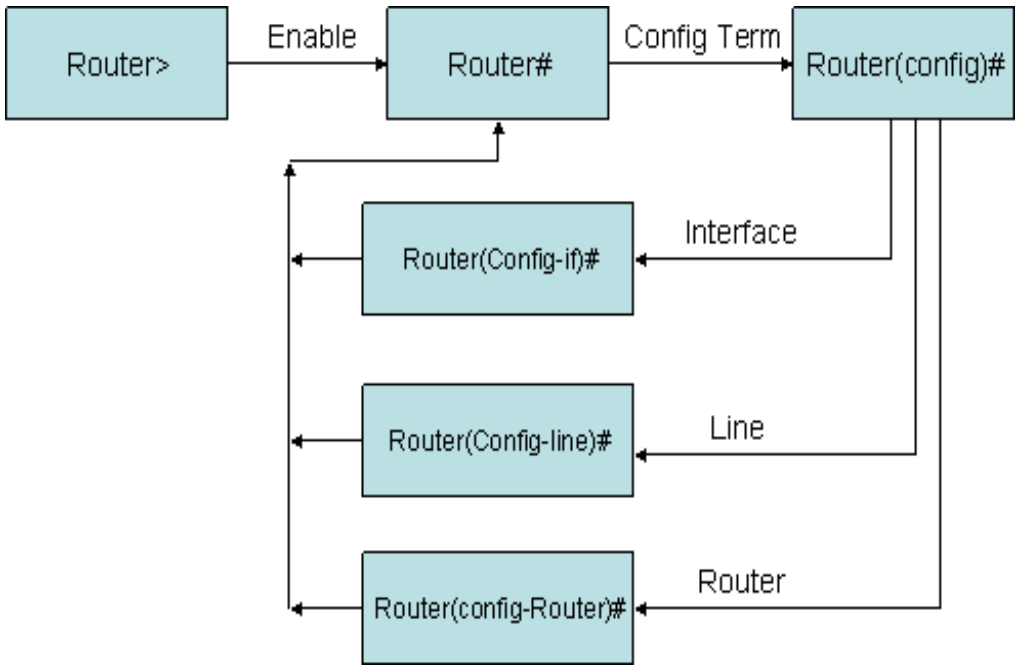
Configuring DHCP



Lab 2

Cisco IOS: Introduction to IOS & Navigating IOS Modes

Modes	Example
User EXEC mode	Router>enable
Privileged EXEC mode	Router configure terminal
Global configuration mode	Router(config)#



Edit and Help Features: ? , Tab , Up arrow.

Lab 3: VLAN & Trunking Configuration

To Show Switch VLANS:

Switch# **show vlan**

To Create VLAN:

Switch(config)#**vlan 2 Students**

Switch(config-vlan)#**name s**

Switch(config-vlan)#exit

Switch(config)#interface fastEthernet 0/2

Switch(config-if)#**switchport mode access**

Switch(config-if)#**switchport access vlan 2**

Switch(config)#interface fastEthernet 0/3

Switch(config-if)#**switchport mode access**

Switch(config-if)#**switchport access vlan 2**

Switch(config)#**vlan 3**

Switch(config-vlan)#**name Teachers**

Switch(config)#**interface range fastEthernet 0/4-6**

Switch(config-if)#**switchport mode access**

Switch(config-if)#**switchport access vlan 3**

Switch(config-if)#exit

Switch#write

Switch#show vlan

To Configure Trunk Interface:

Switchs(config)# interface fa0/24

Switch(config-if)#Switch mode trunk

To Show Trunk Interfaces:

Switch# show interface trunk

Lab 4: InterVLAN Routing Using Router

Ethernet Interface Configurations:

Router(Config)# Interface fa0/0

Router(Config-if)# **no shutdown**

Router(Config-if)# **no ip address**

Router(Config-if)# exit

Sub-Interface Configurations:

Router(Config)# Interface fa **0/0.1**

Router(Config-if)# **encapsulation dot1q** 2

Router(Config-if)# IP address 192.168.1.0 255.255.255.0

Router(Config-if)# exit

Router(Config)# Interface fa **0/0.2**

Router(Config-if)# **encapsulation dot1q** 3

Router(Config-if)# IP address 192.168.10.0 255.255.255.0

Router(Config-if)# exit

DIY: InterVLAN routing using Layer 3 Switch.

Lab 5: Switch Port Security

To Configure:

Switch(config)# interface fa 0/1

Switch(config-if)# switchport mode access

Switch(config-if)# switchport port-security maximum 1

Switch(config-if)# switchport port-security mac-address 0013.20b7.1235

Switch(config-if)# switchport port-security violation shutdown

Switch(config-if)# switchport port-security

Switch(config)# interface range fa 0/2-3

Switch(config-if)# switchport mode access

Switch(config-if)# switchport port-security maximum 1

Switch(config-if)# switchport port-security mac-address sticky

Switch(config-if)# switchport port-security violation restrict

Switch(config-if)# switchport port-security

To show/ verify:

Switch# show port-security

Switch# show port-security address

Router's Configuration: hostname, enable password, Save.

To configure the host name and enable password:

Router>enable

Router#configure terminal

Router(config)#**hostname** KanyRouter

HawlerRouter(config)#**enable password** myPass2017

HawlerRouter(config)#exit

HawlerRouter#**write**

To Verify:
HawlerRouter#**show** start

Lab 6

Router's Configuration: VTY Line and LAN Interface.

To configure IP address to LAN interfaces, run the commands:

HawlerRouter >enable

HawlerRouter #configure terminal

HawlerRouter (config)#**interface** fastethernet 0/0

HawlerRouter (config-if)#**ip address** 10.0.0.1 255.0.0.0

HawlerRouter (config-if)#**no shutdown**

HawlerRouter (config-if)#exit

HawlerRouter (config)#exit

HawlerRouter #

To configure VTY lines with password, run the following commands:

HawlerRouter >enable

HawlerRouter #configure terminal

HawlerRouter (config-line)#**line vty 0 4**

HawlerRouter (config-line)#**password** *@Kani#2015*

HawlerRouter (config-line)#**login**

HawlerRouter (config-line)#exit

HawlerRouter (config)#exit

HawlerRouter #

To Verify:

HawlerRouter#show start

HawlerRouter#show ip interface brief

Router's Configuration: View, Change and Eraser configuration.

To show the running configuration:

Router#show run

To show the start-up configuration:

Router#show startup

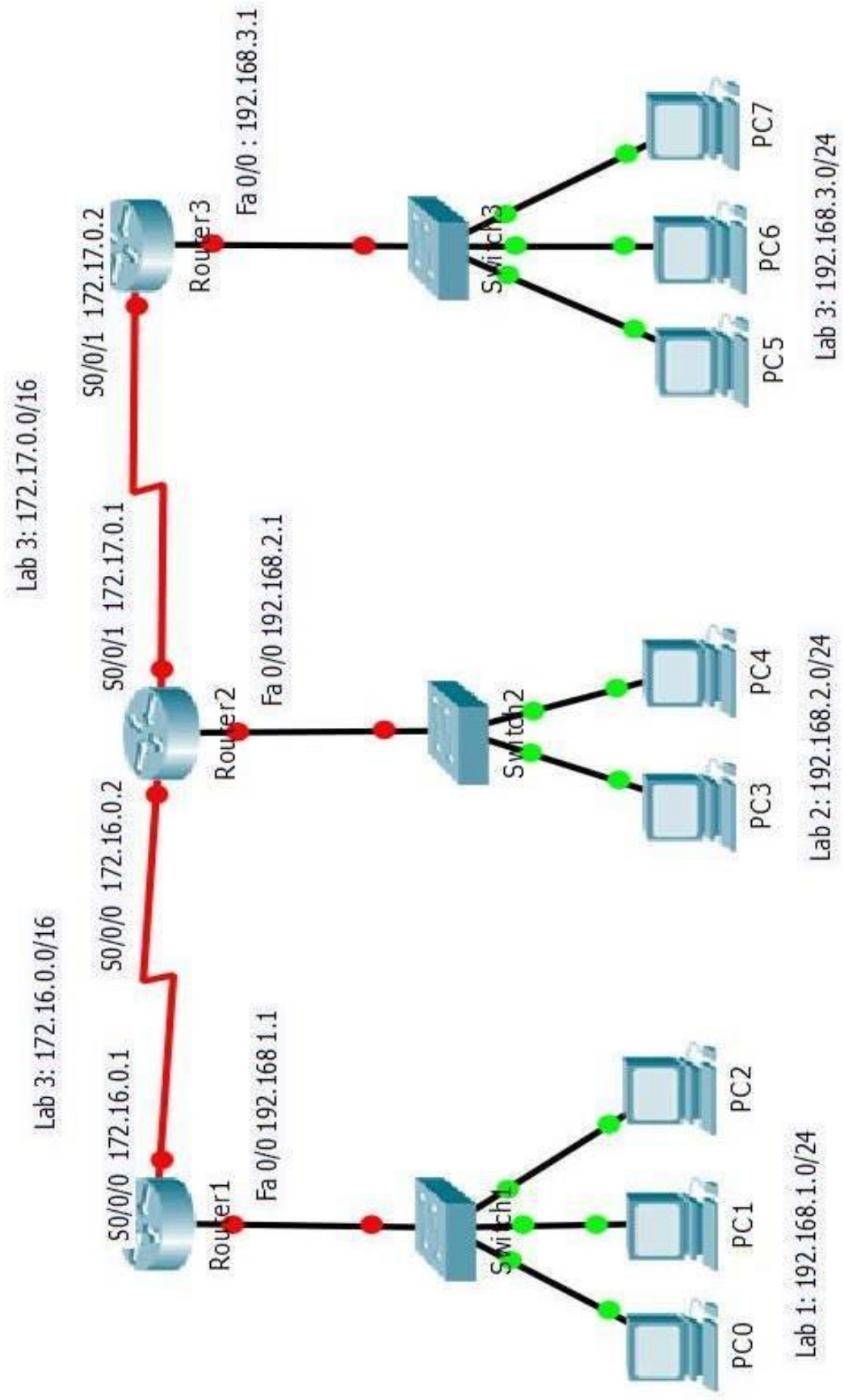
To erase the configuration stored in NVRAM:

Router#erase startup

To restart the router:

Router#reload

Network Topology



Lab 7: Router's Configuration: WAN Interface.

To configure WAN Serial interface on Router 1, Type the following commands:

PC>telnet 192.168.1.1

Password:

Router1>ena

Password:

Router1#conf t

Router1(config)#**interface serial 0/0/0**

Router1(config-if)#ip add 172.16.0.1 255.255.0.0

Router1(config-if)#no sh

Router1(config-if)#**clock rate 64000**

Router1(config-if)#**encapsulation ppp**

Router1(config-if)#exit

Router1#**show start**

Router1#**show run**

Router1#write

DIY Task: Using same commands configure the other Serial interfaces.

Lab 8

: Static Routing Configuration

The following configuration commands enable static routing in Router1 and Router2.

To Enable Static Routing, add only **indirectly** connect networks to router.

Router1:

Router1(config)#**ip route 192.168.2.0 255.255.255.0 ser 0/0/0**

Router1(config)#**do show ip route**

….

C 172.16.0.0/16 is directly connected, Serial0/0/0

C 172.16.0.2/32 is directly connected, Serial0/0/0

C 192.168.1.0/24 is directly connected, FastEthernet0/0

S 192.168.2.0/24 is directly connected, Serial0/0/0

….

Router2:

Router2(config)#**ip route 192.168.1.0 255.255.255.0 ser 0/0/0**

Router2(config)#**do show ip route**

….

C 172.16.0.0/16 is directly connected, Serial0/0/0

C 172.16.0.1/32 is directly connected, Serial0/0/0

S 192.168.1.0/24 is directly connected, Serial0/0/0

C 192.168.2.0/24 is directly connected, FastEthernet0/0

….

To check network connectivity between PCs on Lab1 and Lab2 using **ping** command

ping 192.168.2.10

tracert 192.168.2.10

To remove static routing on any router use “No”, for example

Router1(config)# **no ip route 192.168.1.0 255.255.255.0 ser 0/0/0**

DIY Task: Enable Static Routing in all Routers.

Lab 9: RIP Configuration

The following configuration commands enable dynamic routing protocol RIP version 2 in both Router1 and Router2.

To Enable RIP, advertise only **directly** connect networks in each router.

Router1:

Router1(config)#**router rip**

Router1(config-router)#**version** 2

Router1(config-router)#**network** 192.168.1.0

Router1(config-router)#**network** 172.16.0.0

Router1(config-router)#exit

Router1(config)#do sh run

Router1(config)#do sh ip route

…

R 192.168.2.0/24 [120/1] via 172.16.0.2, 00:00:02, Serial0/0/0

…

Router2:

Router2(config)#**router rip**

Router2(config-router)#**version** 2

Router2(config-router)#**network** 192.168.2.0

Router2(config-router)#**network** 172.16.0.0

Router2(config-router)#exit

Router2(config)#do sh run

Router2(config)#do sh ip route

…

R 192.168.1.0/24 [120/1] via 172.16.0.1, 00:00:02, Serial0/0/0

…

To check network connectivity between PCs on Lab1 and Lab2 using **ping** command

DIY Task: Enable RIP in all Routers.

Lab 10: OSPF Configuration

The following configuration commands enable dynamic routing protocol OSPF in both Router1 and Router2.

To Enable OSPF, advertise only **directly** connect networks in each router and using **wildcard** mask with **area**.

Router1:

Router1(config)#**router ospf 1**

Router1(config-router)#**network** 192.168.1.0 0.0.0.255 **area** 0

Router1(config-router)#**network** 172.16.0.0 0.0.25.255 **area** 0

Router1(config-router)#exit

Router1(config)#do sh run

Router1(config)#**do sh ip ospf neighbor**

Router1(config)#do sh ip route

…

O 192.168.2.0/24 [110/65] via 172.16.0.2, 00:02:16, Serial0/0/0

…

Router2:

Router2(config)#**router ospf 1**

Router2(config-router)# **network** 192.168.2.0 0.0.0.255 **area** 0

Router2(config-router)# **network** 172.16.0.0 0.0.25.255 **area** 0

Router2(config-router)#exit

Router2(config)#do sh run

Router2(config)#**do sh ip ospf neighbor**

Router2(config)#do sh ip route

…

O 192.168.1.0/24 [110/65] via 172.16.0.1, 00:00:02, Serial0/0/0

…

To check network connectivity between PCs on Lab1 and Lab2 using **ping** command

DIY Task: Enable OSPF in all Routers.

Lab 11: EIGRP Configuration

The following configuration commands enable dynamic routing protocol EIGRP in both Router1 and Router2.

To Enable EIGRP, advertise only **directly** connect networks in each router using **autonomous** system number.

Router1:

Router1(config)#**router eigrp 1**

Router1(config-router)#**network** 192.168.1.0

Router1(config-router)#**network** 172.16.0.0

Router1(config-router)#exit

Router1(config)#do sh run

Router1(config)#**do sh ip eigrp neighbor**

Router1(config)#do sh ip route

…

D 192.168.2.0/24 [90/2172416] via 172.16.0.2, 00:00:31, Serial0/0/0

…

Router2:

Router2(config)#**router eigrp 1**

Router2(config-router)# **network** 192.168.2.0

Router2(config-router)# **network** 172.16.0.0

Router2(config-router)#exit

Router2(config)#do sh run

Router2(config)#**do sh ip eigrp neighbor**

Router2(config)#do sh ip route

…

D 192.168.1.0/24 [90/2172416] via 172.16.0.1, 00:00:45, Serial0/0/0

…

To check network connectivity between PCs on Lab1 and Lab2 using **ping** command

DIY Task: Enable EIGRP in all Routers.

Lab 12: ACL

Standard Access Control List

Scenario: configure an ACL on Router2 such that PC1 (192.168.1.11) should not communicate with Lab2 Network (192.168.2.0).

Before configuring ACL check network connectivity between PC1 and Lab2 network.

Router#conf t

Router(config)#**access-list 1 deny 192.168.1.11 0.0.0.0**

Router(config)#**access-list 1 permit any**

Router(config)#int fa 0/0

Router(config-if)#**ip access-group 1 out**

Router(config-if)#exit

Router(config)# **do show ip access-list**

To test ping from PC1 to any PC in Lab2.

DIY Task: Lab 1 network could not communicate with Lab 2 only.

Extended Access Control List

Scenario: configure an ACL on Router2 such that PC1 (192.168.1.11) should not access only HTTP Server in Lab2 Network (192.168.2.0).

Before configuring ACL, add an HTTP server and then check HTTP access between PC1 and Lab2 HTTP server.

Router#conf t

Router(config)#**access-list 100 deny tcp 192.168.1.11 0.0.0.0 192.168.2.2 0.0.0.0 eq 80**

Router(config)#**access-list 100 permit ip any any**

Router(config)#int fa 0/0

Router(config-if)#ip access-group 100 out

Router(config-if)#exit

Router(config)# do show ip access-list

Router(config)# **do show ip int fa 0/0**

To test first ping from PC1 to HTTP server and then accessing HTTP server.

DIY Task: Only PC1 could access with Lab 2 HTTP Server.

Lab 13:

Using CDP

CDP is enabled by default on all Cisco devices. It is used for troubleshooting connectivity between Cisco devices. To check output of CDP use the following commands.

To enable CDP:

Router(config)#cdp run

To show CDP setting:

Router(config)#do show cdp

To show directly connected devices:

Router(config)#do show cdp neighbor

Router(config)#do show cdp neighbor detail

Backup and Restore IOS and Configuration

To backup and restore Cisco IOS and configuration (start and run) follow the procedure below:

First install and configure a TFTP server.

To backup startup configuration:

Router2#**copy startup-config tftp:**

Address or name of remote host []? **192.168.2.2**

Destination filename [Router-confg]? **kanyconfig**

Writing startup-config...!!

[OK - 1006 bytes]

1006 bytes copied in 0.082 secs (12268 bytes/sec)

To backup IOS configuration:

Router2#**show flash**

Router2#**copy flash: tftp:**

Source filename []? **c1841-advipservicesk9-mz.124-15.T1.bin**

Address or name of remote host []? **192.168.2.2**

Destination filename [c1841-advipservicesk9-mz.124-15.T1.bin]? KanyRouter2IOS

Writing c1841-advipservicesk9-mz.124-15.T1.bin...!!

[OK - 33591768 bytes]

33591768 bytes copied in 0.795 secs (4436474 bytes/sec)

DIY Task: Restore Startup configuration and IOS from TFTP Server to Router2.

Password Recovery/Reset

Do the following steps to reset the password of Cisco Router.

1.Interrupt the boot sequence by **Ctrl+ Break or Ctrl + C**.

2.type **Confreg 0x2142**.

3.type **reset**.

4. Press No , enable .

5. Copy startup-config file running-config.

6. Set **Enable secret Kany2018**.

7. Apply “**No Shutdown**” to all interfaces.

8. type **config-register 0x2102**.

9. type **Write**.

10. type **Reload**.

VTP Configuration.

To share VLAN database between switches using the following commands in each switch**:**

To Configure:

Switch(Config)# VTP domain kany

Switch(Config)# VTP mode server

Switch(Config)# VTP password k@2017

To Verify:

Switch# show vtp status

Switch# show vtp password

Switch# show vlan

Lab 14: IPV6

To Assign IPv6 address:

Router(Config)#interface fa 0/0

Router(Config)#**ipv6 2001:1::1/64**

To Enable IP6 Routing:

Router(Config)#**ipv6 unicast-routing**

To enable IPv6 Static Routing:

Router(Config)#**ipv6 route 2001:0::/64 2001:3::2**

To Show IPv6 Routing Table:

Router#**show ipv6 route**