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Semester:_____6th_____   **Section: _____D_____**

EE-357 Computer and Communication Networks
Experiment - 2
Switch Administrative Function and LAN Connections

Name	Reg. No	PLO5/ CLO3	PLO5/ CLO3	PLO5/ CLO3	PLO5/ CLO3	PLO5/ CLO3
		Viva / Quiz / Lab Performance 5 Marks	Analysis of data in Lab Report 5 Marks	Modern Tool Usage 5 Marks	Ethics and Safety 5 Marks	Individual and Team Work 5 Marks
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EXPERIMENT NO 2

Switch Administrative Function

1. Objective

This lab exercise is designed for understanding and using basic configuration commands on a Cisco Switch interacting through Cisco IOS.

2. Resources Required

- Computer
- Packet Tracer (version 5 or higher)
- ENSP

3. Introduction

This lab introduces Cisco IOS (Internetwork Operating System) which is the proprietary CLI (command line interface) based software empowering nearly all the Cisco devices. IOS is a package of routing, switching, internetworking and telecommunications functions tightly integrated with a multitasking operating system.

The loading process in Cisco IOS is as follows:

a) Bootstrap is loaded from ROM which starts up POST (Power On Self Test).

b) Valid image file is searched from flash memory, if found is loaded into the RAM, otherwise ROMMON is loaded from ROM.

c) Valid startup-config is searched from NV-RAM, if found is loaded into the RAM as running-config, otherwise the device just starts without any previous configurations.
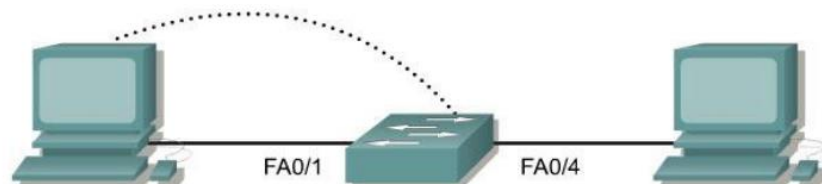
From this we conclude that Cisco devices have 4 types of memories present:

a) ROM

b) Flash

c) NV-RAM

d) RAM

4. Procedure

1. Open Packet Tracer 5 and setup a network similar to the following network. Use Cisco 2950T switch.

Switch Designation	Switch Name	Enable Secret Password	Enable, VTY, and Console Passwords
Switch 1	AL Switch	class	cisco

Straight-through cable	——————————
Serial cable	——————Z——————
Console (Rollover)	••••••••••••••••••••••
Crossover cable	– – – – – – – – – •

2. Double click the switch and goto CLI tab. Follow the steps below to complete the lab. You can do the same using a PC if you use a **console (one side is RS 232, other is RJ45—blue colored in Packet Tracer)** cable for connection between PC and Switch. Goto PC's desktop then Terminal (equivalent of HyperTerminal), accept the default settings and login to the Switch.

Step 1 Enter privileged mode

a. Privileged mode gives access to all the switch commands. Many of the privileged commands configure operating parameters. Therefore, privileged access should be password-protected to prevent unauthorized use. The privileged command set includes those commands contained in user EXEC mode, as well as the **configure** command through which access to the remaining command modes is gained.

Switch>**enable**

Switch#

b. Notice the prompt changed in the configuration to reflect privileged EXEC mode.

Step 2 Examine the current switch configuration

a. Examine the following current running configuration file:

Switch#**show running-config**

b. How many Ethernet or Fast Ethernet interfaces does the switch have? _____24_____

```
!
!
spanning-tree mode pvst
!
interface FastEthernet0/1
!
interface FastEthernet0/2
!
interface FastEthernet0/3
!
interface FastEthernet0/4
!
interface FastEthernet0/5
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
```

```
interface Vlan1
 no ip address
 shutdown
!
!
!
!
line con 0
!
line vty 0 4
 login
line vty 5 15
 login
!
!
end
```

c. What is the range of values shown for the VTY lines?

0 to 4, 5 to 15

d. Examine the current contents of NVRAM as follows:

Switch#**show startup-config**

%% Non-volatile configuration memory is not present

```
Switch#show startup-config
startup-config is not present
```

e. Why does the switch give this response?

Because no running configuration is present yet

Step 3 Assign a name to the switch

a. Enter **enable** and then the configuration mode. The configuration mode allows the management of the switch. Enter **ALSwitch**, the name this switch will be referred to in the following: Switch#**configure terminal**

Enter the configuration commands, one for each line. End by pressing **Ctrl-Z**. Switch(config)#**hostname ALSwitch**

ALSwitch(config)#**exit**

b. Notice the prompt changed in the configuration to reflect its new name. Type **exit** or press **CtrlZ** to go back into privileged mode.

```
Switch#show startup-config
startup-config is not present
Switch#enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname ALSwitch
ALSwitch(config)#exit
ALSwitch#
%SYS-5-CONFIG_I: Configured from console by console
```

Step 4 Examine the current running configuration

a. Examine the current configuration that follows to verify that there is no configuration except for the hostname:

ALSwitch#**show running-config**

b. Are there any passwords set on the lines?

No

c. What does the configuration show as the hostname of this switch

ALSwitch

Step 5 Set the access passwords

Enter config-line mode for the console. Set the password on this line as **cisco** for login. Configure the vty lines 0 to 15 with the password cisco as follows:

ALSwitch#**configure terminal**

Enter the configuration commands, one for each line. End by pressing **Ctrl-Z**. ALSwitch(config)#**line con 0**

ALSwitch(config-line)#**password cisco**

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

ALSwitch(config-line)#**line vty 0 15**

ALSwitch(config-line)#**password cisco**

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

ALSwitch(config-line)#**exit**

Step 6 Set the command mode passwords

a. Set the **enable password** to cisco and the **enable secret password** to **class** as follows:
ALSwitch(config)#**enable password cisco**

ALSwitch(config)#**enable secret class**

b. Which password takes precedence, the enable password or enable secret password?

enable secret password

Step 7 Save the configuration

a. The basic configuration of the switch has just been completed. Back up the running configuration file to NVRAM as follows:

Note: This will ensure that the changes made will not be lost if the system is rebooted or loses power.

ALSwitch#**copy running-config startup-config**

Destination filename [startup-config]?[**Enter**] Building configuration... [OK]

ALSwitch#

Step 8 Examine the startup configuration file

a. To see the configuration that is stored in NVRAM, type **show startup-config** from the privileged EXEC (enable mode)

ALSwitch#**show startup-config**

b. What is displayed?

The running configuration

```
ALSwitch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
ALSwitch(config)#line con 0
ALSwitch(config-line)#password cisco
ALSwitch(config-line)#login
ALSwitch(config-line)#line vty 0 15
ALSwitch(config-line)#password cisco
ALSwitch(config-line)#login
ALSwitch(config-line)#exit
ALSwitch(config)#enable password cisco
ALSwitch(config)#enable secret class
ALSwitch(config)#^Z
ALSwitch#
%SYS-5-CONFIG_I: Configured from console by console

ALSwitch#copy running-config startup-config
Destination filename [startup-config]? [Enter] Building configuration... [OK]
%Error copying nvram:[Enter] Building configuration... [OK] (Invalid argument)
ALSwitch#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
ALSwitch#show startup-config
Using 1167 bytes
!
version 12.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname ALSwitch
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
enable password cisco
!
!
!
spanning-tree mode pvst
!
interface FastEthernet0/1
!
interface FastEthernet0/2
!
interface FastEthernet0/3
!
interface FastEthernet0/4
!
interface FastEthernet0/5
!
interface FastEthernet0/6
```

```
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
 --More--
```

c. Are all the changes that were entered recorded in the file?

yes

```
interface Vlan1
 no ip address
 shutdown
!
!
!
!
line con 0
 password cisco
 login
!
line vty 0 4
 password cisco
 login
line vty 5 15
 password cisco
 login
!
!
end

 --More--
```

Step 9 Configure the hosts attached to the switch

Configure the hosts to use the same IP subnet for the address, mask.

Step 10 Verify connectivity

 a. To verify that hosts and switch are correctly configured, ping the switch IP address from the hosts.

b. Were the pings successful?

yes

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=0ms TTL=128
Reply from 192.168.1.2: bytes=32 time=0ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>
```

c. If the answer is no, troubleshoot the hosts and switch configurations.

Step 11 Record the MAC addresses of the host

a. Determine and record the layer 2 addresses of the PC network interface cards. Check by using command **ipconfig /all** in command prompt of the Packet Tracer PC (in Desktop tab).

 b. PC0

```
PC>ipconfig  /all

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Physical Address.................: 0003.E4CA.9A41
   Link-local IPv6 Address..........: FE80::203:E4FF:FECA:9A41
   IP Address.......................: 192.168.1.1
   Subnet Mask......................: 255.255.255.0
   Default Gateway..................: 0.0.0.0
   DNS Servers......................: 0.0.0.0
   DHCP Servers.....................: 0.0.0.0
   DHCPv6 Client DUID...............: 00-01-00-01-7A-5A-15-10-00-03-E4-CA-9A-41
```

c.PC1:

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

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Physical Address.................: 0001.6401.8347
   Link-local IPv6 Address..........: FE80::201:64FF:FE01:8347
   IP Address.......................: 192.168.1.2
   Subnet Mask......................: 255.255.255.0
   Default Gateway..................: 0.0.0.0
   DNS Servers......................: 0.0.0.0
   DHCP Servers.....................: 0.0.0.0
   DHCPv6 Client DUID...............: 00-01-00-01-91-68-0B-5C-00-01-64-01-83-47
```

Step 12 Determine the MAC addresses that the switch has learned

a. To determine the what MAC addresses the switch has learned use the **show mac-address-table** command as follows at the privileged EXEC mode prompt:

ALSwitch#**show mac-address-table**

```
ALSwitch#show mac-address-table
         Mac Address Table
-----------------------------------------

Vlan    Mac Address        Type        Ports
----    -----------        -------     -----

  1     0001.6401.8347     DYNAMIC     Fa0/2
  1     0003.e4ca.9a41     DYNAMIC     Fa0/1
...  .  .
```

b. How many dynamic addresses are there?_____2_____

c. How many total MAC addresses are there?_____

d. How many addresses have been user defined?_____

e. Do the MAC addresses match the host MAC addresses? _____

Step 13 Determine the show MAC table options

a. To determine the options the **show mac-address-table** command has use the **?** option as follows:

ALSwitch#**show mac-address-table ?**

```
ALSwitch#show mac-address-table
         Mac Address Table
-------------------------------------------

Vlan    Mac Address         Type        Ports
----    -----------         --------    -----

   1    0001.6401.8347      DYNAMIC     Fa0/2
   1    0003.e4ca.9a41      DYNAMIC     Fa0/1
ALSwitch#
ALSwitch#show mac-address-table ?
  dynamic      dynamic entry type
  interfaces   interface entry type
  static       static entry type
  <cr>
ALSwitch#show mac-address-table
         Mac Address Table
-------------------------------------------

Vlan    Mac Address         Type        Ports
----    -----------         --------    -----

   1    0001.6401.8347      DYNAMIC     Fa0/2
   1    0003.e4ca.9a41      DYNAMIC     Fa0/1
```

b. How many options are available for the **show mac-address-table** command?

3

c. Show only the mac-address-tables that were learned dynamically.

d. How many are there?

2

Step 14 Clear the MAC address table

To remove the existing MAC addresses use the **clear mac-address-table** command from the privileged EXEC mode prompt as follows:

ALSwitch#**clear mac-address-table dynamic**

Step 15 Verify the results

a. Verify that the **mac-address-table** was cleared as follows:

ALSwitch#**show mac-address-table**

```
ALSwitch#clear mac-address-table dynamic
ALSwitch#show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address        Type        Ports
----    -----------        --------    -----
```

Step 16 Examine the MAC table again

a. Look at the MAC address table again using the **show mac-address-table** command at the privileged EXEC mode prompt as follows:

ALSwitch#**show mac-address-table**

a. How many MAC addresses are there?

2

```
ALSwitch#
ALSwitch#
ALSwitch#clear mac-address-table ?
  dynamic  dynamic entry type
  <cr>
ALSwitch#clear mac-address-table
ALSwitch#
ALSwitch#show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address        Type        Ports
----    -----------        --------    -----

ALSwitch#show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address        Type        Ports
----    -----------        --------    -----

   1    0001.6401.8347     DYNAMIC     Fa0/2
   1    0003.e4ca.9a41     DYNAMIC     Fa0/1
ALSwitch#
```

Step 18 Exit the switch

Leave the switch welcome screen by typing **exit** as follows:

ALSwitch#**exit**

```
        Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type       Ports
----    -----------       --------   -----

   1    0001.6401.8347    DYNAMIC    Fa0/2
   1    0003.e4ca.9a41    DYNAMIC    Fa0/1
ALSwitch#exit




ALSwitch con0 is now available



Press RETURN to get started.
```

5. Student activity

Connect five PCs to a Switch and repeat the lab procedure on ENSP software including these following conditions

1. Set the banner on switch

```
#
header shell information "Welcome to ENSP!"
header login information "All activities are Logged and Reported"
#
user-interface con 0
```

```
Feb  9 2022 12:13:17-08:00 SEECS_BEE_11_D DS/4/DATASYNC_CFGCHANGE:OID 1
1.2011.5.25.191.3.1 configurations have been changed. The current chang
is 13, the change loop count is 0, and the maximum number of records is
[SEECS_BEE_11_D]header shell information #Welcome to ENSP!#
[SEECS_BEE_11_D]
Feb  9 2022 12:15:17-08:00 SEECS_BEE_11_D DS/4/DATASYNC_CFGCHANGE:OID 1
1.2011.5.25.191.3.1 configurations have been changed. The current chang
is 14, the change loop count is 0, and the maximum number of records is
[SEECS_BEE_11_D]save
```

2. Set the password NameRollNo

```
Feb  9 2022 12:13:17-08:00 SEECS_BEE_11_D DS/4/DATASYNC_CFGCHANGE:OID 1
1.2011.5.25.191.3.1 configurations have been changed. The current chang
is 13, the change loop count is 0, and the maximum number of records is
[SEECS_BEE_11_D]header shell information #Welcome to ENSP!#
[SEECS_BEE_11_D]
Feb  9 2022 12:15:17-08:00 SEECS_BEE_11_D DS/4/DATASYNC_CFGCHANGE:OID 1
1.2011.5.25.191.3.1 configurations have been changed. The current chang
is 14, the change loop count is 0, and the maximum number of records is
[SEECS_BEE_11_D]save
```

3. Switch Name SEECS_BEE_ClassName

```
<Huawei>system-view
Enter system view, return user view with Ctrl+Z.
[Huawei]sysname SEECS_BEE_11_D
[SEECS_BEE_11_D]
Feb  9 2022 11:50:06-08:00 SEECS_BEE_11_D DS/4/DATASYNC_CFGCHANGE:OID 1.3.
1.2011.5.25.191.3.1 configurations have been changed. The current change n
is 4, the change loop count is 0, and the maximum number of records is 409
```

Output:

```
Username:NA
Password:
Welcome to ENSP!
<SEECS_BEE_11_D>
```

You may visit following link for reference (use ctrl + left click to directly go to URL):

https://www.programmersought.com/article/34204970890/