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Lab 2 : Dynamic Routing VLAN / Spanning Tree

I.   Part 1 : IPv6

- **Q1.1 : What is the advantage of disabling DNS lookup ?**

DNS lookup causes delays to users if the router utilizes a DNS server on the network. When an erroneous URL is typed, the DNS lookup function will attempt to find the URL on the DNS server. If no DNS server is available, the user's computer will hang while the lookup is performed.

To conclude, disabling DNS lookup is useful to decrease user delays if no DNS server is configured.

- **Q1.2 Why do we obtain two addresses for one interface?**

```
Pinging 2000::207:ECFF:FEC8:A335 with 32 bytes of data:

Reply from 2000::207:ECFF:FEC8:A335: bytes=32 time=16ms TTL=128
Reply from 2000::207:ECFF:FEC8:A335: bytes=32 time<1ms TTL=128
Reply from 2000::207:ECFF:FEC8:A335: bytes=32 time<1ms TTL=128
Reply from 2000::207:ECFF:FEC8:A335: bytes=32 time<1ms TTL=128

Ping statistics for 2000::207:ECFF:FEC8:A335:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 16ms, Average = 4ms
```

```
C:\>ping 2000::201:42FF:FE4A:CB10

Pinging 2000::201:42FF:FE4A:CB10 with 32 bytes of data:

Reply from 2000::201:42FF:FE4A:CB10: bytes=32 time=18ms TTL=128
Reply from 2000::201:42FF:FE4A:CB10: bytes=32 time=2ms TTL=128
Reply from 2000::201:42FF:FE4A:CB10: bytes=32 time<1ms TTL=128
Reply from 2000::201:42FF:FE4A:CB10: bytes=32 time<1ms TTL=128

Ping statistics for 2000::201:42FF:FE4A:CB10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 18ms, Average = 5ms
```

Unlike IPv4 which didn't support more than one IP address per interface, improvements allow secondary addresses for IPv6 so that you could always count on it being possible. Every IPv6 interface has a link-local IP address. The interface is also able to communicate on a large network and it also has a global scope address.

- **Q1.3 For the following steps, show and comment the different modifications**

```
Router#show ipv6 interface brief
FastEthernet0/0            [up/up]
    FE80::1
    2000::1
    2001:DB8:1:1::1
FastEthernet0/1            [administratively down/down]
    unassigned
Vlan1                      [administratively down/down]
    unassigned
```

```
Router#show ipv6 interface brief
FastEthernet0/0           [up/up]
    FE80::1
    2000::1
    2001:DB8:1:1::1
FastEthernet0/1           [administratively down/down]
    unassigned
Vlan1                     [administratively down/down]
    unassigned
```

For CAD :

● Static		
2001:DB8:1:2::2	/	64
FE80::3		
FE80::1		

For accounting :

● Static		
2001:DB8:1:1::2	/	64
FE80::2		
FE80::1		

- **Q.1.4 What is the IPv6 address obtained by Auto Config ? Is the autoconfiguration stateless or stateful ?**

For bIlling :

IPv6 Configuration

● Automatic	○ Static	Ipv6 request successful.		
IPv6 Address	2001:DB8:1:1:260:5CFF:FED5:4E54		/	64
Link Local Address	FE80::260:5CFF:FED5:4E54			
Default Gateway	FE80::1			
DNS Server				

For sales :

IPv6 Configuration

● Automatic	○ Static	Ipv6 request successful.		
IPv6 Address	2001:DB8:1:1:201:42FF:FE4A:CB10		/	64
Link Local Address	FE80::201:42FF:FE4A:CB10			
Default Gateway	FE80::1			
DNS Server				

For engineering :

IP v6 Configuration			
○ Automatic	● Static		
IPv6 Address	2001:DB8:1:2::4	/	64
Link Local Address	FE80::4		
Default Gateway	FE80::1		
DNS Server			

For Design :

IP v6 Configuration			
○ Automatic	● Static		
IPv6 Address	2001:DB8:1:2::3	/	64
Link Local Address	FE80::5		
Default Gateway	FE80::1		
DNS Server			

Accounting

```
C:\>ping 2001:DB8:1:1::2

Pinging 2001:DB8:1:1::2 with 32 bytes of data:

Reply from 2001:DB8:1:1::2: bytes=32 time=3ms TTL=128
Reply from 2001:DB8:1:1::2: bytes=32 time<1ms TTL=128
Reply from 2001:DB8:1:1::2: bytes=32 time<1ms TTL=128
Reply from 2001:DB8:1:1::2: bytes=32 time<1ms TTL=128

Ping statistics for 2001:DB8:1:1::2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 0ms

C:\>tracert 2001:DB8:1:1::2

Tracing route to 2001:DB8:1:1::2 over a maximum of 30 hops:

  1    24 ms      0 ms       0 ms      2001:DB8:1:1::2

Trace complete.
```

CAD :

```
C:\>ping 2001:DB8:1:2::2

Pinging 2001:DB8:1:2::2 with 32 bytes of data:

Reply from 2001:DB8:1:2::2: bytes=32 time=33ms TTL=127
Reply from 2001:DB8:1:2::2: bytes=32 time=1ms TTL=127
Reply from 2001:DB8:1:2::2: bytes=32 time=1ms TTL=127
Reply from 2001:DB8:1:2::2: bytes=32 time<1ms TTL=127

Ping statistics for 2001:DB8:1:2::2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 33ms, Average = 8ms

C:\>tracert 2001:DB8:1:2::2

Tracing route to 2001:DB8:1:2::2 over a maximum of 30 hops:

  1    0 ms       0 ms       0 ms      2001:DB8:1:1::1
  2    0 ms       0 ms       0 ms      2001:DB8:1:2::2

Trace complete.
```
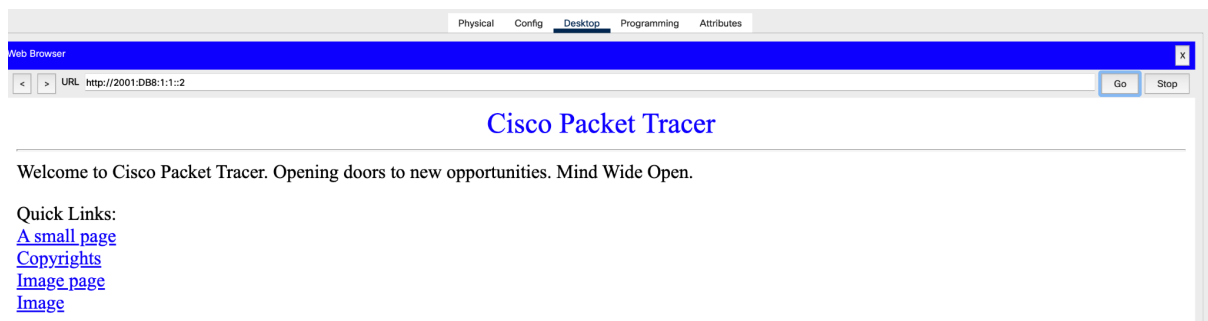
Accounting website:

| Physical | Config | Desktop | Programming | Attributes |

Web Browser   X

| < | > | URL http://2001:DB8:1:1::2 | Go | Stop |

Cisco Packet Tracer

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CAD website :

| Physical | Config | Desktop | Programming | Attributes |

Web Browser   X

| < | > | URL http://2001:DB8:1:2::2 | Go | Stop |

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Q1.5 Compare the two techniques static and autoconfiguration IPv6 addressing, advantages and drawbacks.

Static : the address that doesn't change. Once your device is assigned a static IP address, that number typically stays the same until the device is decommissioned or your network architecture changes. Static IP addresses generally are used by servers or other important equipment.

Autoconfiguration : when we start an IPv6 interface, the interface checks whether a valid IP configuration exists. If a valid IP configuration does not exist, the interface automatically initiates the address autoconfiguration process.

There are two types of autoconfiguration : stateless and stateful.

The advantages of autoconfiguration are that no host configuration is necessary and that no server is needed for stateless autoconfiguration.

II.   Part 2: Dynamic Routing (EIGRP)

Q2.3: Bring the screenshot of the ip interfaces of the three routers.

```
R1>en
Password:
R1#show ip interface brief
Interface          IP-Address      OK? Method Status                Protocol
FastEthernet0/0    172.16.1.1      YES manual up                    up
FastEthernet1/0    unassigned      YES unset  administratively down down
Serial2/0          192.168.10.5    YES manual up                    up
Serial3/0          172.16.3.1      YES manual up                    up
FastEthernet4/0    unassigned      YES unset  administratively down down
FastEthernet5/0    unassigned      YES unset  administratively down down
R1#
```

```
R2#show ip in
R2#show ip interface brief
Interface          IP-Address      OK? Method Status                Protocol
FastEthernet0/0    172.16.2.1      YES manual up                    up
FastEthernet1/0    unassigned      YES unset  administratively down down
Serial2/0          172.16.3.2      YES manual up                    up
Serial3/0          192.168.10.9    YES manual up                    up
FastEthernet4/0    unassigned      YES unset  administratively down down
FastEthernet5/0    unassigned      YES unset  administratively down down
R2#
```

```
R3#show ip interface  brief
Interface              IP-Address      OK? Method Status                 Protocol
FastEthernet0/0        192.168.1.1     YES manual up                     up
FastEthernet1/0        unassigned      YES unset  administratively down down
Serial2/0              192.168.10.6    YES manual up                     up
Serial3/0              192.168.10.10   YES manual up                     up
FastEthernet4/0        unassigned      YES unset  administratively down down
FastEthernet5/0        unassigned      YES unset  administratively down down
R3#
```

Q2.4: Try to ping PC2 from PC1, is it possible? if yes or not, please comment.

```
Packet Tracer PC Command Line 1.0
C:\>ping 172.16.2.10

Pinging 172.16.2.10 with 32 bytes of data:

Reply from 172.16.1.1: Destination host unreachable.
Reply from 172.16.1.1: Destination host unreachable.
Reply from 172.16.1.1: Destination host unreachable.
Reply from 172.16.1.1: Destination host unreachable.

Ping statistics for 172.16.2.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

It is not possible to ping PC2 from PC1.

Q2.5 Which interface on the R2 router is the neighbor adjacent? Use the following command line

```
R2#show ip  eigrp nei
R2#show ip  eigrp neighbors
IP-EIGRP neighbors for process 1
```

Q2.6 Give the corresponding commands for the configuration steps ?

```
R3>en
Password:
R3#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router eigrp 1
R3(config-router)#network 192.168.1.0 0.0.0.255
R3(config-router)#network 192.168.10.4 0.0.0.3
R3(config-router)#network 192.168.10.8 0.0.0.3
R3(config-router)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#write mem
R3#write memory
Building configuration...
[OK]
R3#
```

Q2.7 After these configurations, bring the screenshot of "show ip route" command for the three routers?

```
R1>en
Password:
R1#show ip ro
R1#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter are
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     172.16.0.0/16 is variably subnetted, 3 subnets, 3 masks
D        172.16.0.0/16 is a summary, 00:37:35, Null0
C        172.16.1.0/24 is directly connected, FastEthernet0/0
C        172.16.3.0/30 is directly connected, Serial3/0
     192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
D        192.168.10.0/24 is a summary, 00:37:35, Null0
C        192.168.10.4/30 is directly connected, Serial2/0

R1#
```

```
R2>en
Password:
R2#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     172.16.0.0/16 is variably subnetted, 3 subnets, 3 masks
D       172.16.0.0/16 is a summary, 00:38:13, Null0
C       172.16.2.0/24 is directly connected, FastEthernet0/0
C       172.16.3.0/30 is directly connected, Serial2/0
     192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
D       192.168.10.0/24 is a summary, 00:38:13, Null0
C       192.168.10.8/30 is directly connected, Serial3/0

R2#
```

```
R3#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

C    192.168.1.0/24 is directly connected, FastEthernet0/0
     192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
D       192.168.10.0/24 is a summary, 00:01:52, Null0
C       192.168.10.4/30 is directly connected, Serial2/0
C       192.168.10.8/30 is directly connected, Serial3/0

R3#
```

Q2.8 Please give the result of the following command : "show ip protocols"

```
R1#show ip prot
R1#show ip protocols

Routing Protocol is "eigrp  1 "
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0
  EIGRP maximum hopcount 100
  EIGRP maximum metric variance 1
Redistributing: eigrp 1
  Automatic network summarization is in effect
  Automatic address summarization:
    172.16.0.0/16 for Serial2/0
      Summarizing with metric 28160
    192.168.10.0/24 for FastEthernet0/0, Serial3/0
      Summarizing with metric 20512000
  Maximum path: 4
  Routing for Networks:
    172.16.0.0
    192.168.10.4/30
  Routing Information Sources:
    Gateway         Distance      Last Update
  Distance: internal 90 external 170
```

Q2.9 Now you are able to ping PC2 and PC3 from PC1. Comment and provide the screenshots.

```
C:\>ping 192.168.1.10

Pinging 192.168.1.10 with 32 bytes of data:

Reply from 172.16.1.1: Destination host unreachable.
Reply from 172.16.1.1: Destination host unreachable.
Reply from 172.16.1.1: Destination host unreachable.
Reply from 172.16.1.1: Destination host unreachable.

Ping statistics for 192.168.1.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 172.16.2.10

Pinging 172.16.2.10 with 32 bytes of data:

Reply from 172.16.1.1: Destination host unreachable.
Reply from 172.16.1.1: Destination host unreachable.
Reply from 172.16.1.1: Destination host unreachable.
Reply from 172.16.1.1: Destination host unreachable.

Ping statistics for 172.16.2.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

Q2.10: Comment the obtained values.

BW corresponds to the bandwidth. DLY is the interface delay.

Q2.11 What is the default bandwidth metric for a serial interface? Modify the bandwidth of the Serial interfaces.

The default bandwidth is 1544.

```
R1(config)#Interface
R1(config)#inter
R1(config)#interface Serial 2/0
R1(config-if)#band
R1(config-if)#bandwidth 1544
R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
```

Q2.12 Set the bandwidth to 1024 kbps for the links between R1 R2 R2 R3 and 64 kbps for the link R1 R3 using "bandwidth" command. The bandwidth needs to be changed so that the EIGRP metric can be calculated correctly.

```
R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface Serial 2/0
R1(config-if)#bandwidth 1024
R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#interface
R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface Serial 3/0
R1(config-if)#band
R1(config-if)#bandwidth 64
R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#
```

```
R2>en
Password:
R2#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#interf
R2(config)#interface Se
R2(config)#interface Serial 2/0
R2(config-if)#band
R2(config-if)#bandwidth 1024
R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#interface Se
R2(config)#interface Serial 3/0
R2(config-if)#band
R2(config-if)#bandwidth 1024
R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
|
```

```
R3>en
Password:
R3#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#interface Se
R3(config)#interface Serial 2/0
R3(config-if)#band
R3(config-if)#bandwidth 1024
R3(config-if)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#interf
R3(config)#interface Serial 3/0
R3(config-if)#band
R3(config-if)#bandwidth 64
R3(config-if)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#|
```

Q2.13 Check the modification of the bandwidth using "show interface serial 2/0"

```
R1#
R1#show interface serial 2/0
Serial2/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 192.168.10.5/30
  MTU 1500 bytes, BW 1024 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/0/256 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
     Available Bandwidth 768 kilobits/sec
  5 minute input rate 81 bits/sec, 0 packets/sec
  5 minute output rate 76 bits/sec, 0 packets/sec
     367 packets input, 22020 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     361 packets output, 21660 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 output buffer failures, 0 output buffers swapped out
 --More--
```

We can see that the BW has been changed to 1024.

Q2.14 Examine the successors and feasible distances in the routing table on R1 using the command "show ip eigrp topology" and "show ip route"

```
R1#
R1#
R1#
R1#
R1#show ip eigrp to
R1#show ip eigrp topology
IP-EIGRP Topology Table for AS 1/ID(192.168.10.5)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - Reply status

P 172.16.0.0/16, 1 successors, FD is 28160
        via Summary (28160/0), Null0
P 172.16.1.0/24, 1 successors, FD is 28160
        via Connected, FastEthernet0/0
P 172.16.3.0/30, 1 successors, FD is 40512000
        via Connected, Serial3/0
P 192.168.10.0/24, 1 successors, FD is 3011840
        via Summary (3011840/0), Null0
P 192.168.10.4/30, 1 successors, FD is 3011840
        via Connected, Serial2/0
R1#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     172.16.0.0/16 is variably subnetted, 3 subnets, 3 masks
D       172.16.0.0/16 is a summary, 00:12:23, Null0
C       172.16.1.0/24 is directly connected, FastEthernet0/0
C       172.16.3.0/30 is directly connected, Serial3/0
     192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
D       192.168.10.0/24 is a summary, 00:12:23, Null0
C       192.168.10.4/30 is directly connected, Serial2/0
```

Q2.15 What are the paths to join the network 192.168.1.0? What is the best path resulting from EIGRP protocol? You give the feasible distance.

There are 2 paths possible to join the network 192.168.1.0.

By R3 (192.168.10.4) and then FE 0/0 of R3
By R2 and then FE of R3.

The best one if the first and the FD is 3011840.

Q2.16 Simulate the transmission of ICMP messages.

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Dele
◄	Failed	PC1	PC2	IC...	🟦	0.000	N	0	(...	(del
◄	Failed	PC1	PC3	IC...	🟪	0.000	N	1	(...	(del

Q2.17 Delete the defined passwords in the second task and report the required commands

```
R1>en
Password:
R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#line con 0
R1(config-line)#no login
R1(config-line)#no pass
R1(config-line)#no password
R1(config-line)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
```

III. Part 3: VLAN and Spanning Tree

Q3.1 How to disable DNS lookup? Give the command line

```
Switch>no ip
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#no ip do
Switch(config)#no ip doma
Switch(config)#no ip domain lookup
Switch(config)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs
------------------------------------------------------------------------------

Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
Switch#
Switch#
Switch#
Switch#
```

Same for the 2 other switches

Q3.2 Comment the obtained result of "show vlan" command line. Use "brief" to reduce the given information.

```
Switch#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
Switch#
```

Q3.3 List the possible switchport modes of a Cisco switch. Give the difference between these modes.

These are the possible switchport modes :
- Access Ports: Belong to a single VLAN and carry the traffic of a single VLAN only
- Trunk Ports: Usually carry the traffic of multiple VLANs and by default will be the member of all VLANs configured on the switch

The main difference is the number of VLAN that they can carry. Also, access ports are usually used to connect the end devices whereas trunk ports are usually used to establish the connectivity between Switch to Switch or Switch to Router. Equally, Trunk ports usually required more bandwidth as compared to Access ports.

Q3.4 Configure the mode access on the interface fa 0/3 of S1 and fa0/3, fa0/4, fa0/5 for S2

```
S1#show interfaces  fastEthernet 0/3 switchport
Name: Fa0/3
Switchport: Enabled
Administrative Mode: static access
Operational Mode: static access
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: native
Negotiation of Trunking: Off
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Administrative private-vlan trunk native VLAN: none
Administrative private-vlan trunk encapsulation: dot1q
Administrative private-vlan trunk normal VLANs: none
Administrative private-vlan trunk private VLANs: none
Operational private-vlan: none
Trunking VLANs Enabled: All
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL
Protected: false
 --More--
```

Q3.5 How to enable trunk mode for all interfaces Fa0/1 et Fa0/2 of each switch: S1 S2 and S3 ?

```
S2#
S2#config t
Enter configuration commands, one per line.  End with CNTL/Z.
S2(config)#interface ra
S2(config)#interface range fa0/1,fa0/2
S2(config-if-range)#sw
S2(config-if-range)#switchport mode tr
S2(config-if-range)#switchport mode trunk

S2(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

S2(config-if-range)#so
S2(config-if-range)#no shu
S2(config-if-range)#no shutdown
S2(config-if-range)#end
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2#show interface trunk
Port        Mode          Encapsulation  Status      Native vlan
Fa0/1       on            802.1q         trunking    1
Fa0/2       on            802.1q         trunking    1

Port        Vlans allowed on trunk
Fa0/1       1-1005
Fa0/2       1-1005

Port        Vlans allowed and active in management domain
Fa0/1       1
Fa0/2       1

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/1       1
Fa0/2       none
```

```
S3>
S3>
S3>en
S3#config t
Enter configuration commands, one per line.  End with CNTL/Z.
S3(config)#interface range fa0/1, fa0/2
S3(config-if-range)#sw
S3(config-if-range)#switchport mode trunk
S3(config-if-range)#no shutdown
S3(config-if-range)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#show inter
S3#show interfaces trunk
S3#show interfaces trunk
Port        Mode          Encapsulation  Status      Native vlan
Fa0/1       on            802.1q         trunking    1
Fa0/2       on            802.1q         trunking    1

Port        Vlans allowed on trunk
Fa0/1       1-1005
Fa0/2       1-1005

Port        Vlans allowed and active in management domain
Fa0/1       1
Fa0/2       1

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/1       1
Fa0/2       1

S3#
```

```
S1(config-if)#end
S1#
%SYS-5-CONFIG_I: Configured from console by console
show ip in
S1#show ip interface brief
Interface              IP-Address      OK? Method Status          Protocol
FastEthernet0/1        unassigned      YES manual up              up
FastEthernet0/2        unassigned      YES manual up              up
FastEthernet0/3        unassigned      YES manual up              up
FastEthernet0/4        unassigned      YES manual down            down
FastEthernet0/5        unassigned      YES manual down            down
FastEthernet0/6        unassigned      YES manual down            down
FastEthernet0/7        unassigned      YES manual down            down
FastEthernet0/8        unassigned      YES manual down            down
FastEthernet0/9        unassigned      YES manual down            down
FastEthernet0/10       unassigned      YES manual down            down
FastEthernet0/11       unassigned      YES manual down            down
FastEthernet0/12       unassigned      YES manual down            down
FastEthernet0/13       unassigned      YES manual down            down
FastEthernet0/14       unassigned      YES manual down            down
FastEthernet0/15       unassigned      YES manual down            down
FastEthernet0/16       unassigned      YES manual down            down
FastEthernet0/17       unassigned      YES manual down            down
FastEthernet0/18       unassigned      YES manual down            down
FastEthernet0/19       unassigned      YES manual down            down
FastEthernet0/20       unassigned      YES manual down            down
FastEthernet0/21       unassigned      YES manual down            down
FastEthernet0/22       unassigned      YES manual down            down
FastEthernet0/23       unassigned      YES manual down            down
FastEthernet0/24       unassigned      YES manual down            down
Vlan1                  172.17.10.1     YES manual up              up
S1#
S1#
```

```
S2(config-if)#end
S2#
%SYS-5-CONFIG_I: Configured from console by console
show ip in
S2#show ip interface brief
Interface              IP-Address      OK? Method Status          Protocol
FastEthernet0/1        unassigned      YES manual up              up
FastEthernet0/2        unassigned      YES manual up              up
FastEthernet0/3        unassigned      YES manual up              up
FastEthernet0/4        unassigned      YES manual up              up
FastEthernet0/5        unassigned      YES manual up              up
FastEthernet0/6        unassigned      YES manual down            down
FastEthernet0/7        unassigned      YES manual down            down
FastEthernet0/8        unassigned      YES manual down            down
FastEthernet0/9        unassigned      YES manual down            down
FastEthernet0/10       unassigned      YES manual down            down
FastEthernet0/11       unassigned      YES manual down            down
FastEthernet0/12       unassigned      YES manual down            down
FastEthernet0/13       unassigned      YES manual down            down
FastEthernet0/14       unassigned      YES manual down            down
FastEthernet0/15       unassigned      YES manual down            down
FastEthernet0/16       unassigned      YES manual down            down
FastEthernet0/17       unassigned      YES manual down            down
FastEthernet0/18       unassigned      YES manual down            down
FastEthernet0/19       unassigned      YES manual down            down
FastEthernet0/20       unassigned      YES manual down            down
FastEthernet0/21       unassigned      YES manual down            down
FastEthernet0/22       unassigned      YES manual down            down
FastEthernet0/23       unassigned      YES manual down            down
FastEthernet0/24       unassigned      YES manual down            down
Vlan1                  172.17.10.2     YES manual up              up
S2#
```

```
show ip in
S3#show ip interface brief
Interface          IP-Address      OK? Method Status          Protocol
FastEthernet0/1    unassigned      YES manual up              up
FastEthernet0/2    unassigned      YES manual up              up
FastEthernet0/3    unassigned      YES manual down            down
FastEthernet0/4    unassigned      YES manual down            down
FastEthernet0/5    unassigned      YES manual down            down
FastEthernet0/6    unassigned      YES manual down            down
FastEthernet0/7    unassigned      YES manual down            down
FastEthernet0/8    unassigned      YES manual down            down
FastEthernet0/9    unassigned      YES manual down            down
FastEthernet0/10   unassigned      YES manual down            down
FastEthernet0/11   unassigned      YES manual down            down
FastEthernet0/12   unassigned      YES manual down            down
FastEthernet0/13   unassigned      YES manual down            down
FastEthernet0/14   unassigned      YES manual down            down
FastEthernet0/15   unassigned      YES manual down            down
FastEthernet0/16   unassigned      YES manual down            down
FastEthernet0/17   unassigned      YES manual down            down
FastEthernet0/18   unassigned      YES manual down            down
FastEthernet0/19   unassigned      YES manual down            down
FastEthernet0/20   unassigned      YES manual down            down
FastEthernet0/21   unassigned      YES manual down            down
FastEthernet0/22   unassigned      YES manual down            down
FastEthernet0/23   unassigned      YES manual down            down
FastEthernet0/24   unassigned      YES manual down            down
Vlan1              172.17.10.3     YES manual up              up
S3#
```

Q3.6 Verify that the switches are correctly configured by pinging between them. From S1, ping the management interface on S2 and S3. From S2, ping the management interface on S3. Comment the obtained result.

```
Success rate is 80 percent (5/5), round-trip min/avg/max = 0/0/0 ms

S1#ping 172.17.10.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.17.10.3, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

S1#ping 172.17.10.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.17.10.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/3/19 ms

S1#
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.17.10.3, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

S2#
```

Q3.7 Verify the creation of the VLAN via "show vlan brief" command line.

```
S2#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/21, Fa0/22, Fa0/23, Fa0/24
10   finance                          active    Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                Fa0/20
20   staff                            active    Fa0/3
30   guest                            active    Fa0/4, Fa0/5, Fa0/6, Fa0/7
                                                Fa0/8, Fa0/9, Fa0/10, Fa0/11
                                                Fa0/12, Fa0/13, Fa0/14, Fa0/15

1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
S2#
```

Q3.8 Ping from PC3 the PC1, PC2 and PC4. Comment the obtained result.

```
Packet Tracer PC Command Line 1.0
C:\>ping 172.17.10.21

Pinging 172.17.10.21 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 172.17.10.21:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 172.17.10.22

Pinging 172.17.10.22 with 32 bytes of data:

Reply from 172.17.10.22: bytes=32 time<1ms TTL=128
Reply from 172.17.10.22: bytes=32 time<1ms TTL=128
Reply from 172.17.10.22: bytes=32 time<1ms TTL=128
Reply from 172.17.10.22: bytes=32 time<1ms TTL=128

Ping statistics for 172.17.10.22:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 172.17.10.27

Pinging 172.17.10.27 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 172.17.10.27:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

Q3.9 Use the command "show vlan status" on S2. What is the maximum number of supported VLANs?

The command doesn't work.

Q3.10 What is the vtp mode by default on the switches?

The default mode is Server.

Q3.11 Set the name of VTP domain and password of S2

```
S2>en
S2#config t
Enter configuration commands, one per line.  End with CNTL/Z.
S2(config)#vtp domain My-office
Changing VTP domain name from NULL to My-office
S2(config)#vtp password cisco
Setting device VLAN database password to cisco
S2(config)#end
S2#
%SYS-5-CONFIG_I: Configured from console by console
|
```

Q3.12 change the vtp mode for S1 to client, with the same domain and password of the server, then report the command line.

```
S1(config)#vtp mode client
Setting device to VTP CLIENT mode.
```

Q3.13 Try to create a new vlan on the S2. Is it possible? explain.

Yes it is possible to create a new Vlan because we are on server mode.

Q3.14 Now use the commands "show vtp status" and "show vlan brief" to ensure that the VLAN configuration is the same for S1 and S2. Do the same for the switch S3.

```
S2#show vtp status
VTP Version                     : 2
Configuration Revision          : 0
Maximum VLANs supported locally : 255
Number of existing VLANs        : 8
VTP Operating Mode              : Server
VTP Domain Name                 : My-office
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Disabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0xFE 0x21 0xB1 0x00 0x16 0xB9 0x09 0x41
Configuration last modified by 172.17.10.2 at 3-1-93 00:48:32
Local updater ID is 172.17.10.2 on interface Vl1 (lowest numbered VLAN interface found)
S2#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/21, Fa0/22, Fa0/23, Fa0/24
10   finance                          active    Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                Fa0/20
20   staff                            active    Fa0/3
30   guest                            active    Fa0/4, Fa0/5, Fa0/6, Fa0/7
                                                Fa0/8, Fa0/9, Fa0/10, Fa0/11
                                                Fa0/12, Fa0/13, Fa0/14, Fa0/15
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
S2#
```

```
show vtp status
VTP Version                     : 2
Configuration Revision          : 0
Maximum VLANs supported locally : 255
Number of existing VLANs        : 5
VTP Operating Mode              : Client
VTP Domain Name                 : My-office
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Disabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0xFE 0x21 0xB1 0x00 0x16 0xB9 0x09 0x41
Configuration last modified by 172.17.10.2 at 3-1-93 00:48:32
S1#show vlan brief

VLAN Name                            Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                         active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                               Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                               Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                               Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                               Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                               Fa0/23, Fa0/24
10   finance                         active
20   staff                           active
30   guest                           active
1002 fddi-default                    active
1003 token-ring-default              active
1004 fddinet-default                 active
1005 trnet-default                   active
S1#
```

```
S3>
S3>en
S3#show vtp s
S3#show vtp status
VTP Version                     : 2
Configuration Revision          : 0
Maximum VLANs supported locally : 255
Number of existing VLANs        : 5
VTP Operating Mode              : Server
VTP Domain Name                 : My-office
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Disabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0xE2 0xD6 0x39 0x2B 0xFC 0x17 0x29 0x9B
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
Local updater ID is 172.17.10.3 on interface Vl1 (lowest numbered VLAN interface found)
S3#show vlan brief

VLAN Name                            Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                         active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                               Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                               Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                               Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                               Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                               Fa0/23, Fa0/24
1002 fddi-default                    active
1003 token-ring-default              active
1004 fddinet-default                 active
1005 trnet-default                   active
S3#
```

Q3.15 Report the Bridge ID Priority and explain the obtained numbers.

```
S2#show spanning-tree
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
             Address     0003.E4A9.5816
             This bridge is the root
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
             Address     0003.E4A9.5816
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- -------------------------------
Fa0/1            Desg FWD 19        128.1    P2p
Fa0/2            Desg FWD 19        128.2    P2p

VLAN0010
  Spanning tree enabled protocol ieee
  Root ID    Priority    32778
             Address     0003.E4A9.5816
             This bridge is the root
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32778  (priority 32768 sys-id-ext 10)
             Address     0003.E4A9.5816
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
 --More--
```

```
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
             Address     0003.E4A9.5816
             Cost        19
             Port        2(FastEthernet0/2)
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
             Address     0007.ECD5.B538
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- -------------------------------
Fa0/1            Desg FWD 19        128.1    P2p
Fa0/2            Root FWD 19        128.2    P2p

S3#
```

For S1 and S2 the bridge id priority is the same : 32778. For S3 it is 32769.

Q3.16 Identify the root bridge switch for each vlan; why a particular switch is selected the root bridge?

```
S2#show spanning-tree vlan 20
VLAN0020
  Spanning tree enabled protocol ieee
  Root ID    Priority    32788
             Address     0003.E4A9.5816
             This bridge is the root
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32788  (priority 32768 sys-id-ext 20)
             Address     0003.E4A9.5816
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface         Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- ------------------------------
Fa0/1             Desg FWD 19        128.1    P2p
Fa0/2             Desg FWD 19        128.2    P2p
Fa0/3             Desg FWD 19        128.3    P2p

S2#
```

The command only gives an answer for S2.

Q3.17 Change the root bridge for vlan 20 to be one of the other switches. Give the related command.

Q3.18 Find designated Ports, Root Ports, Blocked Ports on each switch