TNE20003 – Internet and Cybersecurity for Engineering Applications

Understanding Switches, Routers & Routing Tables

Aims:

- To understand the purpose of switches and routers in a network
- To investigate how the CAM table in a switch and the routing table in a Router work and what function they serve.

Preparation:

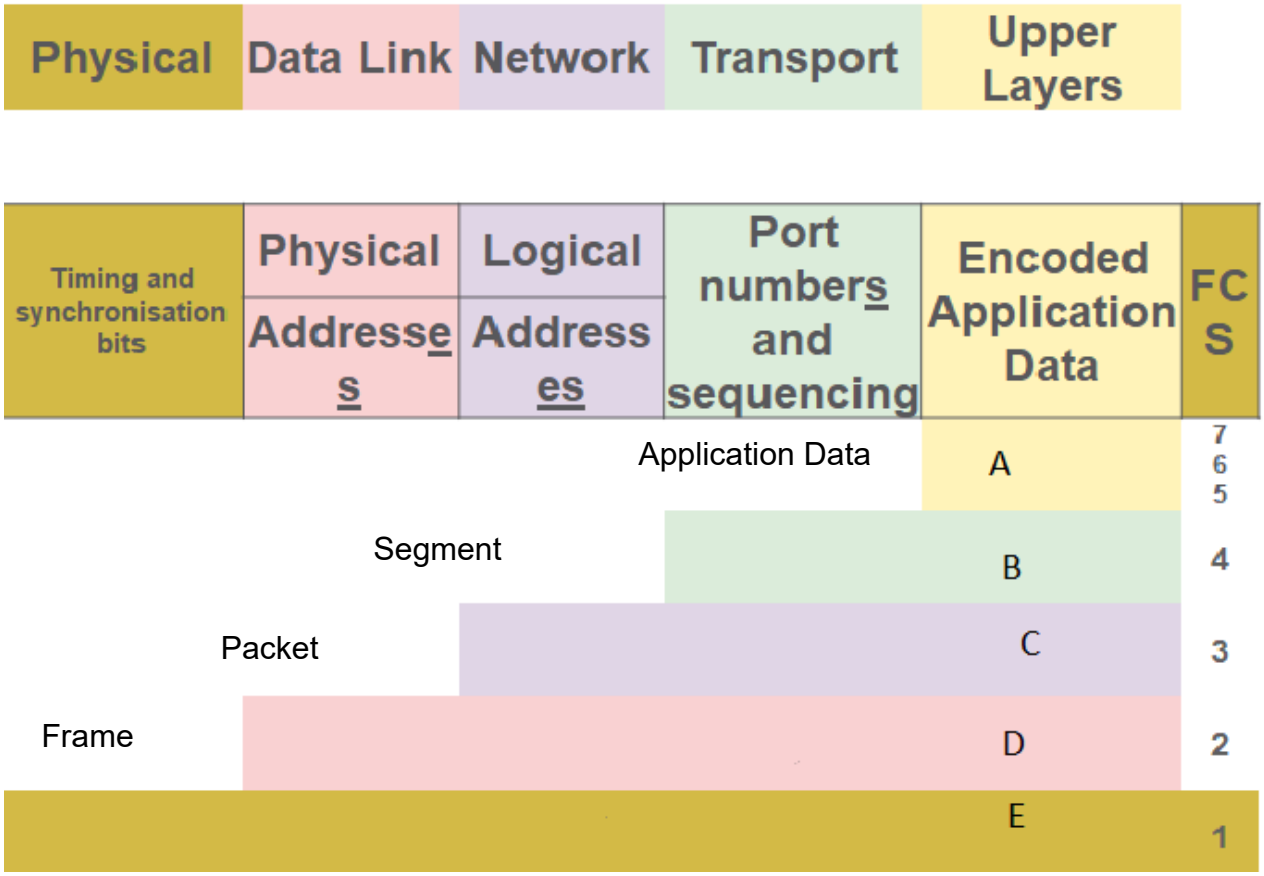
- View "Network Devices - Routers and Switches"

Due Date:

- Nil. In-class activity.

The switch splits the netwrok into smaller micro-segments.

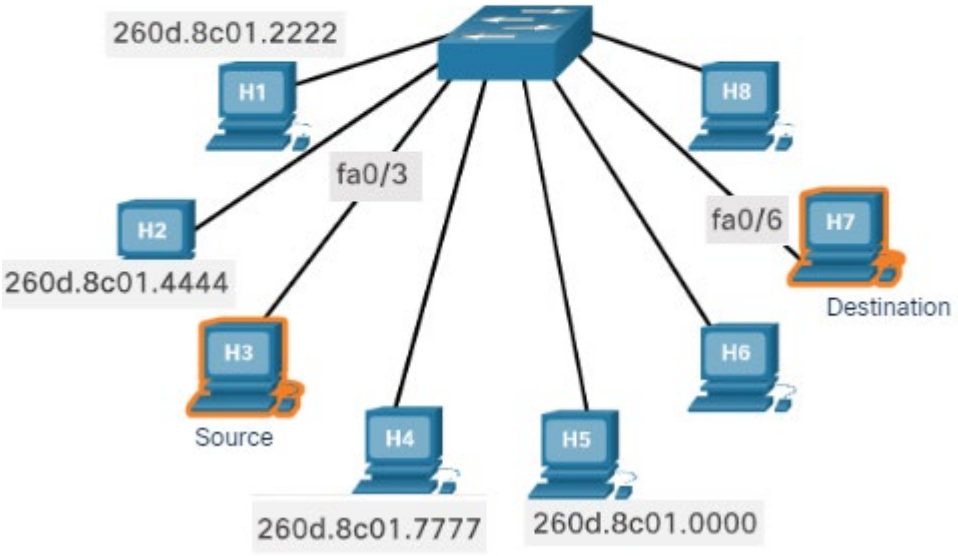
1. What is the name of the information contained in the fields A, B, C, D & E in the diagram below which shows an ethernet frame?



2. How does a switch build the MAC address table (CAM table)?

Using the diagram below, answer the following questions:

MAC Table			
fa0/1	fa0/2	fa0/3	fa0/4
260d.8c01.0000	260d.8c01.1111	260d.8c01.2222	260d.8c01.3333
fa0/5	fa0/6	fa0/7	fa0/8
260d.8c01.4444	260d.8c01.5555		260d.8c01.7777



a) Which host is connected port 8 of the switch?

b) Which port is host 2 connected to?

c) What is the MAC address of host 3?

d) What is the MAC address of host 7?

3. What does a switch do to the collision domain?

4. List 2 functions of a router in a network.

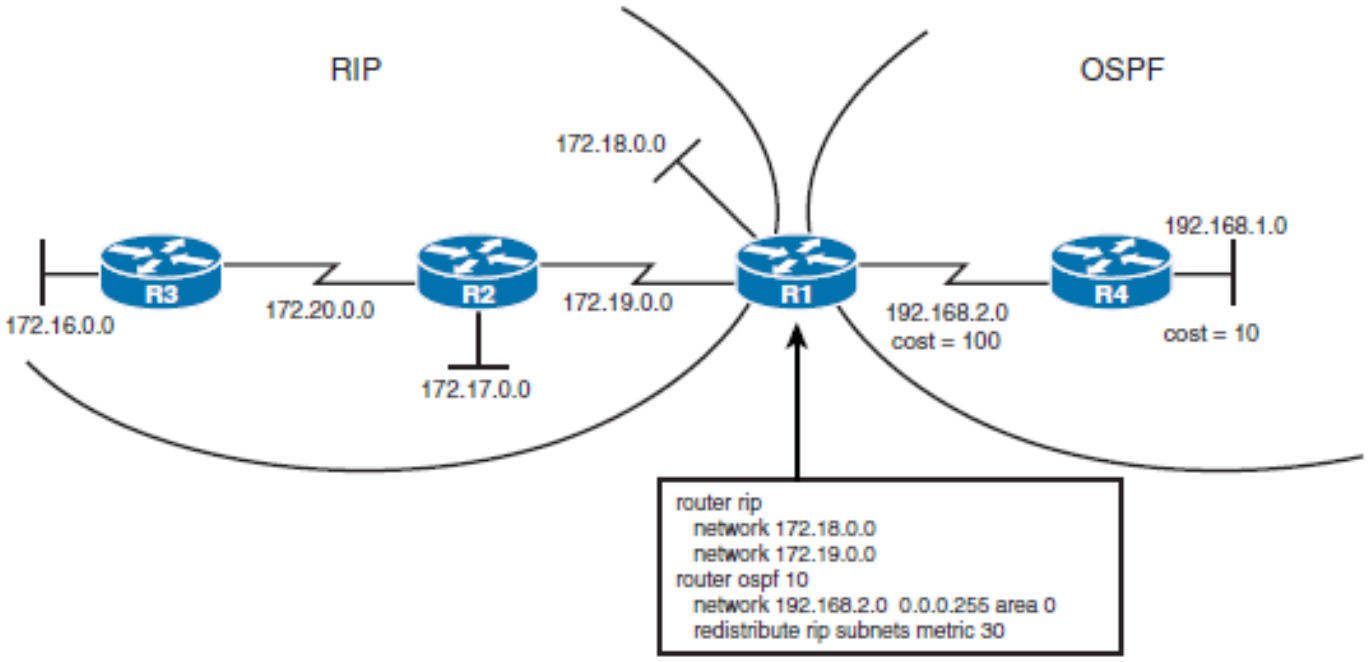
5.

The table shows the routing table of a router named HQ.

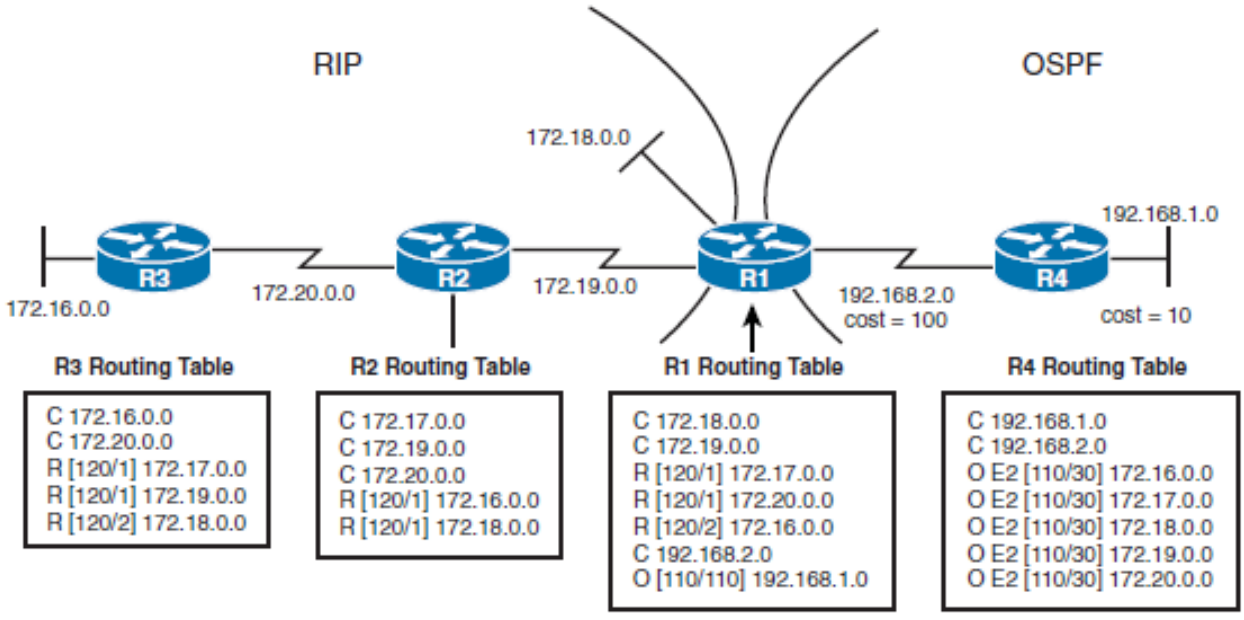
```
HQ# show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        10.1.0.0/16 is directly connected, Loopback0
L        10.1.0.1/32 is directly connected, Loopback0
      172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks
C        172.16.1.0/30 is directly connected, Ethernet0/0
L        172.16.1.1/32 is directly connected, Ethernet0/0
D     192.168.0.0/24 [90/409600] via 172.16.1.2, 00:12:07, Ethernet0/0
D     192.168.16.0/23 [90/307200] via 172.16.1.2, 00:12:07, Ethernet0/0
D EX  192.168.18.0/24 [170/307200] via 172.16.1.2, 00:12:07, Ethernet0/0
```

Which protocol has been used and what are the learned networks?

6. The network below is connected and configured. It is allowed to reach equilibrium, meaning steady state where all devices have told each other about everything they know.



The resulting routing tables are:



Can R4 communicate with any of the networks connected to R1?

Can R3 communicate with any of the networks connected to R1?

Can R3 communicate with any of the networks connected to R4?

Can R4 communicate with any of the networks connected to R3?

Use the diagram below to generate questions as per the need of your group of students.