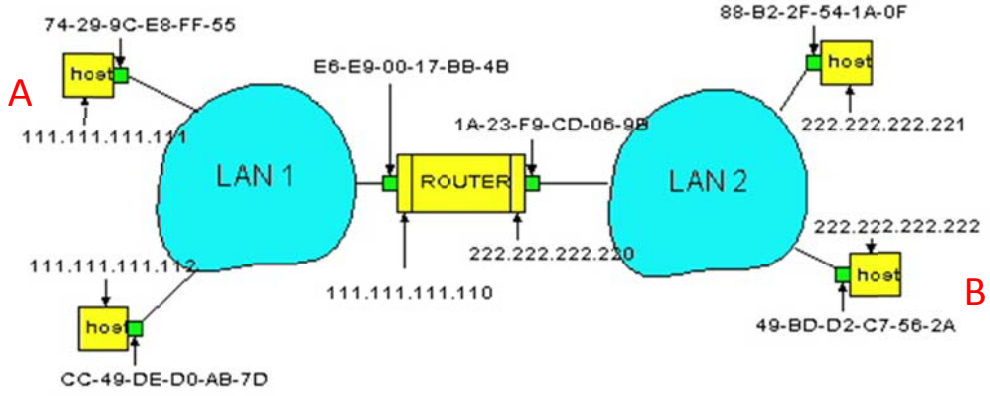
100/06/09 Chapter 4 and 5 Quiz

ID：_____ Name:_____

1. (a) Describe the flow of distance vector routing algorithm. (12%)
   (b) List a distance vector routing protocol. (3%)
2. (a) Why the hierarchical routing is needed? (6%)
   (b) What is the Intra-AS routing protocol? (3%) What routing entries are set by it? (3%)
   (c) List two Intra-AS routing protocols. (6%)
3. Compare and contrast the advertisements used by RIP and OSPF. (12%).
4. Describe and draw two topologies of Ethernet. (10%)
5. Describe how Ethernet uses CSMA/CD with exponential backoff (要寫出碰撞後如何動作) in detail (12%)
6. Consider sending an IP datagram from host B to host A in the LANs shown below. Write down two generated frame headers (B->Router and Router->A) with the Destination MAC address and Source MAC address and the IP header with the Source IP address and Destination IP address. (1% each, 8% total)



7. 平時我們用的雙絞線 Ethernet 網路線是由(a)幾根不同顏色的線?分成幾對絞合在一起? (4%) 列出所有顏色。(8%) (b) 雙絞線 Ethernet 網路線的插頭是一種只能沿固定方向插入並自動防止脫落的塑料接頭，這種接頭的專有名詞是？(3%)
8. Describe the filtering/forwarding operation (algorithm) of the switch. (10%)

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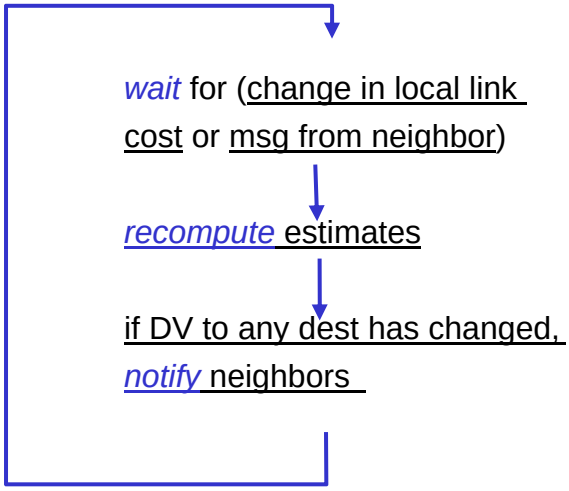
ID：_____ Name:_____

1. (a) Describe the flow of distance vector routing algorithm. (12%)



(3% per item)

(b) List a distance vector routing protocol. (3%)

RIP.

2. (a) Why the hierarchical routing is needed? (6%)
   (b) What is the Intra-AS routing protocol? (3%) What routing entries are set by it? (3%)
   (c) List two Intra-AS routing protocols. (6%)

Ans:

(a) scale: with 200 million destinations:

can't store all dest's in routing tables! (3%)

routing table exchange would swamp links! (3%)

(b) routers in same AS run same "intra-AS" routing protocol (3%); routers in different AS can run different intra-AS routing protocol.

Intra-AS sets entries for internal dests (3%)

(c) RIP, OSPF (6%)

3. Compare and contrast the advertisements used by RIP and OSPF. (12%).
   - With OSPF,
     - a router periodically broadcasts routing information to all other routers in the AS, not just to its neighboring routers. (3%)
     - This routing information sent by a router has one entry for each of the router's neighbors; the entry gives the distance from the router to the neighbor. (3%)
   - A RIP advertisement sent by a router
     - contains information about all the networks in the AS, (3%)
     - although this information is only sent to its neighboring routers. (3%)

4. Describe and draw two topologies of Ethernet. (10%)

Ans:

bus topology (2%)

all nodes in same collision domain (can collide with each other) (2%)

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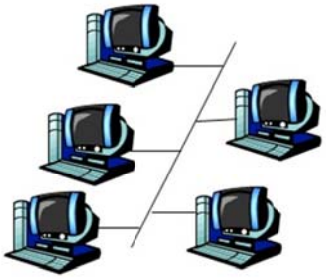
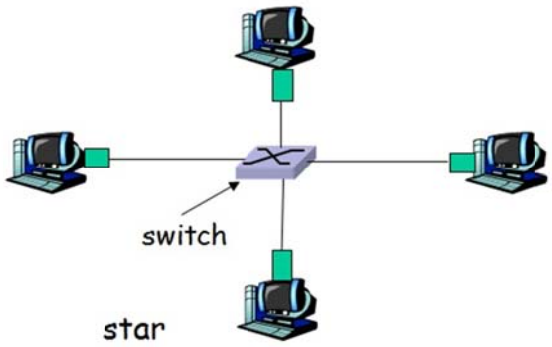
star topology (2%)
active *switch* in center (2%)
each "spoke" runs a (separate) Ethernet protocol (nodes do not collide with each other) (2%)



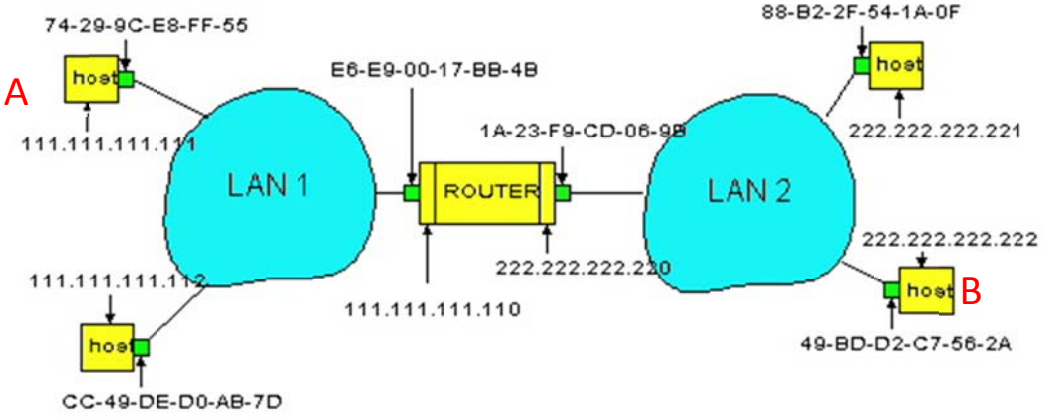


5. Describe how Ethernet uses CSMA/CD with exponential backoff (要寫出碰撞後如何動作) in detail (12%)

Ans:

- adapter doesn't transmit if it senses that some other adapter is transmitting, that is, carrier sense (3%)
- transmitting adapter aborts when it senses that another adapter is transmitting, that is, collision detection (3%)
- Before attempting a retransmission, adapter waits a random time, that is, random access with Exponential Backoff. (3%)
  - first collision: choose K from {0,1}; delay is K· 512 bit transmission times (1%)
    after second collision: choose K from {0,1,2,3}…(1%)
    after ten collisions, choose K from {0,1,2,3,4,…,1023} (1%)

6. Consider sending an IP datagram from host B to host A in the LANs shown below. Write down two generated frame headers (B->Router and Router->A) with the Destination MAC address and Source MAC address and the IP header with the Source IP address and Destination IP address. (1% each, 8% total)



Ans:

From source B to Router

Destination MAC address	Source MAC address	Source IP address	Destination IP address

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1A-23-F9-CD-06-9D	49-BD-D2-C7-56-2A	222.222.222.222	111.111.111.111

From Router to A

Destination MAC address	Source MAC address	Source IP address	Destination IP address
74-29-9C-E8-FF-55	E6-E9-00-17-BB-4B	222.222.222.222	111.111.111.111

7. 平時我們用的雙絞線 Ethernet 網路線是由(a)幾根不同顏色的線?分成幾對絞合在一起? (4%) 列出所有顏色。(8%) (b) 雙絞線 Ethernet 網路線的插頭是一種只能沿固定方向插入並自動防止脫落的塑料接頭，這種接頭的專有名詞是？ (3%)

Ans (a) 8 根不同顏色的線，分成 4 對絞合在一起 (4%) 橙、藍、綠、棕 (8%)
(b) RJ-45 (3%)

8. Describe the filtering/forwarding operation (algorithm) of the switch. (10%)

Ans:

When frame received:

1. record link associated with sending host (2%)
2. index switch table using MAC dest address (2%)
3. **if** entry found for destination
   then {
   if dest on segment from which frame arrived
   then drop the frame (2%)
   else forward the frame on interface indicated (2%)
   }
   else flood (2%)