# Exercises

# Exercise 1

① Which layers does a host process in the Internet five-layers protocol stack？ _____. What is the principal responsibility of the data link-layer?_____.

② Please summarize the operation of the CSMA/CD mechanism.

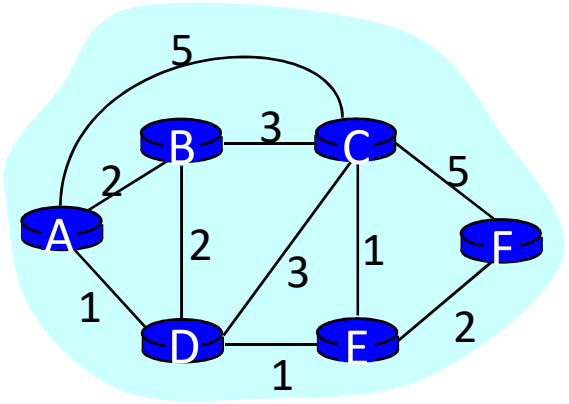
# Exercise 2

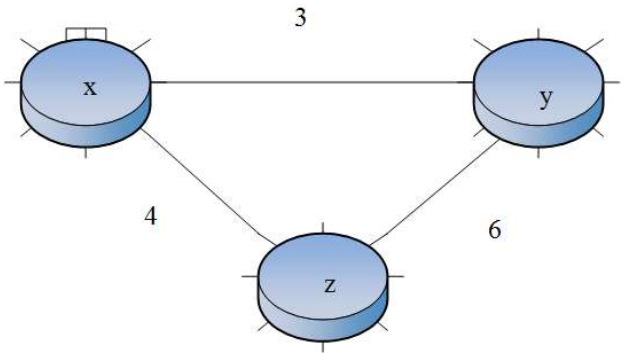
① In CSMA/CD, after the fifth collision, what is the probability that a node chooses K=4? The result K=4 corresponds to a delay of how many seconds on a 10Mbps Ethernet?

② Suppose the IEEE 802.11 RTS and CTS frames were as long as the standard DATA and ACK frames. Would there be any advantage to using the CTS and RTS frames? Why or why not?

# Exercise 3

① Consider the right network. With the indicated link costs, use Dijkstra's short-path algorithm to compute the shortest path from *D* to all network nodes.






# Exercise 3

② Consider the three-node topology shown in the Figure. Compute the distance tables after the initialization step and after each iteration of a synchronous version of the distance-vector algorithm.

③ What is the “count to infinity” problem in distance vector routing? Can the poisoned reverse solve the general count-to-infinity problem? Justify your answer.

# Exercise 4

① Consider sending a 1600-byte datagram into a link that has an MTU of 500 Bytes. Suppose the original datagram is stamped with the identification number 291. How many fragments are generated? What are the values in the various fields in the IP datagram generated related to fragmentation?

② Compare and contrast the IPv4 and IPv6 header fields. (showing how IPv4 and IPv6 are similar and different )Do they have any fields in common?

# Exercise 4

③ Suppose an ISP owns the block of addresses of the form 192.168.56.64/26. Suppose it wants to create four subnets from this block, with each subnet having the same number of IP addresses. What are the prefixed (of form a.b.c.d/x) for the four subnets? For each subnet, give the associated range of destination host addresses and the number of addresses in the range.