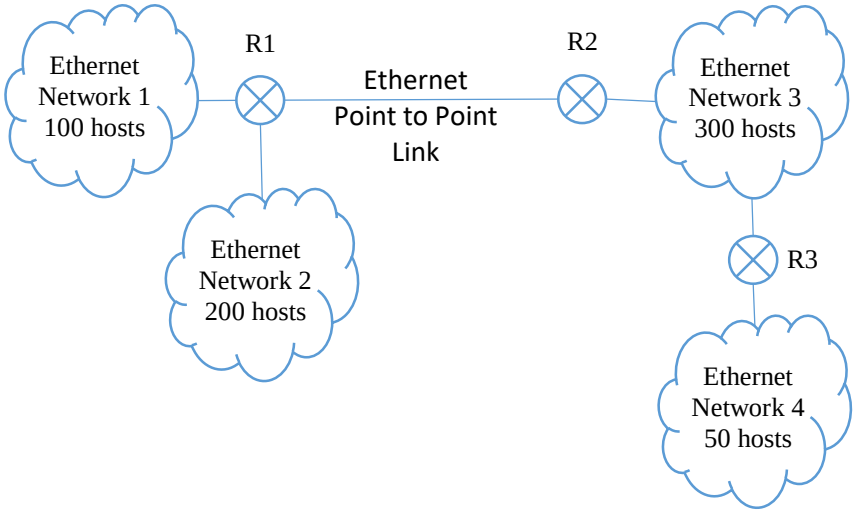
IS 504 – Homework #4

Due: May 17, 2020 Thursday – 23:30

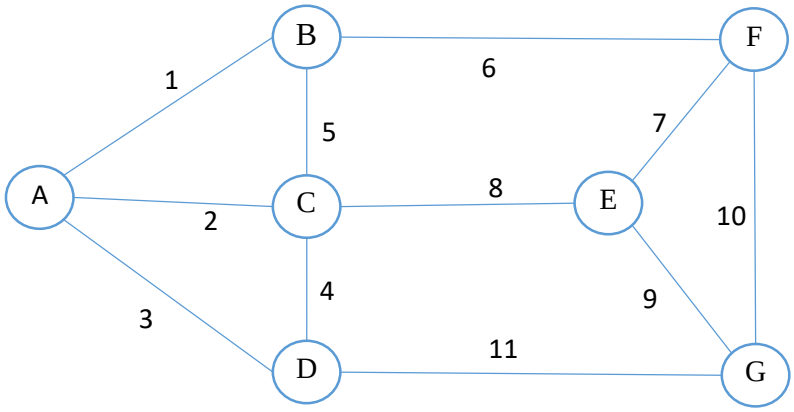
- Late submissions will be accepted by May 25, 2020, 23:30 with 5% per day penalty.
- This is an individual assignment. You have to adhere to the academic integrity principles.

Questions

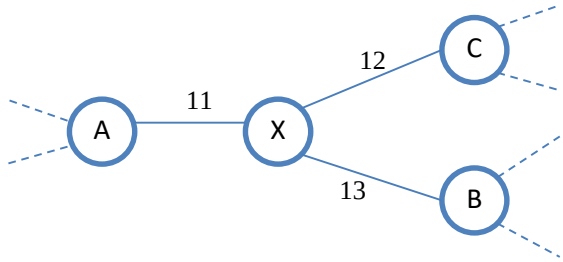
1. Consider the following network that consists of five subnets interconnected by three routers. The number of hosts in each subnet is indicated in the figure. Suppose addresses will be assigned to the devices in these subnets from IP address block 144.122.0.0/22.
    a. (10 pts) Identify the subnets in this network.
    b. (20 pts) Assign network addresses to these subnets in the form a.b.c.d/m such that each subnet has enough number of IP addresses.



2. Consider the following network,
    a. (20 pts) Use Dijkstra's algorithm to compute the shortest path from node "A" to all other network nodes.
    b. (10 pts) Give the forwarding table in node "A" and indicate <destination, cost, next hop> for each destination.



3. A fragment of a network is shown below. Suppose router X has just joined the network and received the following distance vectors from its neighbors (suppose these vectors were received at the same time instant and X computed its first distance vector just after it received all these vectors). The costs of the links between router X and its neighbors are shown in the figure.



The distance vectors received by node X just after it joined the network:

From A	
Destination	Cost
A	0
B	32
C	41
D	90
E	50
F	80

From B	
Destination	Cost
A	32
B	0
C	50
D	70
E	18
F	62

From C	
Destination	Cost
A	41
B	50
C	0
D	49
E	65
F	39

a. (10 pts) Compute X's distance vector by using these received distance vectors.

c. (10 pts) Suppose poisoned reverse <u>is not</u> used. What is the first distance vector sent to each neighbor after receiving these vectors?

d. Suppose poisoned reverse <u>is</u> used.

   i. (10 pts) What is the first distance vector sent to each neighbor after receiving these vectors?

   ii. (10 pts) Does A's distance vector change after processing the first distance received from X? Justify your answer.