Assignment #7

No late assignments accepted!

ECE 487 (Data Communications Networks) **Section B1** Dr. Hai Jiang

Electrical and Computer Engineering, University of Alberta Winter 2020

Your Last Name: _____ Your Fist Name: _____

Your Student ID: _____

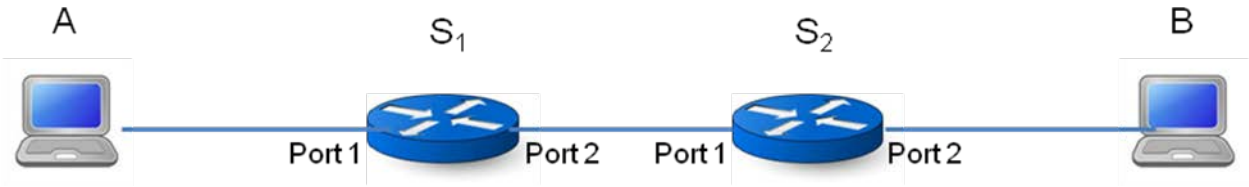
Due: Thursday, March 12, 2020, 4:00 PM, in the assignment box at 2nd Floor - Pedway between ICE and ETLC

1. (6 points) The following figure shows a virtual circuit network. Station A is going to send information to Station B, through two switches: S_1 and S_2. A virtual circuit is set up for this communication: A--> S_1 --> S_2 --> B. For this virtual circuit, the VCIs over the three hops are 24, 15, and 66, respectively.

i) Who are responsible to assign the three VCIs?

ii) Please give the switching tables at the two switches.

iii) For communication from Station A to Station B, please give the VCI numbers included in the frames over the three hops.



Solution:

i) the VCIs 24, 15, and 66 are assigned by S_1, S_2, and B, respectively.

ii) Switching table at S_1:

Incoming		Outgoing	
port	VCI	port	VCI
1	24	2	15

Switching table at S_2:

Incoming		Outgoing	
port	VCI	port	VCI
1	15	2	66

iii) From A to S_1: 24; From S_1 to S_2: 15; From S_2 to B: 66.

2. (5 points) In a domain applying a distance vector routing protocol, station A and station B are neighbors. At a moment, the routing tables at the two stations are:

Station A

To	Cost	Next
A	0	-
B	4	-
C	12	B
D	13	-
E	10	-

Station B

To	Cost	Next
A	4	-
B	0	-
C	9	-
D	5	-
E	9	-

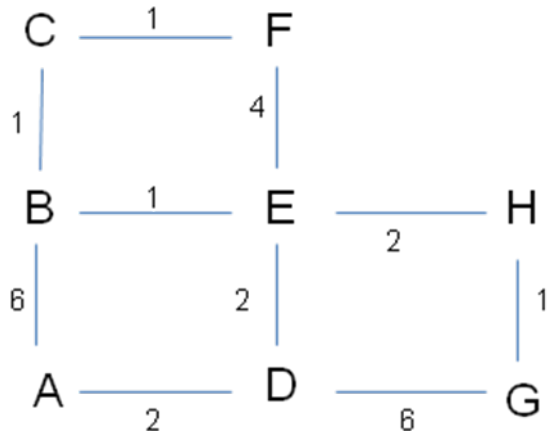
And subsequently, station B shares its routing table with station A. Please determine the contents in station A's routing table after the sharing.

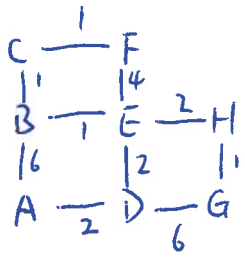
Solution:

Station A

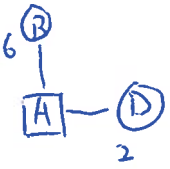
To	Cost	Next
A	0	-
B	4	-
C	13	B
D	9	B
E	10	-

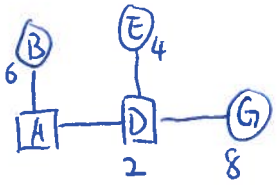
3. (9 points) For the following network topology, please use the Dijkstra algorithm to find the shortest path tree for Station A, and based on the shortest path tree, give the routing table at Station A. **Please show your steps.** Please use a square to represent a station in the permanent list, and a circle to represent a station in the tentative list.

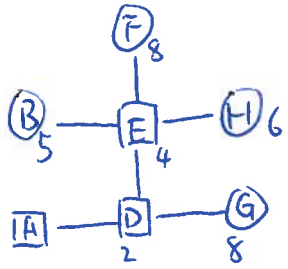


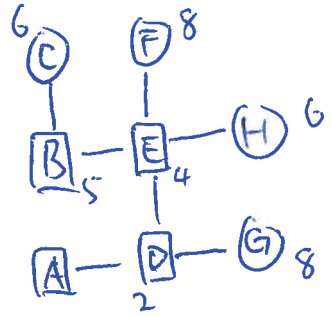


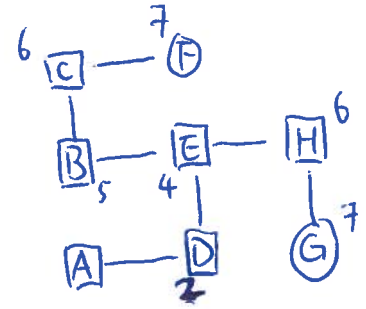
① (A)

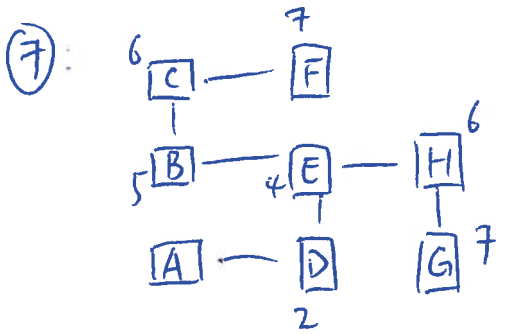
② 

③ 

④ 

⑤ 

⑥ 

⑦ 

routing table at A:

node	cost	next
A	0	—
B	5	D
C	6	D
D	2	—
E	4	D
F	7	D
G	7	D
H	6	D