

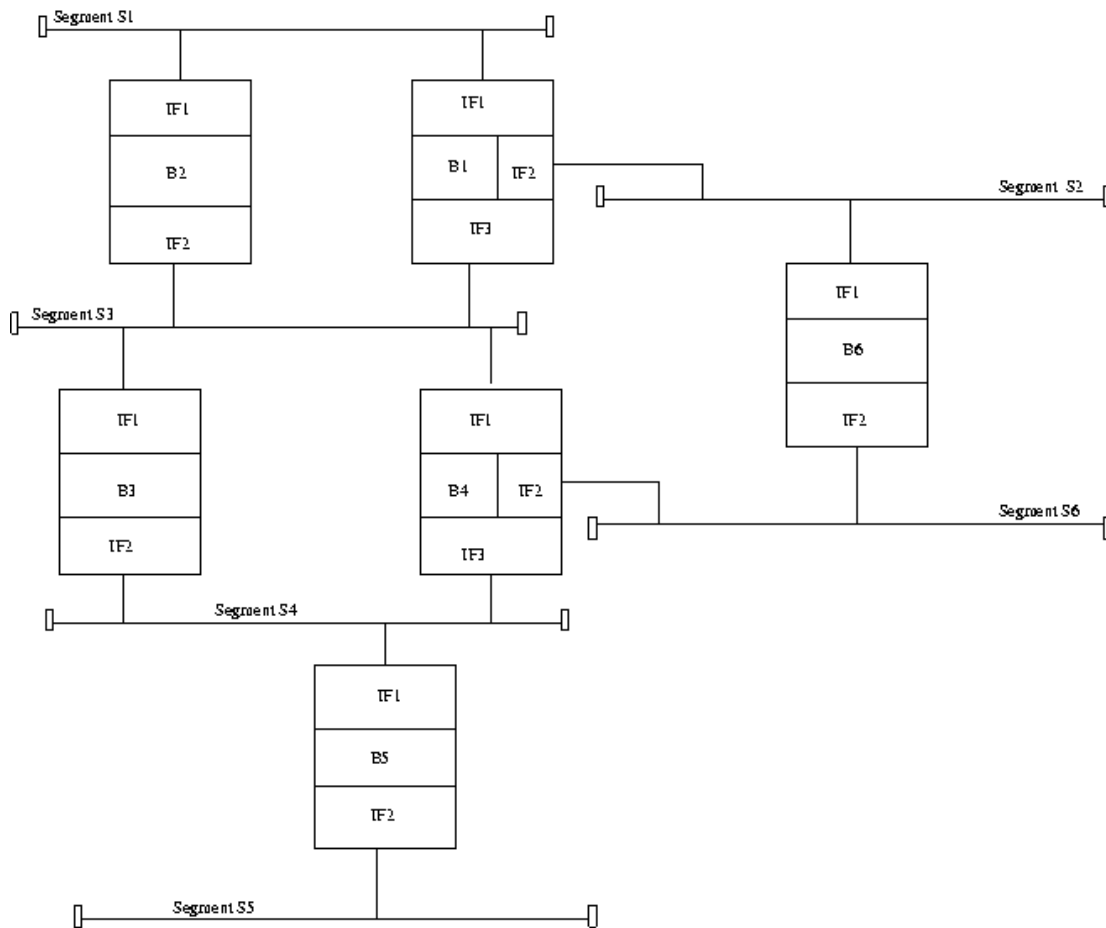
King Fahd University of Petroleum and Minerals
 College of Computer Sciences and Engineering
 Department of Computer Engineering

COE 444/COE 546/CSE 550 – Internetwork Design and Management (T132)

Homework # 01 (due date & time: Wednesday 19/02/2014 during class period)

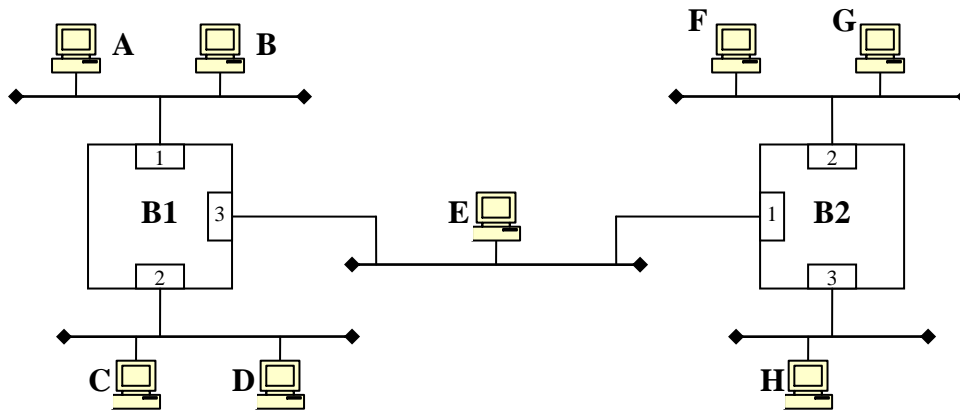
***** Show all your work. No credit will be given if work is not shown! *****

Problem # 1 (40 points): Given a LAN consisting of six Ethernet segments interconnected by 6 bridges as illustrated in the figure below. Note that the ID of each bridge is its name.



- a. (25 points) Suppose we are using fixed routing to configure the bridges. Determine the central routing directory for all segments, and the routing tables for Bridges **B1** and **B4**. If alternate routes are available then chose the one with the least number of hops. If they are the same than choose the one with the lowest bridge ID.
- b. (15 points) Suppose we are using transparent bridges. Assume that all segments are 10BaseT. Determine the active spanning tree topology. Show the elected Root Bridge, the Root Path Cost (RPC), the Root Port (R), and the Designated Port (D) on all the bridges. Show the ports that will be Blocked (B).

Problem # 2 (20 points): Given a LAN consisting of five 10 Mbps Ethernet segments interconnected by two transparent bridges as illustrated in the figure below.



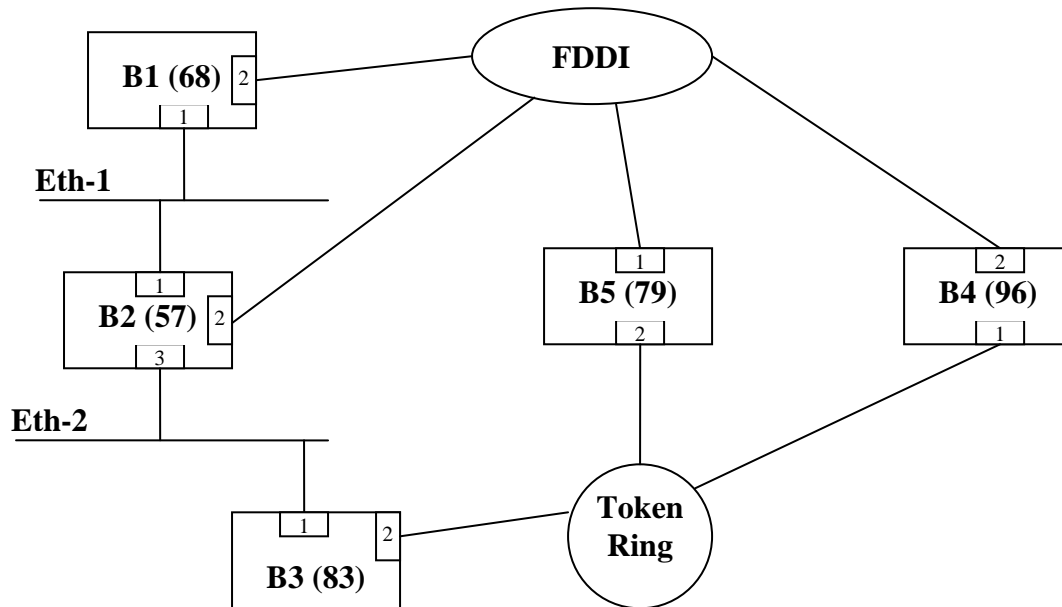
B1 forwarding table has the following entries (the aging time is set initially to 300 seconds):

MAC Address	Port	Aging time
B	1	200
H	3	150

A frame is received without error by bridge B1 with destination address (DA) and source address (SA) as stated in the following table. Fill the following table with the appropriate information

Frame transmitted	Does B1 forward this frame? If yes, then on which port(s) does B1 forward this frame?	Does B1 add/update an entry to its table? If yes, then update the above table with appropriate changes?
DA = "A", SA = "B"		
DA = "B", SA = "A"		
DA = "H", SA = "C"		
DA = "H", SA = "E"		
DA = "D", SA = "F"		

Problem # 3 (40 points): In the figure below you are given a network interconnected by 5 transparent bridges. The bridge ID is shown next to its name, i.e., Bridge_Name (Bridge_ID).



This network interconnects the following:

- 100 Mbps Ethernet (Eth-1)
- 10 Mbps Ethernet (Eth-2)
- 100 Mbps FDDI
- 16 Mbps Token Ring

Costs used in the ports of the bridges	
Data Rate	Cost
10 Mbps	100
16 Mbps	62
100 Mbps	19

1. Determine the active spanning tree topology. In the figure above, show the **cost for each port**, the elected **Root Bridge**, the Root Path Cost (**RPC**), the Root Port (**R**), and the Designated Port (**D**) on all the bridges. Show the ports that will be Blocked (**B**).
2. Also, complete the following with the appropriate explanations. The “Status” field should be **R**, **D**, or **B**.

Bridge (Port)	Status	Explanation
B1 (1)		
B1 (2)		
B2 (1)		
B2 (2)		
B2 (3)		
B3 (1)		
B3 (2)		
B4 (1)		
B4 (2)		
B5 (1)		
B5 (2)		