

Data Communications CS420/520

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Midterm 2 -- Fall 2002

Name: _____ Student ID: _____

This is a *closed* book, *closed* note exam. You may use a calculator but **no computers**. Show **ALL** your work to get full or partial credit for the problem. You have 60 minutes.

Use the space provided – focus on the main issues and do not write long stories. If you need more space than provided, your answer is probably too long!

Problem	Total	Points
1	15	
2	10	
3	10	
4	15	
5	15	
6	10	
7	15	
8	10	
Total:	100	

2. (10 pts) With respect to Internetworking

a) What is the difference between *Internet*-Fragmentation and *Intranet*-Fragmentation?

b) Which of the two fragmentations (internet or intranet) does IP use?

c) Briefly describe the terms

i) 100Base-TX

ii) 100Base-FX

iii) 1000Base-SX

iv) 1000Base-LX

v) 1000Base-T

3. (10 pts) With respect to Internetworking

a) What is the difference between a hub and a switch?

b) Describe the responsibilities of an Intermediate System, e.g. a Router

c) Given the routing tables below: a frame, destined for Node 6, arrives at Node 2. Indicate the path the packet traverses, i.e. show which nodes it visits on its path to the destination.

Node 1 Directory

Destination	Next Node
2	2
3	4
4	4
5	4
6	4

Node 2 Directory

Destination	Next Node
1	1
3	3
4	4
5	4
6	4

Node 3 Directory

Destination	Next Node
1	5
2	5
4	5
5	5
6	5

Node 4 Directory

Destination	Next Node
1	2
2	2
3	5
5	5
6	5

Node 5 Directory

Destination	Next Node
1	4
2	4
3	3
4	4
6	6

Node 6 Directory

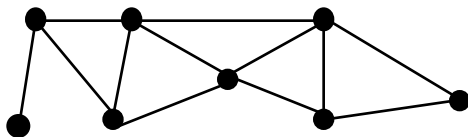
Destination	Next Node
1	5
2	5
3	5
4	5
5	5

5. (15) Looking at bridged networks:

- a) (8 pts) Assume that we have a network consisting of a collection of subnetworks (each with exactly 100 attached workstations and at most two 4-port bridges). From a given host, what is the maximum number of other hosts that can be contacted by going through no more than 2 bridges? Note, with a single 4-port bridges each subnet can have access to 3 other subnets, since it uses one port. Show your computations.

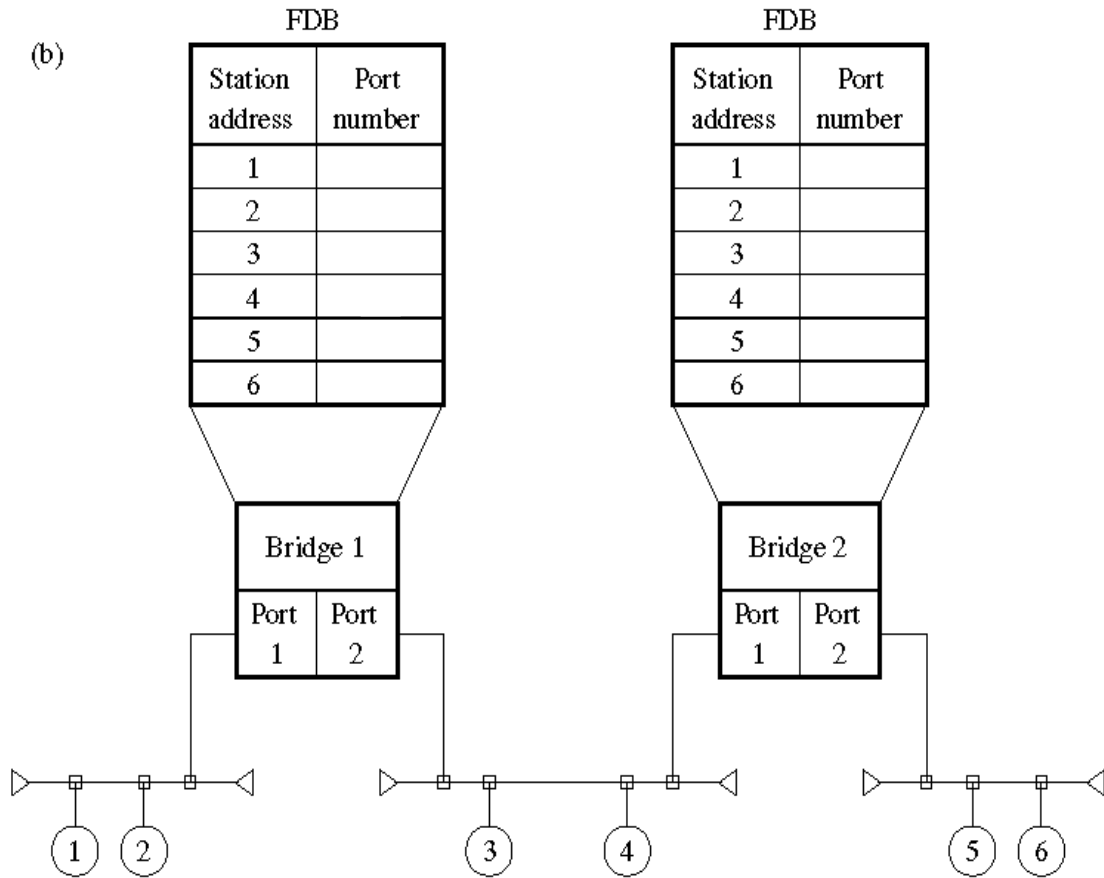
- b) What is a spanning tree?
i) (4 pts) define the term:

- ii) (3 pts) given the network below, where bridges are represented by vertices and communication links by edges of the graph, indicate one possible spanning tree:



6. (10) Looking at bridged networks:

- a) Assume we have the following two routing bridges, three subnets with two nodes each. Fill in the routing tables.



- b) What is the main motivation for packet switching in networks? Justify your answer by comparing it with circuit switching.

8. (10 pts) Describe 5 fields of the IP frame header below. (Address fields count only once).

