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

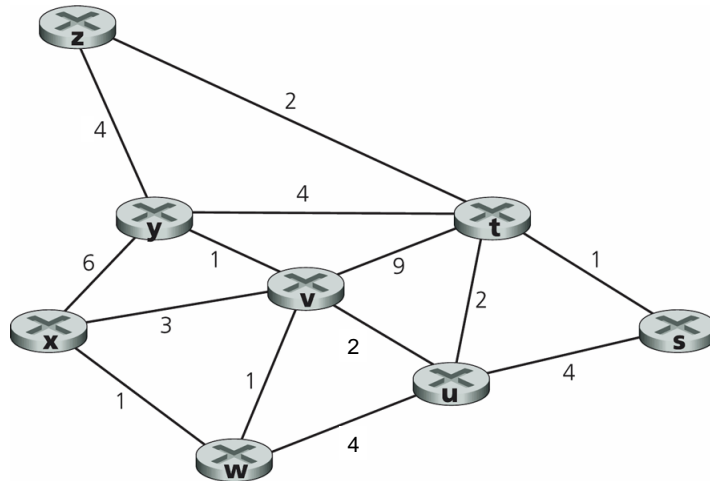**COE 344 – Computer Networks (T122)**

Homework # 04 (*due date & time: Saturday 20/04/2013 during class period*)

==**Late homework submission will NOT be accepted**==

| *** Show all your work. No credit will be given if work is not shown! *** |
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Problem # 1 (50 points):
Consider the following network.

With the indicated link costs, use *Dijkstra*'s shortest-path algorithm, <u>as discussed in class</u>, to compute the shortest path from *x* to all network nodes using the table given below.

N'	D(s),p(s)	D(t),p(t)	D(u),p(u)	D(v),p(v)	D(w),p(w)	D(y),p(y)	D(z),p(z)

Problem # 2 (18 points): Consider the following IP-based network with the assigned IP addresses as shown. For each of the following cases, complete the table regarding the datagram as it is forwarded from the source to the destination.
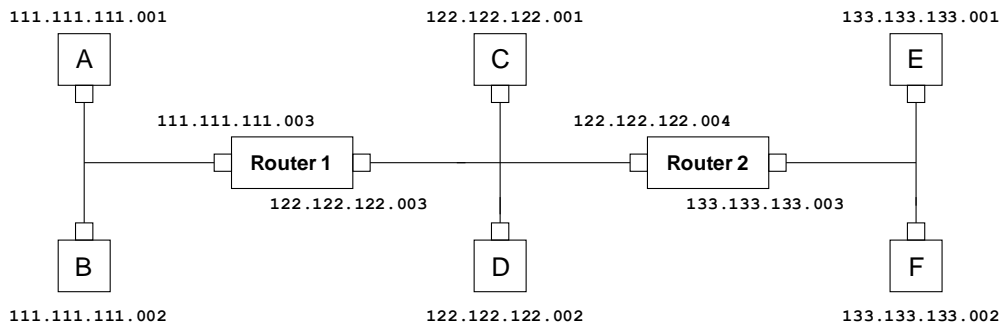
1. Assume that host **B** sends an IP datagram to host **C**.

Source IP address	Destination IP address	Receiving interface IP address that was passed down to the Data Link layer to be used for forwarding

2. Assume that host **A** sends an IP datagram to host **F**.

Source IP address	Destination IP address	Receiving interface IP address that was passed down to the Data Link layer to be used for forwarding

3. Assume that host **F** sends an IP datagram to host **D**.

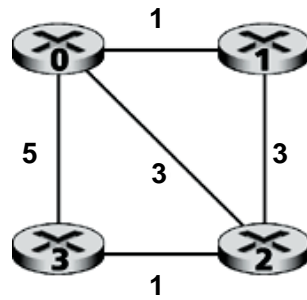| Source IP address	Destination IP address	Receiving interface IP address that was passed down to the Data Link layer to be used for forwarding

Problem # 3 (32 points): Consider the following network.

Suppose that the link cost $c(1,2)$ has changed from 3 to 1, re-compute the distance tables for nodes 0, 1, 2, and 3 after each iteration of a synchronous version of the distance vector algorithm using as many of the following tables as needed. Note that the current tables' values *prior* to the link cost change are as shown in the leftmost column of the tables.

cost to

D^0	0	1	2	3
0	0	1	3	4
1	1	0	3	4
2	3	3	0	1
3	4	4	1	0

from

cost to

D^0	0	1	2	3
0				
1				
2				
3				

from

cost to

D^0	0	1	2	3
0				
1				
2				
3				

from

cost to

D^0	0	1	2	3
0				
1				
2				
3				

from

cost to

D^0	0	1	2	3
0				
1				
2				
3				

from

cost to

D^1	0	1	2	3
0	0	1	3	4
1	1	0	3	4
2	3	3	0	1
3	∞	∞	∞	∞

from

cost to

D^1	0	1	2	3
0				
1				
2				
3				

from

cost to

D^1	0	1	2	3
0				
1				
2				
3				

from

cost to

D^1	0	1	2	3
0				
1				
2				
3				

from

cost to

D^1	0	1	2	3
0				
1				
2				
3				

from

cost to

D^2	0	1	2	3
0	0	1	3	4
1	1	0	3	4
2	3	3	0	1
3	4	4	1	0

from

cost to

D^2	0	1	2	3
0				
1				
2				
3				

from

cost to

D^2	0	1	2	3
0				
1				
2				
3				

from

cost to

D^2	0	1	2	3
0				
1				
2				
3				

from

cost to

D^2	0	1	2	3
0				
1				
2				
3				

from

cost to

D^3	0	1	2	3
0	0	1	3	4
1	∞	∞	∞	∞
2	3	3	0	1
3	4	4	1	0

from

cost to

D^3	0	1	2	3
0				
1				
2				
3				

from

cost to

D^3	0	1	2	3
0				
1				
2				
3				

from

cost to

D^3	0	1	2	3
0				
1				
2				
3				

from

cost to

D^3	0	1	2	3
0				
1				
2				
3				

from