King Fahd University of Petroleum and Minerals
College of Computer Sciences and Engineering
Department of Computer Engineering
COE 344 - Computer Networks (T101)

## Homework \# 04 (due date \& time: Sunday 19/12/2010 during class period)

## Late homework submission will NOT be accepted

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

## Problem \# 1 ( 50 points):

Consider the following network.


With the indicated link costs, use Dijkstra's shortest-path algorithm, as discussed in class, to compute the shortest path from $y$ to all network nodes using the table given below.

| $N^{\prime}$ | $D(s), p(s)$ | $D(t), p(t)$ | $D(u), p(u)$ | $D(v), p(v)$ | $D(w), p(w)$ | $D(x), p(x)$ | $D(z), p(z)$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
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Problem \# 2 (18 points): Consider the following IP-based network with the assigned IP addresses as shown.


1. Complete the following table assuming that host $B$ sends an IP datagram to host $C$.

| Source IP address | Destination IP address | IP address that was passed <br> down to Data Link layer to <br> be used for forwarding |
| :---: | :--- | :--- |
|  |  |  |
|  |  |  |
|  |  |  |

2. Complete the following table assuming that host A sends an IP datagram to host E.

| Source IP address | Destination IP address | IP address that was passed <br> down to Data Link layer to <br> be used for forwarding |
| :---: | :--- | :--- |
|  |  |  |
|  |  |  |
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3. Complete the following table assuming that host F sends an IP datagram to host D.

| Source IP address | Destination IP address | IP address that was passed <br> down to Data Link layer to <br> be used for forwarding |
| :---: | :--- | :--- |
|  |  |  |
|  |  |  |
|  |  |  |

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



Starting with the initialization step, 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. Start with the leftmost column of the tables.

| cost to |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| $D^{0}$ | 0 | 1 | 2 | 3 |
| 0 |  |  |  |  |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |



| cost to |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $D^{1}$ | 0 | 1 | 2 | 3 |  |
| 0 |  |  |  |  |  |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |



| cost to |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| $D^{1}$ | 0 | 1 | 2 | 3 |
| 0 |  |  |  |  |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |


| cost to |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| $D^{1}$ | 0 | 1 | 2 | 3 |
| 0 |  |  |  |  |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |



| cost to |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $D^{3}$ | 0 | 1 | 2 | 3 |  |
| 0 |  |  |  |  |  |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |


| cost to |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $D^{3}$ | 0 | 1 | 2 | 3 |  |
| 0 |  |  |  |  |  |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |



| cost to |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $D^{3}$ | 0 | 1 | 2 | 3 |  |
| 0 |  |  |  |  |  |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |


| cost to |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $D^{3}$ | 0 | 1 | 2 | 3 |  |
| 0 |  |  |  |  |  |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |

