# King Fahd University of Petroleum and Minerals 

College of Computer Sciences and Engineering

## Department of Computer Engineering

COE 344 - Computer Networks (T121)

## Homework \# 04 (due date \& time: Saturday 01/12/2012 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 $\boldsymbol{t}$ to all network nodes using the table given below.

| $N^{\prime}$ | $D(s), p(s)$ | $D(u), p(u)$ | $D(v), p(v)$ | $D(w), p(w)$ | $D(x), p(x)$ | $D(y), p(y)$ | $D(z), p(z)$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
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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 A 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 |
| :---: | :--- | :--- |
|  |  |  |
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|  |  |  |

2. Complete the following table assuming that host B sends an IP datagram to host F .

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

