CS 335, Assignment 4
(Please submit your answers in a single PDF file using UR Courses)

**NOTE: The objective of this assignment is that you study the textbook and the slides, and then answer the questions below yourself. You SHOULD NOT simply copy and paste the answers from the textbook or from the slides.

Total = 55
1. (i) [4] Define forwarding and routing.
(ii) [3] Give three fundamental components of a router architecture.
(iii) [2] In the IP datagram, what does "time to live" mean?
(iv) [2] Why do we need fragmentation?
(v) [2+4] Give two advantages that DHCP has over manually assigning IP addresses. Give the steps, how does a DHCP client obtain an IP address from a DHCP server?

2. (i) [2] Consider a subnet with prefix 128.119.40.128/26. Give the range of the IP addresses that can be assigned in this network.
(ii) [4] Suppose an ISP owns the block of addresses of the form 128.119.40.64/26. Suppose it wants to create four subnets from this block, with each block having the same number of IP addresses. What are the prefixes (of form a.b.c.d/x) for the four subnets?
(iii) Consider the network setup in Figure 4.25 of the textbook (seventh edition). Suppose that the ISP instead assigns the router the address 24.34.112.235 and that the network address of the home network is 192.168.1/24.
        (a) [4] Assign addresses to all interfaces in the home network.
        (b) [6] Suppose each host has two outgoing TCP connections, all to port 80 at host 128.119.40.86. Provide the six corresponding entries in the NAT translation table.

3. (i) [10] Consider the following network. With the indicated link costs, use Dijkstra's algorithm to compute the shortest path from x to all network nodes.
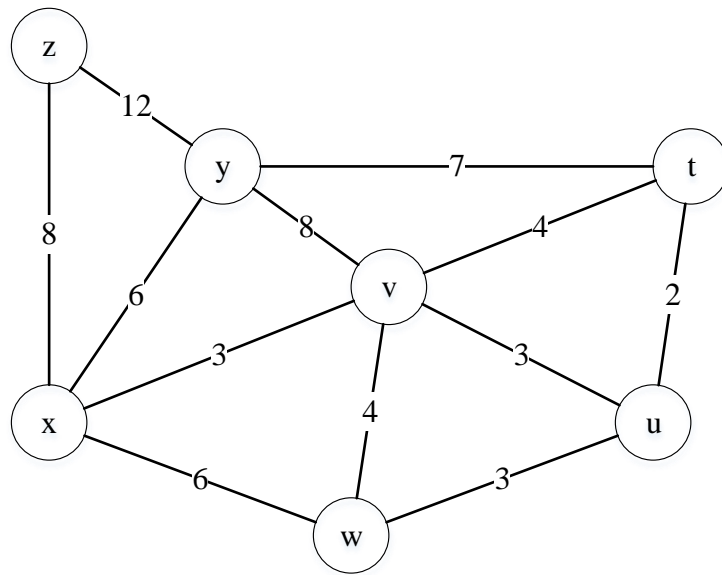
(ii) [12] Consider the network shown below, and assume that each node initially knows the costs to each of its neighbors. Consider the distance vector algorithm and show the distance table entries at node z.