

## Assignment-2

### Introduction to Internet (IT30037)

1. Briefly explain the concepts of connection less and connection oriented (virtual circuit) routing services offered by network layer, and discuss their positive and negative aspects.
2. Consider the subnet shown in Fig. 1. Distance vector routing is used, and the following vectors have just come in to router C: from B: (5,0,8,12,6,2); from D: (16,12,6,0,9,10); and from E: (7,6,3,9,0,4). The measured delays to B, D and E are 6, 3 and 5, respectively. What is C's new routing table? Give both the outgoing line to use and the expected delay.

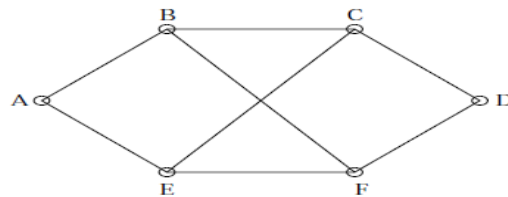


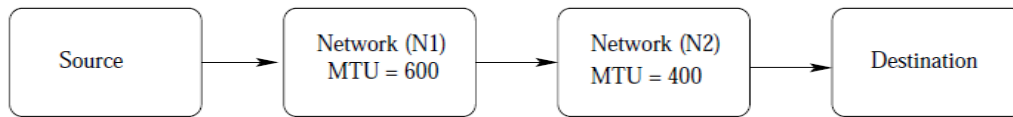
Fig. 1: Subnet

3. What is count to infinity problem in distance vector routing? How it is avoided in link state routing?
4. A network consists of 2,56,000 hosts has organized into subnets at 3 levels. At level-1, all 2,56,000 hosts are connected, at level-2 hosts are divided into four groups and at level-3 each group at level-2 is further divided into four subgroups. Assume the partitions at level-2 and level-3 are performed uniformly. Indicate the first and last address of groups and subgroups at each level. Derive the network masks at each level for routing the packets to the desired destinations. The required IP address space is provided by the ISP starting from 132.96.0.0
5. A large number of consecutive IP addresses are available starting at 198.16.0.0. Suppose that four organizations, A, B, C, and D, request 1000, 2000, 4000, and 8000 addresses, respectively, and in that order. For each of these, give the first IP address assigned, the last IP address assigned, and the mask in the w.x.y.z/s notation.
6. Show the forwarding process of the following packets at the router R1 with the following destination addresses: (i) 180.70.65.140, (ii) 201.4.22.35 and (iii) 18.24.32.78

Routing Table for Router R1			
Mask	Network Address	Next Hop	Interface
255.255.255.192	180.70.65.192	-----	m2
255.255.255.128	180.70.65.128	-----	m0
255.255.255.0	201.4.22.0	-----	m3
255.255.252.0	201.4.16.0	-----	m1
Any	Any	180.70.65.200	m2

7. Mention different header fields in IPv4. Assume a 1024 byte data packet (packet id: 10) has to pass through two networks whose MTUs are 600 and 400 bytes respectively, to reach destination. Specify the IP fields related to fragmentation in the case of transparent and non-

transparent fragmentations (i) at the source, (ii) while passing through the network whose MTU is 600 (iii) while passing through the network whose MTU is 400 and (iv) at the destination. How the destination IP combine these fragments and regenerate the original packet?



8. The host dumped a file of size 2 MB at a rate of 40 MB/sec to the network. Design the suitable traffic shapping policy at the network interface by optimizing the transmission delay (derive (i) the specifications of the policy, (ii) draw the input and output flows at the network interface and (iii) total transmission delay) for the following cases: (1) Network can handle only smooth traffic at a rate of 4 MB/sec and (2) Initially, network can handle the bursty traffic at a rate of 50 MB/sec for 20 msec, and then allow smooth traffic at a rate of 4 MB/sec.
9. Briefly, explain the control fields present in base and extension headers of IPv6.
10. Briefly, discuss the control fields present in TCP and UDP headers.
11. Briefly, explain TCP transmission control (flow) and congestion control policies.
12. Suppose that the TCP congestion window is set to 54 KB and a timeout occurs. What will be the new threshold? How big will the window be if the next 4 transmission bursts are all successful? Assume that the maximum segment size is 2 KB.