**ASSIGNMENT I**

**13/8/2013**

**CLASS: T.E.( CSE)I&II SUBJECT: Computer Network**

1. A group of *N* stations share a 56-kbps pure ALOHA channel. Each station outputs a 1000-bit frame on an average of once every 100 sec, even if the previous one has not yet been sent (e.g., the stations can buffer outgoing frames). What is the maximum value of *N*?
2. Explain different service primitives offered by each layer in TCP/IP reference model.
3. Explain PURE ALOHA protocol and also state its vulnerable time, throughput and disadvantages.
4. A large population of ALOHA users manages to generate 50 requests/sec, including both originals and retransmissions. Time is slotted in units of 40 msec.
   1. What is the chance of success on the first attempt?
   2. What is the probability of exactly *k* collisions and then a success?
   3. What is the expected number of transmission attempts needed?
5. Explain all ICMP error reporting and query messages in detail.
6. Consider building a CSMA/CD network running at 1 Gbps over a 1-km cable with no repeaters. The signal speed in the cable is 200,000 km/sec. What is the minimum frame size?
7. Compare connection‐less (VC) and connection‐oriented (DS) packet switched networks.
8. ARP and RARP both map addresses from one space to another. In this respect, they are similar. However, their implementations are fundamentally different. In what major way do they differ? Explain with example
9. Fragment IPv4 datagram of 6000 bytes into 3 fragments each of size 2000 bytes with header of 20 bytes. Further fragment the fragments numbered 1 and 3 into fragments of size 800bytes
10. and 1200 bytes with header size of 60 bytes.An IP datagram has arrived with the following information in the header (in hexadecimal): **45 00 00 54 00 03 00 00 20 06 00 00 7C 4E 03 02 B4 0E 0F 02**
    1. Are there any options?
    2. Is the packet fragmented?
    3. What is the size of the data?
    4. Is a checksum used?
    5. How many more routers can the packet travel to?
    6. What is the identification number of the packet?
    7. What is the type of service?
11. A router with IP address 125.45.23.12 and Ethernet physical address 23:45:AB:4F:67:CD has received a packet for a host destination with IP address 125.11.78.10 and Ethernet physical address AA:BB:A2:4F:67:CD.
    1. Show the entries in the ARP request packet sent by the router.
    2. Show the entries in the ARP packet sent in response to part a.
    3. Encapsulate the packet made in part a in a data link frame. Fill in all the fields.
    4. Encapsulate the packet part b in a data link frame. Fill in all the fields.
12. Explain strict source routing option in IPV4 header. An IP datagram using the *Strict source routing* option has to be fragmented. Do you think the option is copied into each fragment, or is it sufficient to just put it in the first fragment? Explain your answer.
13. In a block of addresses, we know the IP addresses of two hosts are 25.34.12.56/16, 182.44.82.16/26. What is the first address (network address) and the last address (limited broadcast address) in each of these blocks?
14. An organization is granted the block 16.0.0.0/8. The administrator wants create 500 fixed-length subnets.
    1. Find the subnet mask.
    2. Find the number of addresses in each subnet.
    3. Find the first and the last address in the first subnet.
    4. Find the first and the last address in the last subnet (subnet 500).
    5. An ISP is granted a block of addresses starting with 150.80.0.0/16.
15. The ISP wants to distribute these blocks to 2600 customers as follows: Design the subblocks and give the slash notation for each subblock. Find out how many addresses are still available after these allocations.
    1. The first group has 200 medium-size businesses; each needs approximately 128 addresses.
    2. The second group has 400 small businesses; each needs approximately16 addresses.
    3. The third group has 2000 households; each needs 4 addresses.
16. Explain the classfull IPv4 addressing scheme in detail.
17. What is the minimum size of an ICMP packet? What is the maximum size of an ICMP packet?
18. An ICMP message has arrived with the header (in hexadecimal): “ **05 00 11 12 11 0B 03 02”** What is the type of the message? What is the code? What is the purpose of the message? What is the value of the last 4 bytes? What do the last bytes signify?

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