1. A network administrator is assigned a block of addresses starting with 198.50.0.0/16. The administrator needs to distribute these addresses to two groups of departments within an organization as follows:
    a. (i) The first department has 1020 teams; each needs 14 addresses.
    b. (ii) The second department has 250 teams; each needs 60 addresses.
    c. Design the subblocks by giving the network address and address range in the form of a.b.c.d/x for each subblock. Finally, analyze how many addresses are still available after these allocations.
2. Suppose, two hosts A and B are separated by 15,750 km and are connected by a direct link of R = 1.75 Mbps and also assume that the propagation speed over the link is 2.8 × 108m/s.
    a. (i) Consider sending a file of 8,80,000 bits from A to B continuously as one big message. How long does it take?
    b. (ii) Now, suppose that the file is broken up into 11 packets each containing 80,000 bits. Assume that checking bit errors of each data packet (before transmitting it) requires 20 msec. Calculate the time it takes to send the file. Differentiate this time with the previous scenario.
3. Chandler is interested in understanding packet fragmentation. As such, he set the MTU of the network to 1020 bytes and sent data of size 6001 bytes.
    a. a. Indicate how many packets will be formed after fragmentation.
    b. b. Identify the value of the offset field of the 2nd packet. Identify the data size of the last packet.
    c. c. Identify the value of the 'More Fragment' flag on the last packet.
4. Assume for classful addresses, Calculate the i. Total subnets, ii. Block size iii. Valid subnets iv. Total hosts iv. Valid hosts per subnet of the following IP address
    a. 192.168.100.9/26
5. Determining the Network, Broadcast and usable Host range for IP address 172.16.47.36 and Subnet Mask 255.255.224.0.
6. A small organization is given a block with the beginning address and the prefix length 205.16.37.24/29 (in CIDR notation). What is the range of the block?
7. What is the network address if one of the addresses is 167.199.170.82/27?
8. A company is granted the site address 131.107.0.0. The company needs 1000 subnets. Design the subnet. Write down the range of the first 9 subnets.
9. An organization is granted the block 130.34.12.64/26. The organization needs to have four subnets. What are the subnet addresses and the range of addresses for each subnet?