1. Change the following IP addresses from dotted-decimal notation to binary notation.

    a. 114.34.2.8
    b. 129.14.6.8
    c. 208.34.54.12
    d. 238.34.2.1

2. Change the following IP addresses from binary notation to dotted-decimal notation.

    a. 01111111 11110000 01100111 01111101
    b. 10101111 11000000 11111000 00011101
    c. 11011111 10110000 00011111 01011101
    d. 11101111 11110111 11000111 00011101

3. Find the class of the following IP addresses.

    a. 208.34.54.12
    b. 238.34.2.1
    c. 114.34.2.8
    d. 129.14.6.8

4. Write the following masks in slash notation (In).

    a. 255.255.255.0
    b. 255.0.0.0
    c. 255.255.224.0
    d. 255.255.240.0

5. Find the range of addresses in the following blocks.

    a. 123.56.77.32/29
    b. 200.17.21.128/27
    c. 17.34.16.0/23
    d. 180.34.64.64/30

6. An organization is granted the block 211.17.180.0/24. The administrator wants to create 32 subnets.

    a. Find the subnet mask.
    b. Find the number of addresses in each subnet.
    c. Find the first and last addresses in subnet 1.
    d. Find the first and last addresses in subnet 32.

7. In an IPv4 datagram, the M bit is 0, the value of HLEN is 5, the value of total length is 200, and the offset value is 200. What is the number of the first byte and number of the last byte in this datagram? Is this the last fragment, the first fragment, or a middle fragment?

8. An ISP is granted a block of addresses 16.12.64.0/20. The ISP wants to distribute these blocks to 8 organizations with each organization receiving 256 addresses.

    a. Find the number and range of addresses in the ISP block.
    b. Design the subblocks and find the range of addresses for each organization.
    c. Show the outline of the address distrbition.
    d. Find the first and last address in the last subnet.

9. An ISP is granted a block of addresses 80.70.56.0/21. The ISP wants to distribute these blocks to two organizations each with 500 addresses, two organizations each with 250 addresses, and three organizations each with 50 addresses.

    a. Find the number and range of addresses in the ISP block.
    b. Design the subblocks and find the range of addresses for each organization.
    c. Find the range of unallocated addresses.
    d. Show the outline of the address distrbition.

10. An IP datagram has the following partial information in the header (in hexadecimal): 45000054 00030000 2006...

    a. What is the header size?
    b. Are there any options?
    c. What is the size of the data?
    d. Is this packet fragmented?
    e. How many more routers can the packet travel to?
    f. What is the protocol number of the payload carried by the packet?

11. Combine the following three blocks into a single block:

    a. 16.27.24.0/26
    b. 16.27.24.64/26
    c. 16.27.24.128/25

12. Consider the following routing table:

Network Destination	Next Hop
142.150.64.0/20	A
142.150.71.128/28	B
142.150.71.128/30	D
142.150.0.0/16	C

    a. Assume that a router receives an IP datagram with destination 142.150.71.132. Determine the next hop of the IP datagram.
    b. Add a routing table entry to the table to direct all IP datagrams whose destination address does not match any of the entries to next hop C.

13. Show the shortest form of the following addresses.

    a. 2340:lABC:119A:A000:0000:0000:0000:0000
    b. 0000:00AA:0000:0000:0000:0000:119A:A231
    c. 2340:0000:0000:0000:0000:119A:A001:0000
    d. 0000:0000:0000:2340:0000:0000:0000:0000