Dear Students:

These are some practice problems on subnetting and subnet masking. They are not to be handed in. No solutions will be provided, however I will be glad to check your answers during my regular office hours or via e-mail (for DEN students ONLY). In all of the questions, assume for simplicity that the all 0's and all 1's can be used for the subnet ID but they can't be used for host ID.

1. The IP address of a host on a class C network is 198.123.46.237. Four subnets are allowed on this network. What are the subnet mask and the subnet address?

2. What are the range of hosts on a subnet whose address is 150.20.193.4?

3. Find the subnet address of a host whose IP address is 120.14.22.16 if the subnet mask is 255.255.128.0? What is the host ID?

4. Find the subnet masks that create the following number of subnets (two cases each) in the defined class. Also find the maximum # of hosts on each subnet
   a) 30 and 122 (class A),
   b) 30 and 122 (class B),
   c) 30 and 122 (class C)

5. An organization is granted a Class "A" address. The organization wants to create the maximum # subnets with at least 50,000 hosts on each subnet. Find the best subnet mask in this case.

6. An organization is granted a Class "A" address. The organization wants to create at least 6,000 subnets with the maximum # of hosts on each subnet. Find the best subnet mask in this case.

7. What is the maximum # of subnets using the following masks. The class is identified in parenthesis
   a) 255.255.224.0 (A)
   b) 255.255.224.0 (B)
   c) 255.255.255.224 (C)

Dear Students:

These are some practice problems on Classless IP addressing, subnetting and subnet masking. They are not to be handed in. No solutions will be provided, however I will be glad to check your answers during my regular office hours or via e-mail (for DEN students ONLY).

1. In a block of addresses, we know that the IP address of one host is 25.34.12.56/16. What is the first IP address in this block (This address is the Network Address)? What is the last IP address in this block (This is the limited broadcast address)?

2. An organization is granted the block 16.0.0.0/8. The administrator wants to create 500 "fixed-length" subnets. Find the Subnet Mask, The number of addresses in each subnet, the first and the last addresses in subnet #1 and the first and the last addresses in subnet #500

3. An ISP is granted a block of addresses starting with 190.100.0.0/16. The ISP wants to distribute these blocks to three groups of customers as follows::

   - The first group has 64 customers, each needing 256 addresses
   - The second group has 128 customers, each needing 128 addresses
   - The third group has 128 customers, each needing 64 addresses.

   Design the sub-blocks (The network address and the broadcast address of the first and last customer in each group) and give the slash notation for each sub-block. Find how many IP addresses are still available after these allocations?

4. An ISP is granted a block of addresses starting with 150.80.0.0/16. The ISP wants to distribute these blocks to 2600 customers as follows:

   - The first group has 200 medium-size businesses, each needing 128 addresses
   - The second group has 400 small-size businesses, each needing 16 addresses

- The third group has 2000 residential customers, each needing 4 addresses (This one is a bit tricky!)

Design the sub-blocks (The network address and the broadcast address of the first and last customer in each group) and give the slash notation for each sub-block. Find how many IP addresses are still available after these allocations?

5. A University has 150 LANs with 100 hosts on each LAN. Suppose the University has one class B address. Design an appropriate subnet addressing scheme (i.e. choose an appropriate mask). Repeat using an appropriate classless addressing

6. Perform Classless IP address aggregation (aggregation means building up the block size) on the following /24 addresses: 128.56.24.0/24, 128.56.25.0/24, 128.56.26.0/24 and 128.56.27.0/24. Hint, convert into binary and inspect the bits.