**Subnetting Examples**

**Example 1: Given the following IP address 10.245.131.0 and a subnet mask of 255.255.224.0/19 determine the following:**

1. Class of the IP

**A**

1. Default subnet mask

**255.0.0.0**

1. Network Address

**10.0.0.0**

1. Broadcast address of the network

**10.255.255.255**

1. Subnet ID

**00001010.** **11110101.10000011.00000000(10.245.131.0)**

**11111111.11111111.11100000.00000000 (255.255.224.0/19) AND**

**00001010.** **11110101.10000000.00000000**

Host Bits=13

Network Bits=8

Subnetwork Bits=11

**10.245.128.0**

1. Broadcast address of the subnet.

**Broad cast address = (Convert all the host bits in subnet ID to 1s)**

**00001010.** **11110101.10011111.11111111**

Host Bits=13

Network Bits=8

Subnetwork Bits=11

**10.245.159.255**

1. First host in the subnet.

**First Host = Subnet ID +1 = 10.245.128.0+1=10.245.128.1**

1. Last host in the subnet.

**Last Host = Broadcast of subnet -1 = 10.245.159.255 -1=10.245.159.254**

**Example 2: Given the following IP address 172.16.189.5 a subnet mask of 255.255.254.0/23 determine the following:**

1. Class of the IP

**B**

1. Default subnet mask

**255.255.0.0**

1. Network Address

**172.16.0.0**

1. Broadcast address of the network

**172.16.255.255**

1. Subnet ID

**10101100.** **00010000.** **10111101.00000101(172.16.189.5)**

**11111111.11111111.11111110.00000000 (255.255.254.0/23) AND**

**10101100.** **00010000.** **10111100.00000000**

Subnetwork Bits=7

Network Bits=16

Host Bits=9

**Subnet ID=172.16.188.0**

1. Broadcast address of the subnet.

**Broad cast address = (Convert all the host bits in subnet ID to 1s)**

**Broadcast=10101100.** **00010000.** **10111101.11111111=172.16.189.255**

Subnetwork Bits=7

Network Bits=16

Host Bits=9

1. First host in the subnet.

**First Host = Subnet ID +1 = 172.16.188.0+1=172.16.188.1**

1. Last host in the subnet.

**Last Host = Broadcast of subnet -1 = 172.16.189.255-1=172.16.189.254**

**Example 3**: **Given the following IP address 192.168.121.46 a subnet mask of 255.255.255.240/28 determine the following:**

1. Class of the IP

**C**

1. Default subnet mask

**255.255.255.0**

1. Network Address

**192.168.121.0**

1. Broadcast address of the network

**192.168.121.255**

1. Subnet ID

**11000000.** **10101000.** **01111001.** **00101110 (192.168.121.46)**

**11111111.11111111.11111111.11110000 (255.255.255.240/28) AND**

**11000000.** **10101000.** **01111001.00100000**

Network Bits=24

Host Bits=4

Subnetwork Bit=4

**192.168.121.32**

1. Broadcast address of the subnet.

**Broad cast address = (Convert all the host bits in subnet ID to 1s)**

**11000000.** **10101000.** **01111001.00101111**

Network Bits=24

Host Bits=4

Subnetwork Bit=4

**192.168.121.47**

1. First host in the subnet.

**First Host = Subnet ID +1 = 192.168.121.32+1=192.168.121.33**

1. Last host in the subnet.

**Last Host = Broadcast of subnet -1 = 192.168.121.47-1=192.168.121.46**