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Computer Networks (MC-308)

Homework Assignment - I

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Q1) Identify which of the following IP addresses are network address, broadcast address / normal IP address.

i) 192.0.0.25

$$(192)_{10} = (1100\ 0000)_2$$

As, this starts with 100 this belongs to class C.

Class C has the following Host ID network ID mask.

$$\text{Mask} = 255.255.255.0$$

$$\begin{array}{r} \text{Network ID} = 255.255.255.0 \\ \text{AND } 192.0.0.25 \\ \hline 192.0.0.0 \end{array}$$

$$\text{Network ID} = 192.0.0.0$$

$$\text{Host ID} = 25$$

This is a normal IP address

ii) 139.225.0.0

$$(139)_{10} = (1000\ 1011)_2$$

This starts with 10 hence, this belongs to class-B.

The Network ID mask for Class B is: 255.255.0.0

$$\begin{array}{r} 255.255.0.0 \\ \text{AND } 139.225.0.0 \\ \hline 139.225.0.0 \end{array}$$

$$\text{Network ID} = 139.225.0.0$$

$$\text{The host ID} = 0.0$$

Hence, this is the network address.

iii) 190.0.255.255

$$(190)_{10} = (10001100)_2$$

This belongs to class B.

190.0 255.255
Network Host ID.
ID

The host is the reserved 255.255, hence this is the broadcast address.

iv) 197.10.5.0

$$(197)_{10} = (11000101)_2$$

This starts from 110, hence belongs to class C

$$\text{Mask: } 255.255.255.0$$

$$\begin{array}{r} 255.255.255.0 \\ \text{AND } 197.10.5.0 \\ \hline 197.10.5.0 \end{array}$$

$$\text{Network add ID} = 197.10.5.0$$

As the host ID is using the reserved '0' this represents network address.

Q2) Identify network address for the IP address 65.100.200.250 using default mask.

$$(65)_{10} = (01000001)_2$$

As, this starts with 01, this belongs to class A

$$\text{Default Mask for class A} = 255.0.0.0$$

$$\begin{array}{r} 255.0.0.0 \\ 1111111.0.0.0 \\ \text{AND } 0100001.01100100.11001000.111010 \\ \hline 65.0.0.0 \end{array}$$

Network Address = 65.0.0.0

Q3) Identify broadcast address for 130.75.99.101

$$(130)_{10} = (10000010)_2$$

This belongs to the class B, as it starts from 10.

The mask for class B is Mask = 255.255.0.0
= 1111111.1111111.0.0.0.0

$$1111111.1111111.00000000.00000000$$

$$\text{AND } \begin{array}{r} 10000010.01001011.01100011.01100101 \\ \hline \end{array}$$

$$10000010.01001011.00000000.00000000$$

$$130.75.0.0$$

$$\text{Network ID} = 130.75.0.0$$

The broadcast address uses reserved '1' in all host IP positions.

$$\text{Broadcast address} = 130.75.255.255$$

Q4) If 1 of the address of the block is 46.59.159.179/20.
Calculate its range.

$$(46.59.159.179)_{10} = (00101110.00111011.10011111.10110011)$$

20 bits network
bits

$$\text{Starting IP address} = 00101110.00111011.10010000.00000000$$

$$130.75.72.0$$

Ending IP

$(46.59.159.179/20)_{70} = \underbrace{(0010110.00111011.10011111.10110011)_2}_{\text{20 bit network address bits}}$

Starting (First) IP address: 0010110.00111011.10010000.00000000
46.59.144.0

Last IP address = 0010110.00111011.10011111.11111111
46.59.159.255

So, the range of the IP addresses are:-

(46.59.144.0, 46.59.159.255)