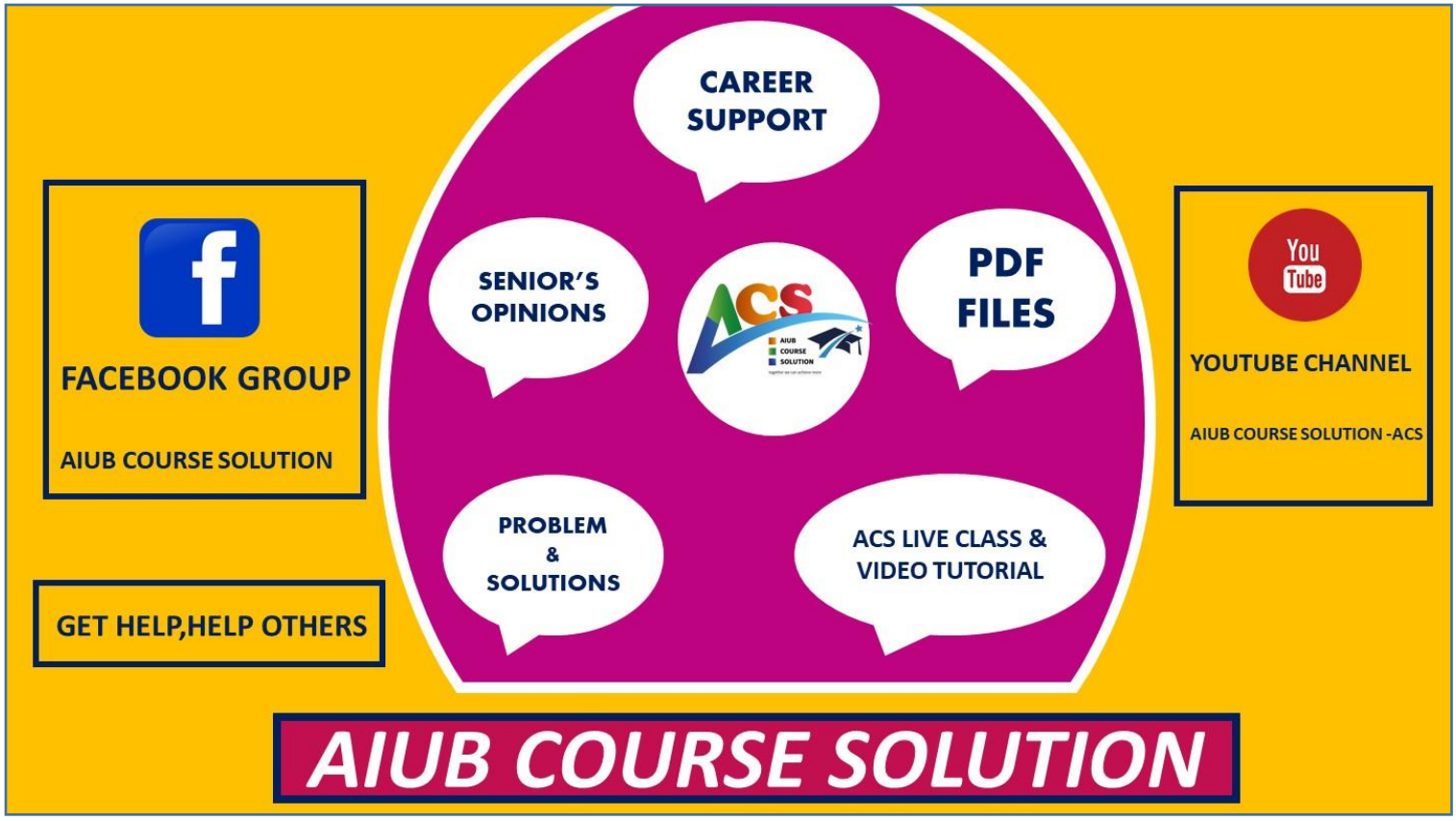

TOGETHER WE CAN ACHIEVE MORE

COURSE NAME: Computer Networks

CHAPTER: Lab Lecture-2

SOLVED BY

NAME: *Ruksat Khan Shayoni*

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LINK = https://www.youtube.com/channel/UCC3KjA8kstFtM-2CxVr-jcg

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Lab Lecture-2 : IP Addressing II

Classful Addressing :

IP Address have 5 classes –

	Class	Binary Notation : 1st Octate	
Configuring Devices	A	0	[1st bit]
	B	10	[1st 2-bit]
	C	110	[1st 3-bit]
Multicast Purpose	D	1110	[1st 4-bit]
Reserved for Research Purpose	E	1111	[1st 4-bit]

Recognizing Class :

Class	Decimal Notation : 1st Byte
A	0-127
B	128 - 191
C	192 - 223
D	224 - 239
E	240 - ...

Address Space :

Class A → 2^{31} → 50%

Class B → 2^{30} → 25%

Class C → 2^{29} → 12.5%

Class D → 2^{28} → 6.25%

Class E → 2^{28} → 6.25%

Special Purpose IP Address :

0.0.0.0 → DHCP discovery message (Dynamic Host Configuration Protocal)

255.255.255.255 → Limited Broadcast

Relationship :

Unicast : One to One

Example - Class A → D or, class C → E

Multicast : One to Many

Example - Class A → D, C

Broadcast : One to All

Example - Class: A → B, C, D, E

Network Address and Host Address :

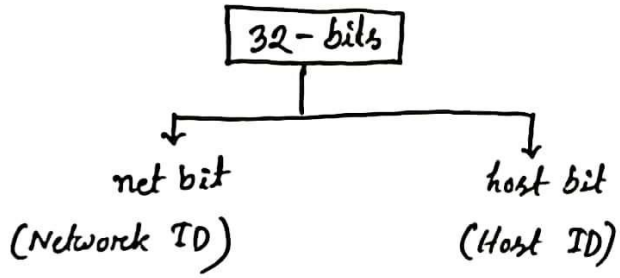
Network ID: Identifies the network on which a host computer can be found.

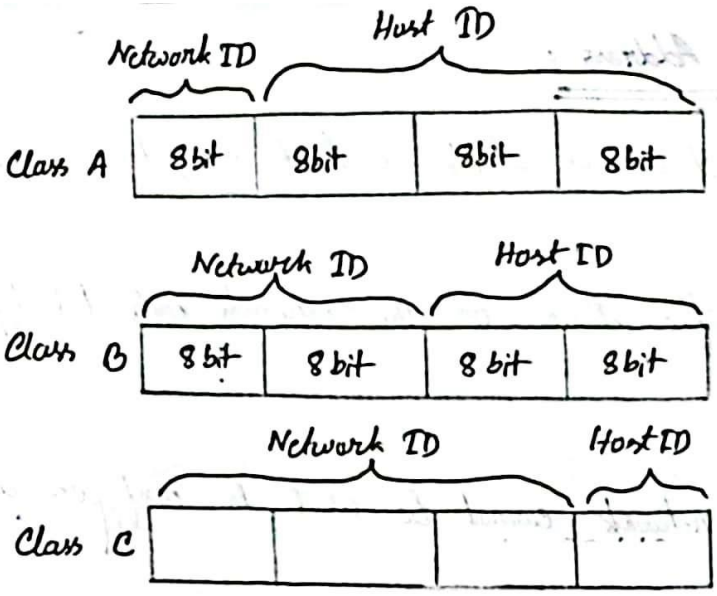
Host ID: Identifies a specific device on the network indicated by the network ID.

* First and Last IP of a network cannot be used to configure a device.

i) Network IP → First IP of a network
ii) Host IP → Middle IP of a network
iii) Broadcast IP → Last IP of a network

32-bits are divided into two groups.





Network ID : 8 bits
Host ID : 24 bits

Network ID : 16 bits
Host ID : 16 bits

Network ID : 24 bits
Host ID : 8 bits

Lab Lecture - 2 : IP Addressing II (contd.)

Lab - 2

30 May, 2022

⇒ First 2-bit 10 হলে, তবে Private IP address

⇒ First octate 172 এবং Second octate 16-31 হলে, তবে Private IP address.

Network Address and Host Address :

* Number of Networks = $2^{\text{number of network bits}}$
* Number of Valid Hosts = $2^{\text{number of host bits}} - 2$
* Number of IP Addresses in the Network = $2^{\text{number of host bits}}$

⇒ More net bits → More devices in network

⇒ More host bits → More IP addresses.

1. Find the number of networks, valid hosts and IP addresses for 192.6.2.0

Ans: Given that, 192.6.2.0

Here, first octate is 192. So, it belongs to class C. So, the number of net bits are 24 and host bits are 8.

∴ Number of Networks = $2^{\text{number of network bits}} = 2^{24} = 16777216$

∴ Number of Valid Hosts = $2^{\text{number of host bits}} - 2 = 2^8 - 2 = 254$

∴ Number of IP addresses = $2^{\text{number of host bits}} = 256$

IP Addresses are 2 types — i) Classful
ii) Classless

i) **Classful:** net bit and host bits আলাদা করা যায়। Example -

130.6.140.35

ii) **Classless:** slash (/) দিয়ে prefix length বোঝানো থাকে, যেটা হচ্ছে number of net bits. Example -

130.6.140.35/18

এখানে, Number of net bits = 18

∴ Number of host bits = 32 - 18 = 14

∴ Number of IP addresses = 2^{14} = 16384

Extracting Information in a Block:

To find Network IP Address:

Step-1: Convert IP into binary.

Step-2: Make all host bits 0.

Step-3: Convert the binary to decimal again

To find Broadcast IP Address:

Step-1: Convert IP address into binary

Step-2: Make all host bits 1.

Step-3: Convert the binary to decimal number again.

* Example: Find Network IP address and ~~Broadc~~ Broadcast IP address for 130.6.190.35/14.

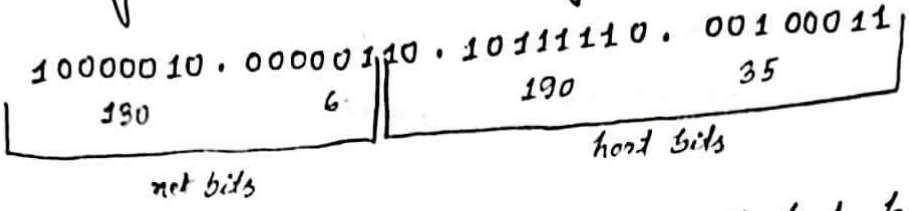
Ans: Given that,

130.6.190.35/14

Here, net bits = 14

∴ host bits = 32 - 14 = 18

⇒ Converting IP address into binary,



⇒ For ~~making~~ finding Network IP, making all host bits 0.

∴ 10000010 . 00000100 . 00000000 . 00000000

⇒ 130.4.0.0

So, the network IP is 130.4.0.0

⇒ For finding Broadcast IP, making all host bits 1.

∴ 10000010 . 00000111 . 11111111 . 11111111

⇒ 130.7.255.255

So, the broadcast IP is 130.7.255.255

(Ans)

Broadcast:

Broadcast: Sending packets to all hosts of a network. Broadcast is

2 types: —

i) Limited Broadcast
ii) Direct Broadcast

i) **Limited Broadcast:** When a host of a network sends packet to all hosts of the same network.

Source IP	Destination IP	Data
5.6.1.2	255.255.255.255	packet

ii) **Direct Broadcast:** When a host of ~~all host~~ a network sends packet to all hosts of another network.

Source IP	Destination IP	Data
192.3.0.1/24	192.3.0.255/24	packet
192.3.0.1 /16	192.3.255.255 /16	

[Last -এর তিনের octate-গুলো 255 -হবে]

Network Mask / Subnet Mask:

Step-1: Make all net bits 1

Step-2: Make all host bit 0.

Network Mask: It's applied on classful addressing.

Example –

Class A → 11111111.00000000.00000000.00000000 or

255.0.0.0

Class B → 11111111.11111111.00000000.00000000 or

255.255.0.0

Class C → 11111111.11111111.11111111.00000000 or

255.255.255.0

Subnet Masking: It's applied on classless addressing.

Example –

Given that,

192.100.12.110/22

Here, net bits = 22

∴ host bits = 32 - 22 = 10

Converting IP address into binary,

11000000.011100100.000011 | 00.01101101

net bit | host bit

Making all net bits 1 and host bits 0.

11111111.11111111.11111100.00000000

⇒ 255.255.252.0

So, after subnet marking the IP address is 255.255.252.0

(Ans)