CS & IT ENGINEERING

COMPUTER NETWORKS

IPv4 Addressing

Lecture No-08

By- Ankit Doyla Sir

Introduction to Subnetting

Q. 100.86.95.75, 157.192.190.253 ,200.1.56.97, 10.34.87.95. Which of the following is common for all these IP Addresses.

A. Class of IP address

B. Limited broadcast address

C. Network address

D. Direct broadcast address

Q. For the IP Addresses 132.54.78.98 identify the Class ,and Limited broadcast Address

class-B (128-191)

A. IP address belong to class A, Limited broadcast address = 255.255.255.255

B. IP address belong to class B, Limited broadcast address = 130.255.255.255

C. IP address belong to class B, Limited broadcast address = 255.255.255.255

D. IP address belong to class A, Limited broadcast address = 130.54.255.255

Q. One host having IP address 200.187.96.0, sends a message to a host with IP address 205.54.83.97, what will be the destination address attached to message by source?

NID HID

200.187.96.0

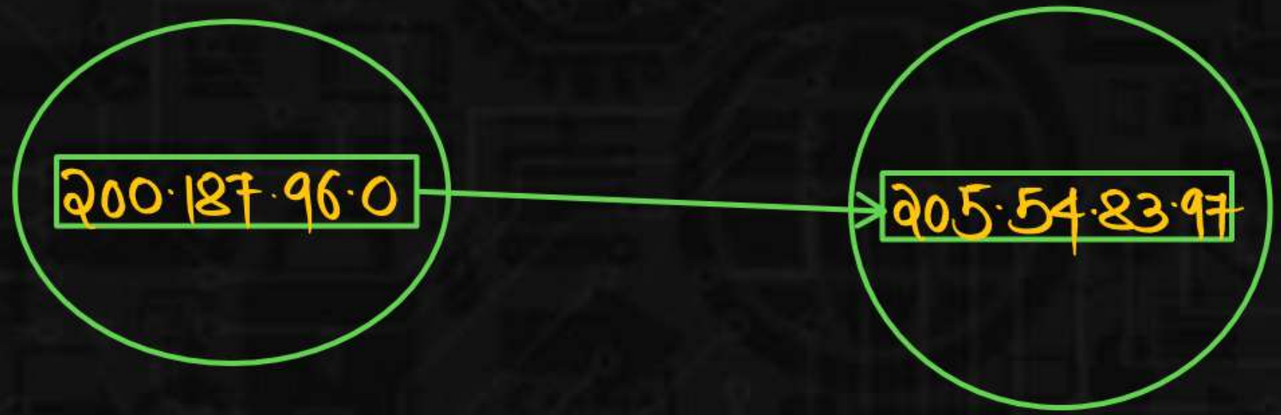
Class-C

A. 205.54.83.97

B. 205.54.83.255

C. 205.54.83.0

D. Not possible ✓



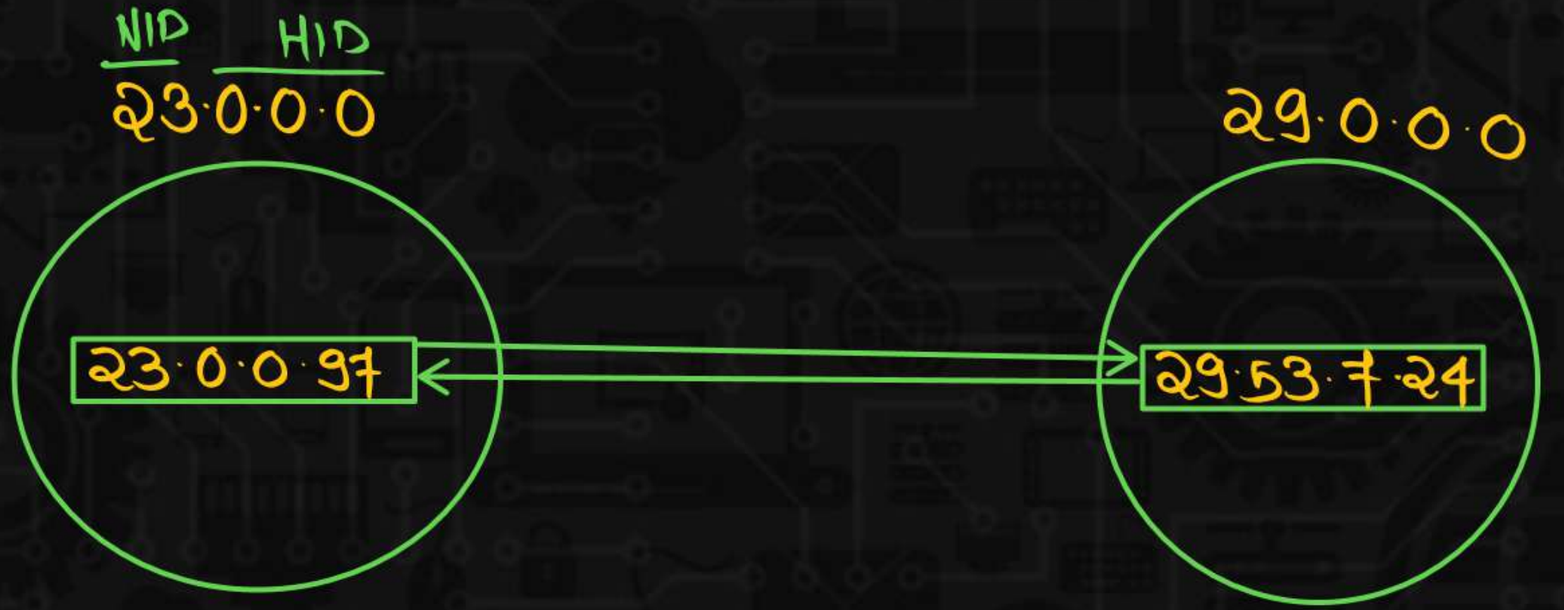
Q. Which of the following can be used as a source IP as well as destination IP ?

A. 23.0.0.97

B. 255.255.255.255 → LBA will always be used as a Destination IP

C. 157.54.255.255 → DBA will always be used as a D.I.P
(157.54 = NID, 255.255 = HID)

D. 15.255.255.255 → DBA " " " " " " "
(15 = NID, 255.255.255 = HID)



S.I.P	D.I.P
23.0.0.97	29.53.7.24

S.I.P	D.I.P
29.53.7.24	23.0.0.97

Q. Which of the following IP address can be given to a computer as a host?

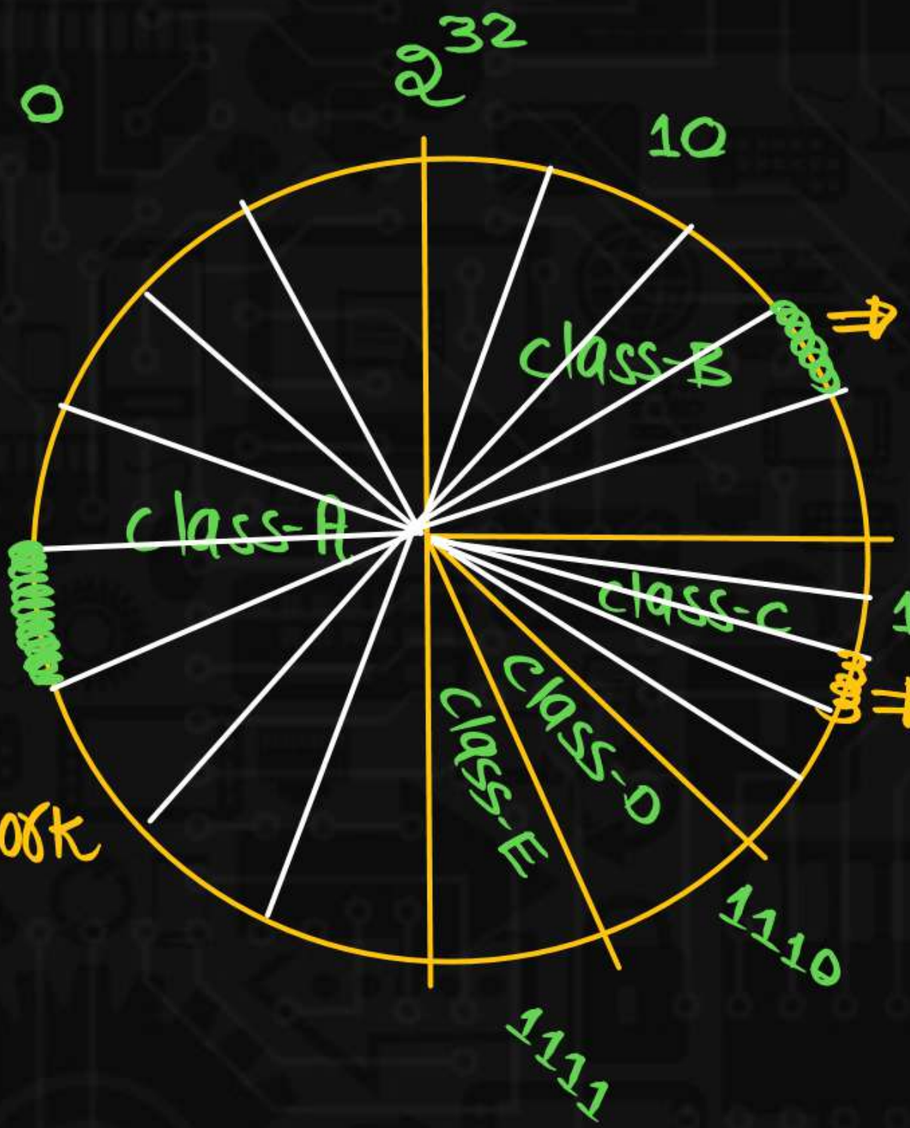
A. 32.0.0.0 (NID HID) → NID of entire Network

B. 255.255.255.255 → Limited Broadcast Address

C. 157.54.255.254 (NID HID)

D. 172.15.0.0 (NID HID) → NID of entire Network

Classful Addressing



2^{16} IP Add | Network
or
$2^{16} - 2$ Host | Network

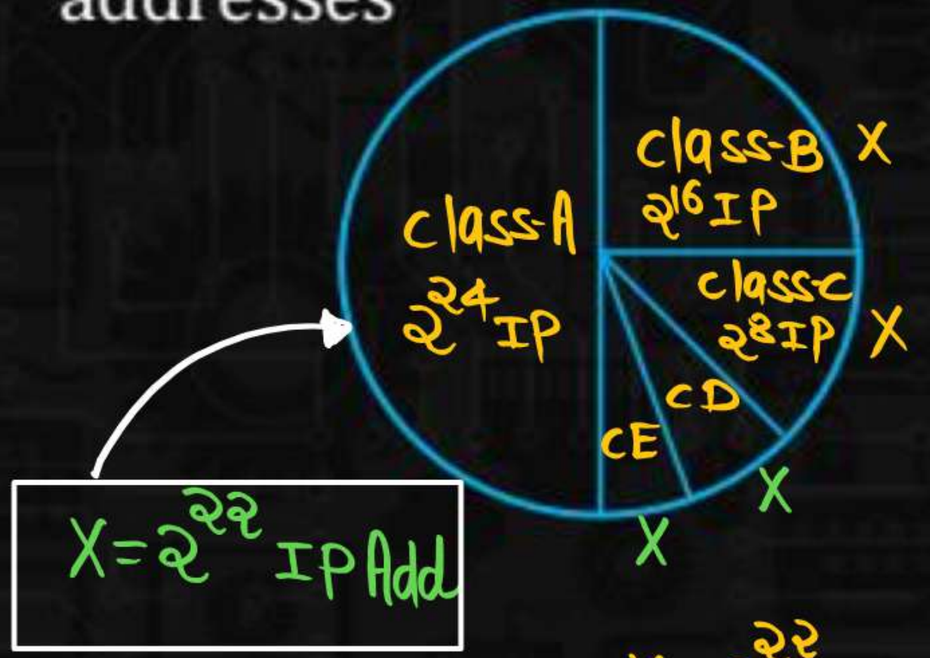
2^{24} IP Add | N|w's
or
$2^{24} - 2$ Host | Network

2^{8} IP Add | Network
or
$2^{8} - 2$ Host | Network

Classful Addressing

Class A → 2^{24} IP Addresses in one network
Class B → 2^{16} IP Addresses in one network
Class C → 2^{8} IP Addresses in one network

I: Organization X need = 2^{22} IP addresses



$X = 2^{22}$ IP

$A \rightarrow 2^{22}$ IP

$B \rightarrow 2^{22}$ IP

$C \rightarrow 2^{22}$ IP

$4 * 2^{22} = 2^2 * 2^{22} = 2^{24}$

IP addresses wasted = $2^{24} - 2^{22}$

$= 2^2 * 2^{22} - 2^{22}$

$= 4 * 2^{22} - 2^{22}$

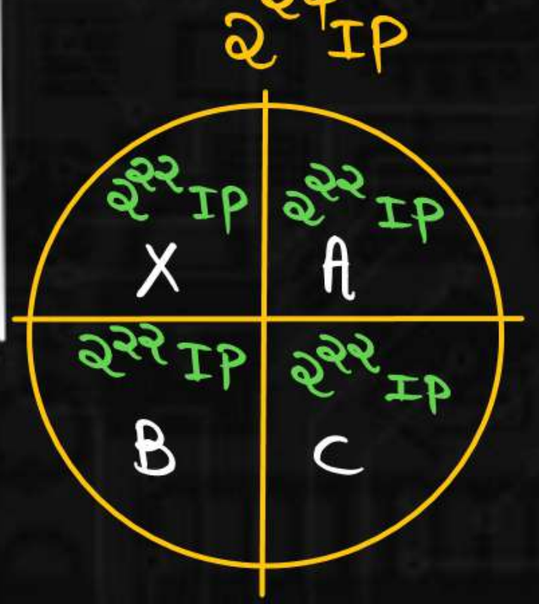
$= 3 * 2^{22}$

$= 3 * 2^2 * 2^{20}$

$= 12 * 2^{20}$

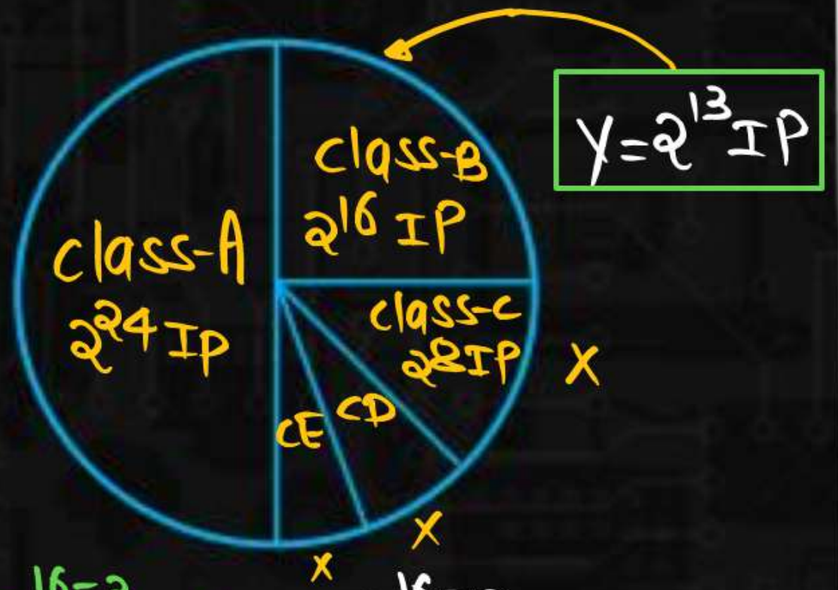
$= 12M$

$= 12,582,912$



$\frac{2^{24}}{4} = \frac{2^{24}}{2^2} = 2^{24-2} = 2^{22}$

II: Organization Y need = 2^{13} IP addresses



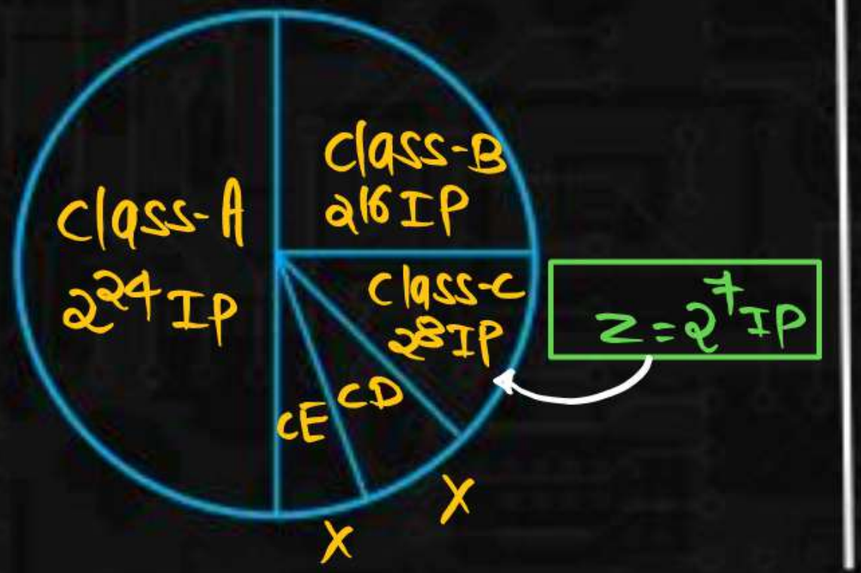
$\frac{2^{16}}{8} = \frac{2^{16}}{2^3} = 2^{16-3} = 2^{13}$

Y = 2^{13} IP
A = 2^{13} IP
B = 2^{13} IP
C = 2^{13} IP
D = 2^{13} IP
E = 2^{13} IP
F = 2^{13} IP
G = 2^{13} IP

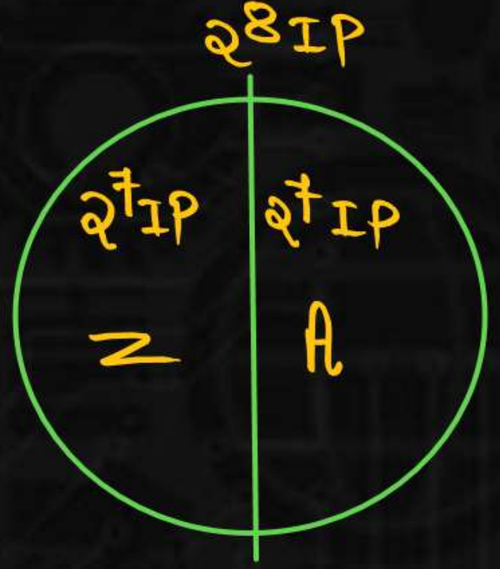
= $8 * 2^{13}$
= $2^3 * 2^{13}$
= 2^{16}

IP addresses wasted = $2^{16} - 2^{13}$
= $2^3 * 2^{13} - 2^{13}$
= $8 * 2^{13} - 2^{13}$
= $7 * 2^{13}$
= $7 * 2^3 * 2^{10}$
= $56 * 2^{10}$
= 56K
= 57,344

III: Organization Z need = 2^7 IP addresses



IP addresses wasted = $2^8 - 2^7$
= 128



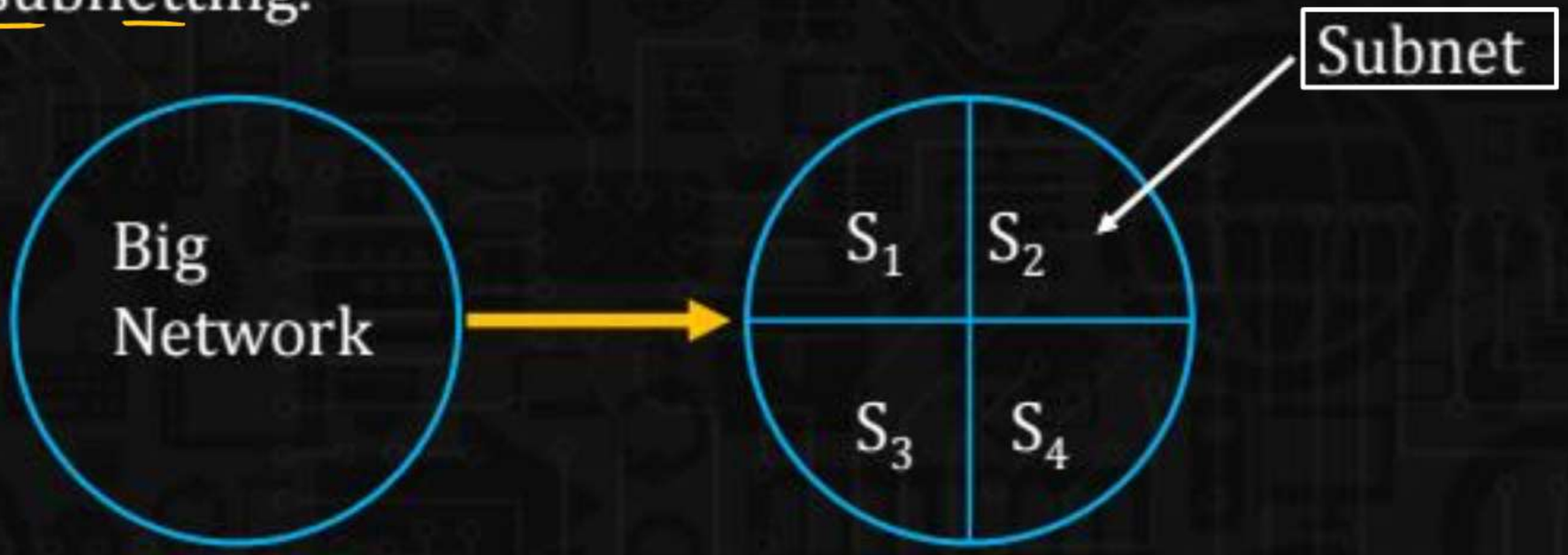
$Z = 2^7$ IP

$A = 2^7$ IP

$2 * 2^7 = 2^8$ IP

Subnetting

The process of dividing a big network into many smaller subnet is called as subnetting.




THANK YOU
GW
SOLDIERS !