Class D → 2^{28}

Class E → 2^{28}

Multicasting → IP addresses possible

reserved

Class A, B, C → applicable for unicasting

2^{28} IP adresses wasted (used by military) Class E

Class A → 2^{24} hosts can be configured.

$2^{24} - 2$ can be used.

Class B → $2^{16} - 2$ can be used

Class C → $2^{8} - 2$ " " "

Casting → Unicasting

→ Broadcasting

Not in syllabus → limited Broadcasting, Directed Bs

Uni Casting

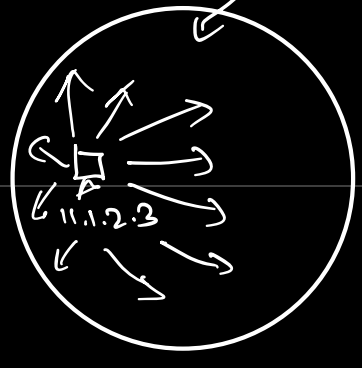
11.0.0.0 (NID) (NID) 22.0.0.0

When all zeros in host ID, then it is Network ID (NID)

↳ starts why -1 (out of -2).

Broad casting

16M Host, (2^{24})



11.0.0.0

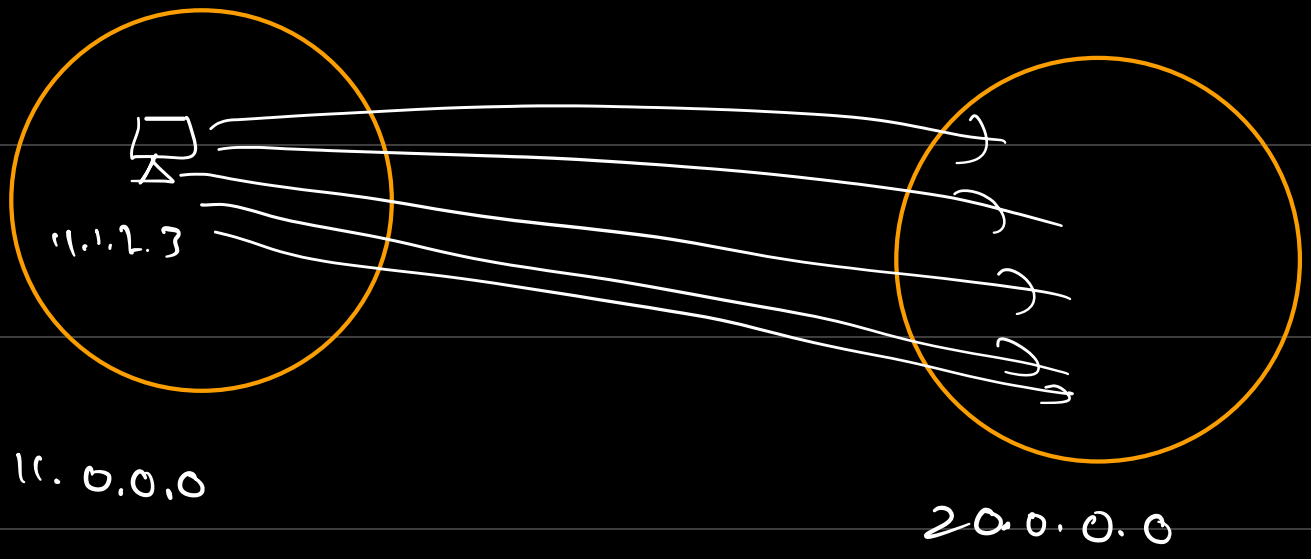
- Uni Casting is wasting resources
- Create a single packet and broadcast to all.

→ to broadcast to in same n/w is limited Bc.

SIP	DIP
11.1.2.3	1111 1111.1111 1111.1111 1111.1111 1111

↑ limited broadcast adress

why -1 (of the -2) in the no. of hosts.



SIP	DIP
11.1.2.3	20.255.255.255

for 198.1.10.0 N/w ID belongs to Class C

directed broadcast address

↳ 198.1.10.255

& for limited br

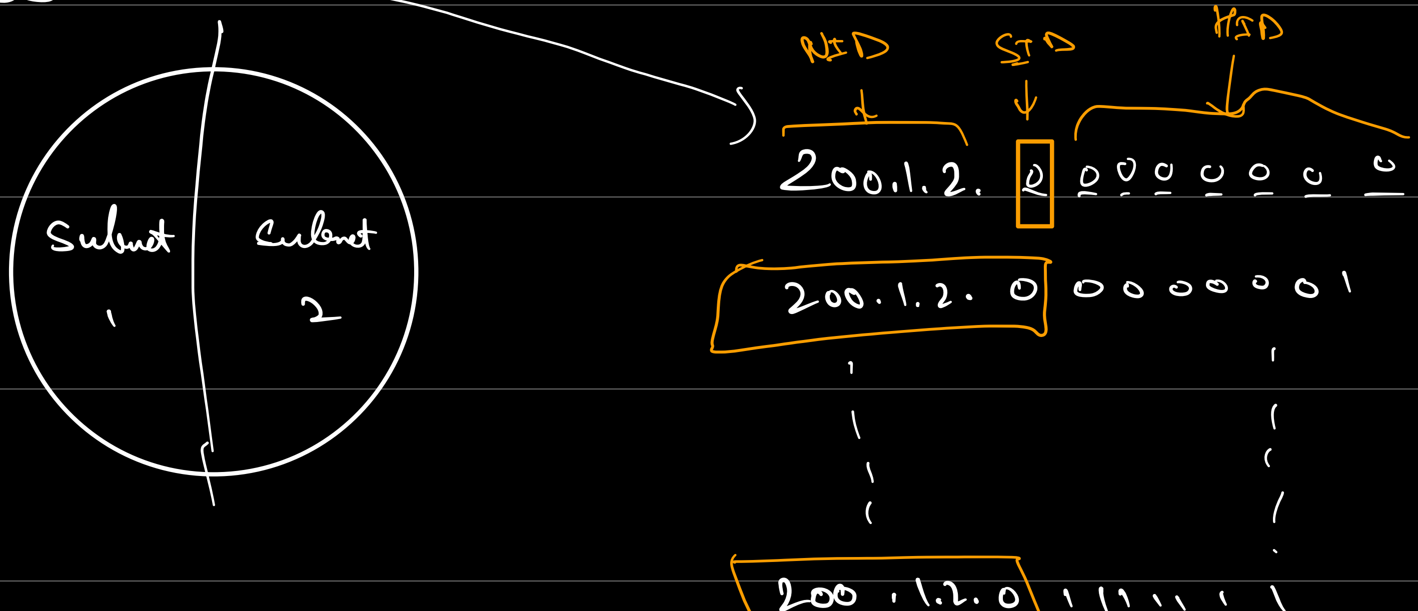
11111111.11111111.........11111111.........11111111...

Note

↳ In case of limited broadcasting, all are 1's.

Subnet / Subnetting

200.1.2.0



→ 200.1.2.0 ← for NIP

200.1.2.1

⋮

200.1.2.127 ← for Broadcast

Subnet 2

200.1.2.1 0000 0000

NID SID HID

200.1.2.1 0000 0001

200.1.2.1 1111 1111

→ 200.1.2.128 ← NID

200.1.2.255 ← Broadcast

Case 1 Single N/w

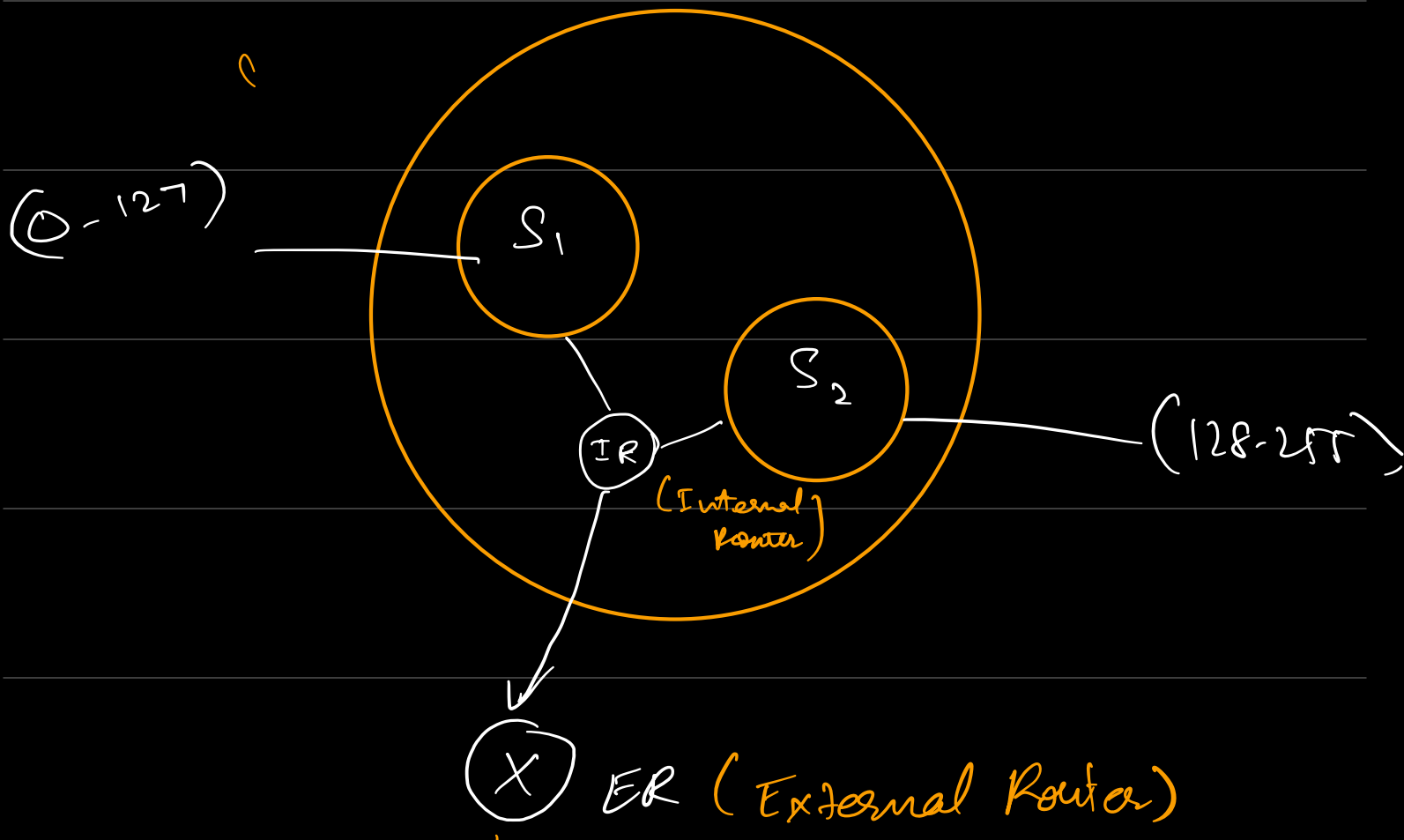
200.1.2.0 ← NID

200.1.2.255 ← Directed Broadcast Address

Case 2 Subnets

200.1.2.0 ← (Subnet ID-1)

200.1.2.255 ← (DBA subnet-2)



SIP	200.1.2.255

← this packet will be sent to both subnets.

Division in 4 parts

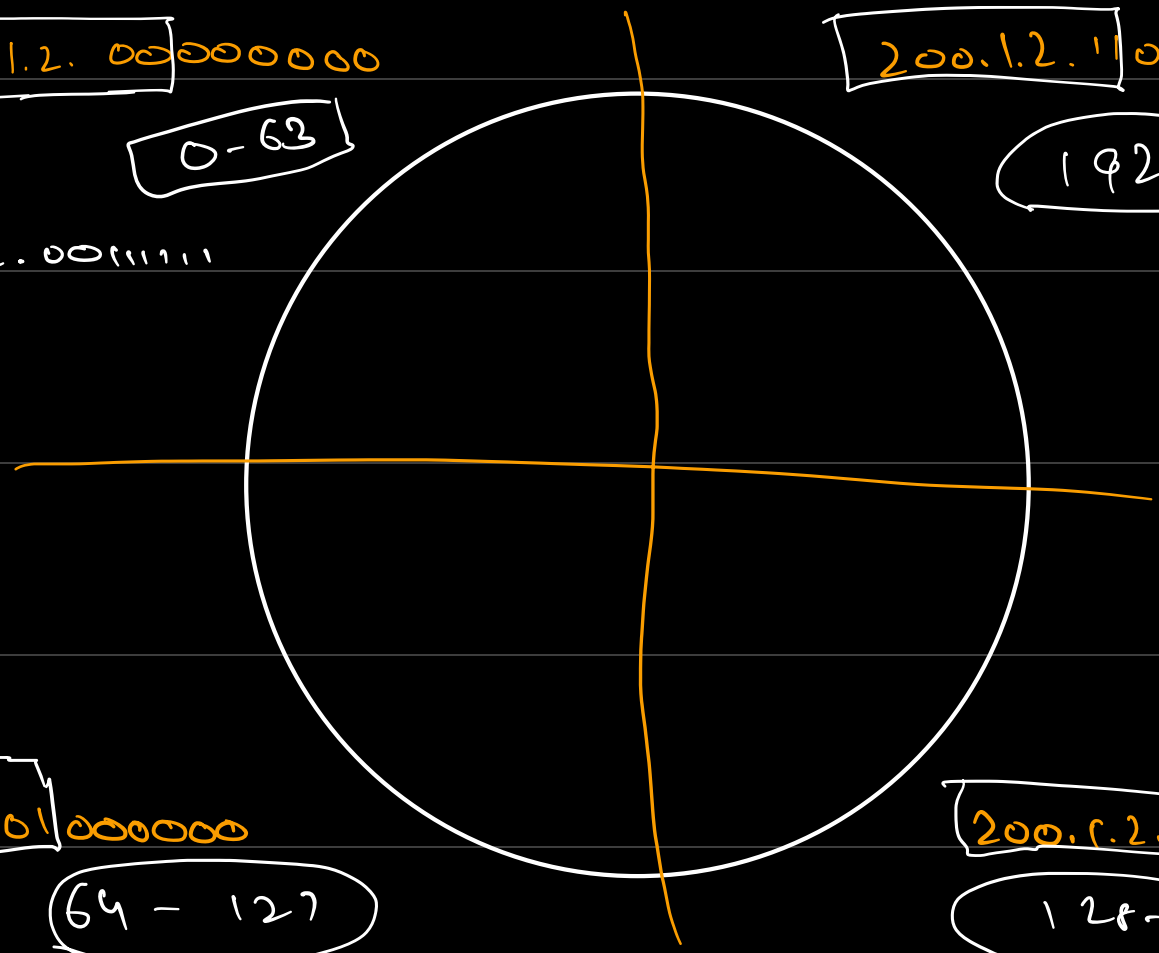
200.1.2.00000000

0-63

200.1.2.11000000

192-255

200.1.2.00111111



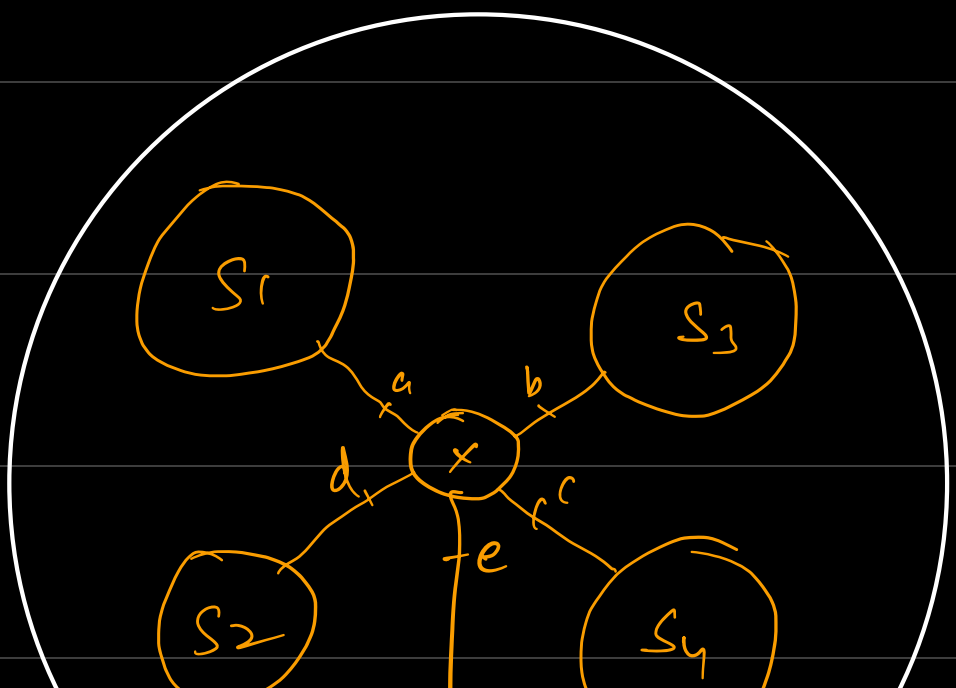
200.1.2.01000000

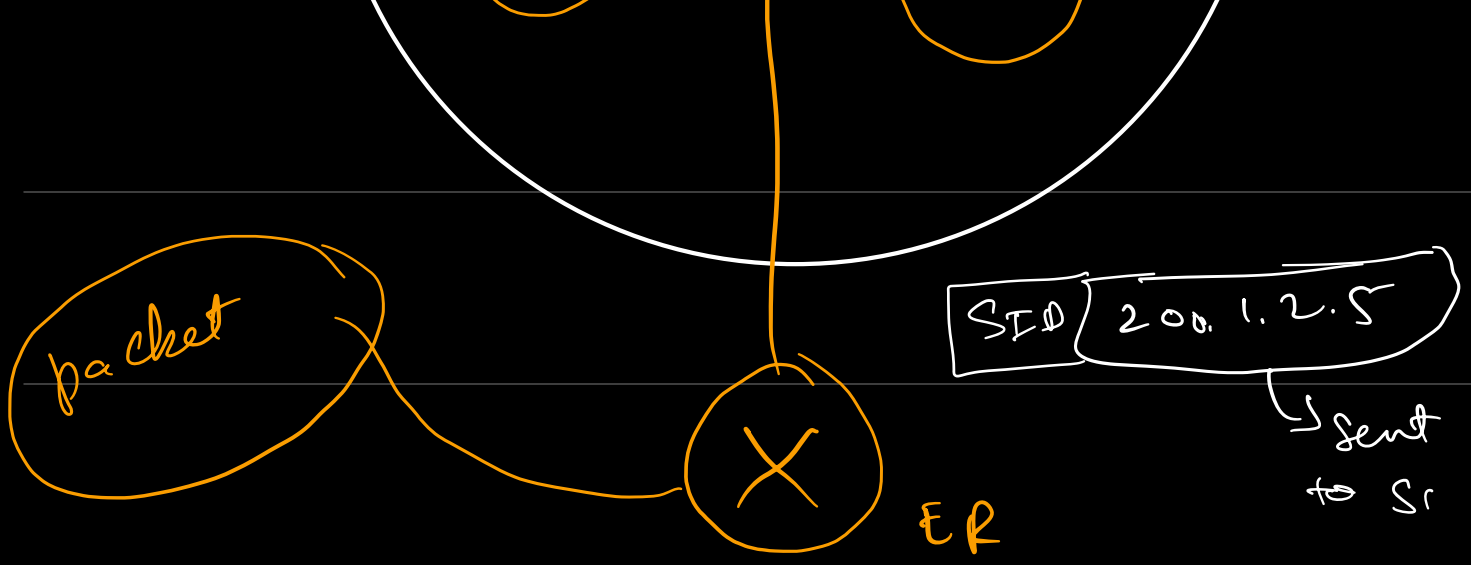
64-127

200.1.2.10000000

128-191

200.1.2.01111111





Subnet Mask

Class A - 255.0.0.0

Class B - 255.255.0.0

Class C → 255.255.255.0

→ In the above exp

255.255.255.11000000

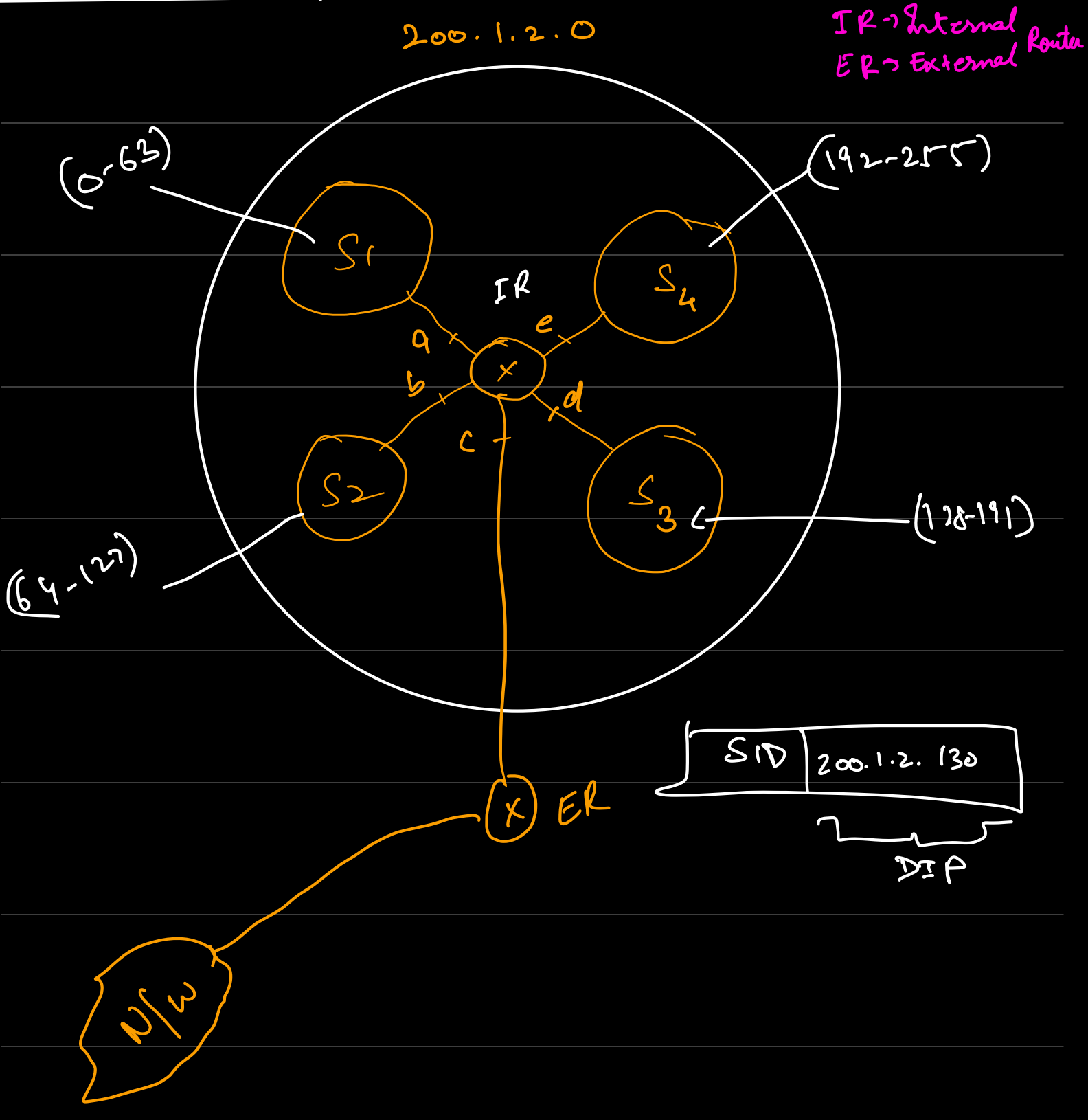
↓

NID & SID

↓

1 Upgrade

255. 255. 255. 192



Subnet Mask Class C → 255. 255. 255. 0

↳ for above diagram

255. 255. 255. 11000000

↓

SID

(subnet ID)

SM = No. of 1's in NID + No. of 1's in SID

24 + 2 = 26

⇒ 11111111. 11111111. 11111111. 11000000

255. 255. 255. 192	SM

NID	SM	Interface
200.1.2.0	255.255.255.192	a
200.1.2.64	"	b
200.1.2.128	"	d
200.1.2.192	"	e
0.0.0.0	0.0.0.0	c

default entry

200 . 1 . 2 . 130 → 10000010
255.255.255.192 → 11000000
200.1.2.128 → 10000000 → 128

↓

check with all

matches with 200.1.2.128

⇒ If not matched with any entry, default entry will always match.

Note → If multiple entries match, give priority to the longest Subnet Mask (No. of 1's sabose zyaada) by IR.

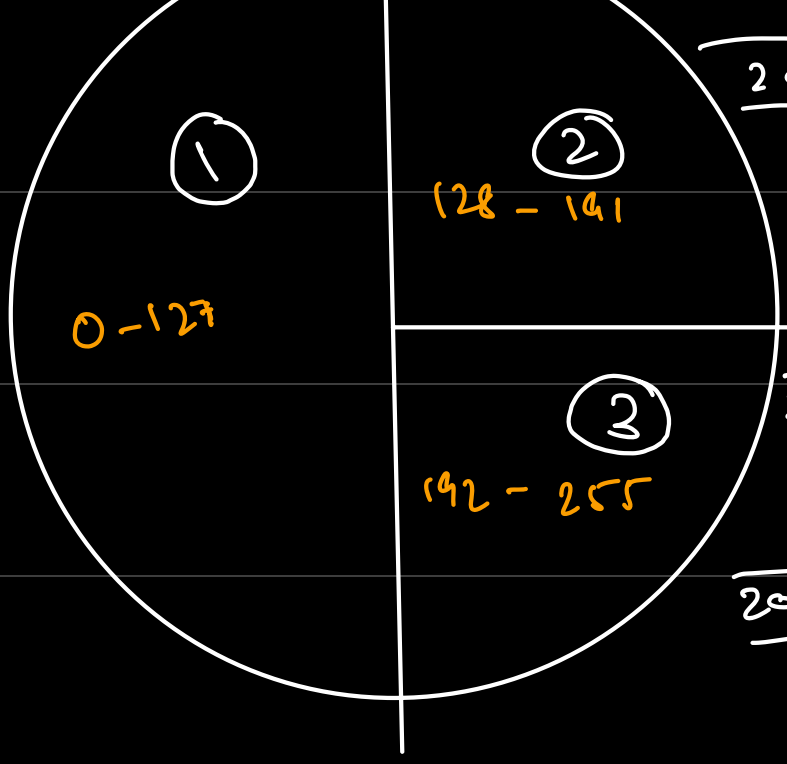
Variable Length Subnet Mask :

200.1.2.0

200.1.2.0 00000000

200.1.2.10 000000

N I D



200.1.2.10 11111

DBA

NID

200.1.2.11 000000

200.1.2.11 111111

DBA

NID

200.1.2.0 0000000

200.1.2.0 1111111

DBA

255.255.255.128 SM ①

255.255.255.142 SM ②

255.255.255.192 SM ③

{2 bits used for subnetting}

Q If Class A n/w is divided and resulting Subnet mask is 255.255.255.192, then

Calculate how many bits should be there for Subnet ID & what should be size of each subnet!

Ans

$$N/W\ ID + SID = 26.$$

$$8 + SID = 26$$

$$SID = 18$$

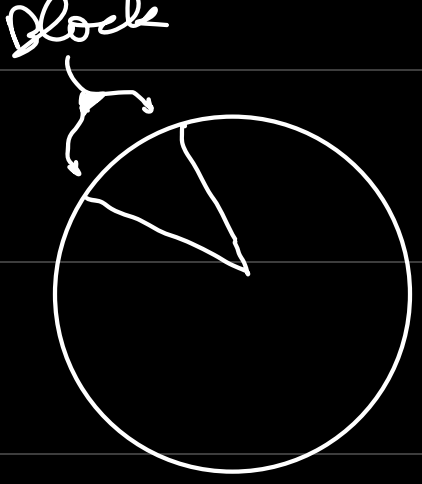
Total No. of subnets $= 2^{18}$

Size of subnet $= 2^{32-26} = 2^6$

Classless addressing

Classless representation ⇒ a.b.c.d/n

n ↑ Block ID / NID



For exp 20.30.50.10 | 20

↑

20 bits for NID

No. of IP adresses = $2^{32-N} = 2^{32-20} = 2^{12}$

How to form CIDR Block?

→ (i) all IP adresses should be Contiguous
(there should be no interleaving)
(0.11, 0.12 --- 0.20) not (0.11, 0.15)

(ii) Size of each blocks which you ask for should be in power of 2. (2^n)

⇒ for 200, 512 will be given.

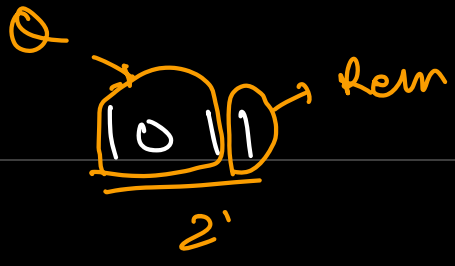
(iii) First IP adress should be evenly divisible by block size.

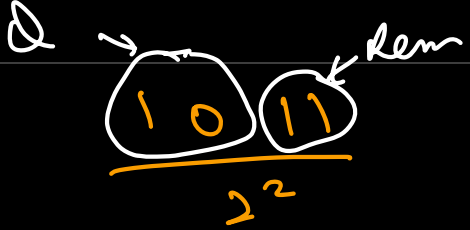
Let say

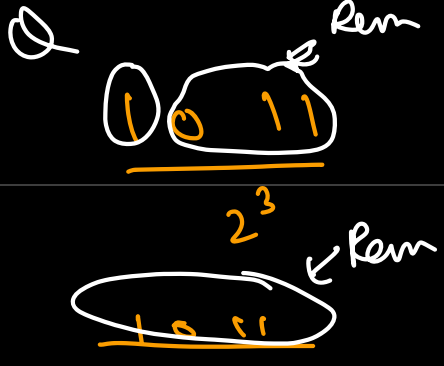
1011 → 11

2^1

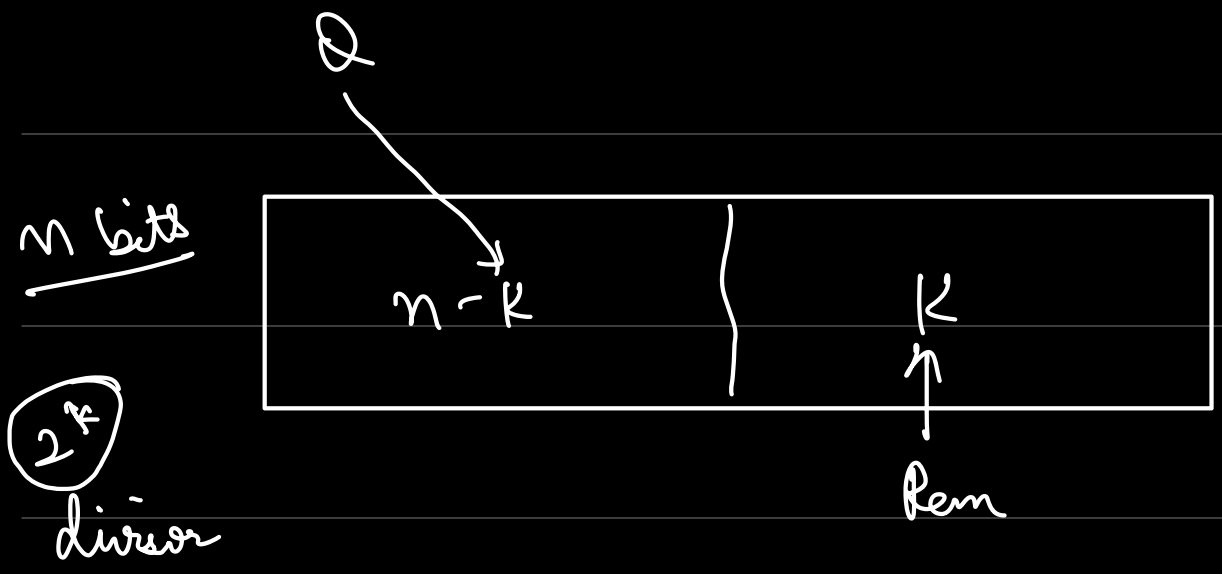
	Q	R
2^1	5	1
2^2	2	3
2^3	1	3
2^4	0	11







n least significant bits are Remainder, rest are 0.


Q
n bits
n - k
k
Rem
2^k
divisor