Computer Science & IT

COMPUTER NETWORKS (CN)

IP address Subnetting Supernetting

Lecture No. 6

By- Ravindra Sir

Recap of Previous Lecture

- Topic
- Topic
- Topic

IP

Topics to be Covered

- Topic
- Topic
- Topic

IP

Unstoppable Indians: Stories to Ignite Student Motivation

R. K. Narayan – Storyteller of Everyday India

R. K. Narayan (1906–2001) created the fictional town of Malgudi, weaving simple yet profound tales of ordinary lives. His debut novel, Swami and Friends (1935), introduced global readers to India's rural rhythms and universal human emotions. Despite limited formal schooling, Narayan's dedication to his craft and keen observation made him a literary icon.

Lesson: Authentic storytelling rooted in local experiences can resonate universally and build cultural bridges.

Unstoppable Indians: Stories to Ignite Student Motivation

Ruskin Bond – Chronicler of the Himalayas

Ruskin Bond (b. 1934) is a celebrated author of stories and novels set in the Himalayan foothills. Born in Kashmir and raised in Dehradun, Bond drew on nature and childhood memories to craft award-winning books like The Room on the Roof. He mentors young writers and champions reading culture through workshops and literary festivals.

Lesson: Observe the world with curiosity—small moments in nature can inspire timeless stories that unite hearts.

Unstoppable Indians: Stories to Ignite Student Motivation

Khushwant Singh – Wit, Wisdom, and Secularism

Khushwant Singh (1915–2014) was a journalist, novelist, and lawyer who critiqued society with incisive wit. His novel Train to Pakistan (1956) portrayed Partition's human toll with empathy and irony. As editor of The Illustrated Weekly of India, he challenged orthodoxy and championed secular humanism through essays, making him a household name. Lesson: Combine intellectual rigor with empathy to challenge injustice and foster open public discourse.

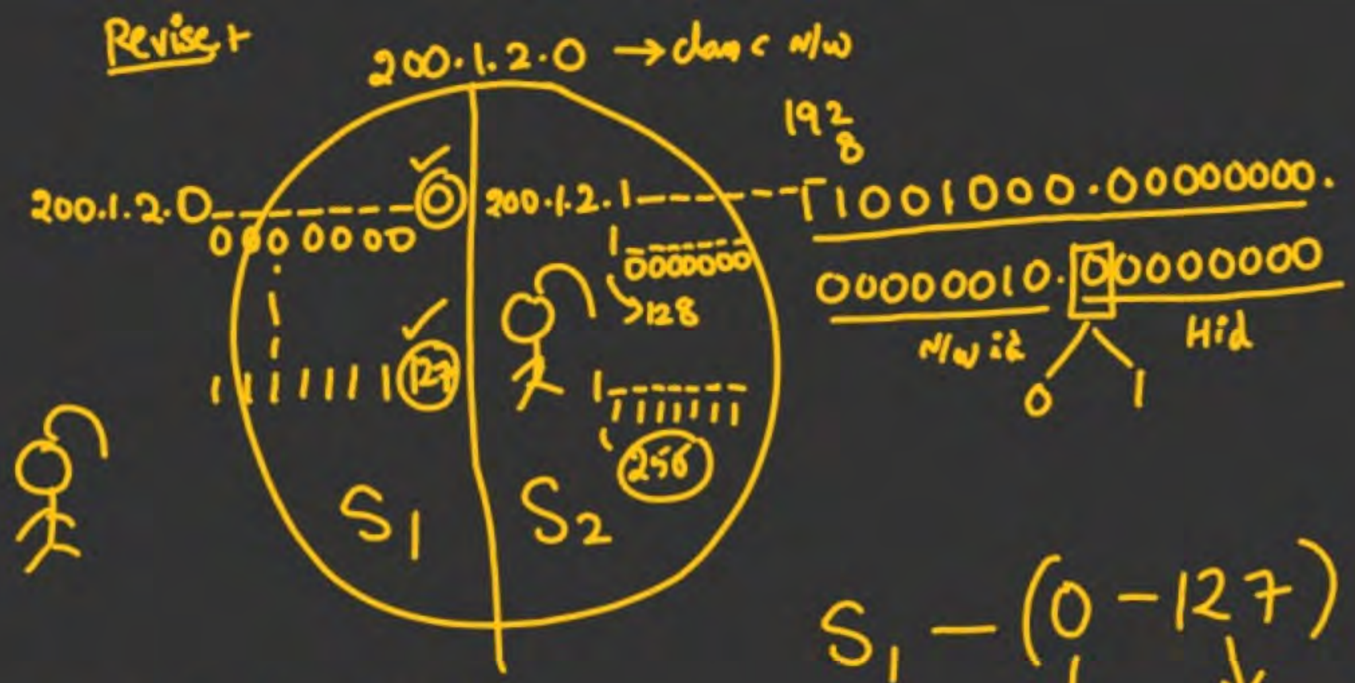
Unstoppable Indians: Stories to Ignite Student Motivation

Arundhati Roy – Writer and Activist

Arundhati Roy (b. 1961) won the Booker Prize in 1997 for The God of Small Things, exploring complex social realities in Kerala. A fierce critic of globalization and environmental degradation, she uses essays and speeches to advocate for Indigenous rights and social justice. Roy's fearless voice bridges literature and activism.

Lesson: **Leverage creative expression to shine light on injustice—words can be powerful tools for social change.**

Revise



192_{8}

10010000.00000000.

00000010.00000000

N/W id | Hid

0 1

200.1.2.0 → NID

200.1.2.255 → DBA

S_1 — (0 - 127)

↓ SID S_1 ↓ DBA of SN S_1

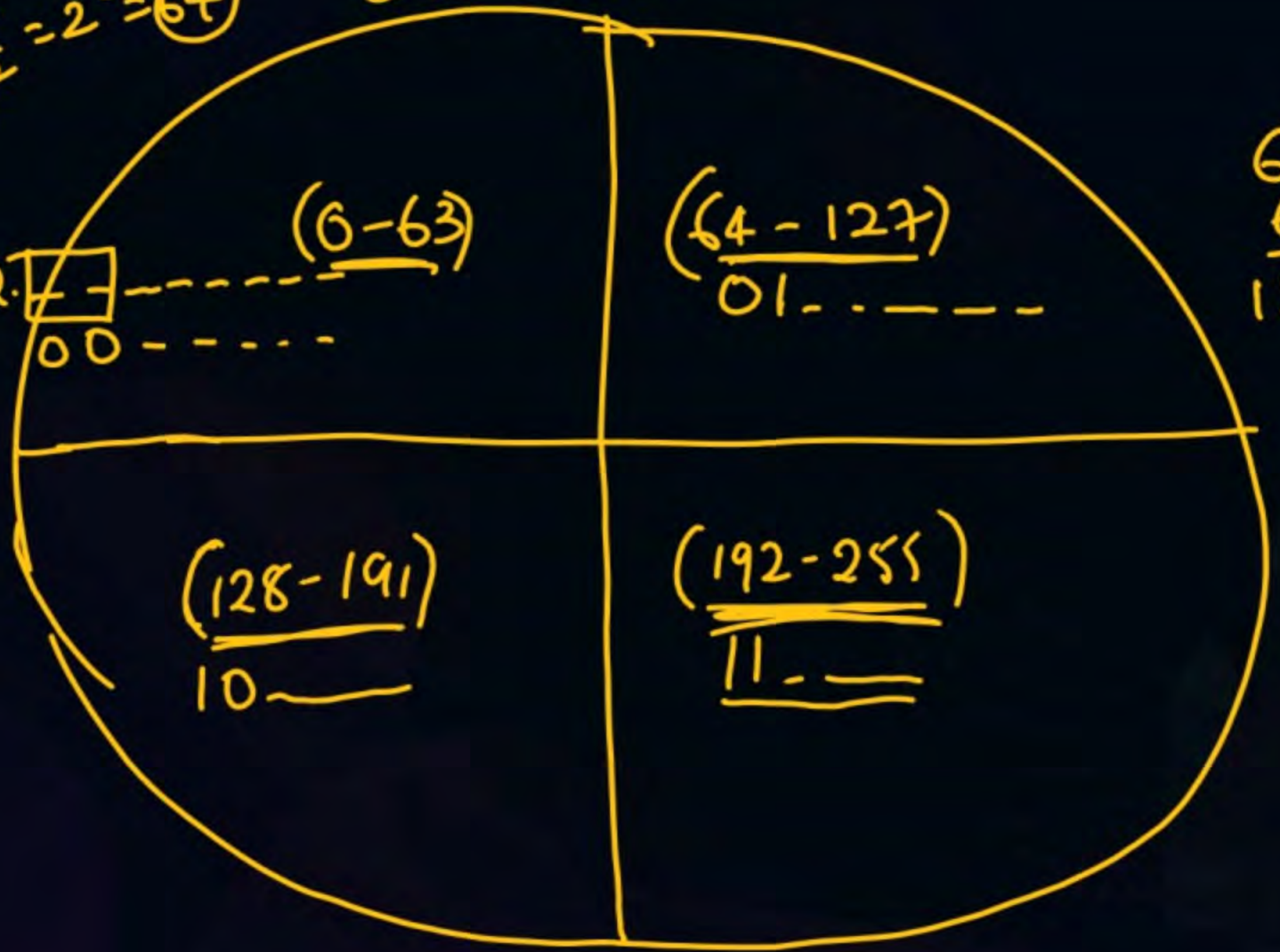
S_2 (128 - 255)

↓ SID of SN S_2 ↓ DBA of SN S_2


200.1.2.0
0-127
DIP=255
a
b
c
DIP=255
128-255
S2

$\frac{256}{4} = \frac{2^8}{2^2} = 2^6 = 64$

200.1.2.0

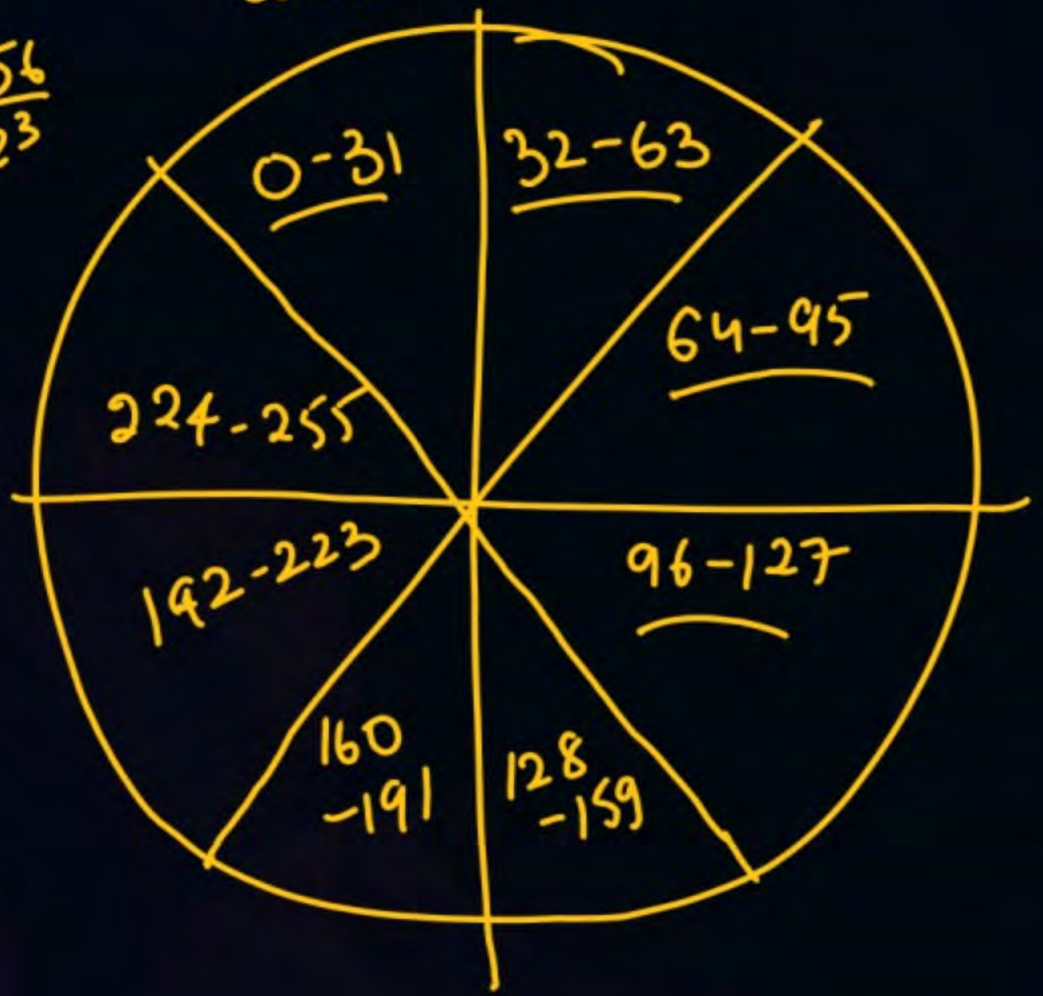


200.1.2.[ ]

64
63
127

128
63
191

200.1.2.0



$\frac{256}{2^8} = \frac{256}{2^3}$

$= \frac{2^8}{2^3}$

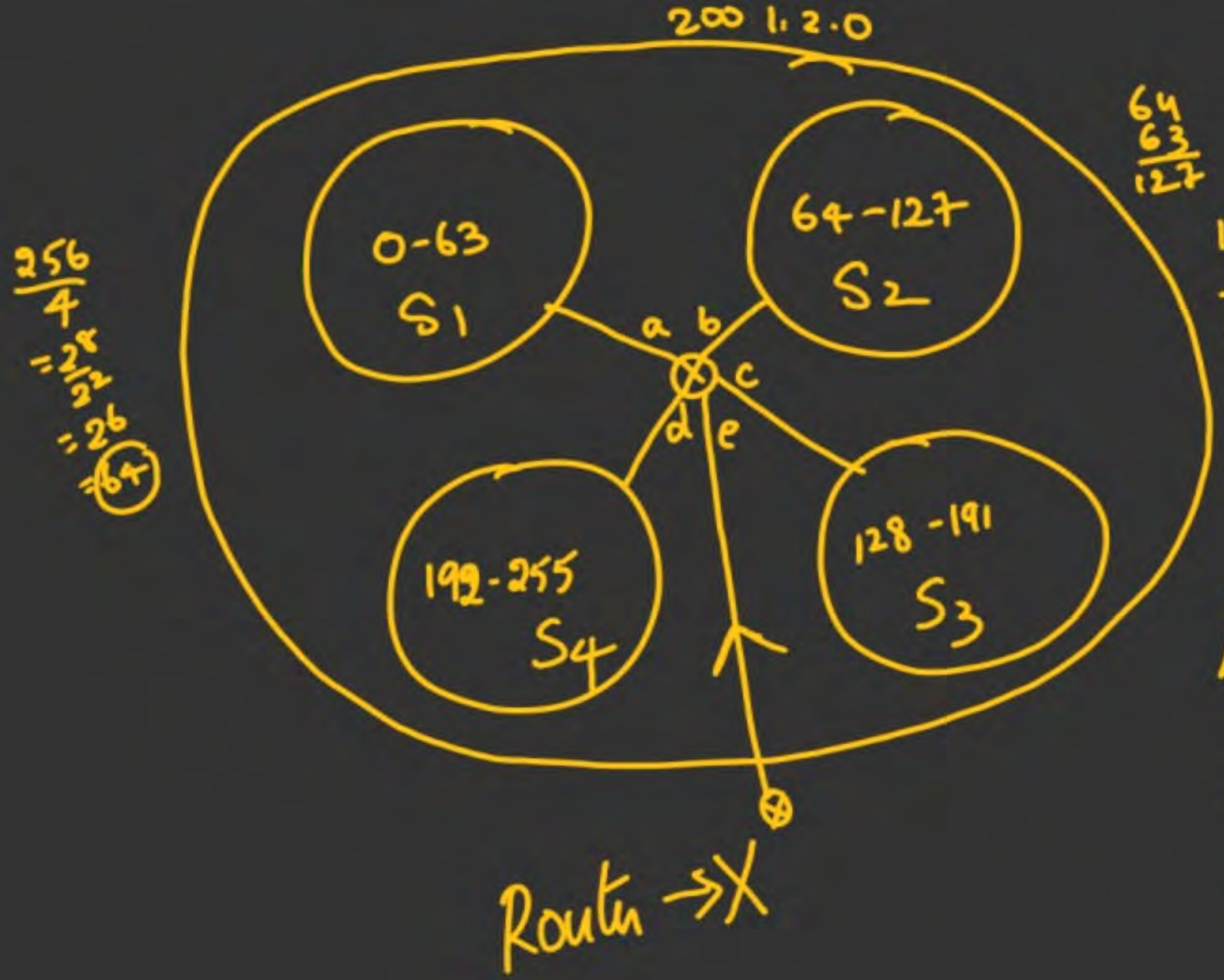
$= 2^5$

$= 32$

0 to 31 = 31

32 to 31 − 63

64 to 31 −



256/4 = 2^8/2^2 = 2^6 = 64

64 / 63 / 127

128 / 63 / 191

192 / 63 / 255

if (0 ≤ IP ≤ 63) { SN = S1, 32 }

		DIP
M	SIP	200.1.2.20

S1 → N/W

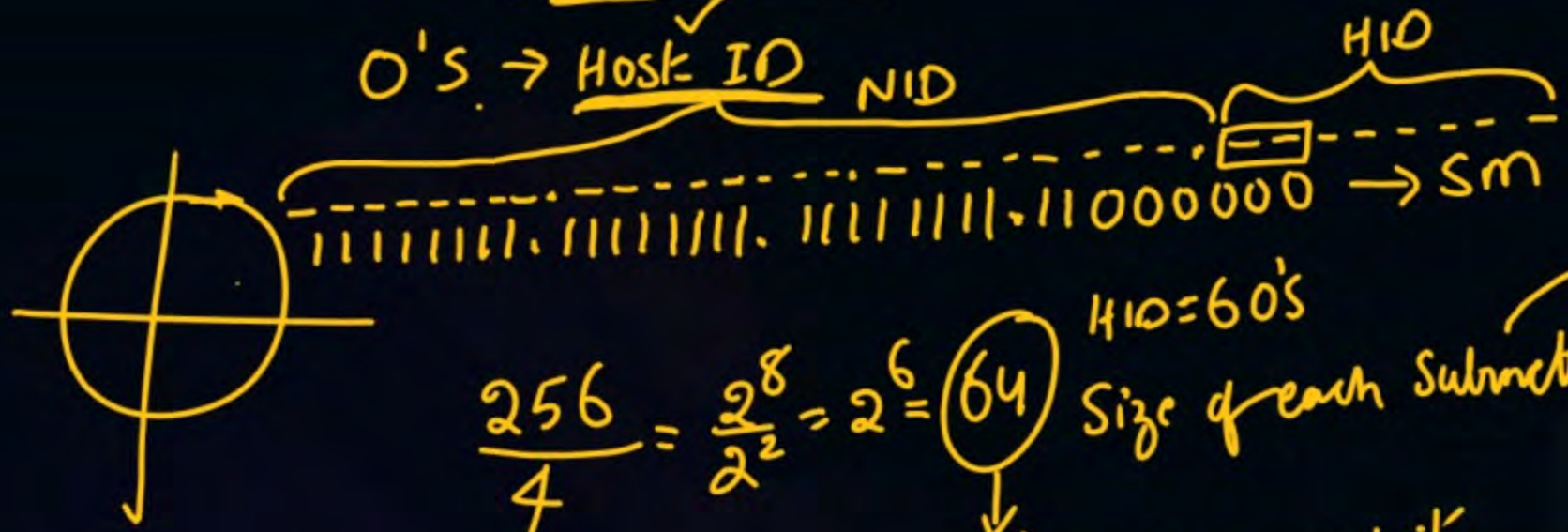
Interface 'a'

Subnet mask

- It is a 32 bit number.

1's → NID + SID

0's → Host ID



$\frac{256}{4} = \frac{2^8}{2^2} = 2^6 = 64$

HID = 6 0's

Size of each subnet $= 2^6 = 64$

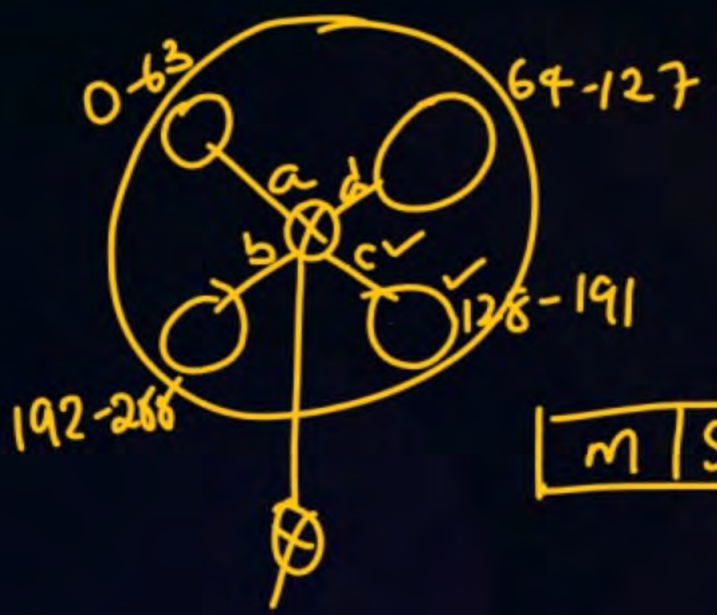
2^6 → HID = 6 bits

11111111.11111111.11111111.11000000 ✓
11001000.00000001.00000010.10000010 ✓

11001000.00000001.00000010.10000000

200 . 1 . 2 . 128 ✓ → NID

128 → C



M	SIP	DIP

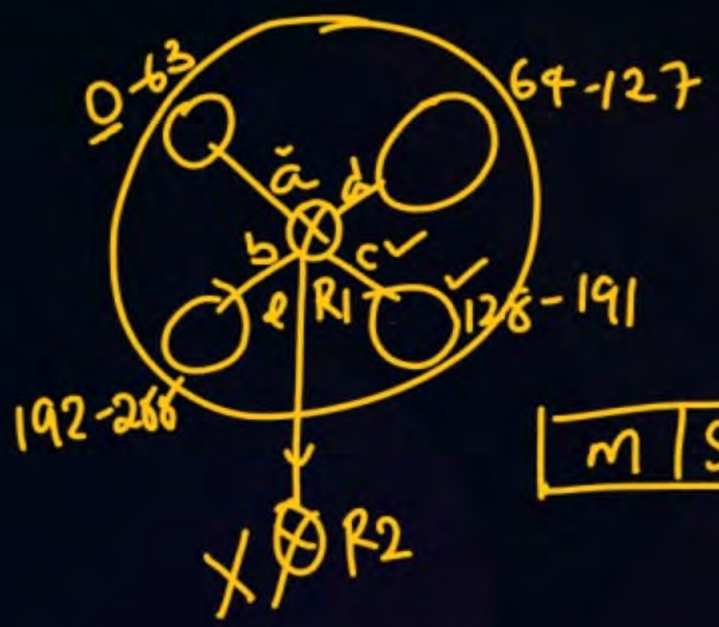
200.1.2.130 ✓

11111111.11111111.11111111.11000000

255.255.255.192

Routing table at R_1

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



M	SIP	DIP

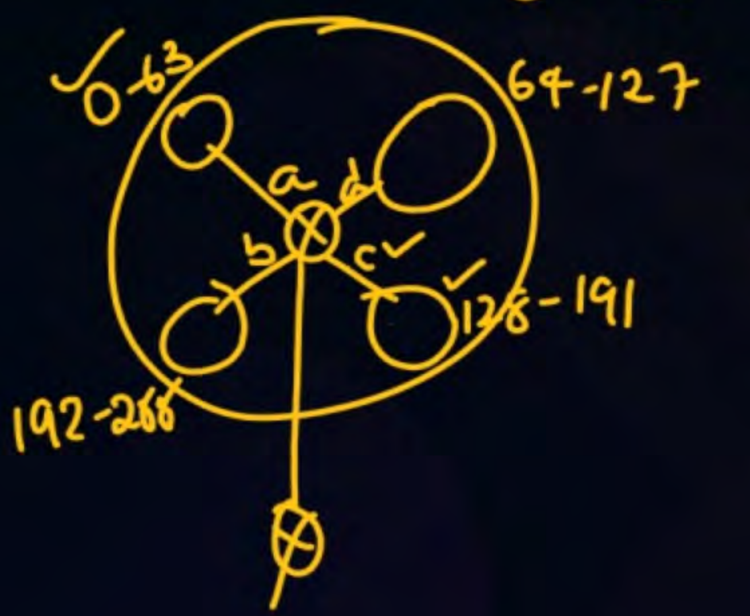
200.1.2.130

when all the subnets have same size then N/M is same for all.

11111111.11111111.11111111.11000000
11001000.00000001.00000010.00010001

200 . 1 . 2 . 0

0 - a



m	SIP	DIP
		200.1.2.17

11111111.11111111.11111111.11000000
11011000.00000001.00000010.00101111

200. 1. 2. 0

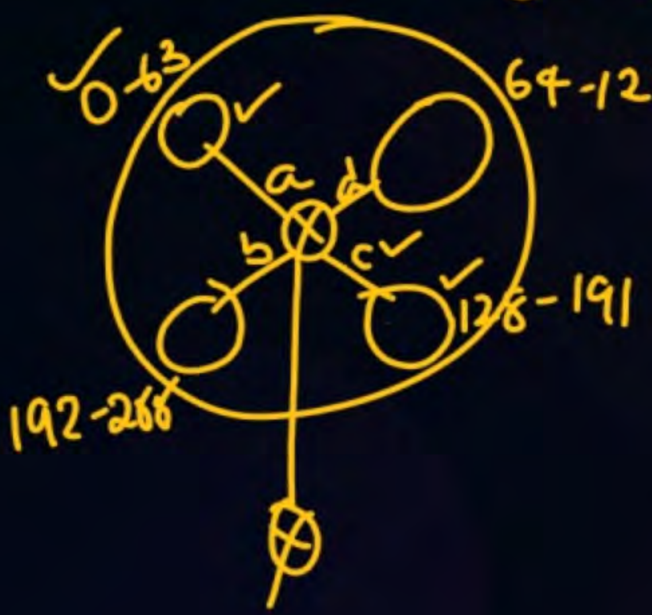
0 → 'a'

0 - 63

64-127

128-191

192-255



DIP

m	SIP	200.1.2.23

23-16+4+2+1

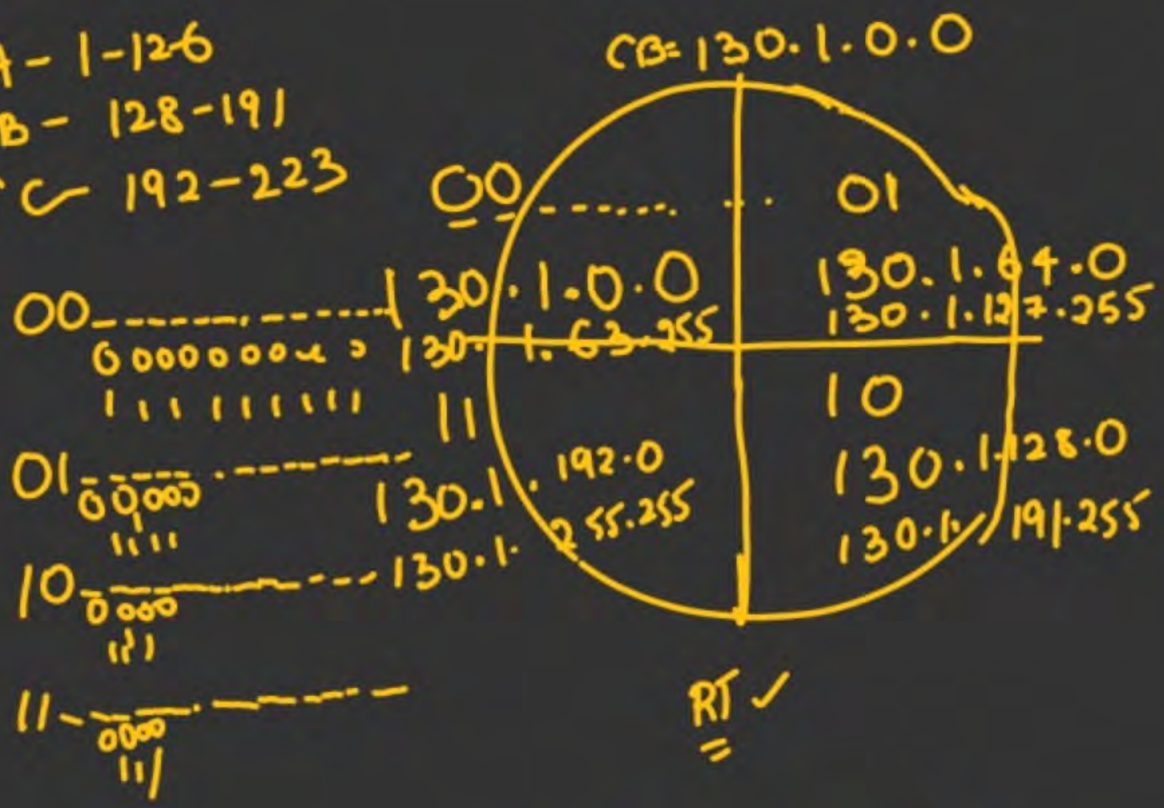
23
↓
16+4+2+1

When a packet arrives at a router, router will see DIP and does "ANDing" with the 'SM'. and takes 3 decisions:

1) If there is only one match, then send the packet on that interface
2) If there is more than one match, then send the packet on the interface with larger Subnet mask.
3) If there is no match, then use the default entry

CA - 1-126
CB - 128-191
CC - 192-223

CB = 130.1.0.0



130 → 128 + 2

10000010 . 00000001 . 00 000000 . 00000000

NID | HID

00
01
10
11

CA - 1-126
CB - 128-191
CC - 192-223

NM ✓ / SM ✓

1's → NID + SID

0's → HID

130 → 128 + 2

10000010.00000001.00000000.00000000

NID | HID

00
01
10
11

CB 130.1.0.0

128

2

10000010.00000001.0000 0000.00000000

NID

HID

00 - SN_1

01 - SN_2

10 - SN_3

11 - SN_4

CB 130.1.0.0

128_2

10000010.00000001.0000 0000.00000000

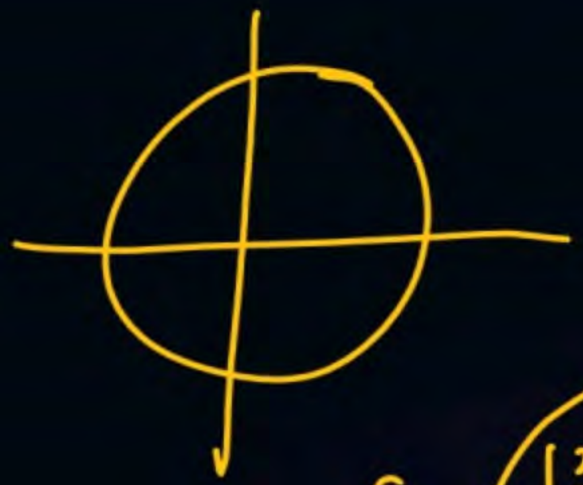
NID | HID

00 - SN_1

01 - SN_2

10 - SN_3

11 - SN_4



S4 (130.1.192.0 to 130.1.265.255)

10000010.00000001.1100 0000.00000000

130 . 1 . 192 . 0

10000010.00000001.11111111.11111111

130 . 1 . 255.255

CB 130.1.0.0

10000010.00000001.0000 0000.00000000

NID HID

128_2

00 - SN_1

01 - SN_2

10 - SN_3

10000010.00000001.10 000000.00000000 → 128.0

10 111111.11111111

128 63 191.255

128
63
191

S3 (130.1.128.0 to 130.1.191.255)

CB 130.1.0.0 128_2

10000010.00000001.0000 0000.00000000

NID HID

00 - SN_1

01 - SN_2

10000010.00000001.01 00 0000.00000000

130. 1. 64.0

01 111111.11111111

127. 255

130.1.

SN2 130.1.64.0 – 130.1.127.255

CB 130.1.0.0

128 / 2

10000010.00000001.0000 0000.00000000

NID HID

00 - SN1

130.1.0.0 = 00 000000.00000000

130.1.63.255 = 00 111111.11111111

S1

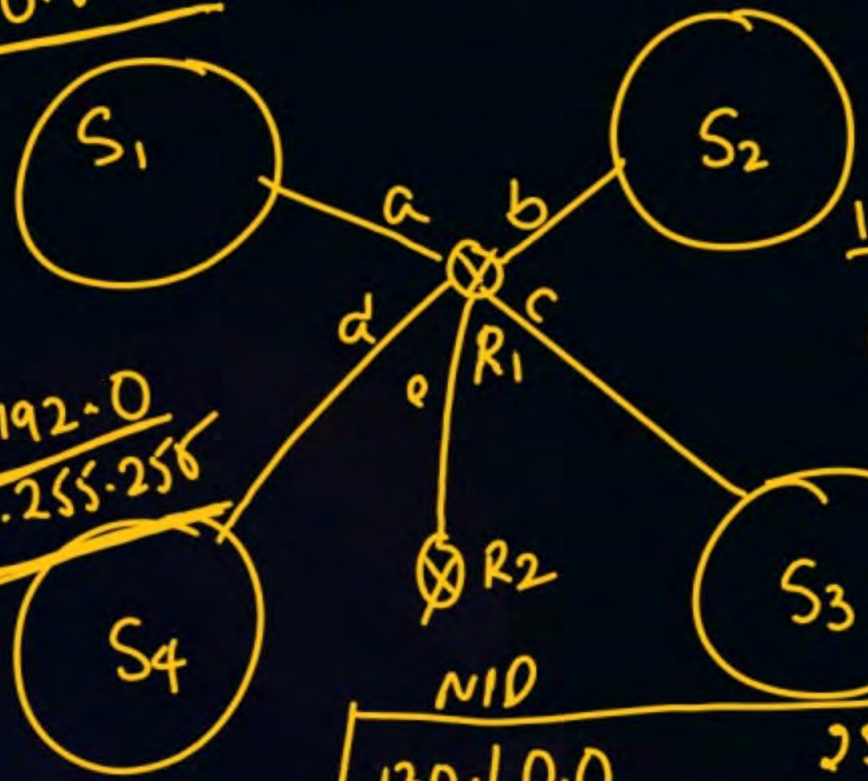
Sm: 255.255.192.0

130.1.0.0 - 130.1.63.255

130.1.0.0

130.1. — NID | SID

255.255.192.0 → Sm/NM



130.1.64.0
to
130.1.127.255

130.1.128.0
130.1.191.255

130.1.192.0
130.1.255.256

NID	Sm	Interface
130.1.0.0	255.255.192.0	a
130.1.64.0	255.255.192.0	b
130.1.128.0	255.255.192.0	c
130.1.192.0	255.255.192.0	d
0.0.0.0	0.0.0.0	e

THANK - YOU