Computer Science & IT

COMPUTER NETWORKS (CN)

IP address Subnetting, Supernetting

Lecture No. 3

By- Ravindra Sir

Recap of Previous Lecture

- Topic
- Topic
- Topic

IP add

Topics to be Covered

- Topic — IP addresses
- Topic
- Topic

Unstoppable Indians: Stories to Ignite Student Motivation

Sridhar Vembu – The Rural Disruptor

After graduating from IIT Madras and earning a PhD from Princeton, Sridhar Vembu turned down Silicon Valley offers to return to Tamil Nadu's villages. From his ancestral home, he co-founded Zoho, training farmers and locals in software development and building a global SaaS company. His belief that talent exists beyond metro cities fueled Zoho's steady growth. For GATE students, his story teaches that innovation requires courage, community, and the conviction that anyone can contribute to technology.

Unstoppable Indians: Stories to Ignite Student Motivation

Kavita Singh – The Village Scholar

Born in a small village in Jharkhand, Kavita had no access to coaching institutes. With only second-hand GATE books and a handwritten notebook from a retired schoolteacher, she self-studied for two years. Despite frequent power cuts and a slow internet connection, she recorded lectures on her phone, listened during farm chores, and solved previous years' papers under the shade of a banyan tree. Her relentless dedication earned her a 98.5 percentile in GATE CS, proving that resourcefulness can outshine resources.

Unstoppable Indians: Stories to Ignite Student Motivation

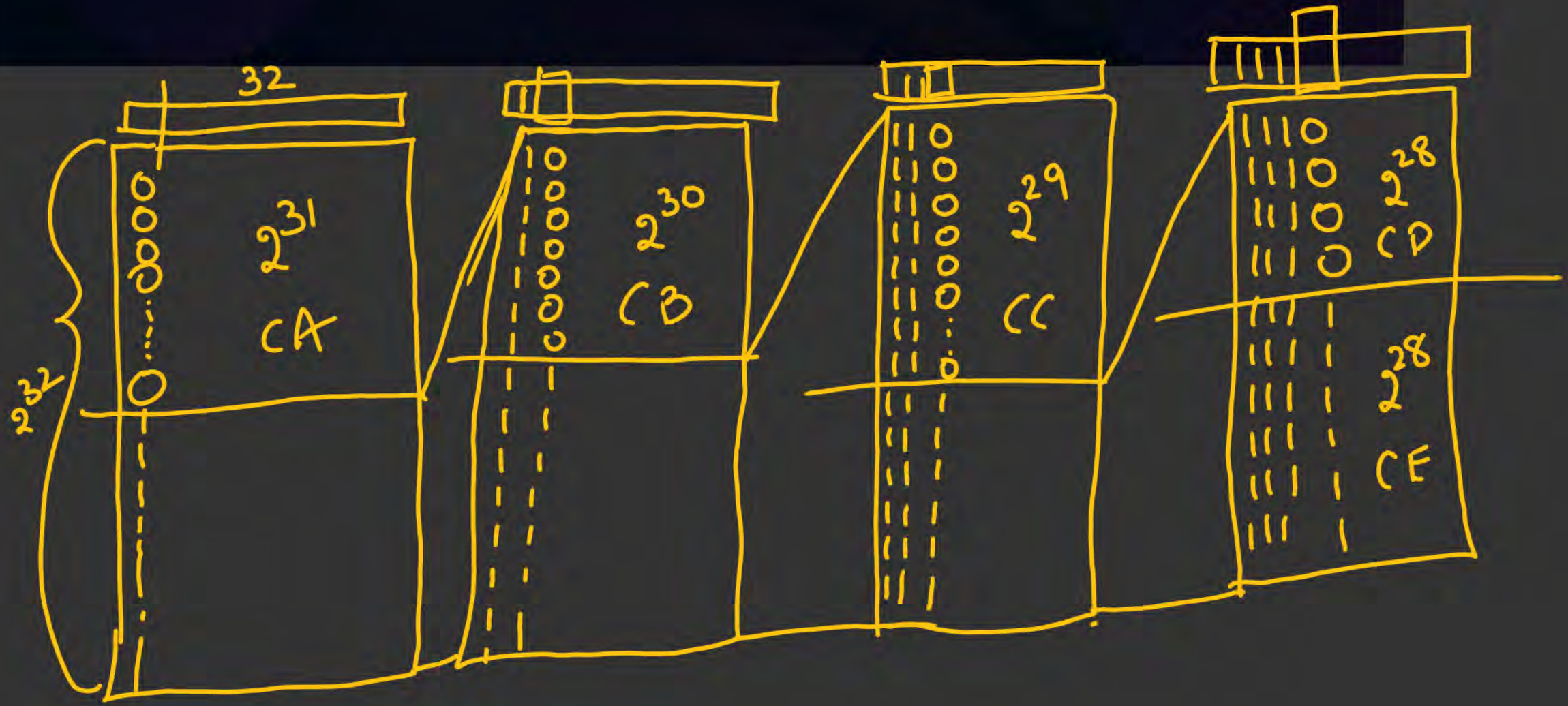
Rajat Verma – The Librarian's Protégé

Struggling with dyslexia in his early school days, Rajat found solace in the campus library at a local engineering college. He befriended the librarian, who guided him to audio summaries and simplified notes. Rajat adapted by creating mind maps and peer-study sessions, turning his weakness into a strength. He scored a 99.2 percentile in GATE, showing that adapting your study style to your strengths can lead to extraordinary results.

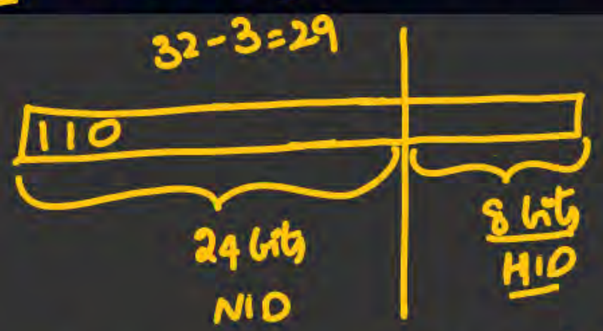
Unstoppable Indians: Stories to Ignite Student Motivation

Sneha Gupta – The Peer Mentor

After scoring below the qualifying mark in her first GATE attempt, Sneha organized a peer-study group of 10 students. She created a rotating teaching schedule, where each member taught one topic per week, fostering accountability and deeper understanding. Over six months, the group's average scores improved dramatically, and Sneha herself jumped to a 97.8 percentile. Her story highlights that teaching others can reinforce your own learning.


32
2^{31}
CA
2^{30}
CB
2^{29}
CC
2^{28}
CD
2^{28}
CE
2^{32}

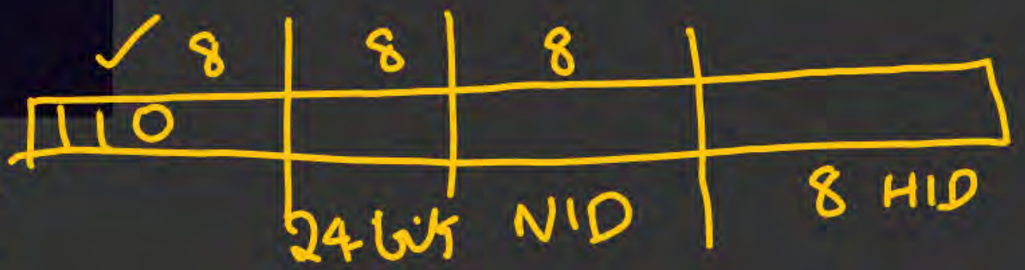
Gate ⊢ How many IP add are in CC = 2^{29}



How many n/w are present in CC = 2^{21}

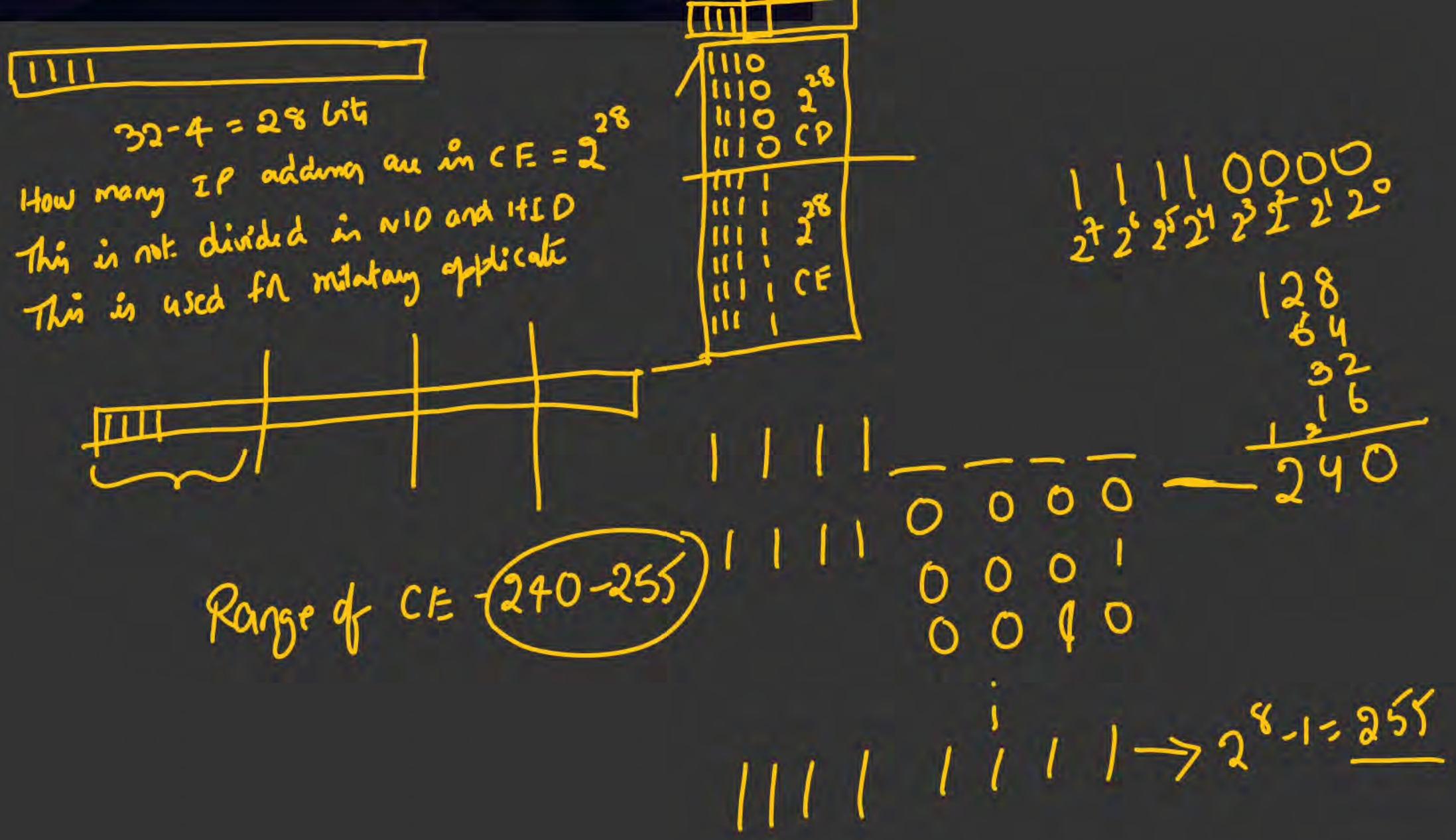
How many IP add are present in CC = 2^8 ✓

How many Hosts can be present in CC n/w = $2^8 - 2$ ✓



NID = 24 − 3 = 21

N/W = 2^{21}


1111
32-4 = 28 bits
How many IP addresses are in CE = 2^{28}
This is not divided in NID and HID
This is used for military applications
1110
1110
1110
1110
2^{28}
CD
2^{28}
CE
11110000
2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0
128
64
32
16
1
240
1111 0000 — 240
0000
0001
0010
1111 → $2^8 - 1 = 255$
Range of CE - 240-255

→ NO NID X
NO HID X

$32 - 4 = 28$

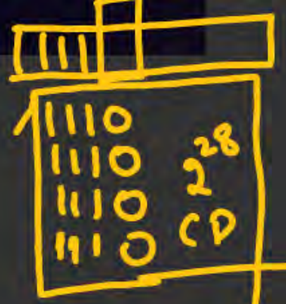
How many IP are present in CD = 2^{28}

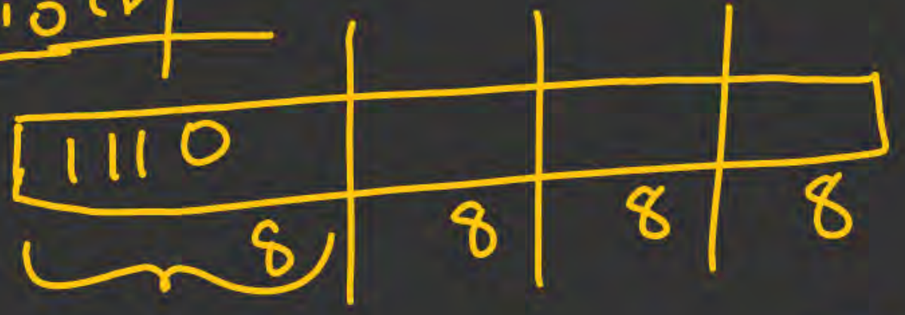
Class D is not divided into NID and HID

CD is used for multicasting

2^{28} IP add are reserved for mc

1000 <





1110 — — — —

0 0 0 0 — 224

0 0 0 1 |

0 0 1 0 |

0 0 1 1 |

: |

1111 — 239

5 min

CF

11100000

$2^7\ 2^6\ 2^5\ 2^4\ 2^3\ 2^2\ 2^1\ 2^0$

128
64
32
1
224

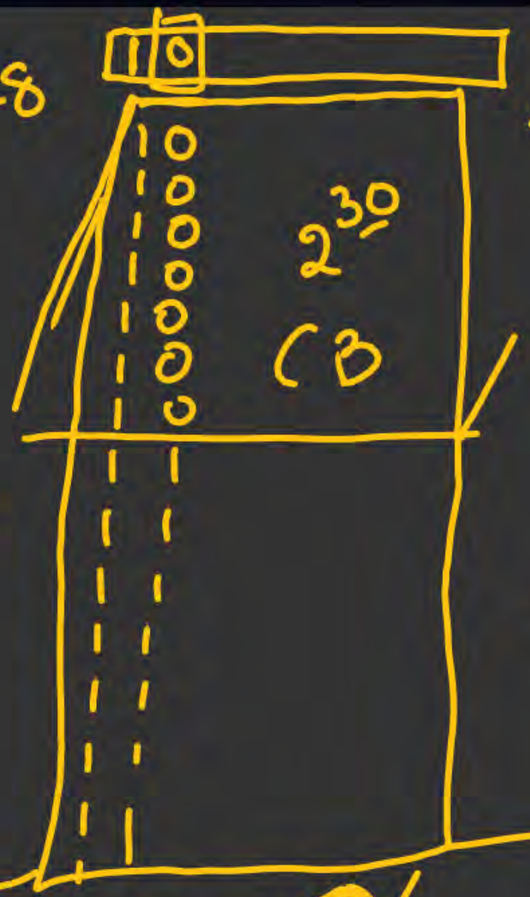
224
15
239

Total no of N/w in CB = 64×256
$= 2^6 \times 2^8$
$= 2^{14}$

10 000000 → 128
10000001
10000010
⋮
10 111111 → 191

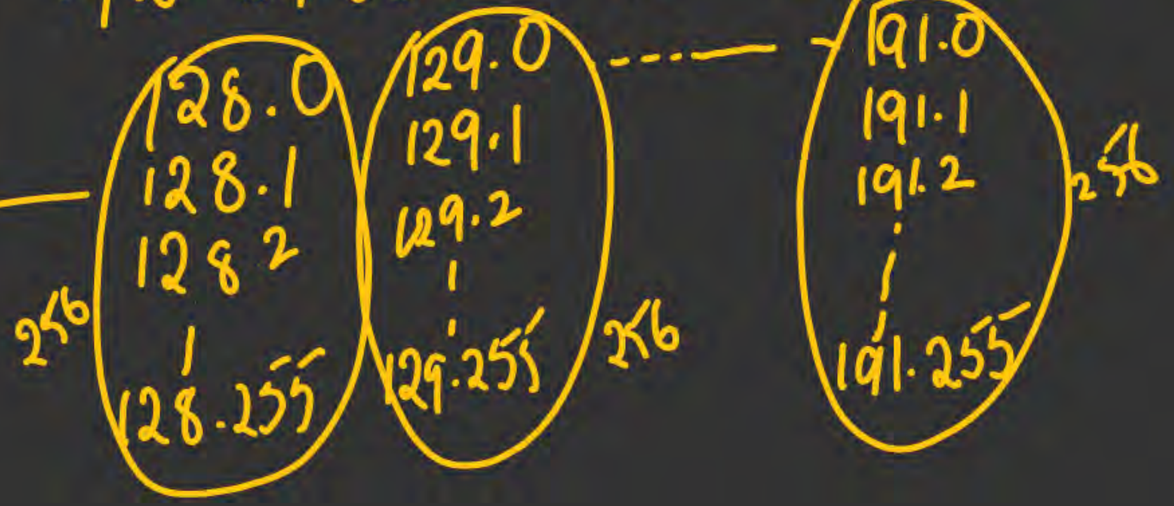
$2^6 - 1 = 63$

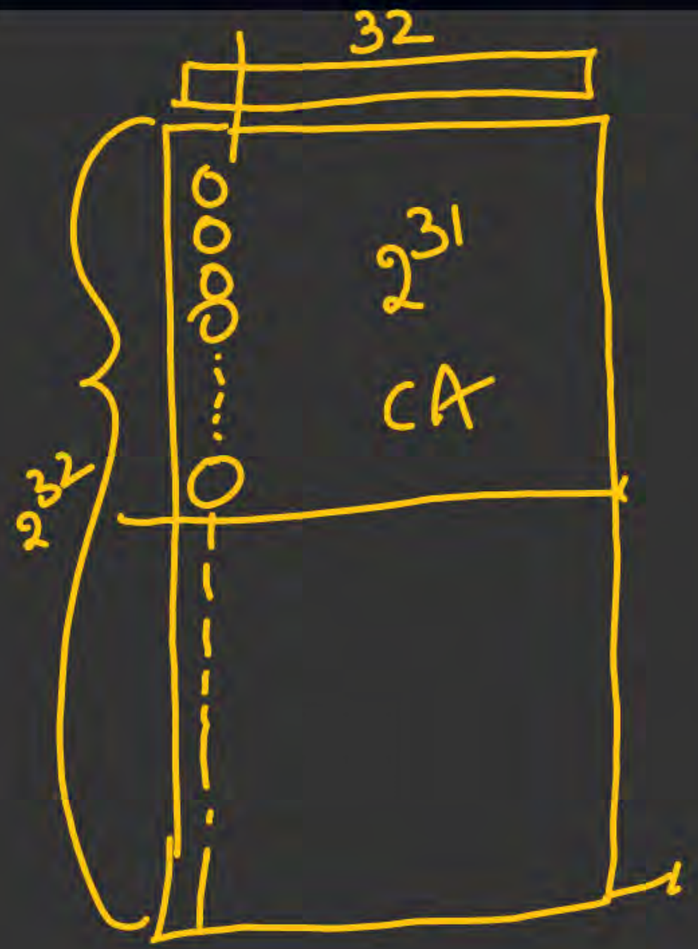
128
63
191



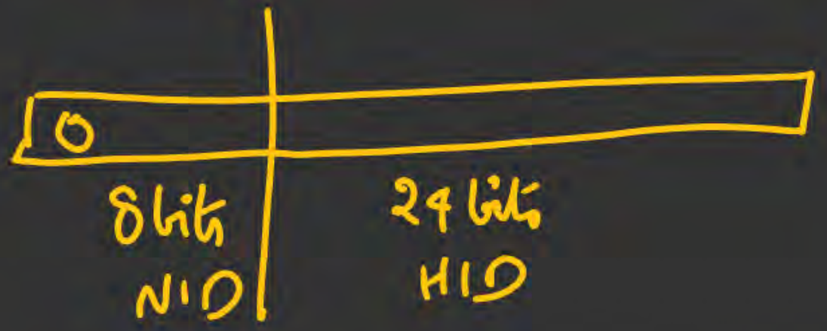
IP add in class B = 2^{30}

N/w in class B = 2^{14} = 16K N/w in CB





How many IP add are present in CA = 2^{31}



$11 = 2^2 - 1 = 3$

$111 = 2^3 - 1 = 7$

$1111 = 2^4 - 1 = 15$

$1111111 = 2^7 - 1 = 127$

N/w = $2^7 = 128$

00000000 → 0 X

00000001 → 1

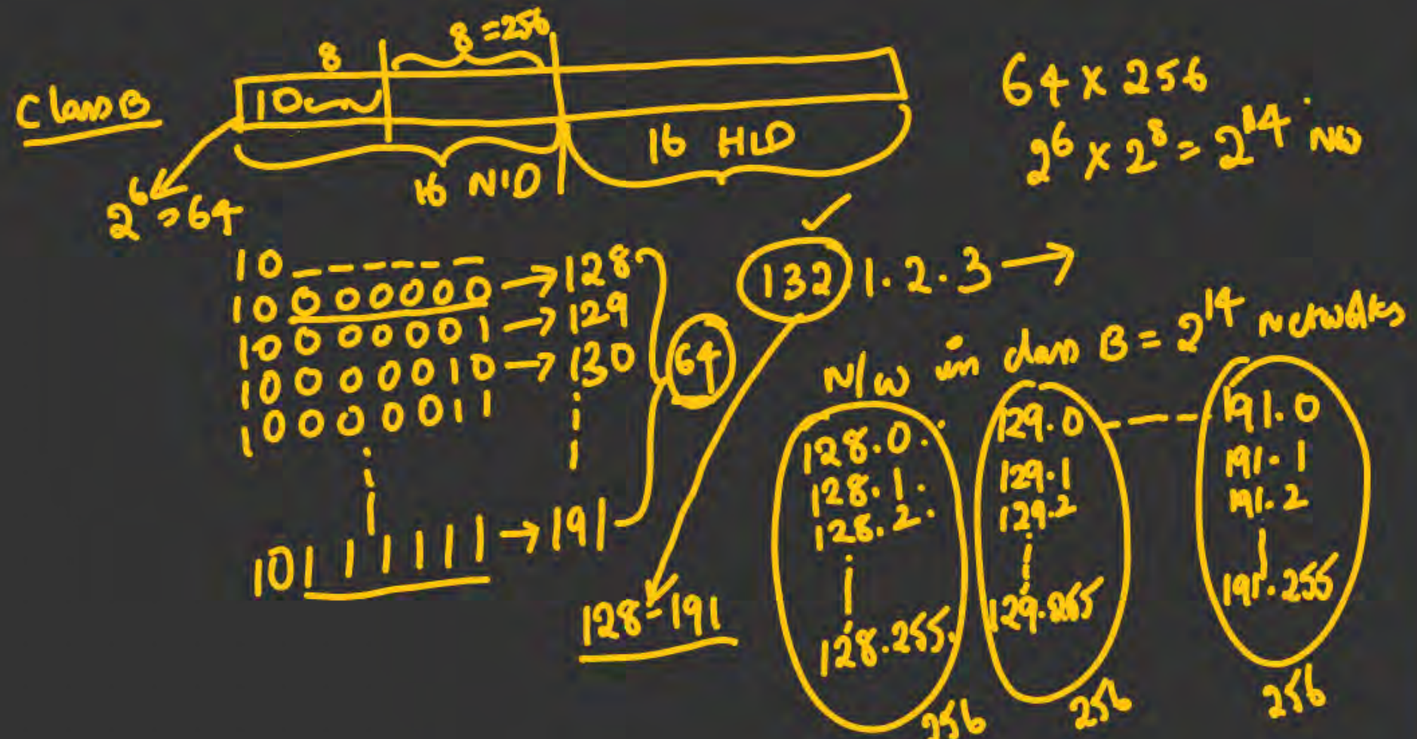
126

11111111 → 127 X

CA → 1 - 126

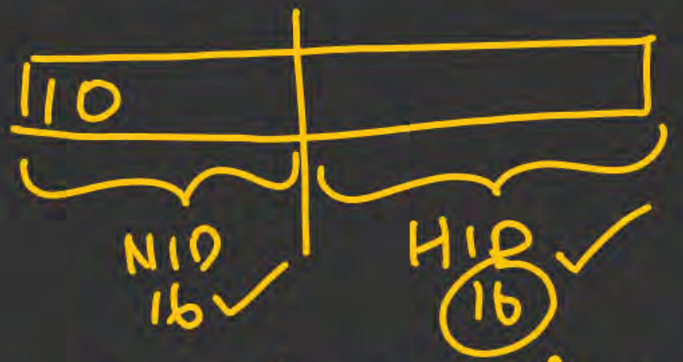
IP add/class = 2^{24}

Hosts/network = $2^{24} - 2$ → later



No of IP in CB = 2^{30}

No of N/w in CB = 2^{14} N/w



IP add are present in a network of class B = 2^{16}

Hosts in a N/w of class B = $2^{16} - 2$

Class C: 110 | 24 NID | 8bits HID

$32-3=29 \rightarrow$ No of IP add in CC $= 2^{29}$

$NID = 24-3 = 21 \rightarrow$ No of n/w in CC $= 2^{21}$ ✓

$IP/N/W = 2^8$

$Hosts/n/w = 2^8 - 2$

11011111

192 | $2^5-1 = 31$

192 + 31 = 223

192.0.0 ——— 223.0.0

192.0.1 ... 223.0.1

192.0.255 ... 223.0.255

192.1.0 ... 223.1.0

192.1.1 ... 223.1.1

192.1.256 ... 223.255.255

11000000 – 192

11000001

11000010

⋮

11011111 – 223

32

$32 \times 2^8 \times 2^8$

$2^5 \times 2^8 \times 2^8 = 2^{21}$ ✓

192-223

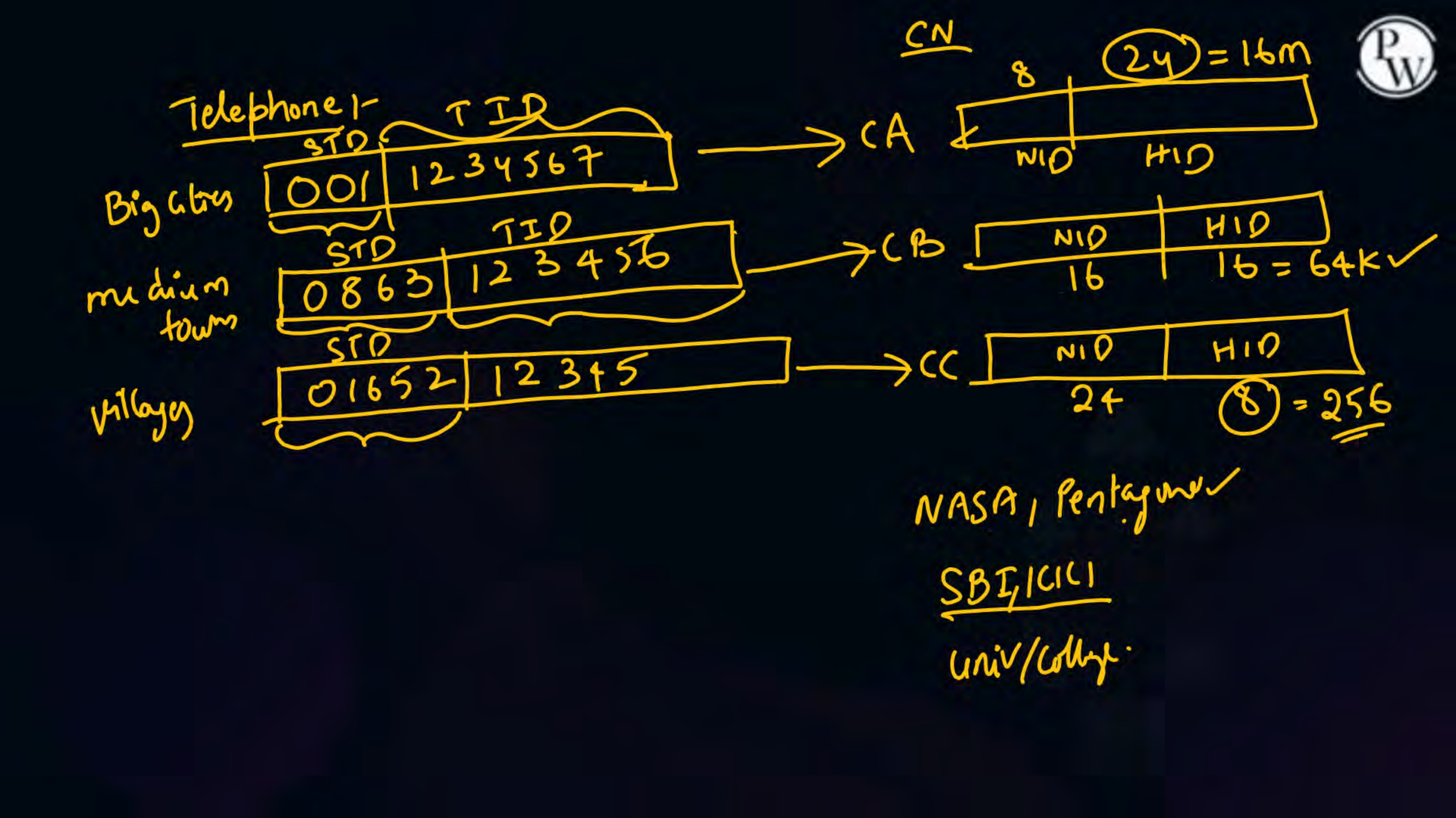
	Range	NID	HID	IP/NW	Hosts/NW	IP add
CA	1-126	8	24	2^{24}	$2^{24}-2$	2^{31}
CB	128-191	16	16	2^{16}	$2^{16}-2$	2^{30}
CC	192-223	24	8	2^{8}	$2^{8}-2$	2^{29} 2^{28}
CD	224-239	—	—	—	—	2^{28}
CE	240-255	—	—	—	—	

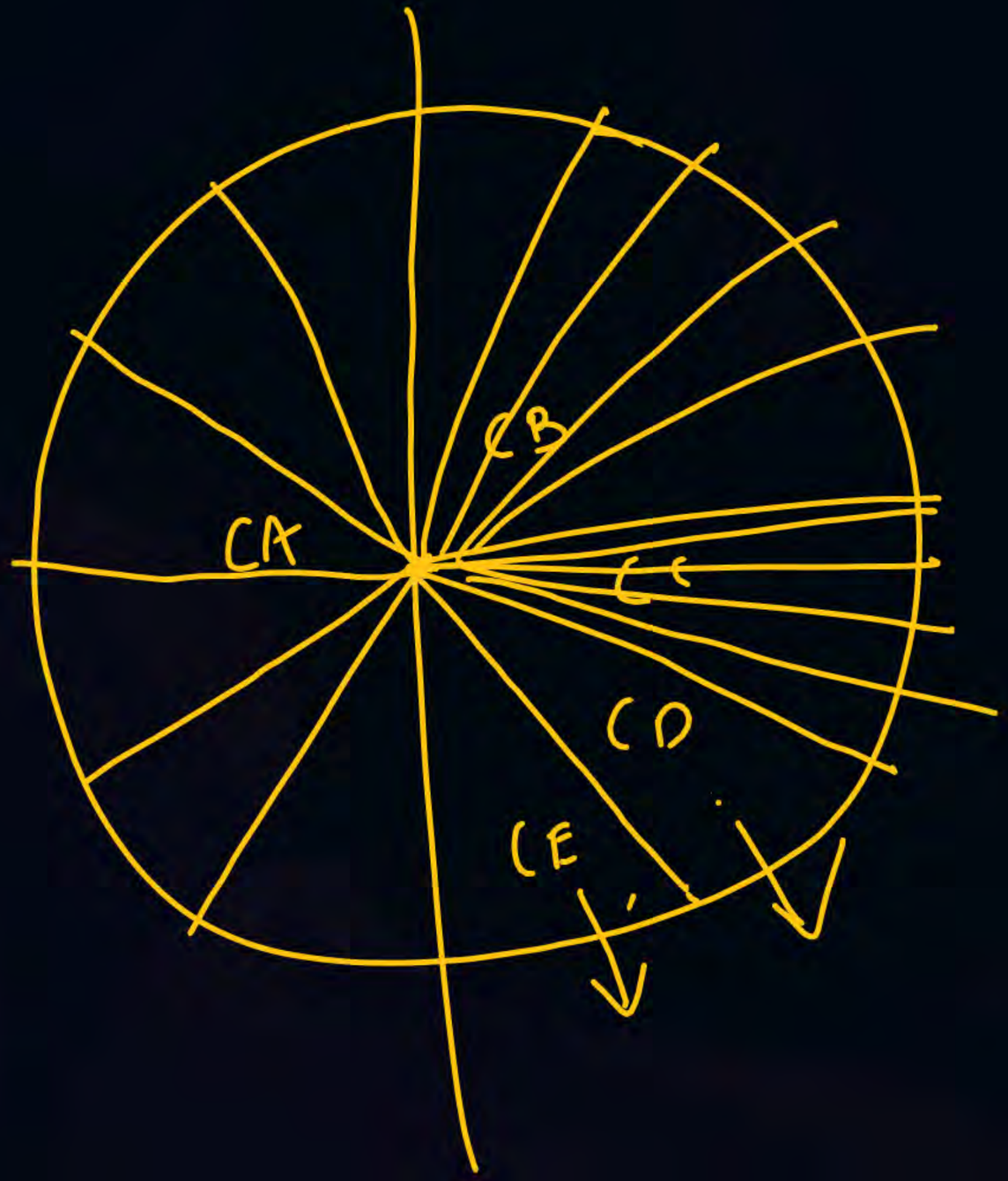
RBR Sir PW

$$\frac{2^{28}+2^{28}+2^{29}+2^{30}+2^{31}}{2^{29}+2^{29}+2^{30}+2^{31}}$$

$$\frac{2^{30}+2^{30}+2^{31}}{2^{31}+2^{31}}$$

$$\frac{}{2^{32}}$$


CN
8
24
= 16m
NID
HID
Telephone :-
TID
STD
Big cities
001
1234567
CA
medium towns
0863
123456
CB
16
16 = 64K
Villages
01652
12345
CC
24
8
= 256
NASA, Pentagon
SBI, ICICI
Univ/College.


CB
CA
CC
CD
CE

THANK - YOU