CS & IT ENGINEERING

COMPUTER NETWORKS

IPv4 Addressing

Lecture No-19

By- Ankit Doyla Sir

- Classless Addressing

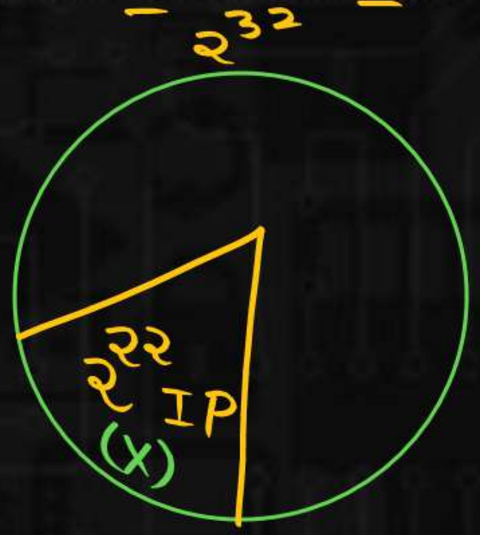
Rules for CIDR

CIDR [Class less inter Domain Routing]

When ever any customer wants a Block of IP Address IANA or ISP will create the Block assigned to customer

Rules to be Followed by IANA for creating the Block

1. All the IP Address in the Block must be Contiguous



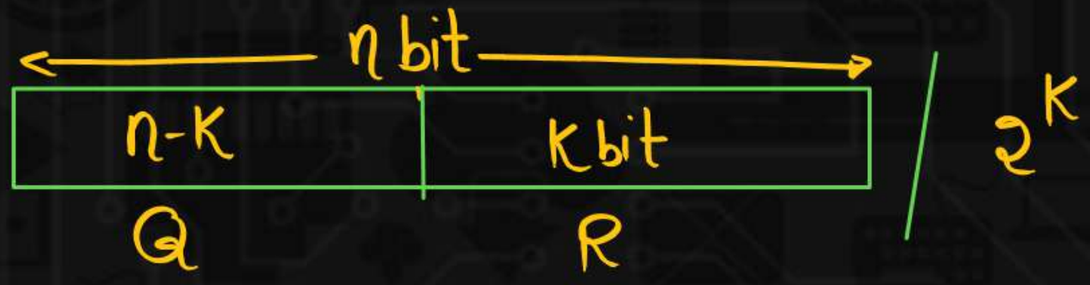
2. Block size must be a Power of 2. i.e 2^n

$(10101)_2 = 21$

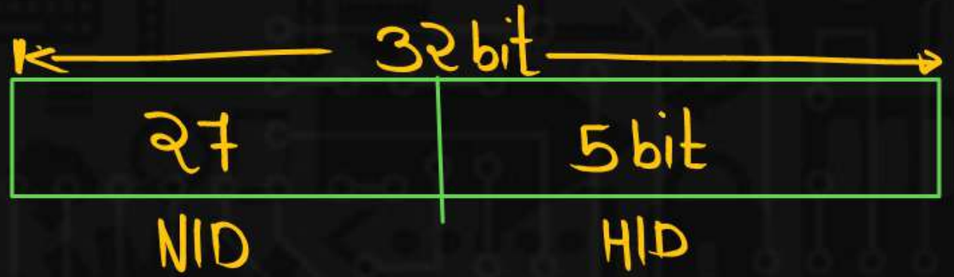
	R	Q
$/ 2^1$	1	10
$/ 2^2$	1	5
$/ 2^3$	5	2
$/ 2^4$	5	1
$/ 2^5$	21	0

$(8192)_{10}$

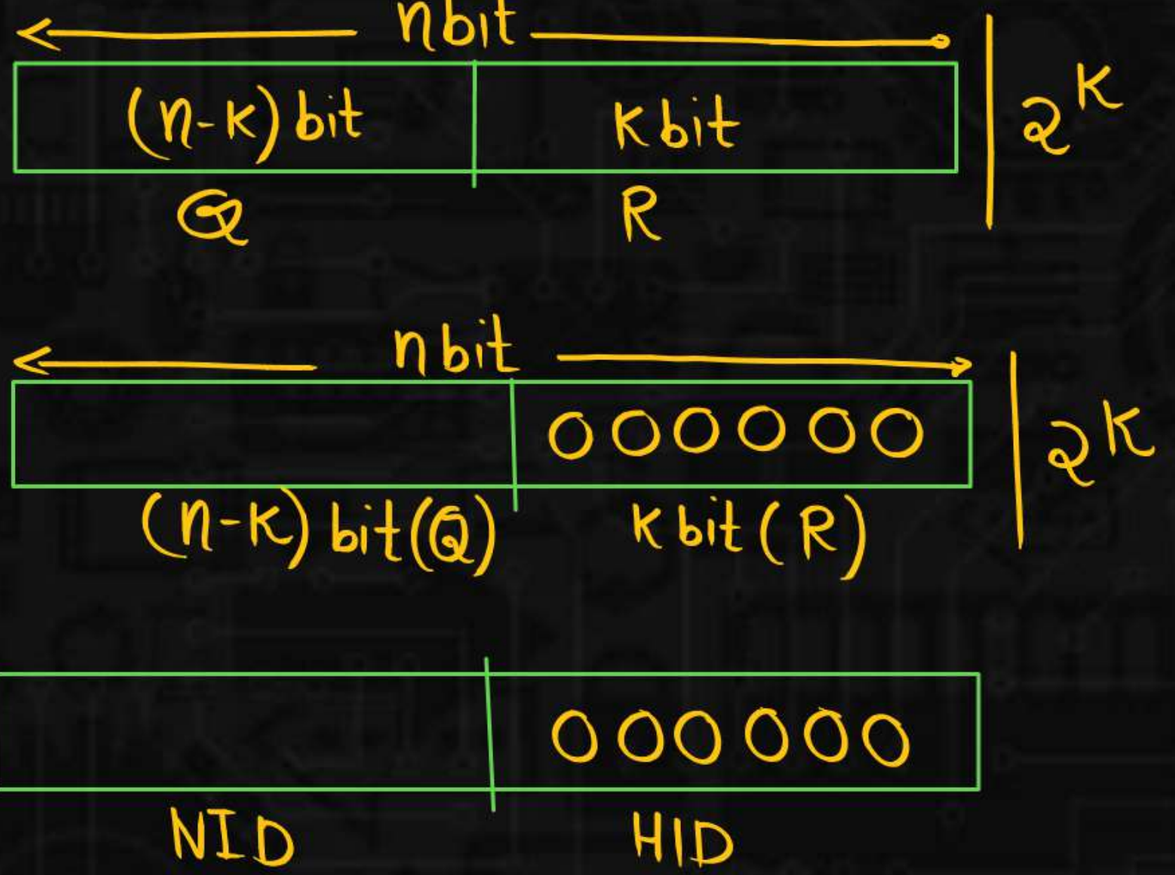
	R	Q
$/ 10^1$	2	819
$/ 10^2$	92	81
$/ 10^3$	192	8
$/ 10^4$	8192	0



Block size = 2^5



3. First IP Address OF the Block must be divisible by size OF the Block. (Block size = 2^K)



Note:
1st IP Address must be used as a Block-id

EX - 1.

100.100.100.64
100.100.100.65
100.100.100.66
100.100.100.67
...
100.100.100.127

$127 - 64 + 1 = 64 = 2^6$

It is Valid Block

① All the IP Addresses in the Block must be contiguous (True)

② Block size = 2^6 (True)

Representation of CIDR block

Block size $= 2^6$

HID = 6 bit, NID = 32 − 6 = 26 bit

100 · 100 · 100 · 64	26

PE

NID = 26 bit, HID = 32 − 26 = 6 bit

100 · 100 · 100 · 01 | 000000
8 + 8 + 8 + 2 | 6
NID | HID

100 · 100 · 100 · 01 | ------
NID | HID

100 · 100 · 100 · 01 000000 → 100 · 100 · 100 · 64
100 · 100 · 100 · 01 000001 → 100 · 100 · 100 · 65
100 · 100 · 100 · 01 000010 → 100 · 100 · 100 · 66
⋮
100 · 100 · 100 · 01 111111 → 100 · 100 · 100 · 127

OR

100.100.100.127|26

PE

NID = 26 bit, HID = 32 - 26 = 6 bit

100.100.100.01 111111
8 + 8 + 8 + 2 | 6
NID | HID

100.100.100.01 ------
HID

100.100.100.01 000000 → 100.100.100.64
100.100.100.01 000001 → 100.100.100.65
⋮ ⋮
100.100.100.01 111111 → 100.100.100.127

R

③ 100.100.100.01 1000000 / 2^6 (Trục)

HID

EX – 2.

100.100.100.128
100.100.100.129
100.100.100.130

100.100.100.255

$255-128+1=128=2^7$

It is Valid Block

① Contiguous (True)

② Block size = 2^7 (True)

③ 100.100.100.10000000 | 2^7 (True)

Rem (HID)

Representation of CIDR Block

Block size = 2^7

HID = 7 bit, NID = 32 - 7 = 25 bit

100.100.100.128/25

EX – 3. 100.100.100.1
100.100.100.2
100.100.100.3
100.100.100.32

} $= 32 = 2^5$

gt is inValid Block

① contigus (True)

② Block size $= 2^5$ (True)

③ 100 · 100 · 100 · 000 0000 1 | 2^5 (False)

Rem

HID

EX – 4. One of the address of the Block is 100.100.100.68/27 then find

NID = 27 bit

HID = 32-27 = 5 bit

No. of IP Addresses in a Block = 2^5

i. Number of addresses in a Block = 2^5
ii. Range of IP address = 100.100.100.64 - 100.100.100.95
iii. Block id/ network id = 100.100.100.64
iv. First host = 100.100.100.65
v. Last host = 100.100.100.94
vi. DBA = 100.100.100.95

EX – 5. One of the address of the Block given as 167.199.128.3/20. then find

H.W

i. Number of addresses in a block
ii. Range of IP address
iii. Block id
iv. First host
v. Last host
vi. DBA


THANK YOU
GW
SOLDIERS !