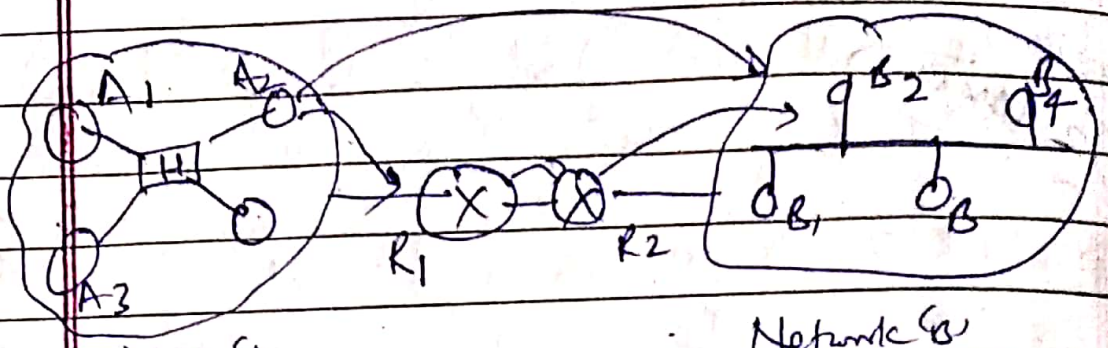
Network layer



(1) Host to Host Delivery / Source to destination
(machine to machine delivery)
by using the logical addresses (IP address)

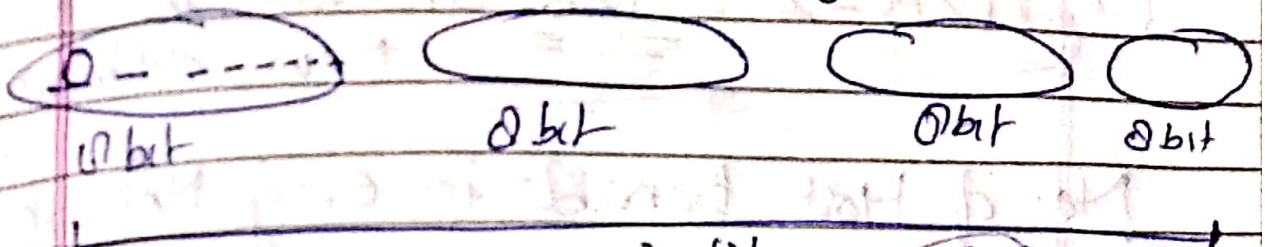
IP address → | Net id | Host id |

(2) Routing: ← RIP (Routing Info. Protocols)
OSPF
↳ to find out the path for sending msg. by using the shortest path
Router → devices used at H/w layer

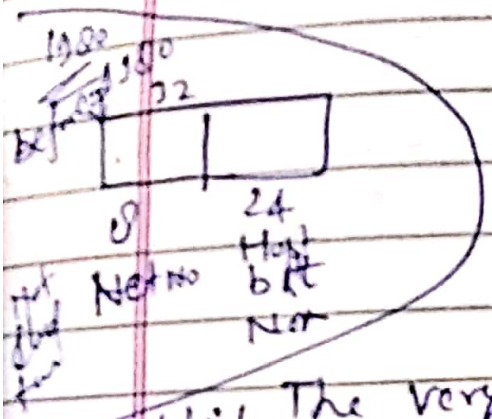
(3) Logical Addressing (IP)

(4) Fragmentation: → (packets) are used Here.
(size of packets used by router)
↳ Router divide the packets in the fragments so that less buffer devices can accepts the data packets easily

Class A in IP Addressing

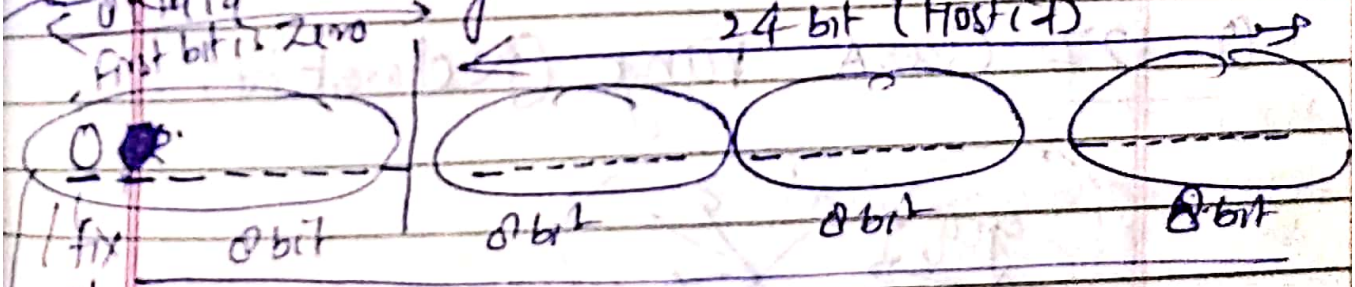


Class full addressing
After 1980 we use

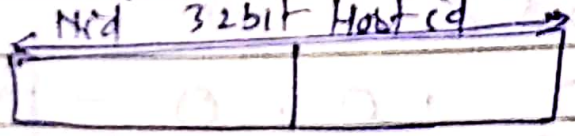


Dotted Decimal representation

The very bit is always 0



$(2)^{31}$ → No. of IP Address in Class A



The first 8 bits represent the Net id remaing it represented the Host id

→ 0 _ _ _ _ _ _ _

7 bit remain the possible Net id is

$(2)^7 =$

00000000
00000001
11111111

No. of Networks in Class A = 2^7 → 128

128 Networks are possible in Class A

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Not used → 0 0 0 00000 → 0 it is not used by Any organization, it is used by {IANA}

Not used → 1 1 1 1111 1 — 127

0 & 127 is not used in Class A
① ②

i.e 128 − 2 = 126 are used in Class A N/w addressing.

No. of Host possible in every Network.

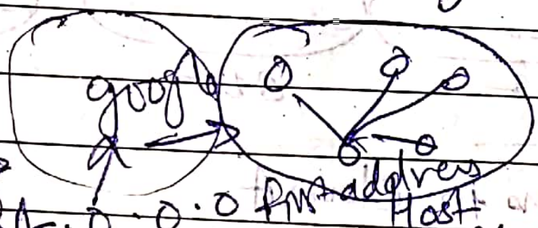
Netid | Hostid

01000000 | -

64 | $(2)^{24}$

$= (2^{24}) - 2 \Rightarrow$

0 − 127 Class A range (Network id)



IP → 64.0.0.0 first address

64.255.255.255 2^{24} are possible.

{64.0.0.0 — first ip address

{64.255.255.255 last address (Broadcast address)

→ Both can't be given to the host

eg ① 64.0.0.1 → First Host in the N/w

eg ② 64.0.0.8 IP address, To define Network

with the help of Default mask we can find out the Network id.

NA) Assign
g) Internet Authority (No)

255.0.0.0 Default mask of Class A

64.0.0.0 Convert it into binary

Host

01000000.00000000.00000000.00000000

11111111.0.0.00000000

AND gate operation

01000000.0.0.0

⇒ 64.0.0.0 IP

Network id

Class B (IPv4)

Class 'B' in IP addressing

32 bit

8 bit | 8 bit | 8 bit | 8 bit

10 ------ (Reserved in class B (prefixed))

Net id | Network id | Host id

10 0 0 0 0 0 0 remaing 6 Place

10 1 1 1 1 1 1 last value 6 place

128
129
191
64 value

Range = 128-191

No. of Networks = 2^{14} = 16384

No. of Hosts in each Nw = 65536 - 2 = 65534

No. of addresses = 30 bit ie $(2)^{30}$

= 25% of All IP address

10 ------ ------

(14)

$(2)^{14}$ = 16384 Networks possible in class B

No. of Host possible! ~~0+0=16~~

2^{16} = 65536 - 2

= 65534

eg 128.0.0.0 → 128.0.255.255 Not used, if denote Network Address

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Date

IP 130.2.3.4 belongs to which Class
↳ Network ?

130.2.3.4
255.255.0.0
AND
130.2.0.0 — Network Address

00000010
11111111
10

Class C IP addressing (IPv4)

32 bit

Prefix

110 - - - - -	- - - - - - - -	- - - - - - - -	- - - - - - - -
8 bit	8 bit	8 bit	8 bit
Net id			Host id

110 00000 → 192

110 11111 → 223

Range := 192-223

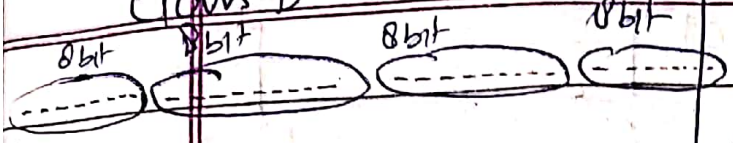
No. of IP addresses in class C
3+8+8+8 = 29
$= (2)^{29} = 12.5\%$ total IP address

No. of N/w = 2^{21} = ≃ 20 lakhs
No. of Hosts in each Network

No. of N/w = 8+8+5 = 21
$(2)^{21} = 2^{21}$ →

No. of Hosts in each N/w =
$2^8 = 256$ Host are possible
= 256 - 2 = 254 possible Host are (usable Host)

Class D



1110 ----
fixed

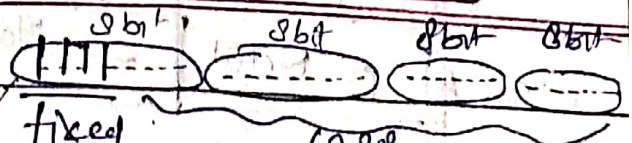
1110 0000 → 224
1110 1111 → 239

Rang = 224-239

No. of address (IP) in class D
$= (2)^{28} \simeq 6.25\%$.

No Network ; No Host is there (because it is used for multicasting (groups) (Broad cast)

Class E



1111
fixed

$(2)^{28}$

No. of IP address in class E
$= (2)^{28} \simeq 6.25\%$.

It is used for military fore purpose

1111 0000 → 240
1111 1111 → 255

No Network, No Host is there it is used for military purpose.

Rough work

Class A
0-128 Range
0 fixed
No. of Host

Class B
129-191 Range
01

Class C
192-223
110

Class D
224-239
1110

Class E
240-255
1111

	8bit	8bit	8bit	8bit
Class A	0 Netid	← Hostid		→
Class B	10 ← Netid →		← Hostid	
Class C	110 ← Netid →			Hostid
Class D	1110	Multicasting		
Class E	1111	Reserved for future use (military)		

	From	TO
Class A	0.0.0.0	127.255.255.255 →
Class B	128.0.0.0	191.255.255.255
Class C	192.0.0.0	223.255.255.255
Class D	224.0.0.0	239.255.255.255
Class E	240.0.0.0	255.255.255.255

Allow the
After log
the ren
local co
TELN

0 - 127.
128 - 191.
192 - 223.
224 - 239
240 - 255.