Ip address : ⊚ (28)

class	Starting Address	Ending Address	
A	0 . 0 . 0 . 0	127 . 255.255.255	Host Address
B	128. 0 . 0 . 0	191. 255. 255. 255	
C	192. 0 . 0 . 0	223. 255.255.255	
D	224. 0 . 0 . 0	239. 255. 255. 255	Multicast
E	240. 0 . 0 . 0	255. 255. 255. 255	Experimental purpose .

How the class were created →

192 . 168 . 32 . 170
‹—— Network ID ——› ‹— Host ID —›

class A:
8 bits	8 bits	8 bits	8 bits
Network	Host	Host	Host
/8 or 255.0.0.0

class B:
Network	Network	Host	Host
/16 or 255.255.0.0

class C:
Network	Network	Network	Host
/24 or 255.255.255.0

1.2.3.4   191.200.100.1   192.168.1.1
  ↓
class A Ip   class B Ip   class c Ip
Address   address   address .

IP address are two type 32 64 168 fore

[Public] vs [Private] Ip address $\leq 2^{16} 2^8 2^4 2^2 2^1 0$

$\boxed{1 \quad 1 \quad 0 \quad 0 \quad 0}$

Private	Public
LAN	Internet

find the [Number of subnets] and the number of [Valid Hosts per subnet]?

- Subnets
  $\rightarrow 2^{\# \text{ of host bits}} \rightarrow 2$

- valid Hosts
  $\rightarrow 2^{\# \text{ of host bits}} (-2) \xrightarrow{\rightarrow \text{network}}_{\rightarrow \text{Broadcas}}$

192.168.1.0

255.255.255.240 / (28)

1·1·1·1·1·1·1·1·1·1.

$\underbrace{1 1 1 1 1 1 1 1 . 1 1 1 1 1 1 1 1 . 1 1 1 1 1 1 1 1}_{\text{network}} . \underbrace{\boxed{1 1 1 1}}_{\text{Subnet}} \boxed{0 0 0 0}$
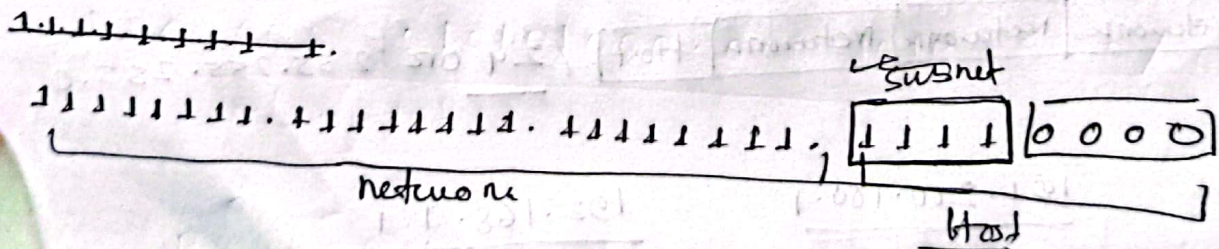
Host

· class c network

- subnet = 2^4 = (16) $\rightarrow$ Number of subnet.

- Host = $2^4 - 2$ = (14) $\rightarrow$ valid Host

How to Find All subnet Numbers

192.168.10.5/28 →CIDR→ classless interdomain routing

① What is network address?

$0 \cdot 2^{80} \cdot 2^{4} \cdot 2^{2} \cdot 2^{1} \cdot 1$

192.168.10.5/28

<u>11000000 . 10101000 . 00001010 .</u> <u>0000</u>/<u>0101</u>
network bit   subnet Host bit

Now:

Network address: All network bits + subnet bits as its, host bits all 0

<u>11000000 . 10101000 . 00001010 .</u> <u>0000</u>/<u>0000</u>
network bit   subnet Host bit
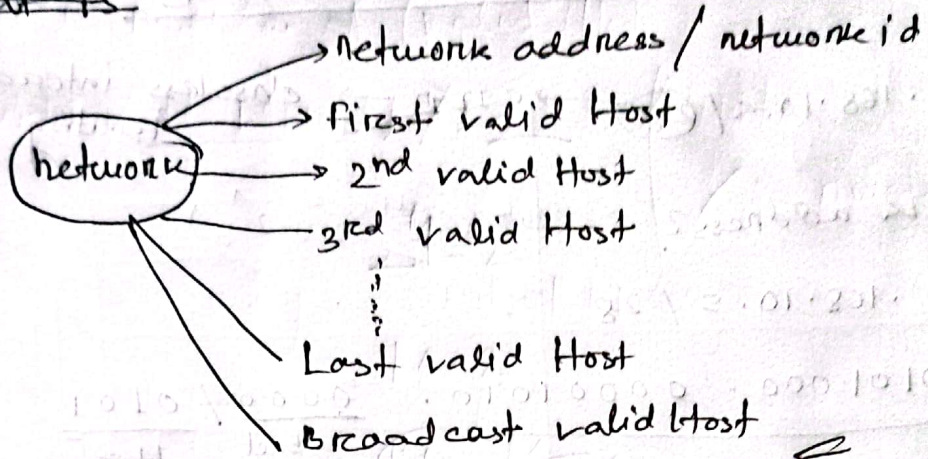
∴ Network address = 192.168.10.0/28 ←

② What is Broadcast address?

Broadcast address = All network bits + subnet bits as it is, host bits all 1

<u>11000000 . 10101000 . 00001010 .</u> <u>0000</u>/<u>1111</u>
                                      subnet Host

∴ Broadcast address = 192.168.10.15

② What is

- Network address / network id
- First valid Host
- 2nd valid Host
- 3rd valid Host
  ⋮
- Last valid Host
- Broadcast valid Host

(network)

③ What is First valid Host? 192.168.10.5/28

~~①~~ Network address = 192.168.10.0/28

Broadcast address = 192.168.10.15/28

∴ fast valid Host = 192.168.10.1/28

Last valid Host = 192.168.10.14/28

⑤ What is $\boxed{\text{subnet mask}}$? 192.168.10.5/28

$\underline{11000000 \cdot 10101000 \cdot 00001010 \cdot \underset{\text{subnet}}{0000} / \underset{\text{Host}}{01011}}$

network bit

subnet mask = All network bits + subnet bits 1 ; host bit 0

$1111 1111 \cdot 11111111 \cdot 11111111 \cdot \underline{1111} / \underline{000}$

∴ subnet mask = 255.255.255.240

⑧ What is Block site / host per subnet?

Subnet mask = 255.255.255.255 ↙(23)

Subnet mask = 255.255.255.240

Block site / host per subnet = 256 - 240

= 16

⑦ What is number of subnet?

Subnet mask = 255.255.255.240

1 1 1 1 1 1 1 1 . 1 1 1 1 1 1 1 1 . 1 1 1 1 1 1 1 1 . $\underbrace{1111}_{\text{subnet}}$ / $\underbrace{0000}_{\text{host}}$

$\underbrace{\hspace{4cm}}_{\text{network}}$

∴ Number of subnet = 2^x

= 2^4

= 16

x = number of 1 in subnet bit

= 4 $x = 4$

↙

1st subnet = 192.168.10.0 to   192.168.10.15

2nd subnet = 192.168.10.16 to 192.168.10.31

3rd subnet = 192.168.10.32 to 192.168.10.47

⋮

এভাবে to চলতে থাকে প্রতি 256 পর্যন্ত

© What is number of (valid) Hos?

Number of host $= 2^Y - 2$ when

$= 2^4 - 2$ $Y =$ number of 0 in [host bit]

or $= 16 - 2$

$\Rightarrow \boxed{14}$ ✓

Tcp/IP protocol suite

5 layer	OSI (7 layer)	4 layer
Application Layer	Application layer	Application layer
	Presentation layer	
	Session layer	
Transport layer	Transport layer	Transport layer
Network layer	Network layer	Internet layer
Data link layer	Data link layer	Network access layer
physical layer	physical layer	

OSI → open (System) (Interconnection) (7) layer

ISO → [International] [Standards] (for) [organization] 1947

OSI model

sender → Application

presentation

Session

Transport

Network

Data link

physical
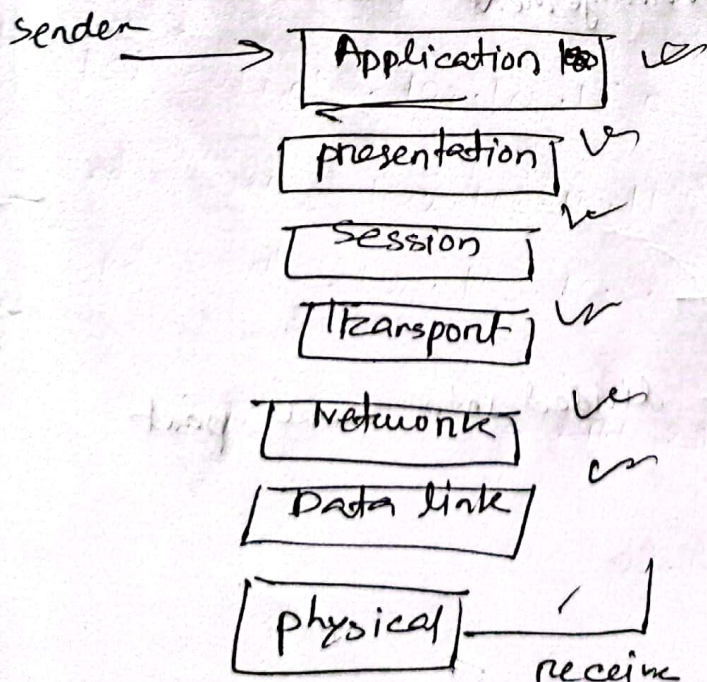
receive

① **Application:-** Network Application

HTTP / HTTPS / FTP / NFS / NNTP

→ File transfer → FTP

→ Web surfing → HTTP/s

→ Eamils → SMTP

Vartual terminal → Telentet.

④ **Presentation layer :-** received data from Application (

| | | / Description
→ Translation | Data compression | Encryption → SSL
Secure
sokets
Layer

Ⅲ **Session layer:** Connection sender and receiver

ⓐ Authentication ↙ @ session management
ⓑ Authorization ↗

Ⅳ **Transmi Transport layer:**

① segmentation of Data are divided into small part

& like

seq.	port
nmbr	pub nmbr
Data	unit

Flow control:

(ii) Error control

there are two protcols are transport layer

<table>
<tr><td>**Services**</td><td>**Protocol**</td></tr>
<tr><td>Connection-oriented Transmission ⟶ (TCP) ⟶ Transmission control Protocol</td></tr>
<tr><td>⟶ Connection lessless Tran.. ⟷ (UDP) ⟶ User Datagram Protocol (UDP)</td></tr>
</table>

Network layer: Transport layer are the sent data in network layer.

(i) logical addressing

IPv4 and IPv6

(mask)

(ii) Path determination

OSPF
BAP
IS-SI

, called frame

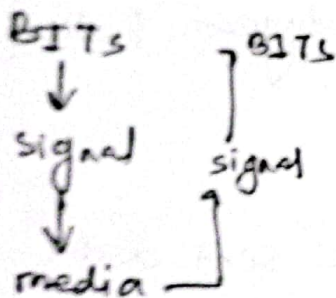**Data link layer:** Received package from Network layer

(i) Logical addressing

⟶ Network layer

(ii) physical addressing

⟶ Data link layer

Access the media → control how data is placed
and received from the media
(media Access control)
(Error detection)
Framing

⇒ **physical layer:**

BITs
↓
signal
↓
media

BITs
signal

DeIp → Dynamic Ip address → Automatically assigned
to server

Static Ip Address: Manually assigned and donot change.