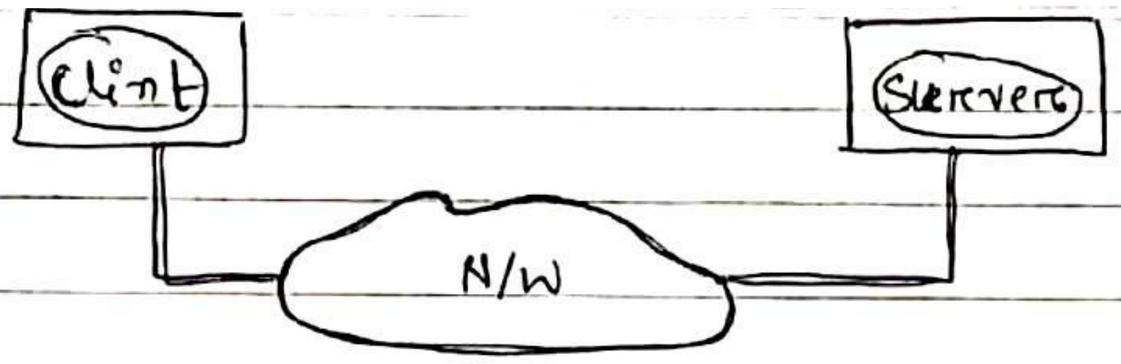
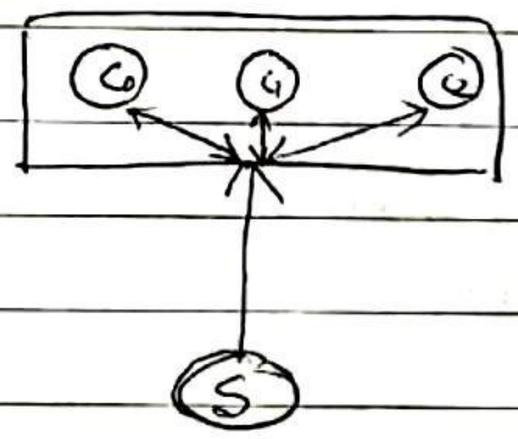
ISO OSI Stack



Functions

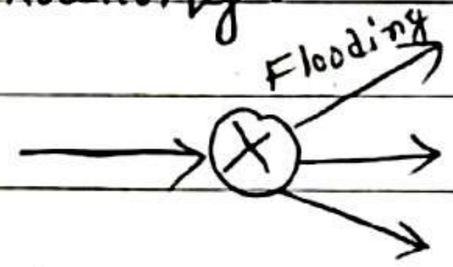
Mandatory ~~f~~ functions

1. Error control
2. Flow control.
3. ~~Acce~~ Access control.
4. Multiplexing & Demultiplexing.



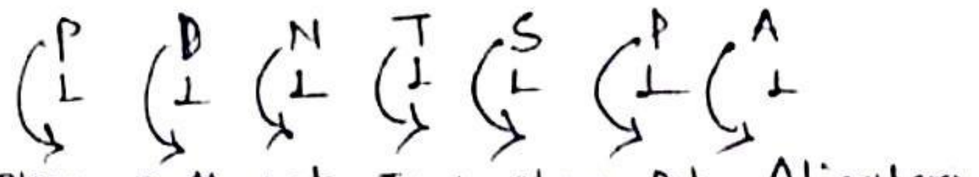
optional functionality

1. Encryption / decryption.
2. Check pointing.
3. Routing.



→ Depending on all the functionality and there grouping there are several ~~free~~ refference model-

1) ISO - OSI.
2) TCP/IP.
3) ATM
4) X.25
5) IEEE
⋮



sachin wife anjali

classmate
Date
Page

- **ISO - OSI**: (International standard organization open system Interconnect)

All layers:

1) Physical Layer (PL) → deals with H/W
2) Datalink Layer (DL) → H/W & softwears.
3) Network Layer (NL) → complex
4) transport Layer (TL) → Thick layers.
5) Session Layer (SL) } for the User Interactiveness.
6) presentation Layer (PL) }
7) Application Layer (AL) }

Adv of layering –
→ Divide and Concer possible.
→ Encaptulation possible.
→ abstraction is possible.
→ Testing possible.

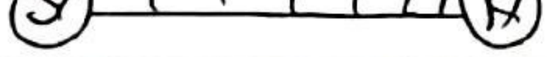
① Physical layer:

→ Physical layer is electrical, mechanical, Functional and prosigeral characteristic of physical links.

links	Signal type
copper	Electrical
optical	Light.
Wireless	Eeletro magnetic Waves

Transmission mode — (PL)

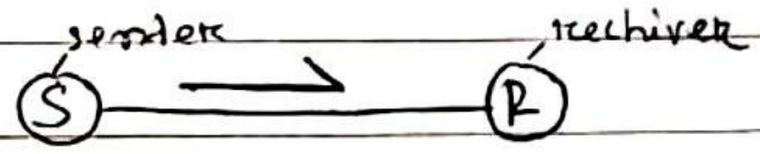
1) Simplex Transmission (STY)



2) Ans

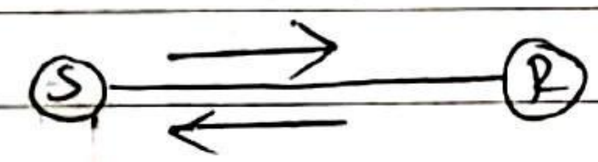
PL deal with all of there.

1) Simplex transmision (ST)



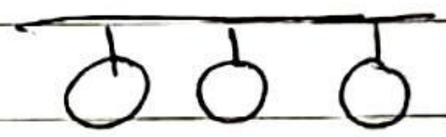
2) Half-duplex transmission (HDT)

3) Full duplex transmision (FDT)

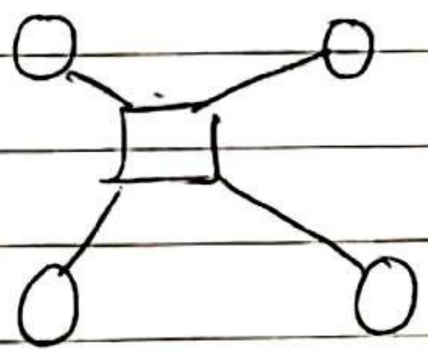


Topology — (PL)

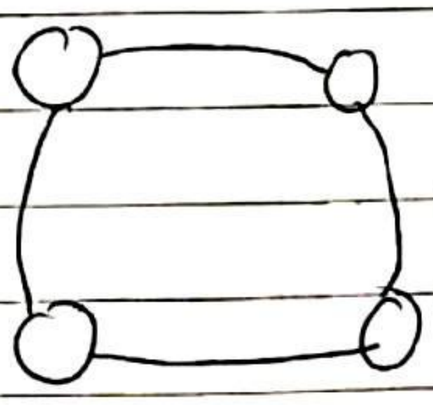
✓1) BUS



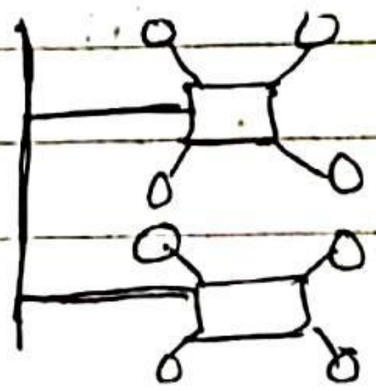
✓2) star



3) ring



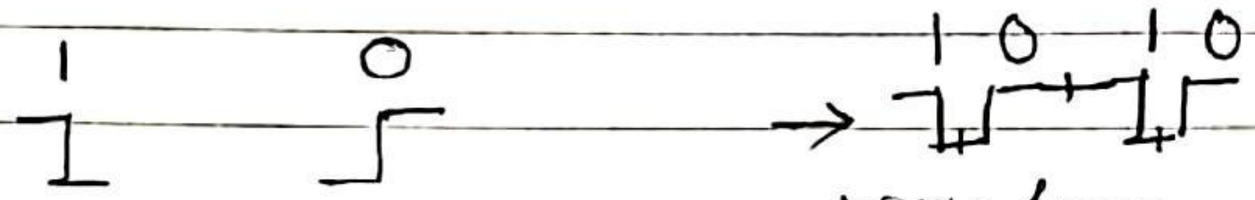
4) combination (tree/ Hybride)



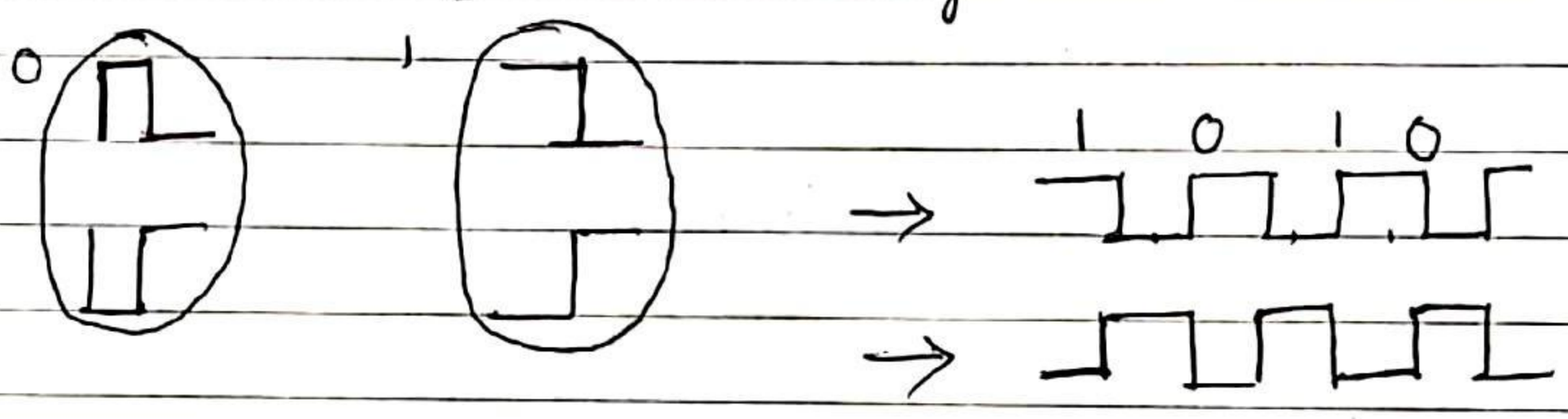
Encoding : (PL)

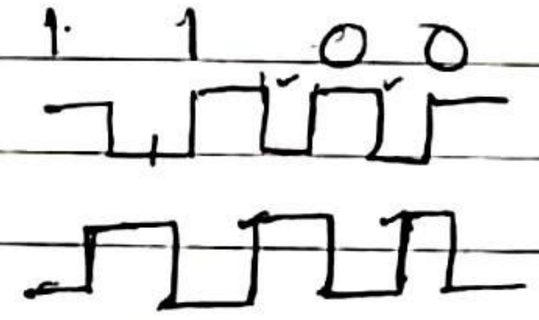
~~1010~~ Signal - 1010

→ Manchester encoding -



→ Differential manchester encoding -





Baud rate = 2 * Bit rate

To send 1 bit = 2 voltage required.

10 bit = 20 vol

10 bit/sec = 20 vol/sec.

↓ ↓

Bite rate — Baud rate

~~Physical~~ layer deals with -

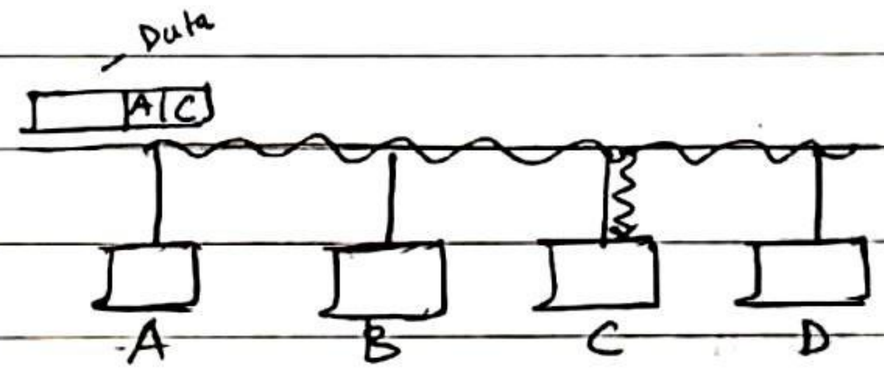
1) Transmission mode.
2) ~~Token~~ Topologys
3) Encoding.

② Data link layer –

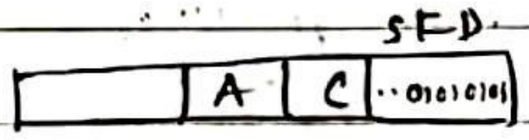
~~responsibilities~~ Responsibilitys–

1. flow control (S&W, GBN, SR)
2. error control (CRC, checksum)
3. Framing.
1. physical addressing.
5. Access control (CSMA/CD, Token passing ...)

3. Framing at DLL –



→ Framing have SFD.



(10101010101010 ...)

$(1+0)^*$

Regular expression

↓

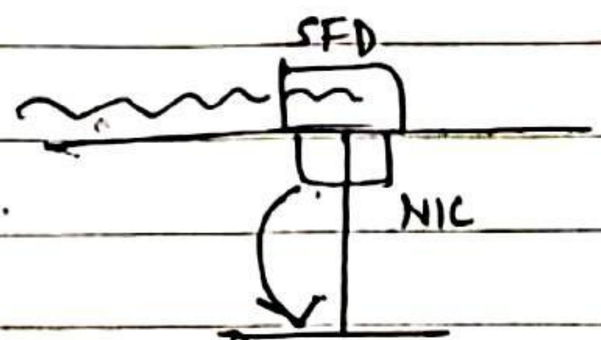
NFN

↓

DFA

↓

SC (sequential circuit)



→ Using SFD we can know packet is starting and after that we can know packet for me or not.

A B C D E

Framing implemented two way

Fixed length fram

Ex: size of fram always fixed

1 = 1000 B

1000 1000

Disadvantage → Internal fragmentation

(900B) + 100B = 1000B

padding — I want to send 100 B

variable length fram

Ex: Frame can be any

urgent ID — 10B

size - 1000 — 1000 B

100 — 100B

Length — frame gives its size ✓

End Delimited — ED SFD — say about end of frame

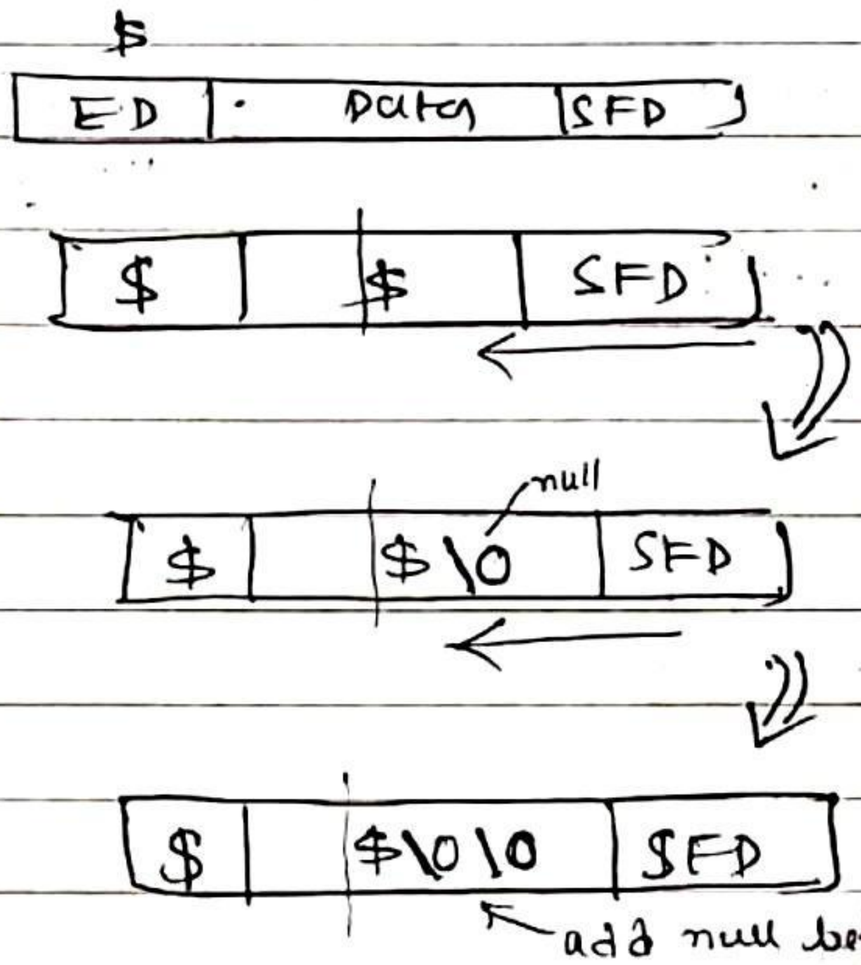
ED Data SFD

When ED = same as Data then problem

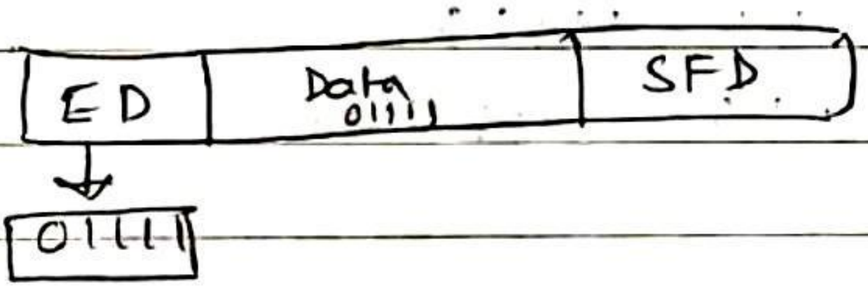
character stuffing

Bit stuffing

• Character stuffing (CS) :



✓• Bit stuffing (BS) :



Sender

Data : 01111

D : 011101

Receiver

01111

01110 1

Rules →

ED

01111

Data: 01101 ⟹ 01110 1

ED: 011111

actual-D: 011110

⇓

0111100

⇓

receiver

0111~~1~~0

011110

011111

⇓

0111101

ED: 01111

0111[0]

D: 0111000111110

⇓

~~0111000111110~~

0111[0]000111[0]10 → after Bit stuffing.

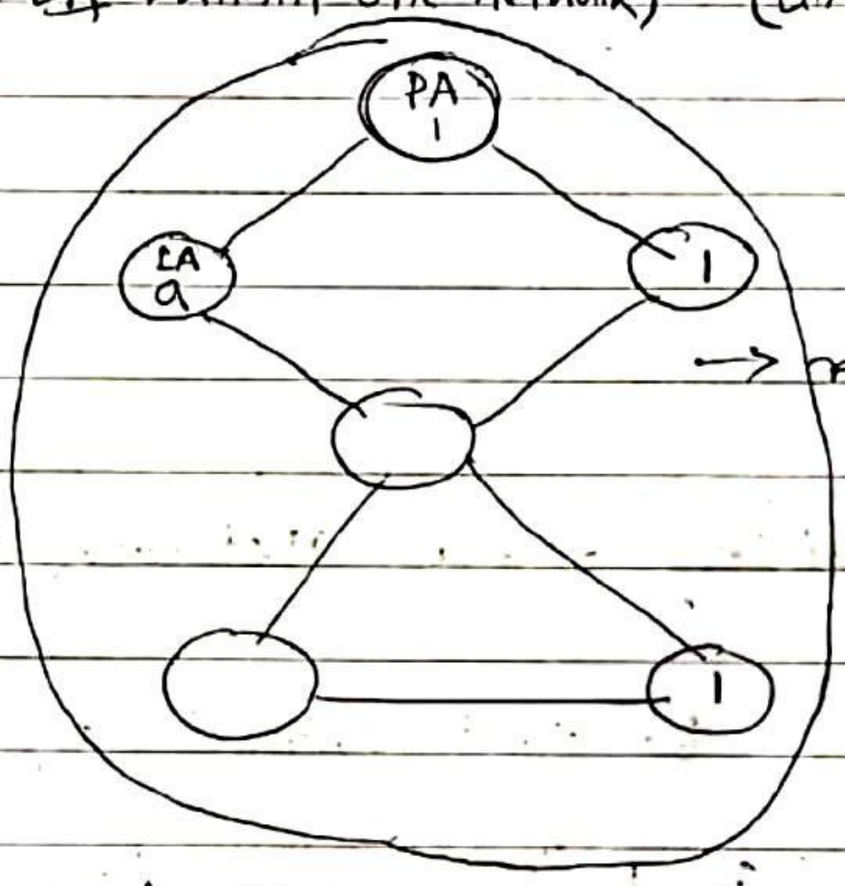
ED: 0111111

0111111[0]

• Physical addressing :-

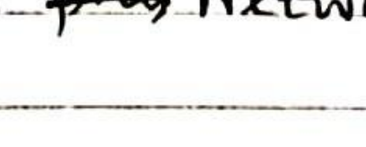
Physical addressing =

Physical Address (unique within one network) & Logical address. (unique in entire network)



IP address
32 / scw

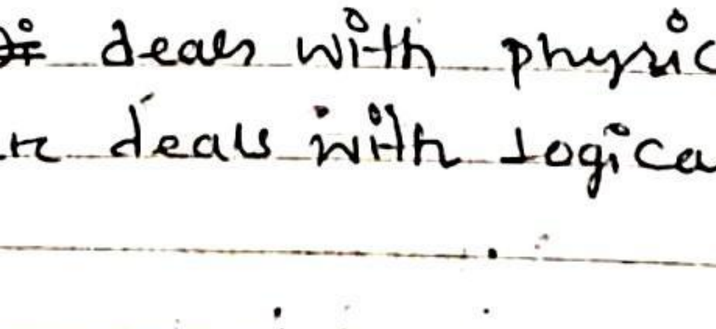
no two IP address are same.



MAC address
48 bit / Hw

NIC → ROM

no two MAC add are same.



→ IP / MAC address globaly unique.

→ As logical address IP address used.

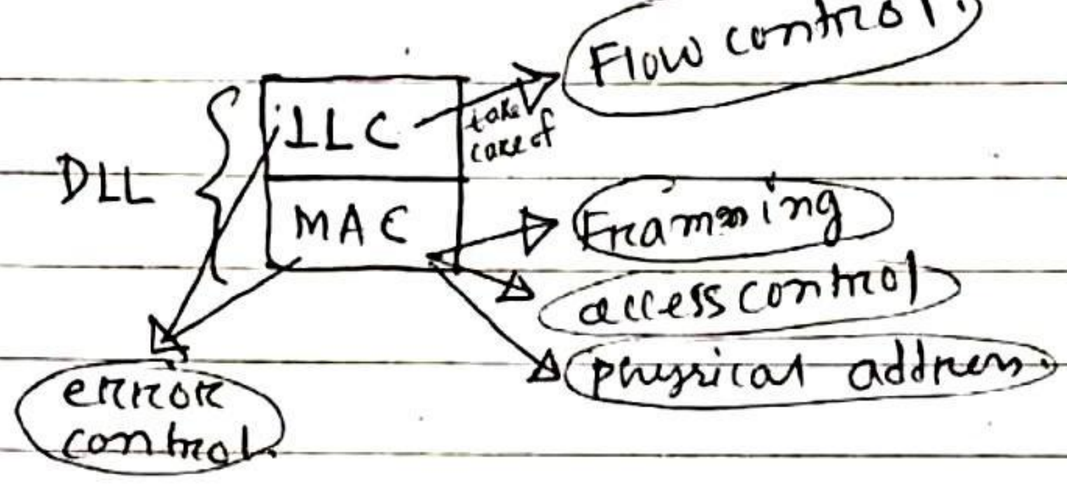
→ As physical address MAC address used.

→ Data link layer deals with physical address.

→ Network layer deals with logical address.

• internet → collection of network.

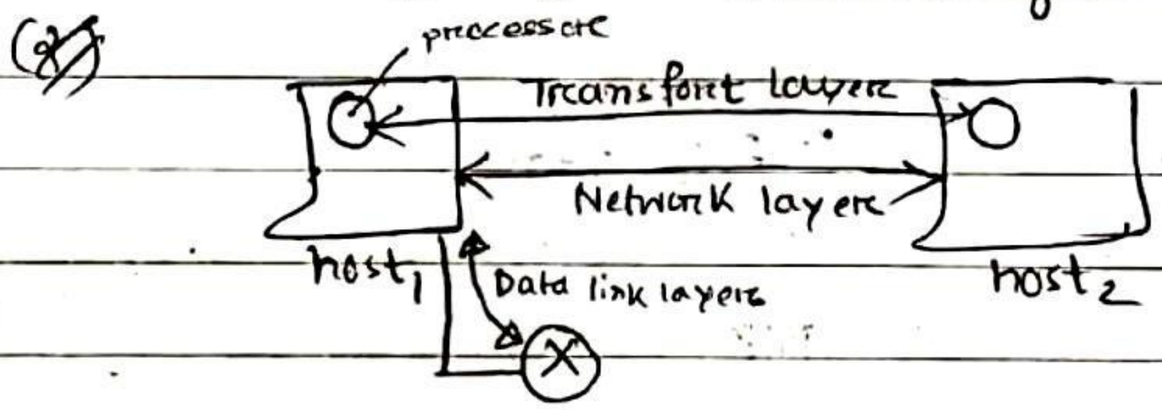
Data link layer Divided into two parts —.
→ Logical link control.
→ Mediaim access control.



(3) Network layer — (layer-3)

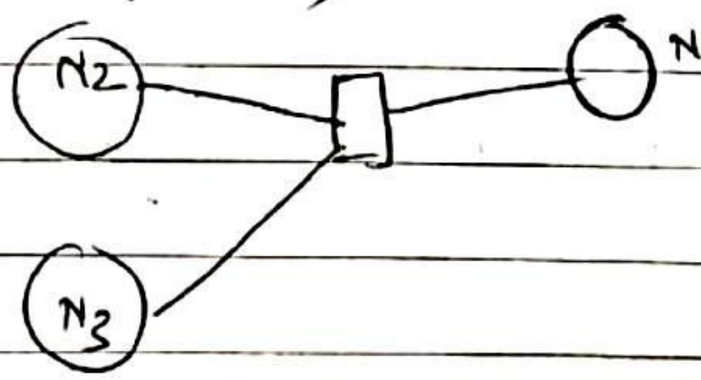
Responsibility of Network layer —

(1) Host to Host connectivity.

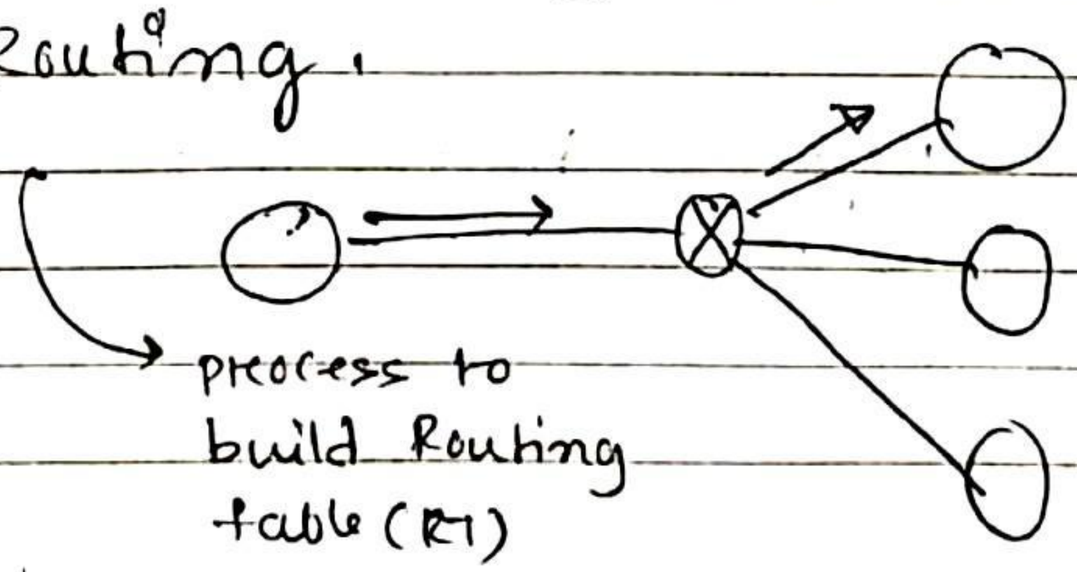


(2) logical addressing

(3) switching (connecting various network together)



(4) Routing:



(5) Congestion control.
(6) Fragmentation.

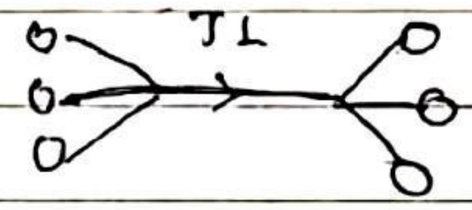
④ Transport layer —

The main responsibility of transport layer —

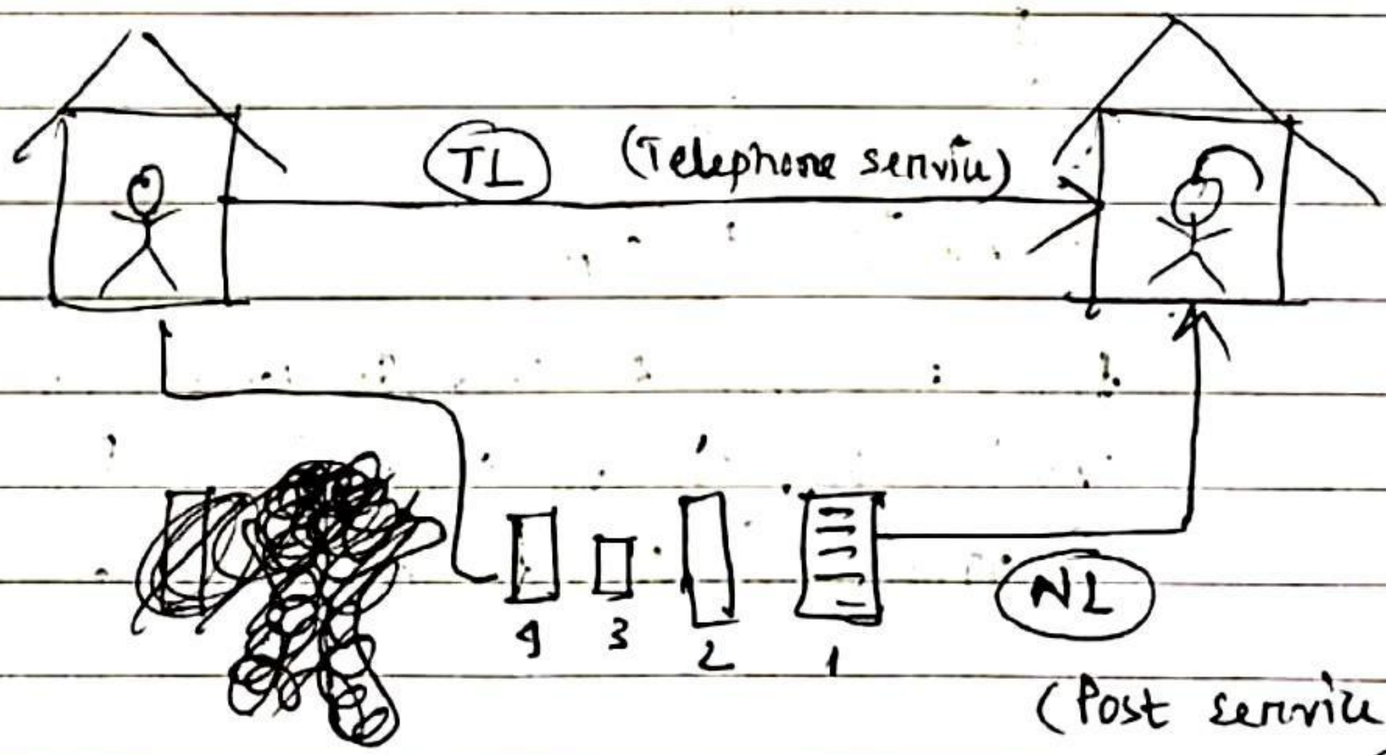
(1) End - End Connectivity. (SPA) — protocol.
(Service point addressing)
~~SPA~~

(2) Flow control. (SR) — protocol

(3) Error control. (CCS)
(4) Segmentation
(5) Multiplexing and Demultiplexing

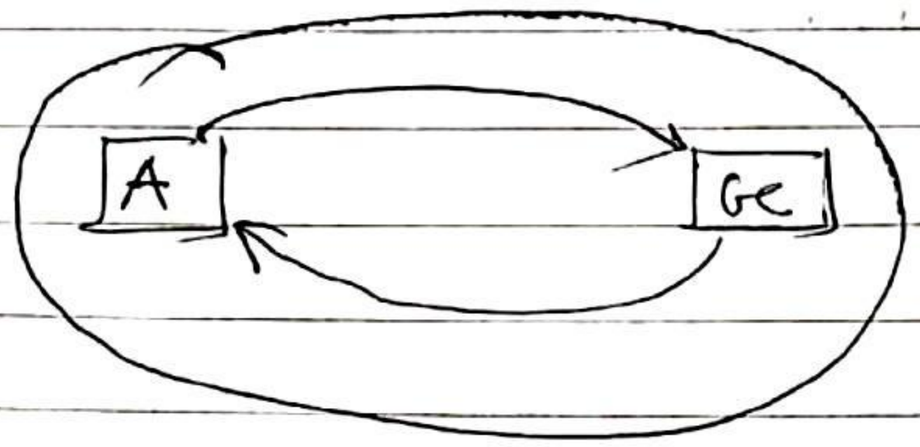


(6) Congestion control.



- How all the layers work together —

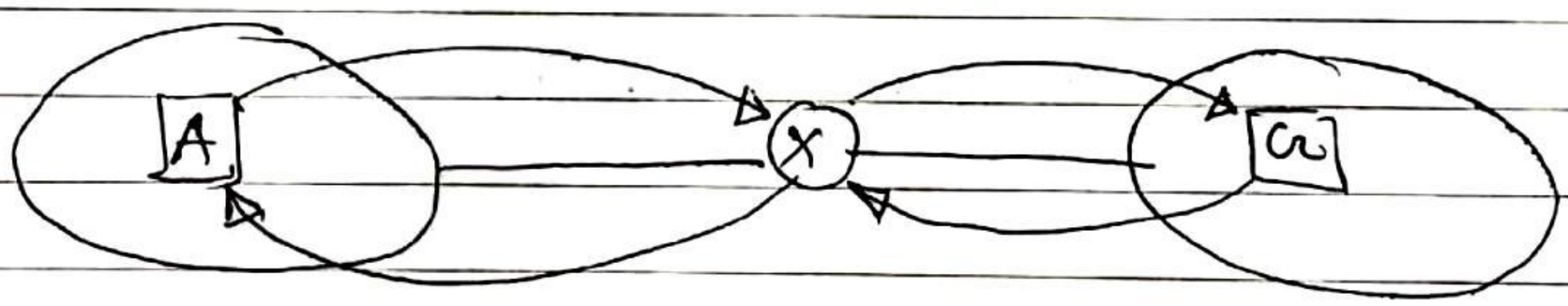
A → you
G → google.
I_A → your IP add
I_G → google IP
S_A → sub netmask of A.

① 

I_A I_G
S_A S_A
$NID_{AA} = NID_{GA}$

↳ that means A and G are in same network.

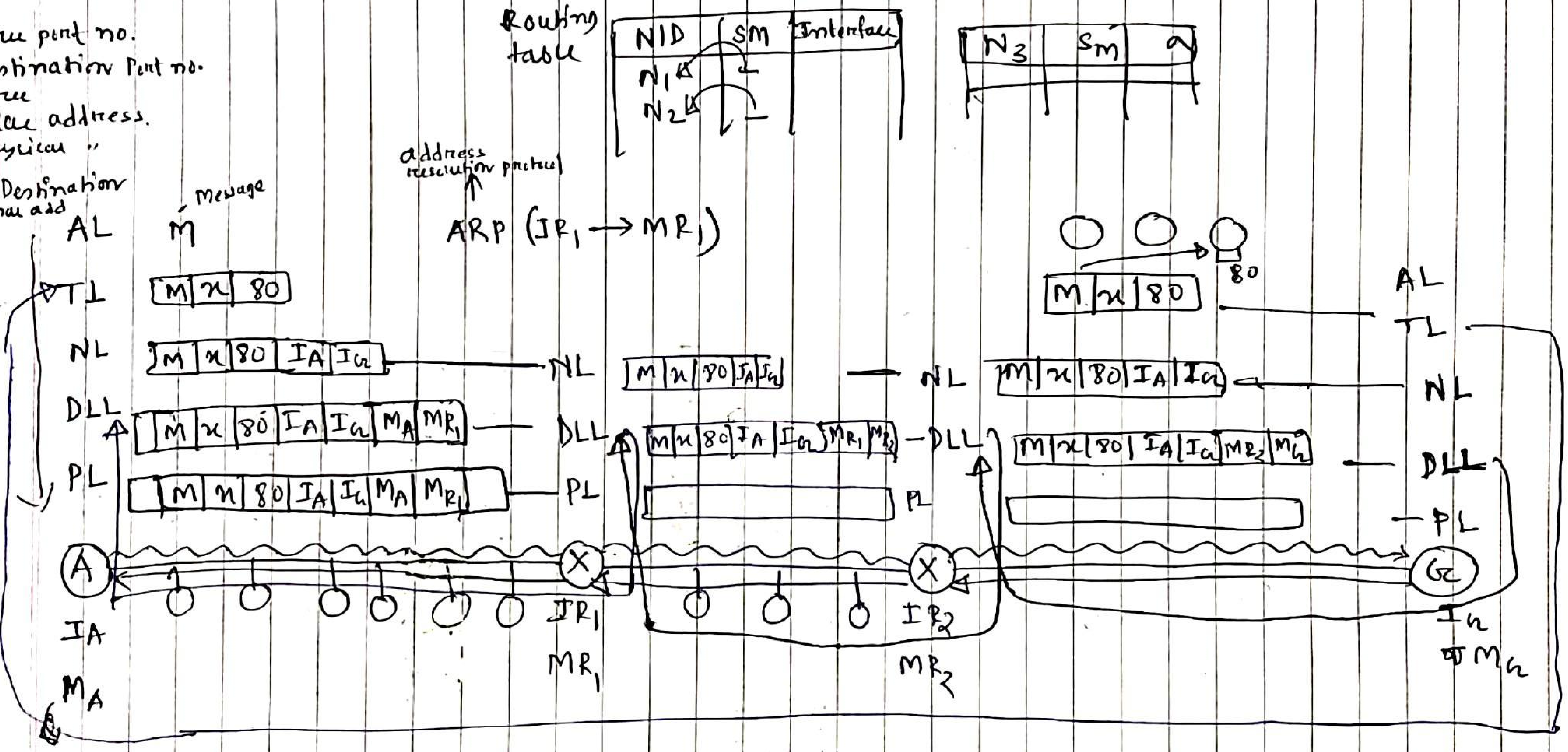
②



I_A I_G
S_A S_A
$NID_{AA} \neq NID_{GA}$

↳ that means A and G both are in diff network, they required Router to Communicate each other.

x → source port no.
80 → Destination Port no.
MA → source Mac address.
→ physical "
M_{R_1} → Destination mac add

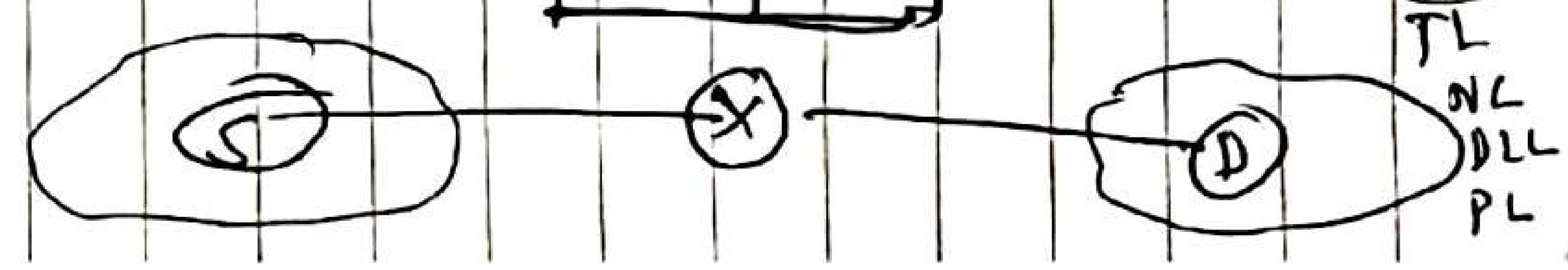


TL → end to end (processor to processor)
NL → Host to Host.
DLL → hop to hop.

Ⓧ Router have only three ~~la~~ layers
→ TL
→ NL
→ DLL.

NL	
DLL	DLL
PL	PL

(hot) 2 — AL
2 — TL
3 — NL
4 — DLL
. PL



(5) Session layer –

responsibilitys. –

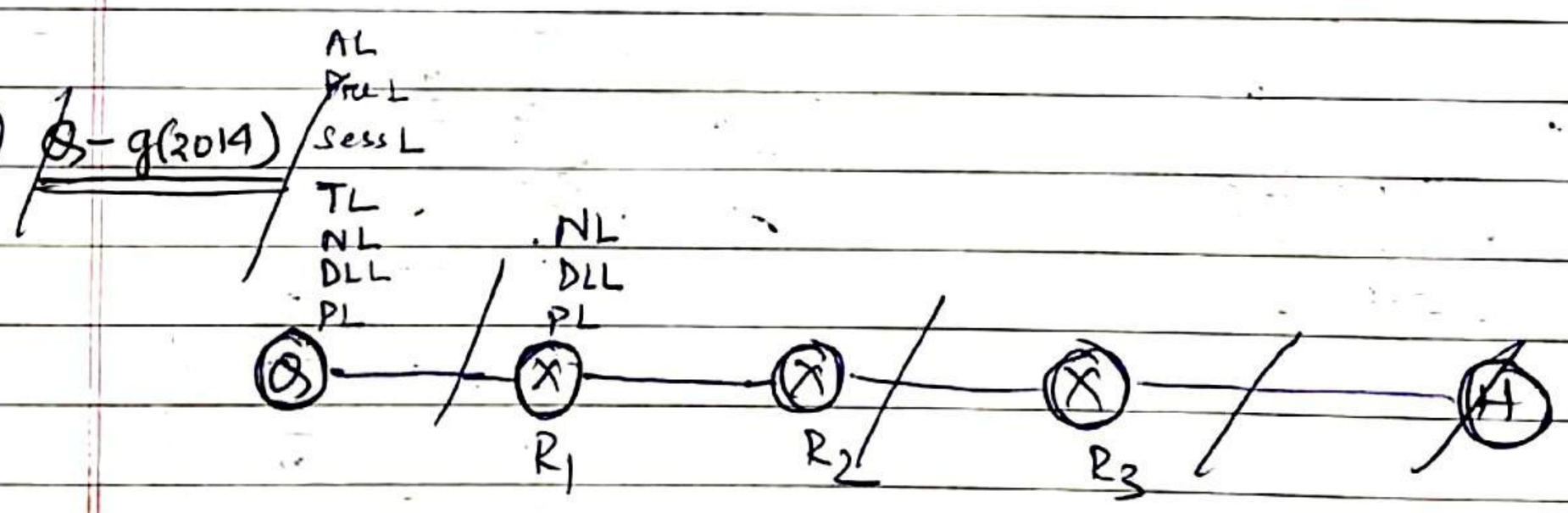
(1) Authentication & Authorization.
(2) check pointing.
(3) Synchronization.
(4) Dialog control.
(5) logical grouping.

(6) presentation layer –

responsibility –

(1) Character translation.
(2) Encryption / ~~Dis~~ Decryption.
(3) Compression / Expension.

(1) ~~B~~ - g(2014)



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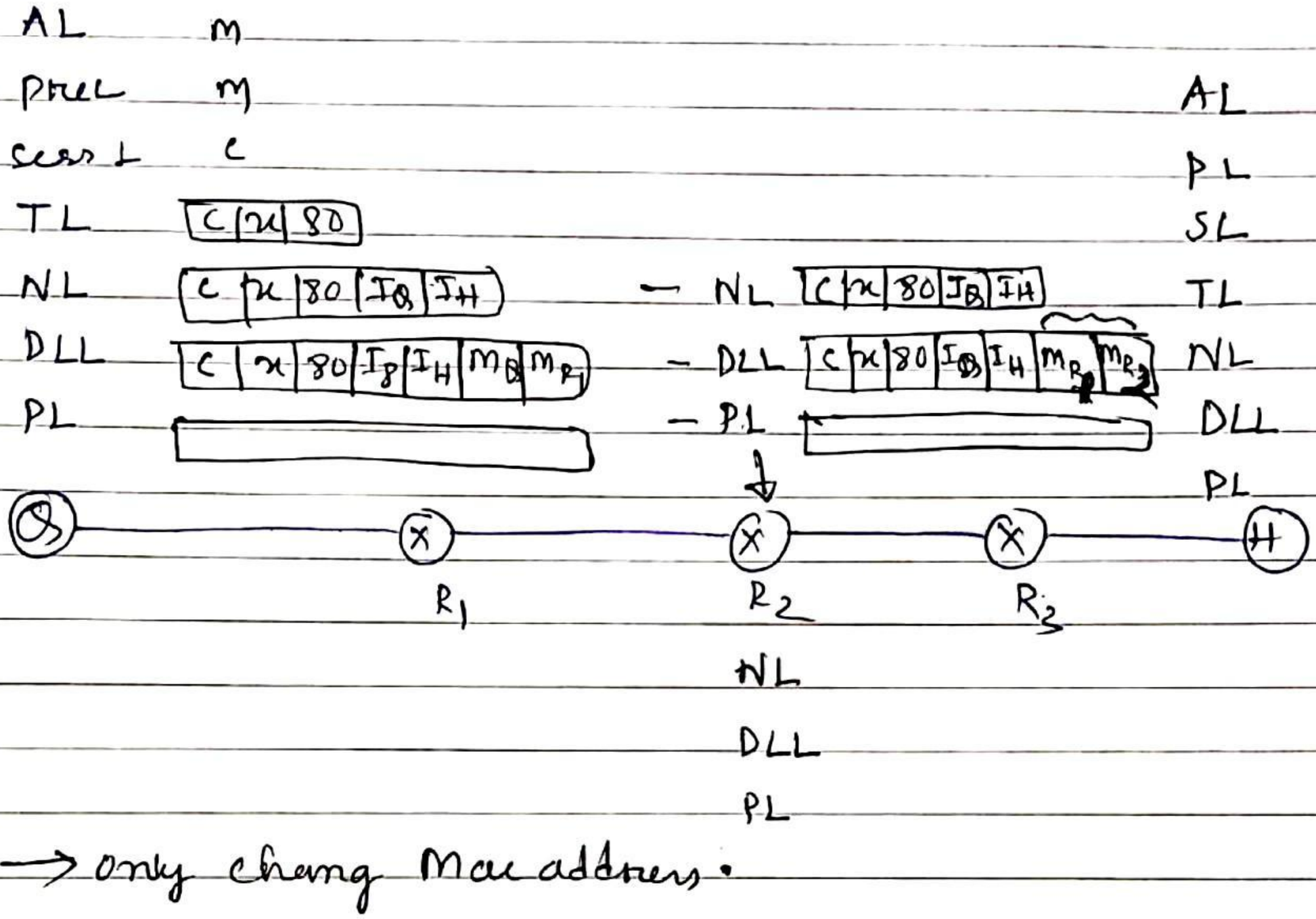

→ Only Change Mac address.