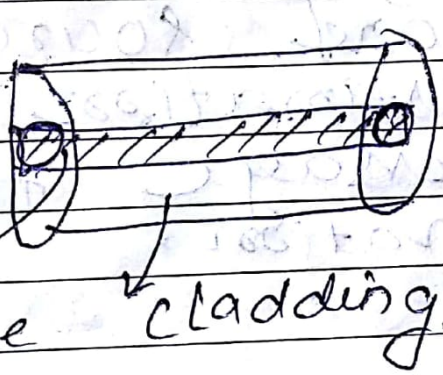
1 (a) Serial Line Internet protocol.

(b) Internet Service provider.

(c) Guided is wired transmission in which data signals are guided along a physical path.

Example optical fiber.



Unguided is wireless transmission to exchange bits of data.

Example microwave

(d) $$C = B \log_2 \left(1 + \frac{S}{N}\right)$$

Channel capacity theorem states that maximum amount of message is received with more loss.

Here
C = capacity
B = Bandwidth
$\frac{S}{N}$ = Signal to Noise ratio

(e) Framing in the data link layer separates a message from one source to a destination or from one message to other destination.

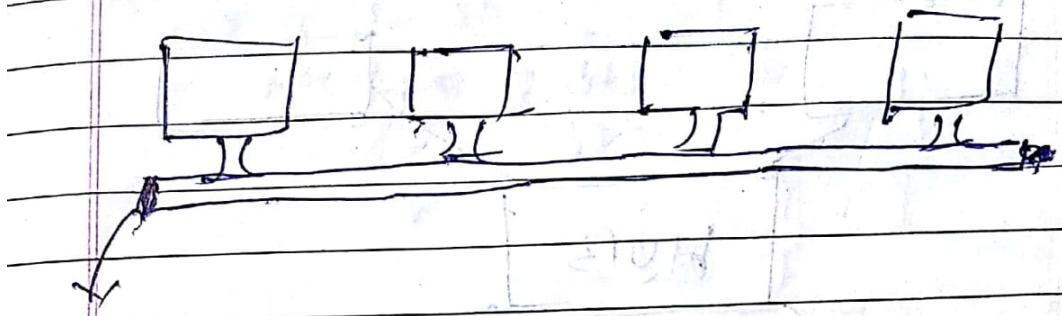
(2) Physical and logical arrangement of computers, cables, networks, hubs are called topology.

There are basic five types of topology :-

(1) Bus topology
(2) Star topology
(3) Ring topology
(4) Mesh topology
(5) Hybrid topology.

Teacher's Signature .....

Bus topology :-



terminator

→ In bus topology all the computers are connected for straight line path.

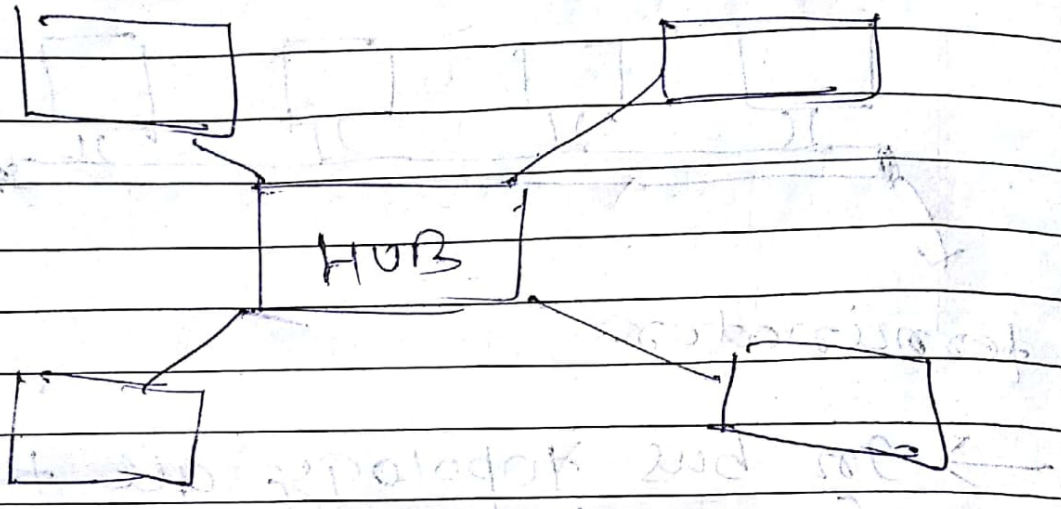
→ We need a hardware called terminator to seperates the computers.

→ The disadvantage of bus topology is that if data is block at one stage then another does not carry the process.

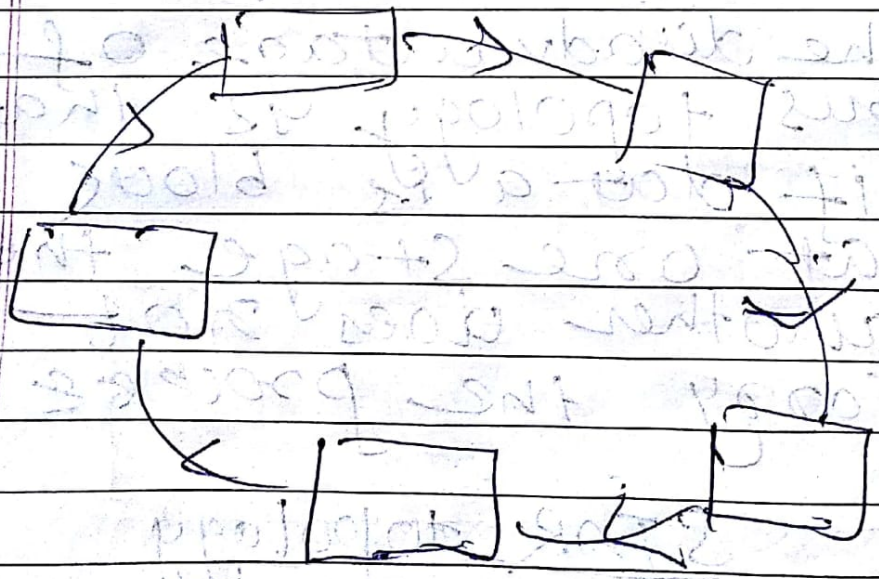
STAR topology

In star topology all computers cables are connected with hubs

Hub is a connecter devices.



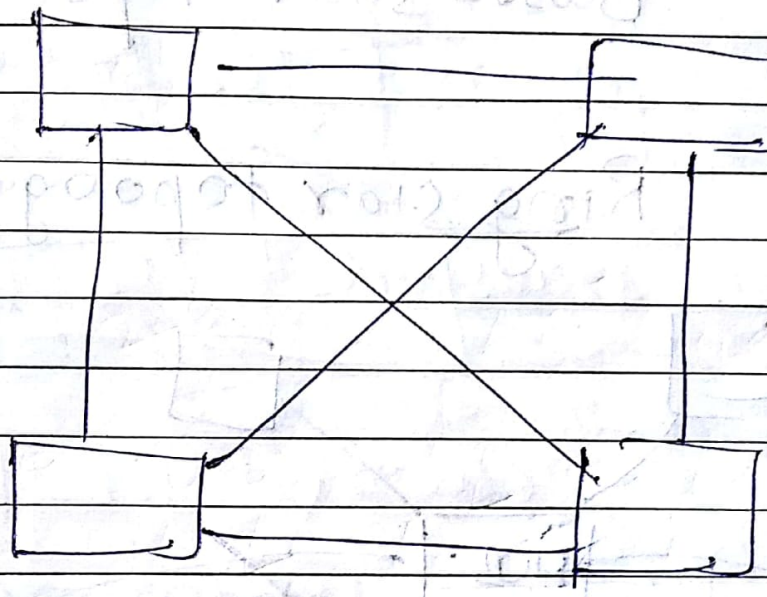
Ring Topology:



for ring topology all the computers / cables are connected in the

Circular form.
And data are transmitted in one direction.

Mess topology:



→ In mess topology all computers are connected with seperates cables.

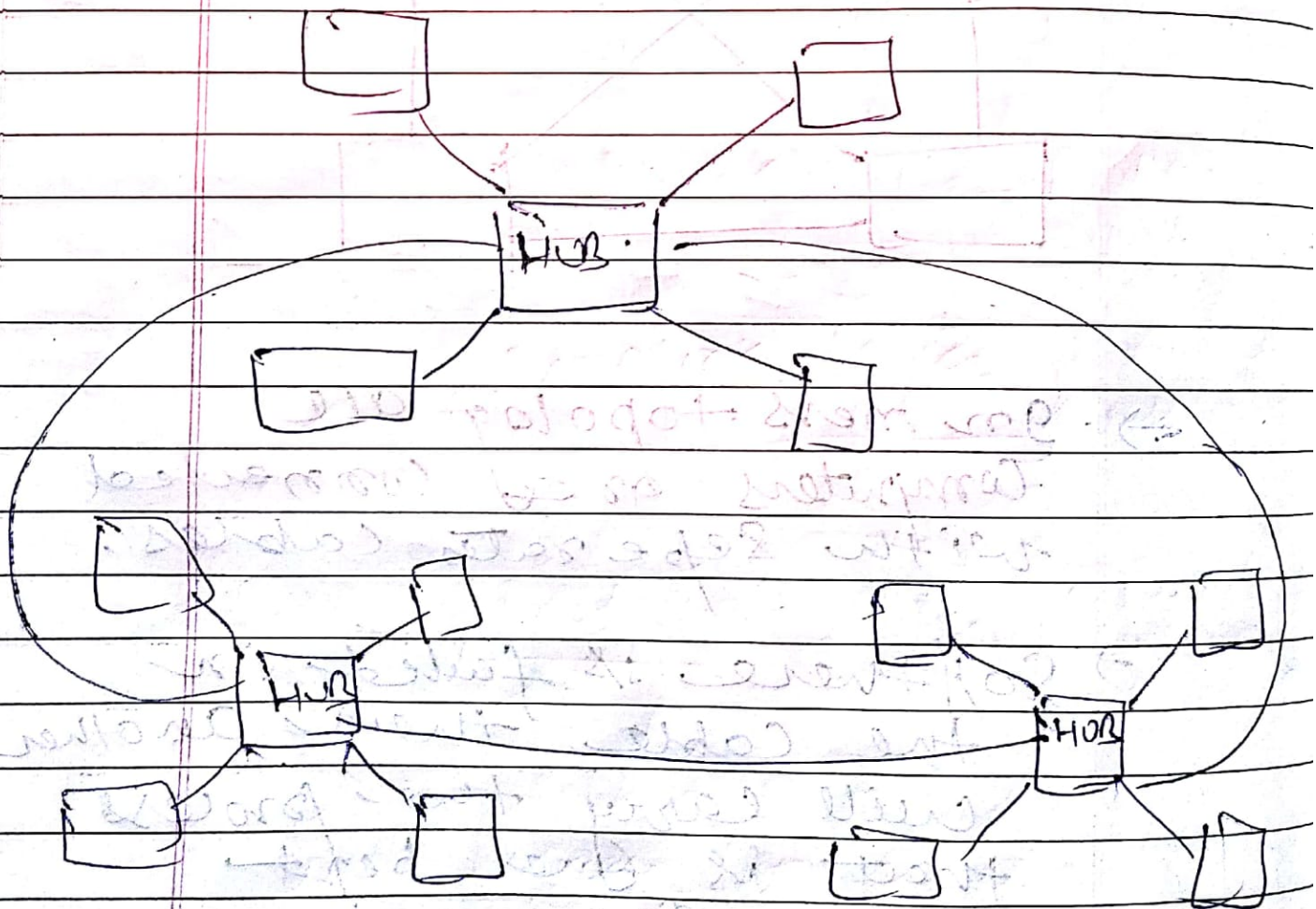
→ So, if there is failed in the cable then another will carry the process that is the best advantage of the mess topology.

Hybrid topology

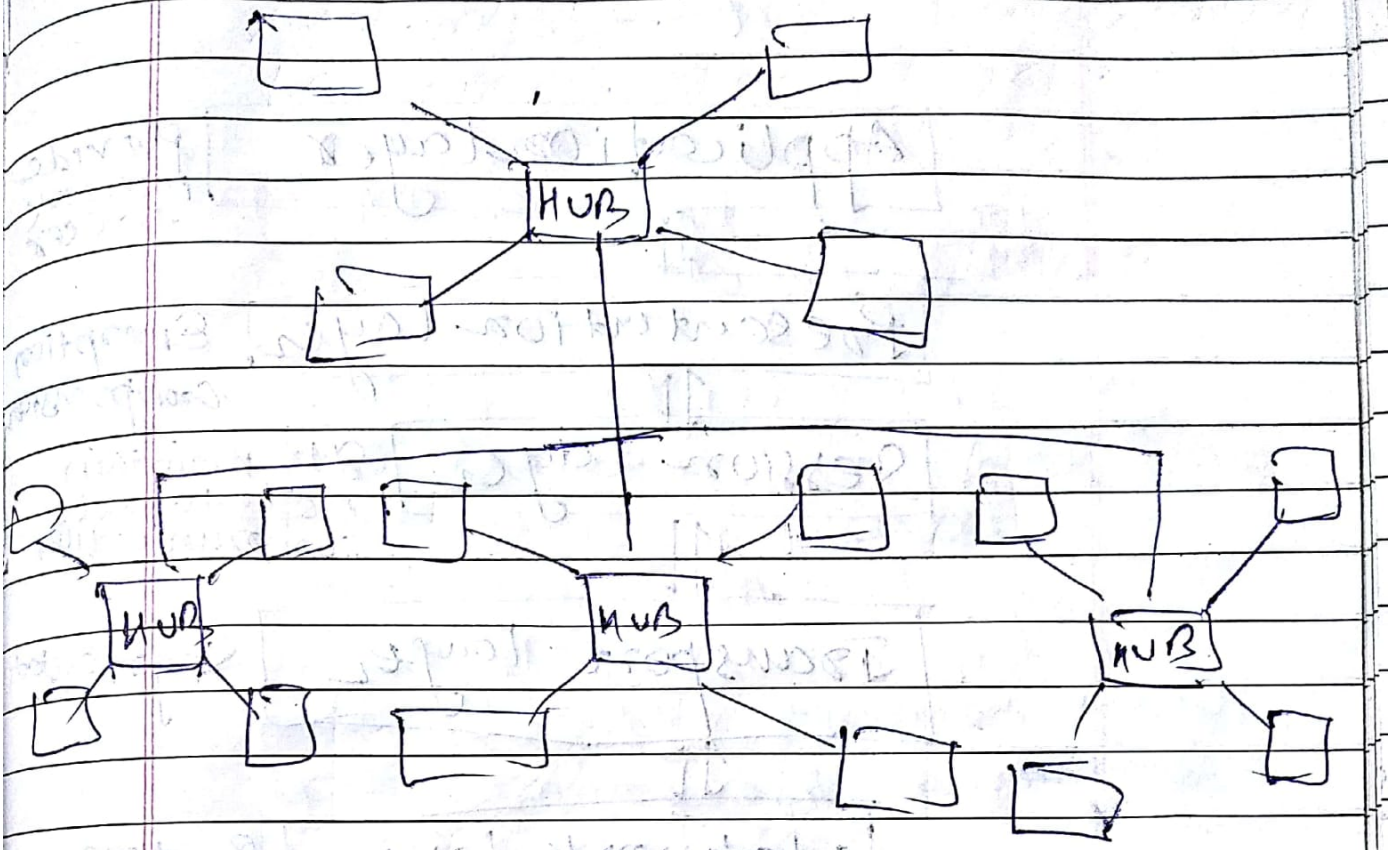
An hybrid topology is two or more topology are connected to form hybrid topology.

1) Ring – star topology
2) Bus – star topology.

Ring star topology



Bus – Star topology :-



(3) OSI Model

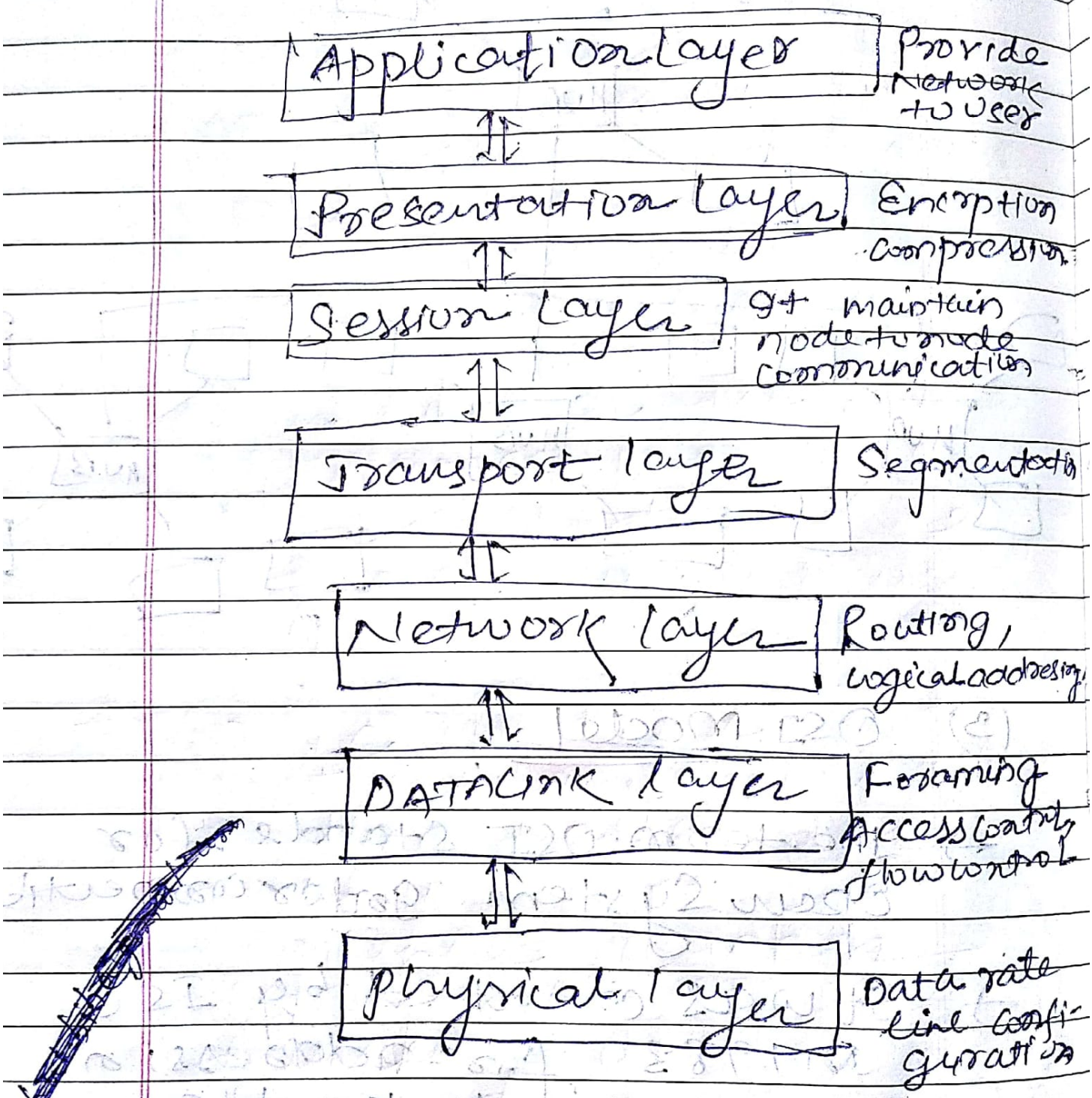
→ The term OSI stands for Open System Interconnection

→ It was created by ISO in 1983 for addressing the network problem.

→ The purpose of an OSI model is to show how to facilitate communication between different System without requiring changes

Teacher's Signature .....

to the logic of the hardware and software.



OSI model has seven layer and each layer is connected with each other

Difference between OSI & TCP/IP model are the followings:—

OSI	TCP/IP
(1) It has seven layer	It has five layer
(2) Network layer is both connection oriented & connection less	Network layer is connection less
(3) OSI Model has seperate presentation & Session layer	TCP/IP does not have a separate presentation layer or Session layer
(4) Transport layer is connection oriented	Transport layer is both connection oriented and connection less
(5) It is less reliable	It is more reliable

Teacher's Signature

(4) Sliding Window

→ Sliding window refers to imaginary boxes at the transmitter and receiver

→ This window holds the frame at either end and provides the upper limit on the number of frames that can be transmitted before requiring an acknowledge.

→ So, in short we can say that, at any instant of time the sender maintain a set of sequence number corresponding to the frames it is permitted to send.

→ Sequence number :—

One of the most important features of all the sliding window

Teacher's Signature .....

protocols that each outbound frame contains a sequence number, ranging from 0 to $2^n - 1$

→ The value of n can be arbitary.

→ These frames which are being permitted to sent are said to be falling in the sending window.

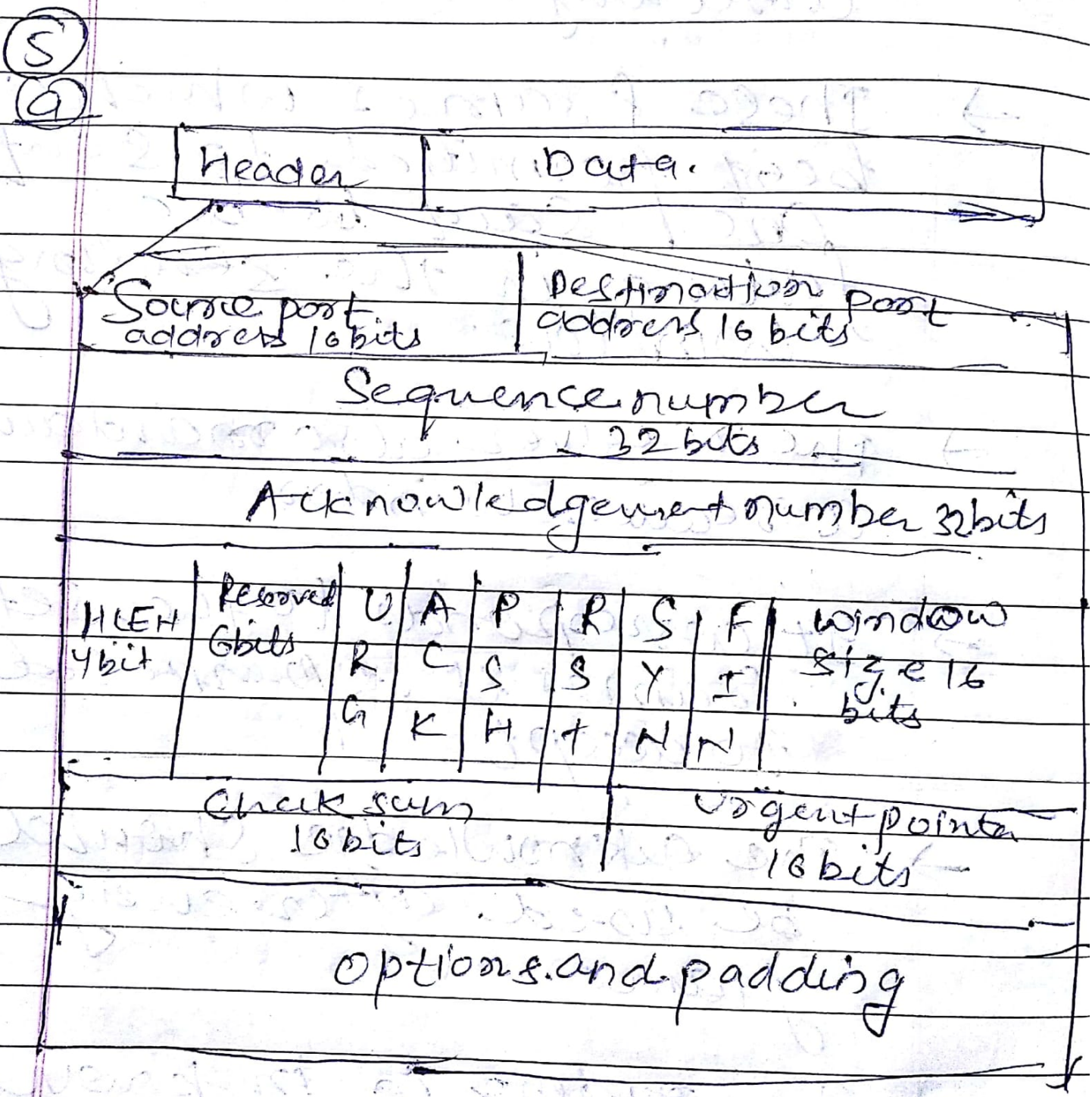
→ The receiver also maintains a receiver window.

→ It corresponds to the set of frames it is permitted to accept

→ The acknowledge should be used after every frame.

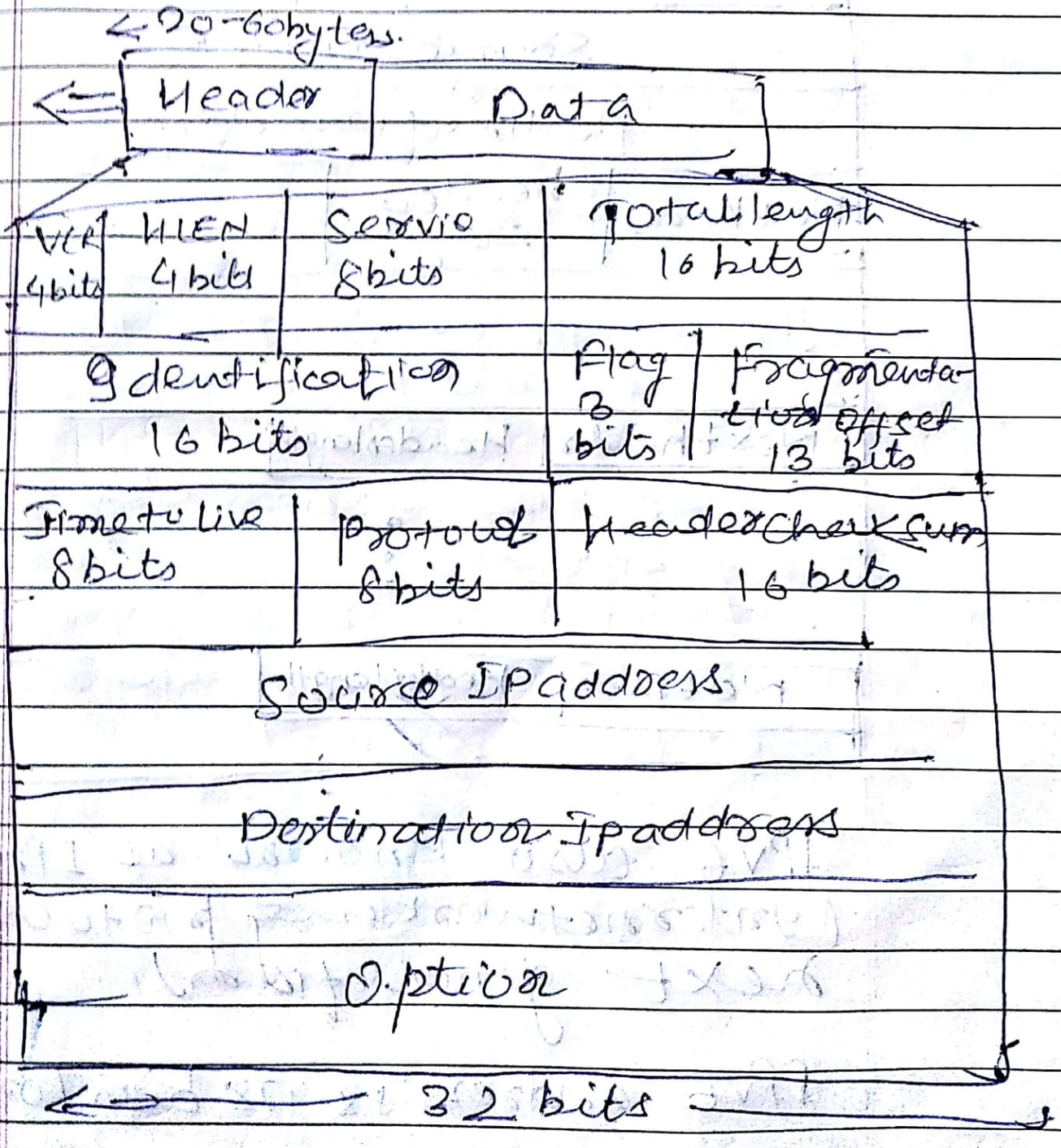
→ In order to improve the efficiency the sender sends multiple frames at time.

(5)
(a)

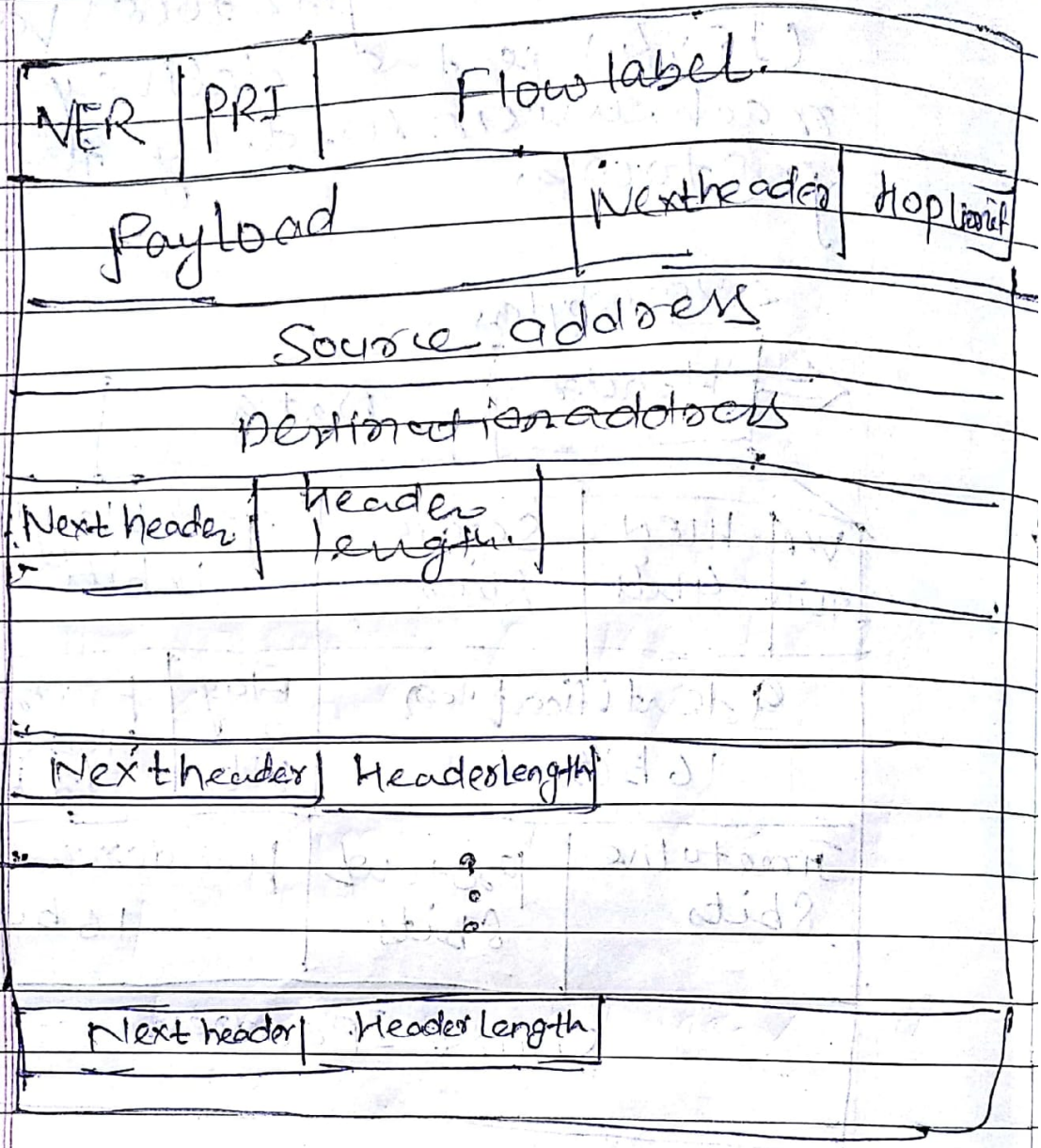


(b) IPV/4

The internet protocol version 4 (IPV4) is the delivery mechanism used by the TCP/IP protocols.



IpV 6



IPV6 also known as IPng (Internetworking protocol, next generation)

IPV6 address is 128 bits long

IPv 6 uses a new header format in which options are separated from the base header and inserted

Ans (c) Bit stuffing is the process of adding one extra 0 whenever five consecutive 1s follows a 0 in the data, so that the receiver does not mistake the pattern 01111110 for a flag.

Byte stuffing

Byte stuffing is the process of adding 1 extra byte whenever there is a flag or escape character in the text.

6) ALOHA

→ The earliest random access method.

→ Random access method means no station is superior to another station.

→ And none is assigned to control over another.

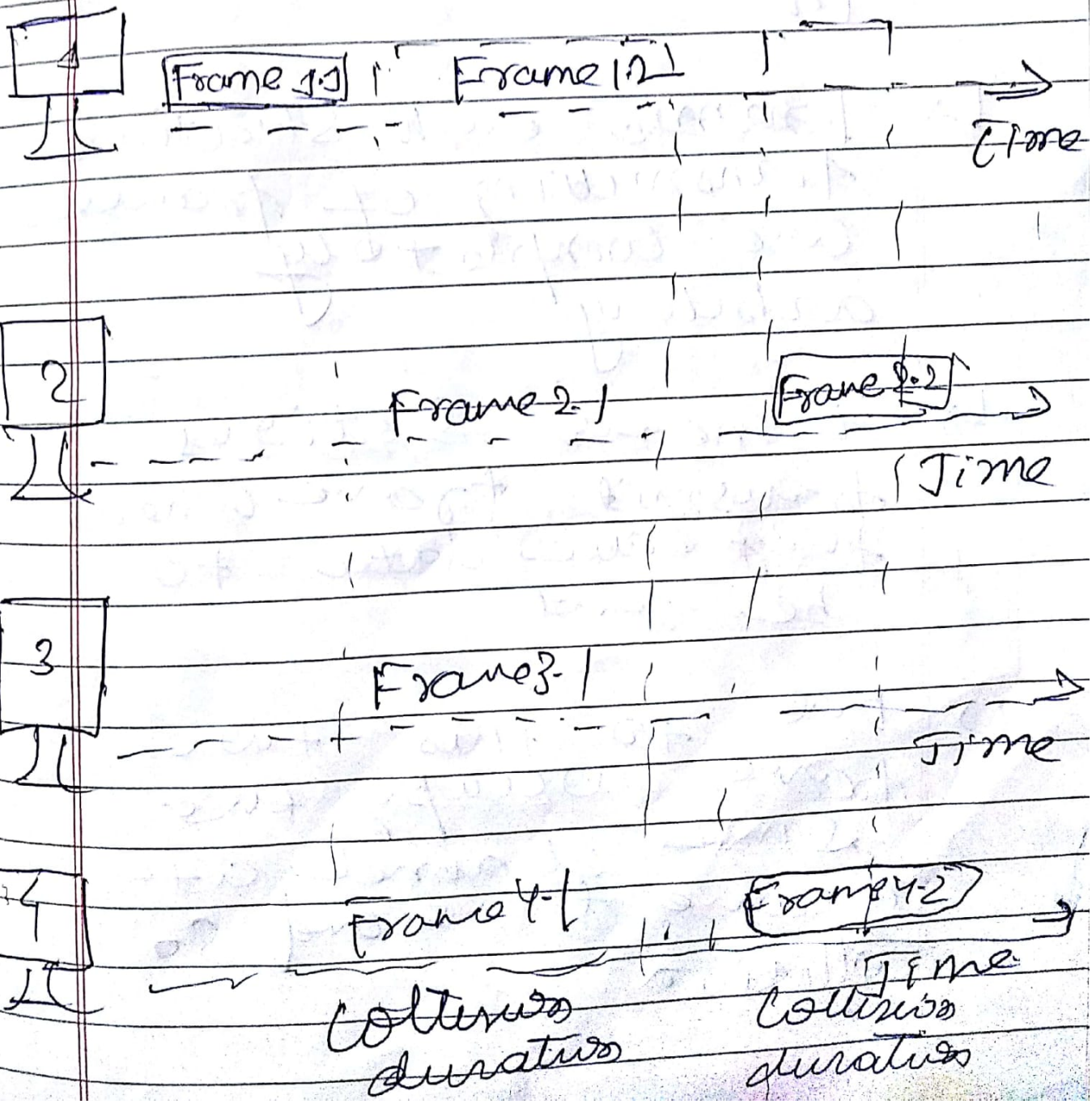
→ It has developed at the University of Hawaii in 1970.

→ It was developed for LAN, but it can be used on any shared medium.

→ The original ALOHA protocols is called pure ALOHA.

→ It is simple, but elegant protocol.

Frames in a pure ALOHA network :-



↳ It does not require global time synchronization

↳ & Uniform frame size is used in it.

↳ Uniform frame size increases the throughput of ALOHA System.

→ There are four station in

↳ ~~frame~~ each station transmitting of frame are completely arbitary

↳ It means Stations transmit frame when they have data to be sent.

↳ Due to this two frame occupy the same channel at a same time and so collision

Pure	Slotted
(1) Frames transmitted At Arbitary times	Frames transmitted at discrete time
(2) $S = Ge^{-2S}$	$S = Ge^{-S}$
(3) Utilization = 18.4%	Utilization 3
(4) Does not require global time	It requires Global time
(5) It is not used in satelites	It is used broadcast ca
(6) Vulnerable time $2 \times T_{fr}$	Vulnerable T_{fr}.