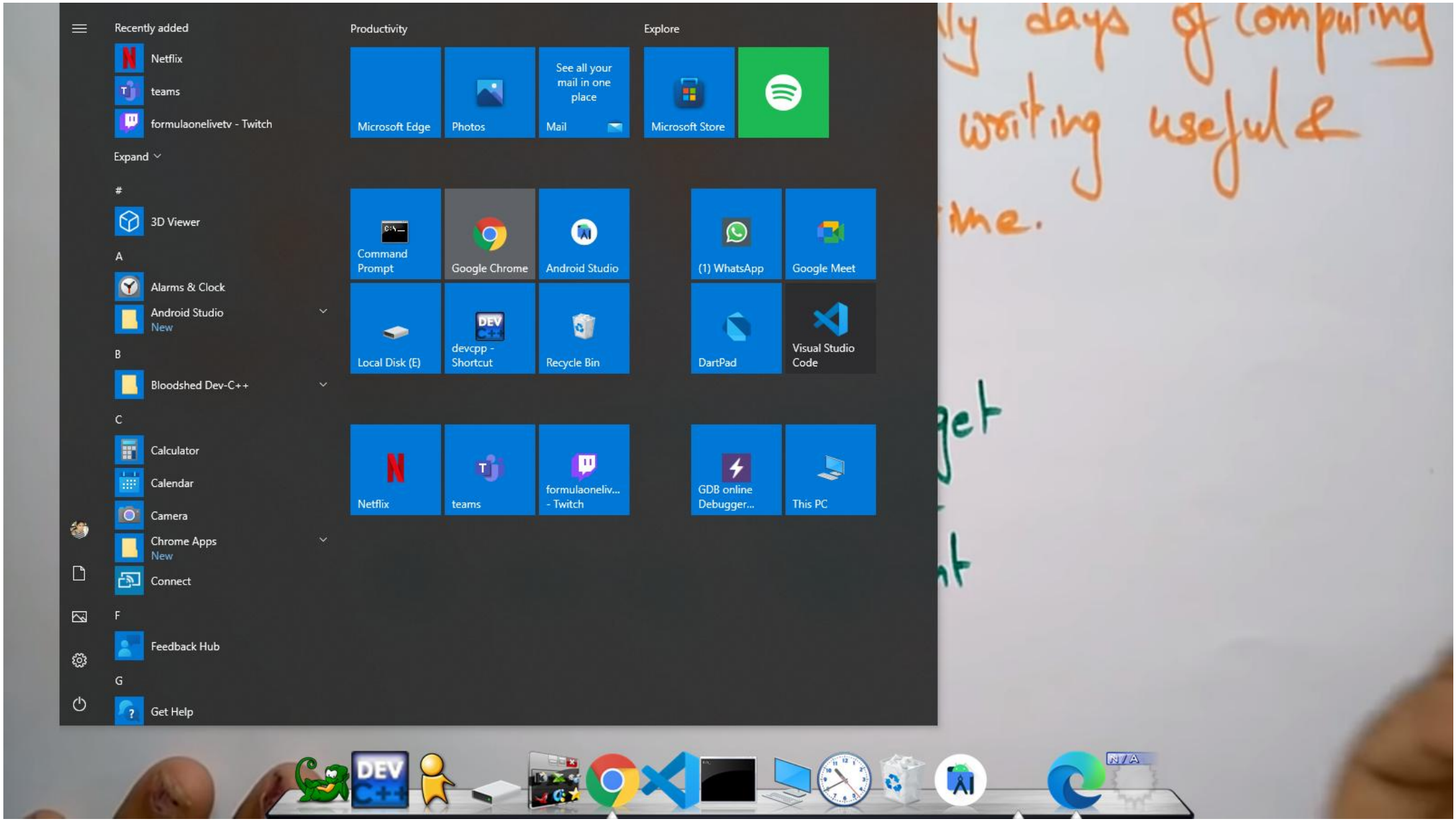
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Microsoft Store
Command Prompt
Google Chrome
Android Studio
(1) WhatsApp
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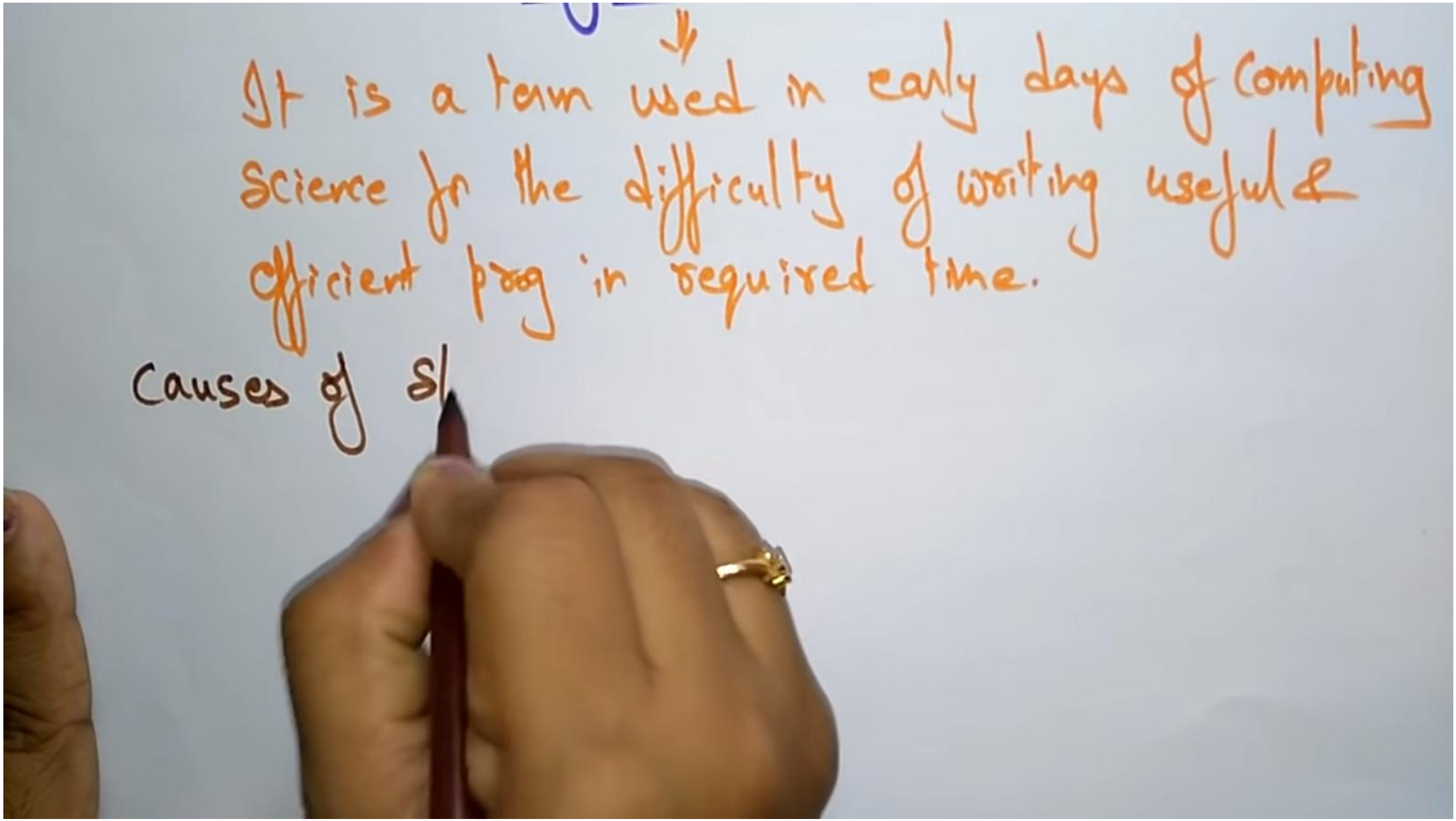
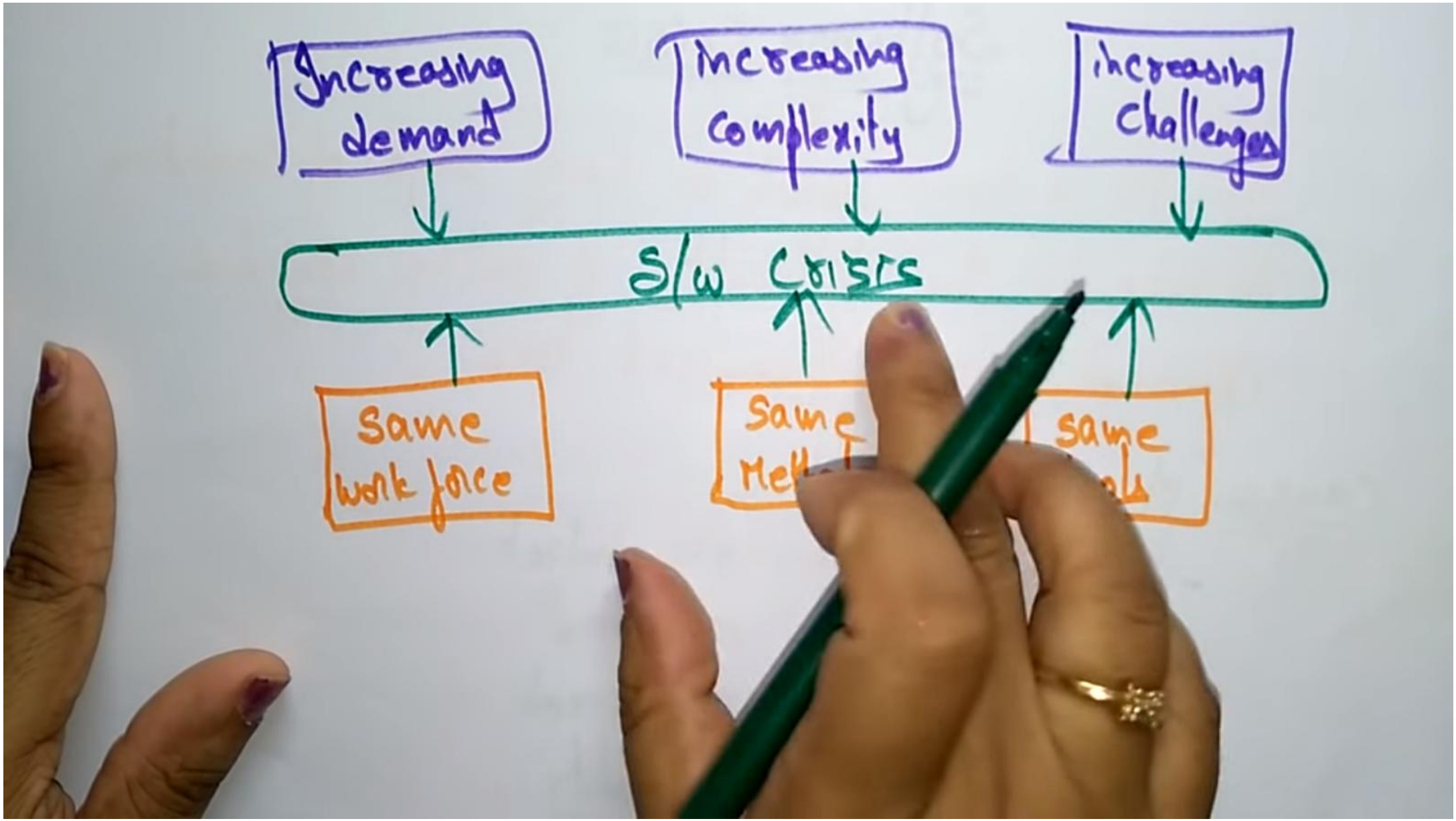
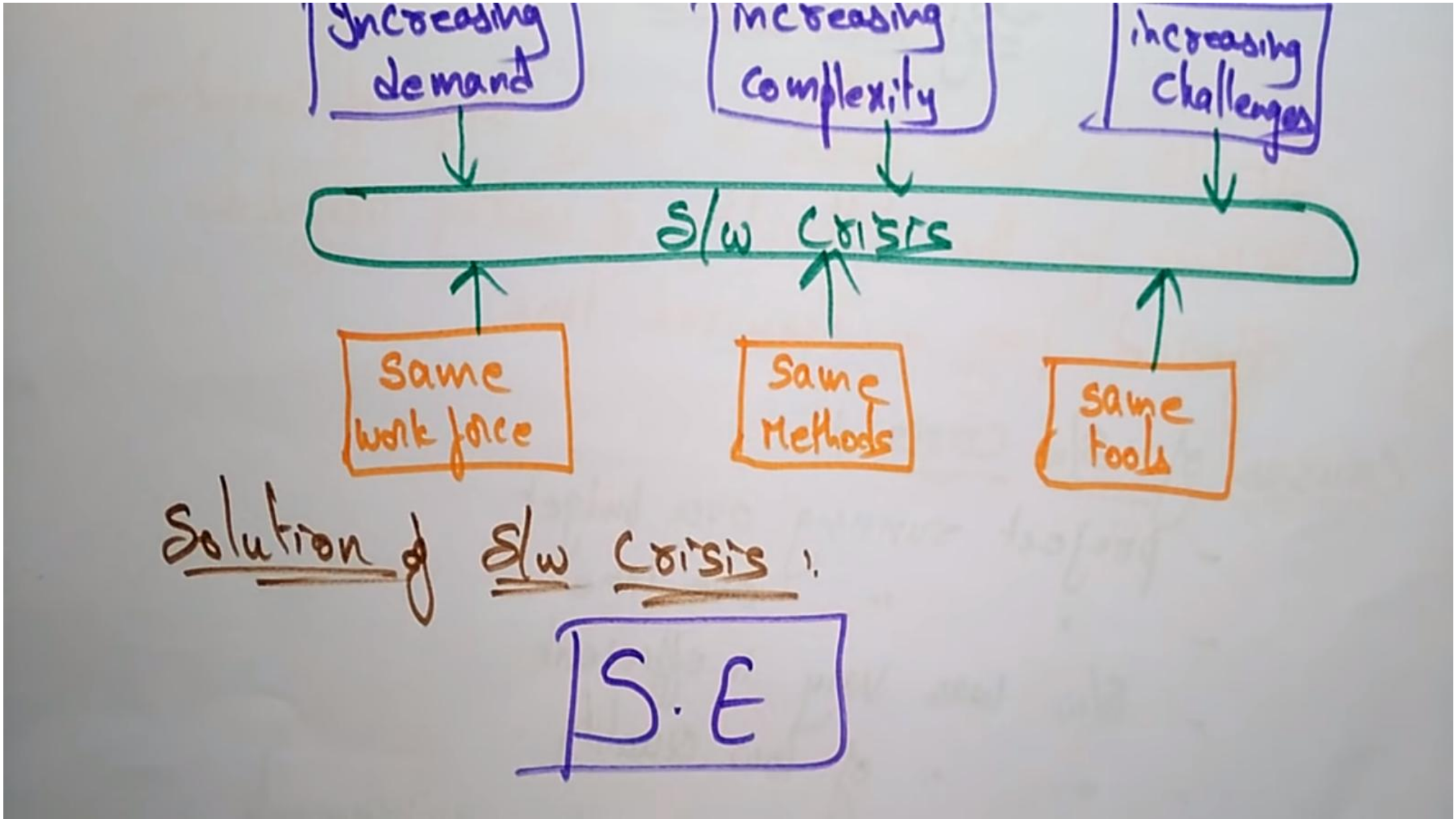

It is a term used in early days of computing
Science for the difficulty of writing useful &
efficient prog in required time.
Causes of sl

It is a term used in early days of computing science for the difficulty of writing useful & efficient prog in required time.

Causes of S/w Crisis :

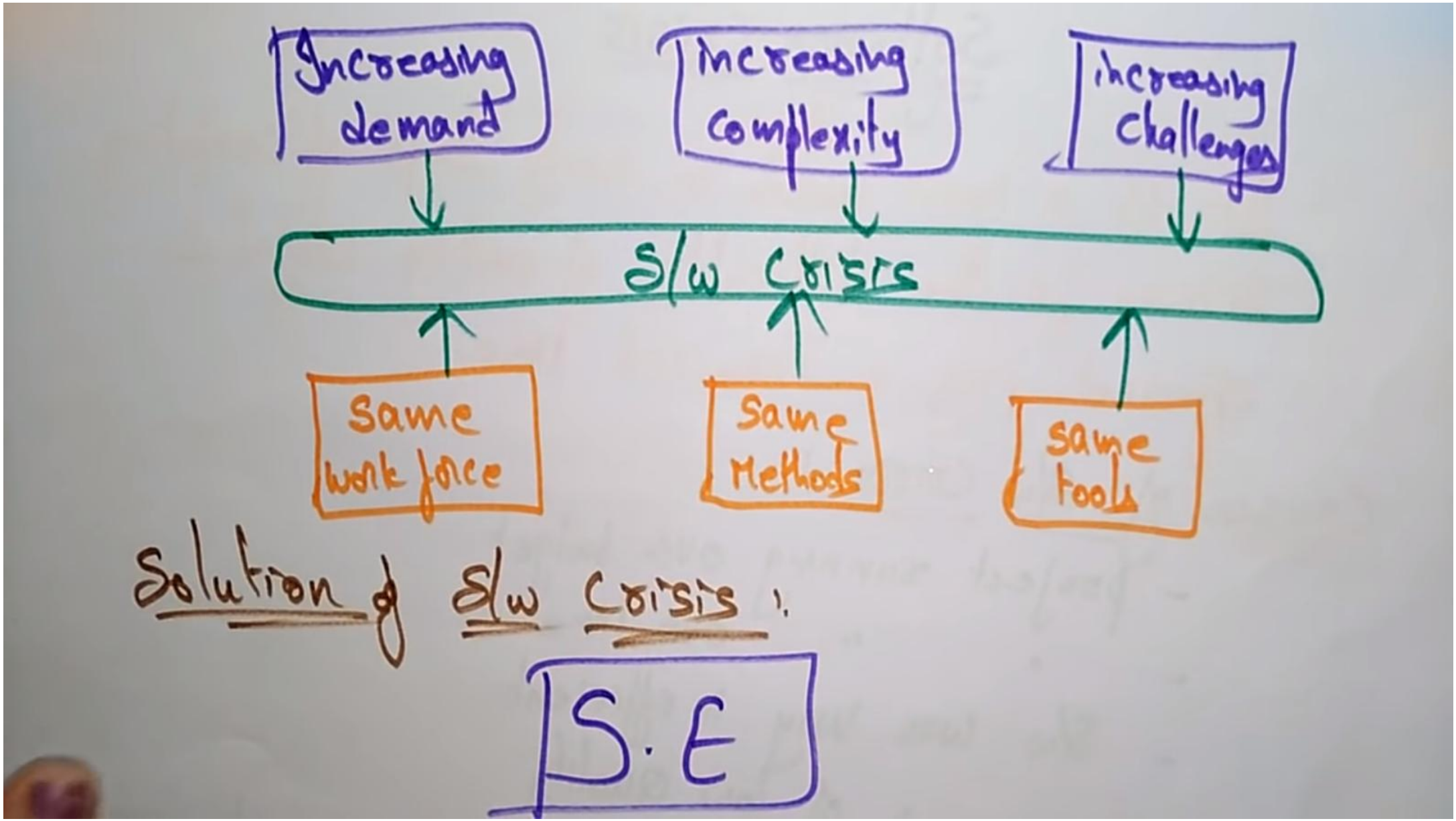
- project running over budget
- " " over time
- S/w was very inefficient
- " " of low Quality
- S/w often didn't meet requirements


Increasing demand
Increasing complexity
increasing challenges
S/w crisis
same work force
same
same



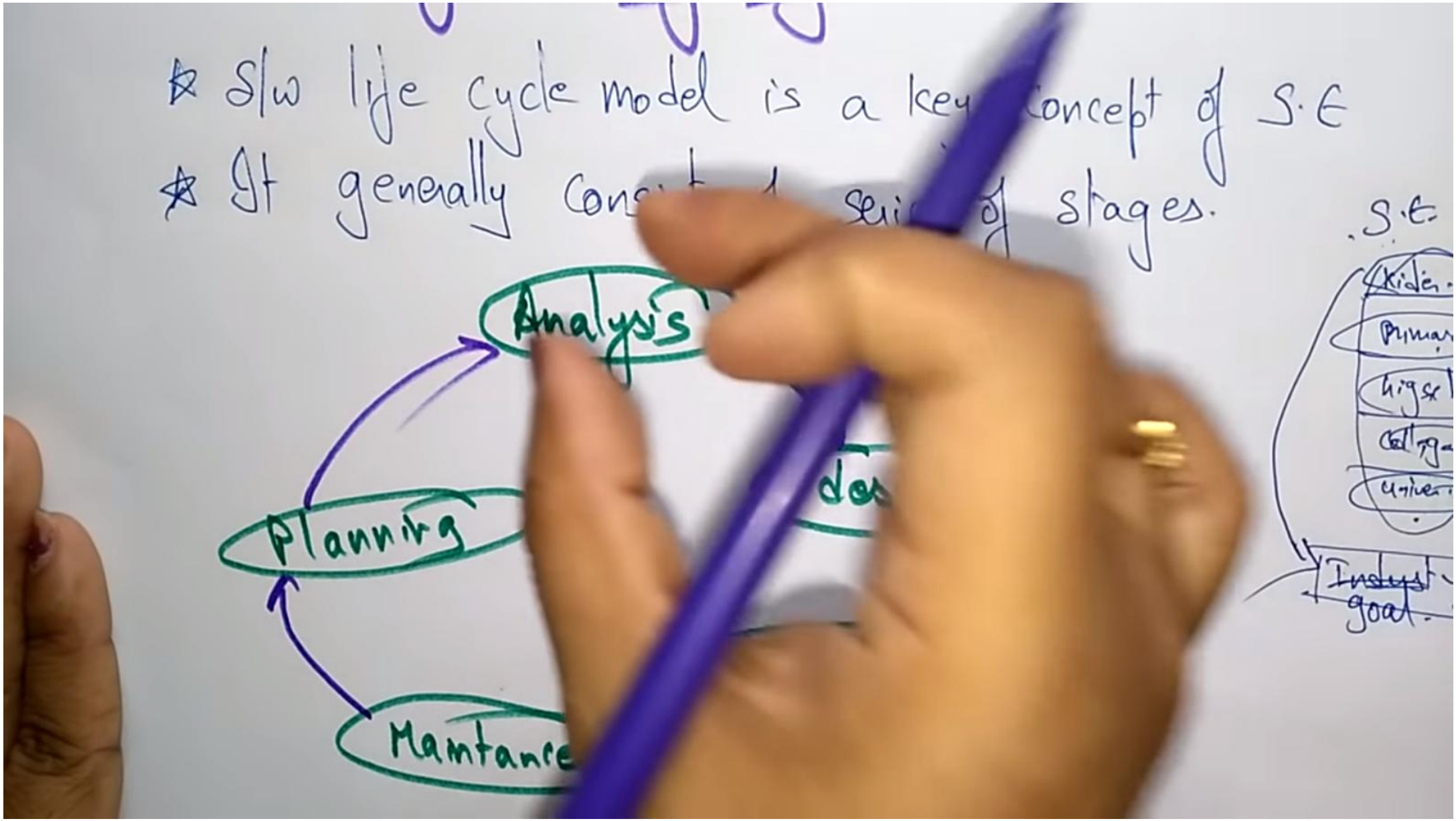
Solution of S/w Crisis :

S.E



Solution of S/w Crisis :

S.E


* S/w life cycle model is a key concept of S.E
* It generally Consist of series of stages.
Analysis
Planning
Mantance
S.E
goal

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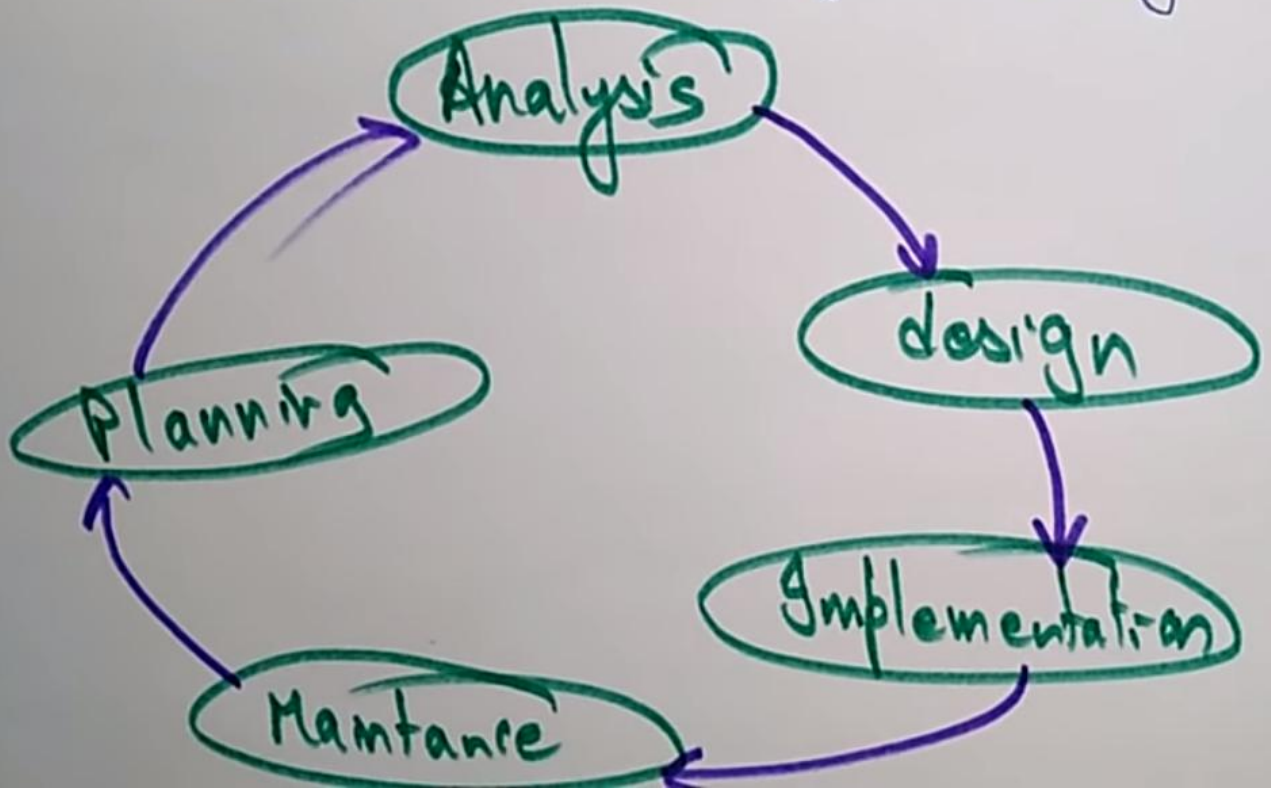
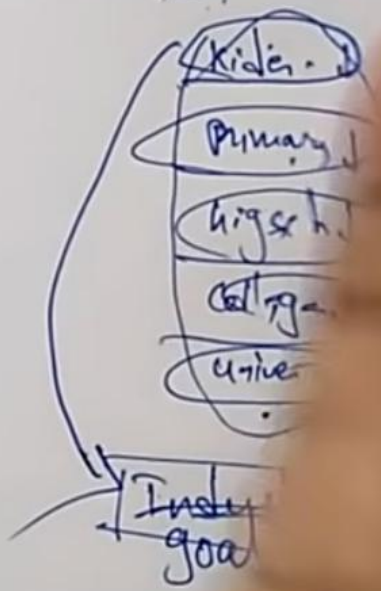
* It generally consists of series of stages.



S.E.



S/w life cycle Model is also called as Process Model.

⇒ It is a descriptive & diagrammatic representation of s/w life cycle.

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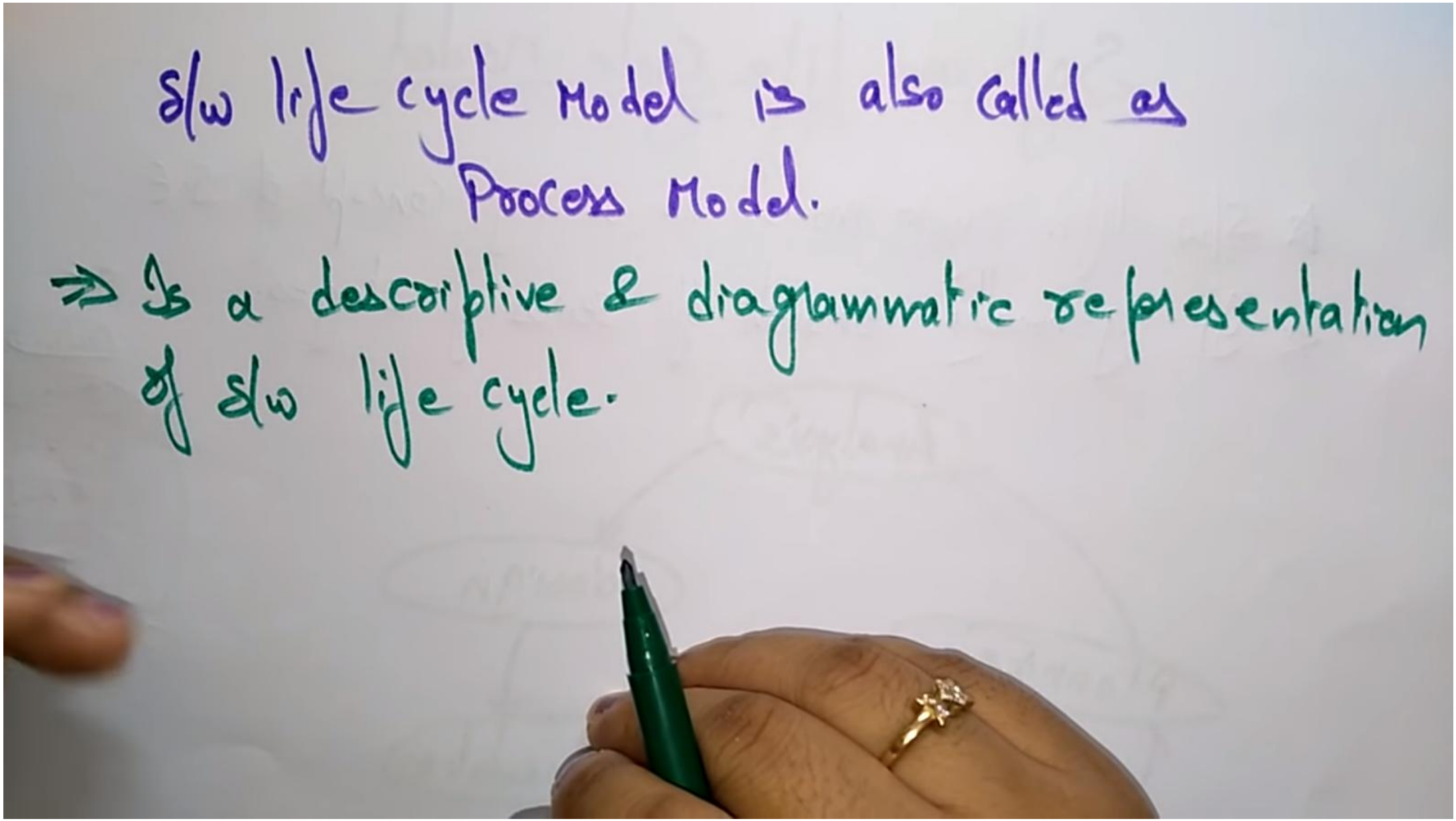
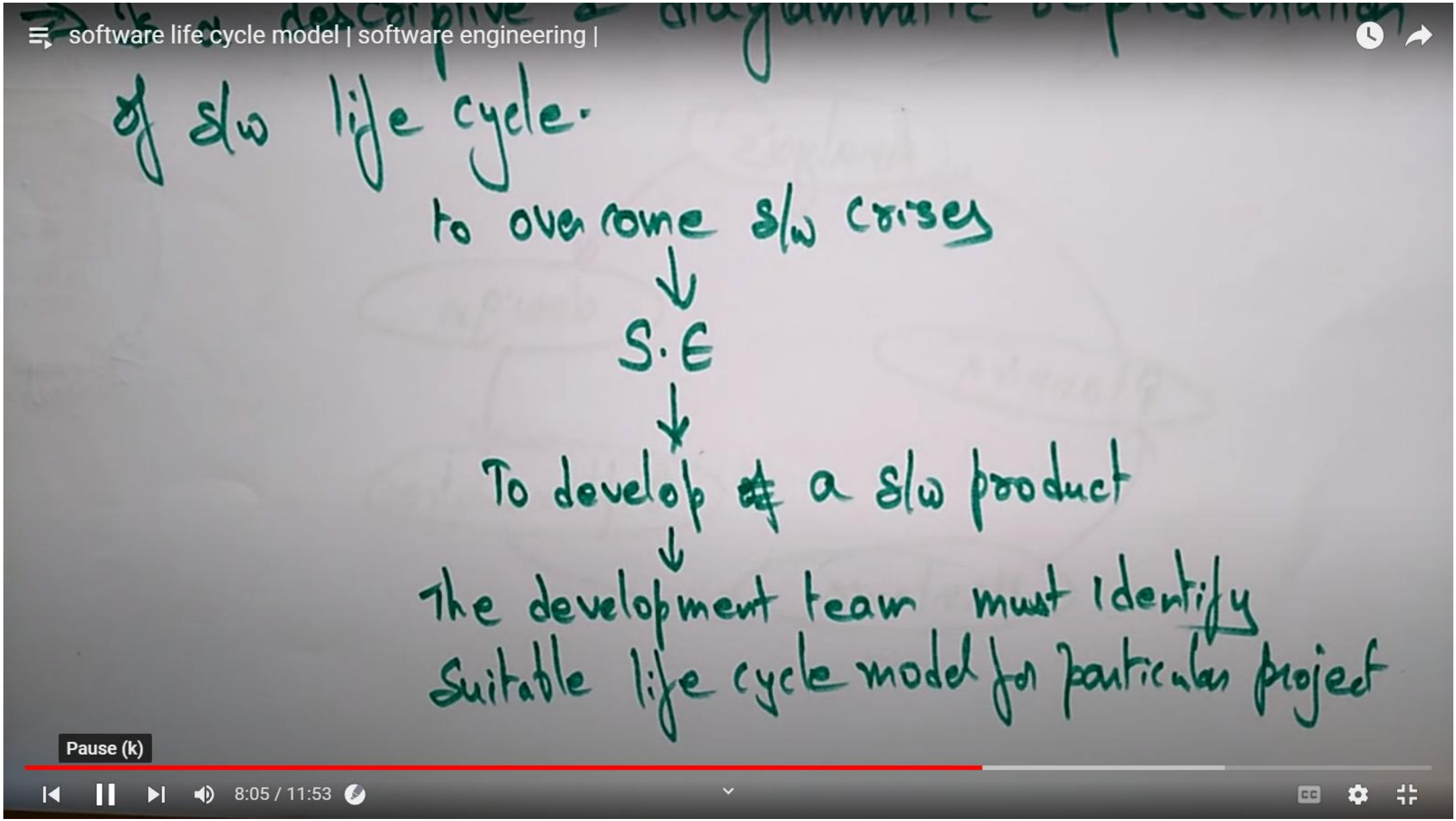
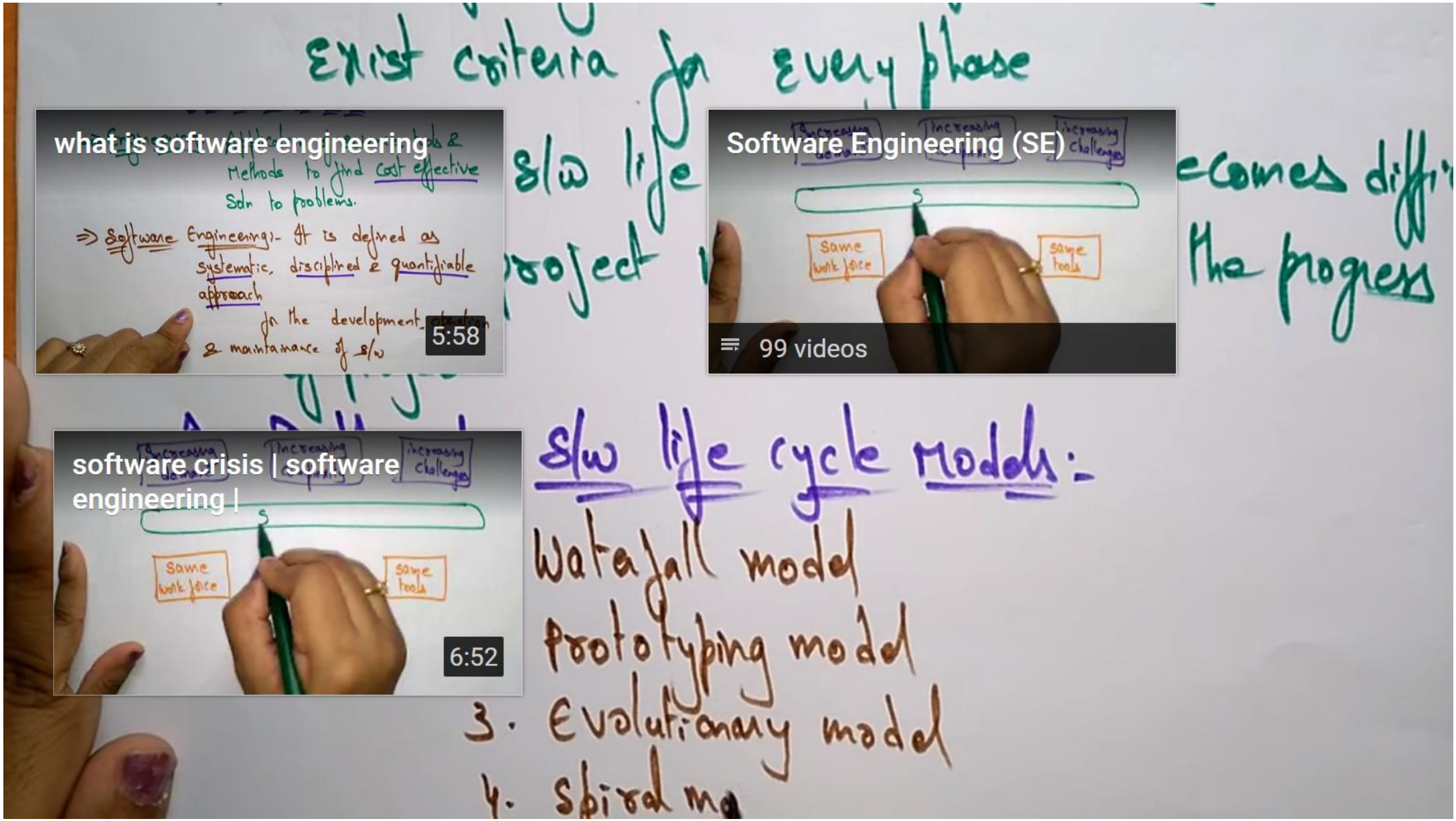
⇒ It is a descriptive & diagrammatic representation of s/w life cycle.




software life cycle model | software engineering |
of s/w life cycle.
to overcome s/w crises
S.E
To develop a s/w product
The development team must identify
Suitable life cycle model for particular project
Pause (k)
8:05 / 11:53

* s/w life cycle model defines entry & exist criteria for every phase
* without s/w life cycle model it becomes difficult for s/w project manager to monitor the progress of project.


Exist criteria for every phase
s/w life
project
comes diffi
the progress
what is software engineering
Methods to find cost effective
Sdn to problems.
=> Software Engineering:- It is defined as
systematic, disciplined & quantifiable
approach
for the development
& maintainance of s/w
5:58
Software Engineering (SE)
Same work force
same tools
99 videos
software crisis | software engineering |
Same work force
same tools
6:52
s/w life cycle modds:-
Waterfall modd
Prototyping modd
3. Evolutionary modd
4. Spiral mo

Software Quality:

"A quality product does exactly what the users want it to do".

⇒ The s/w product, several quality factors :-

- Portability
- Usability
- Reusability
- Correctness
- Maintability

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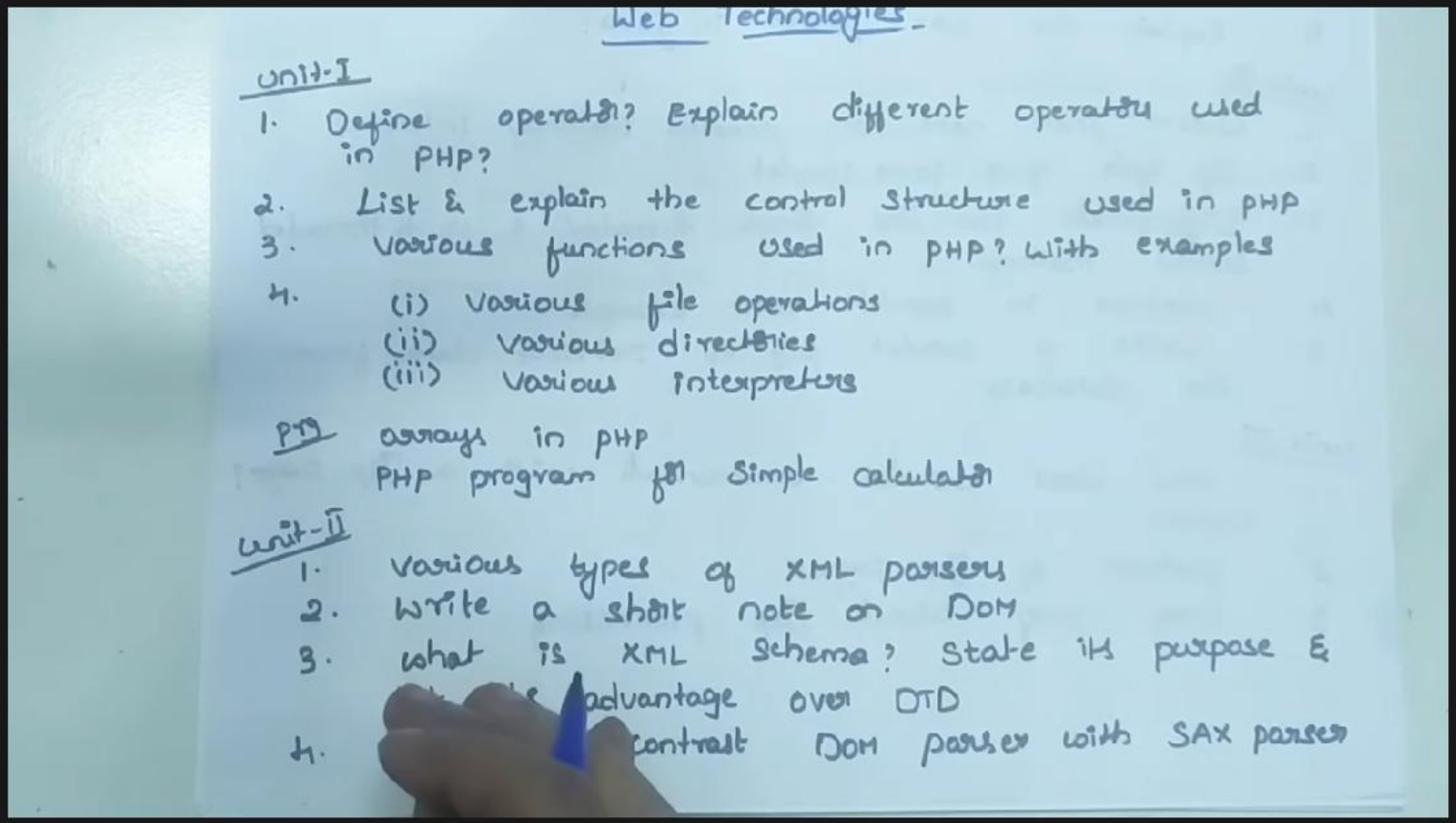

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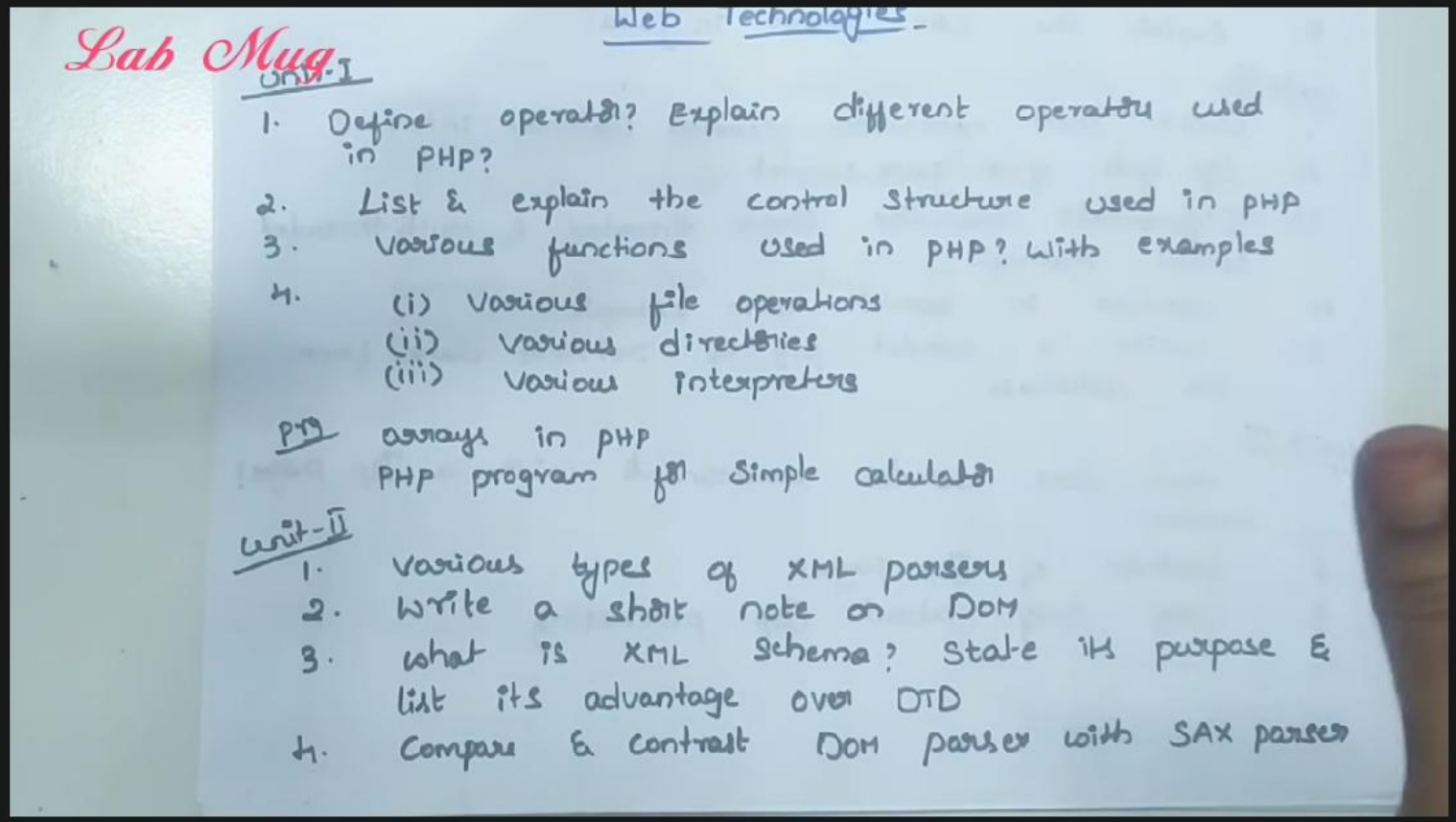

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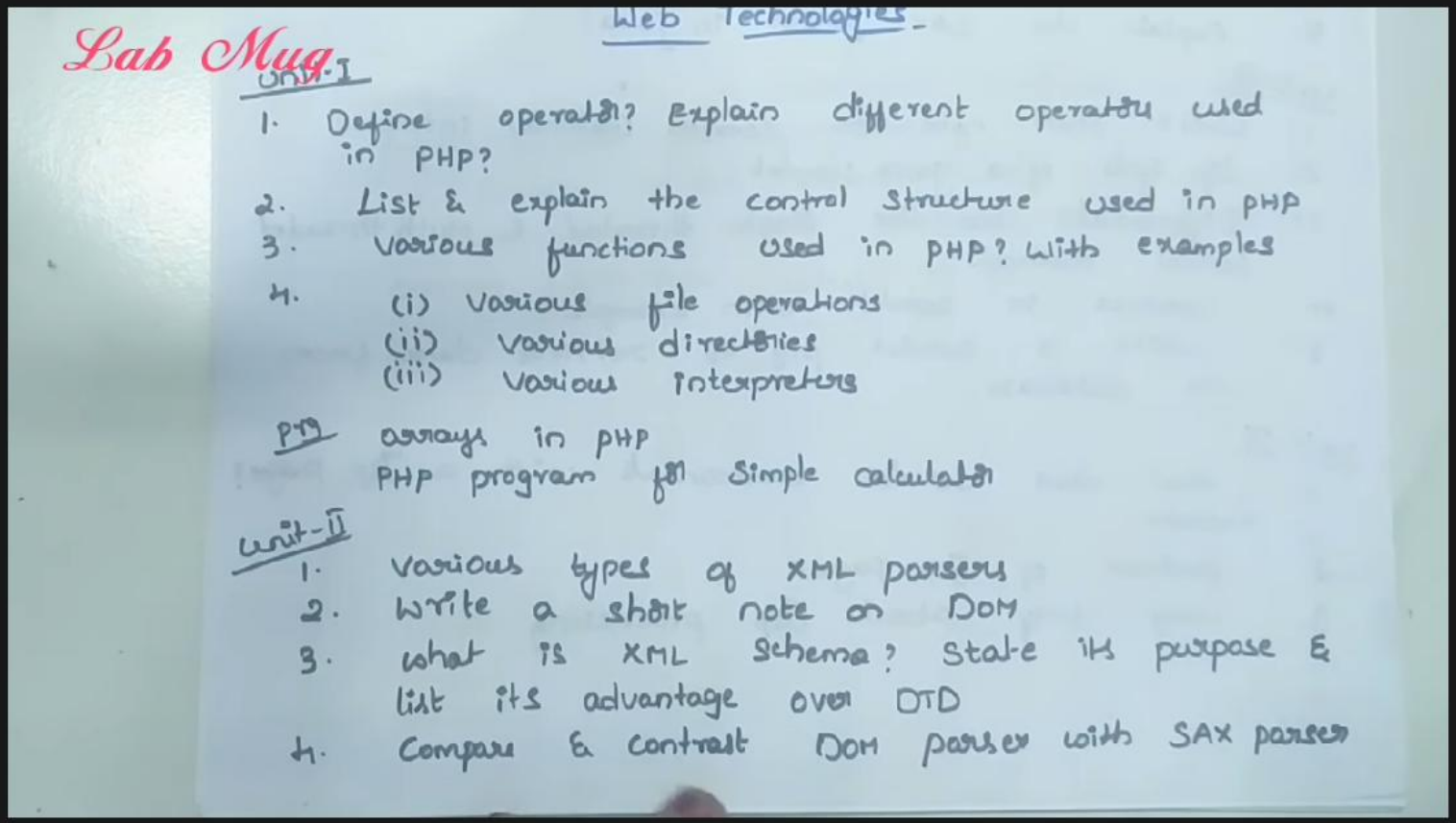

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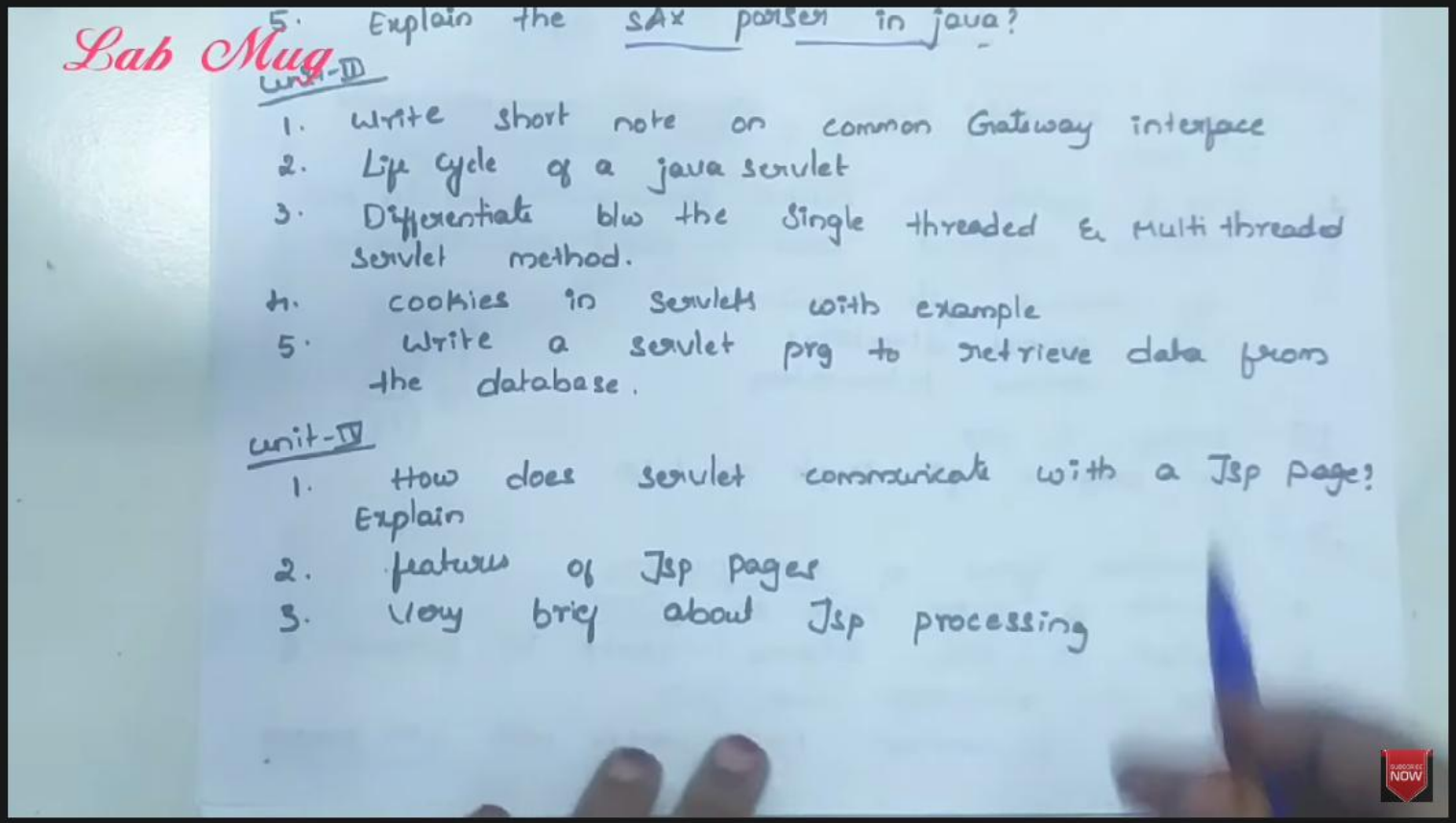

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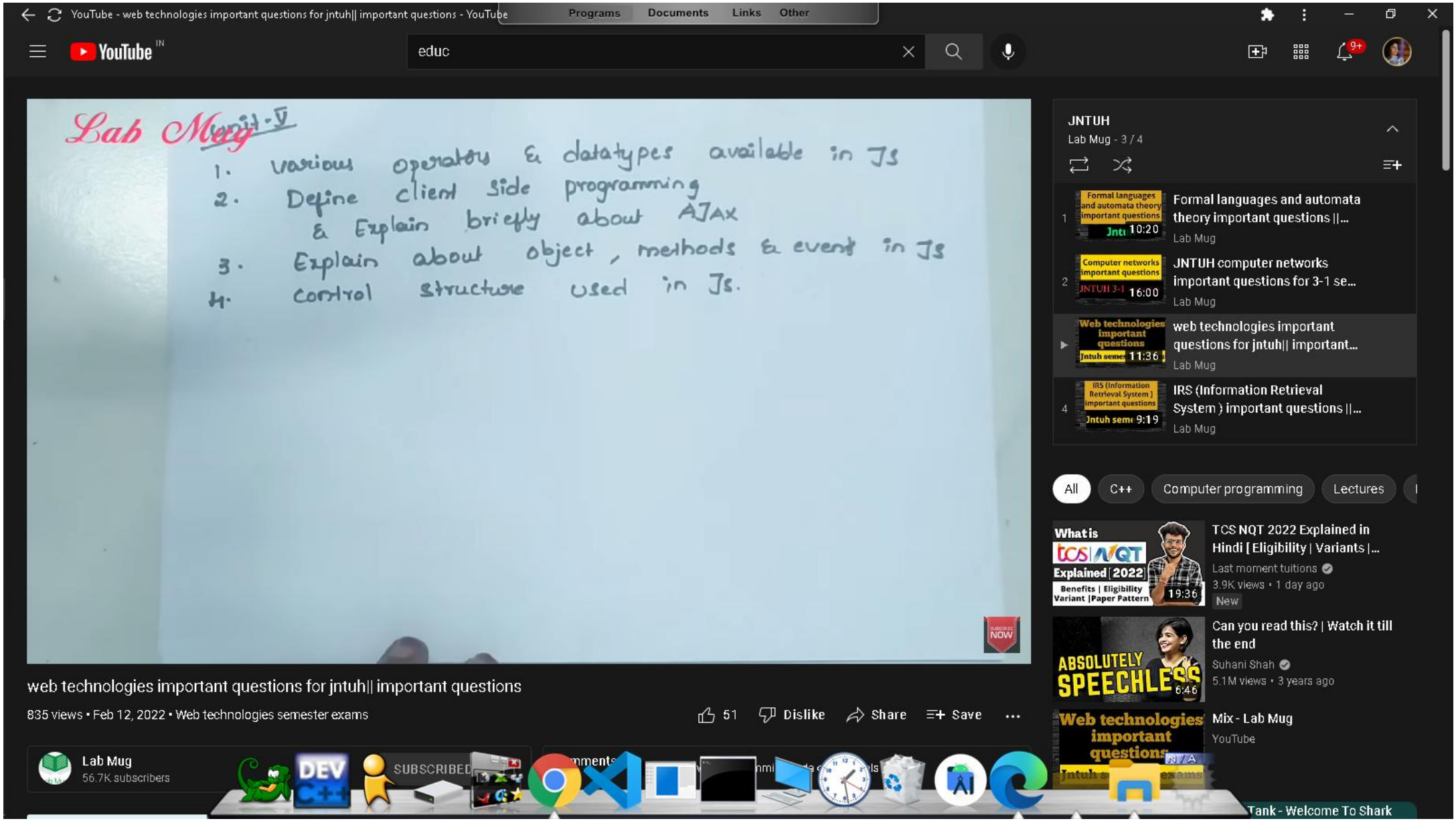
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Unit-V
1. Various operators & datatypes available in JS
2. Define client side programming & Explain briefly about AJAX
3. Explain about object, methods & event in JS
4. Control structure used in JS.
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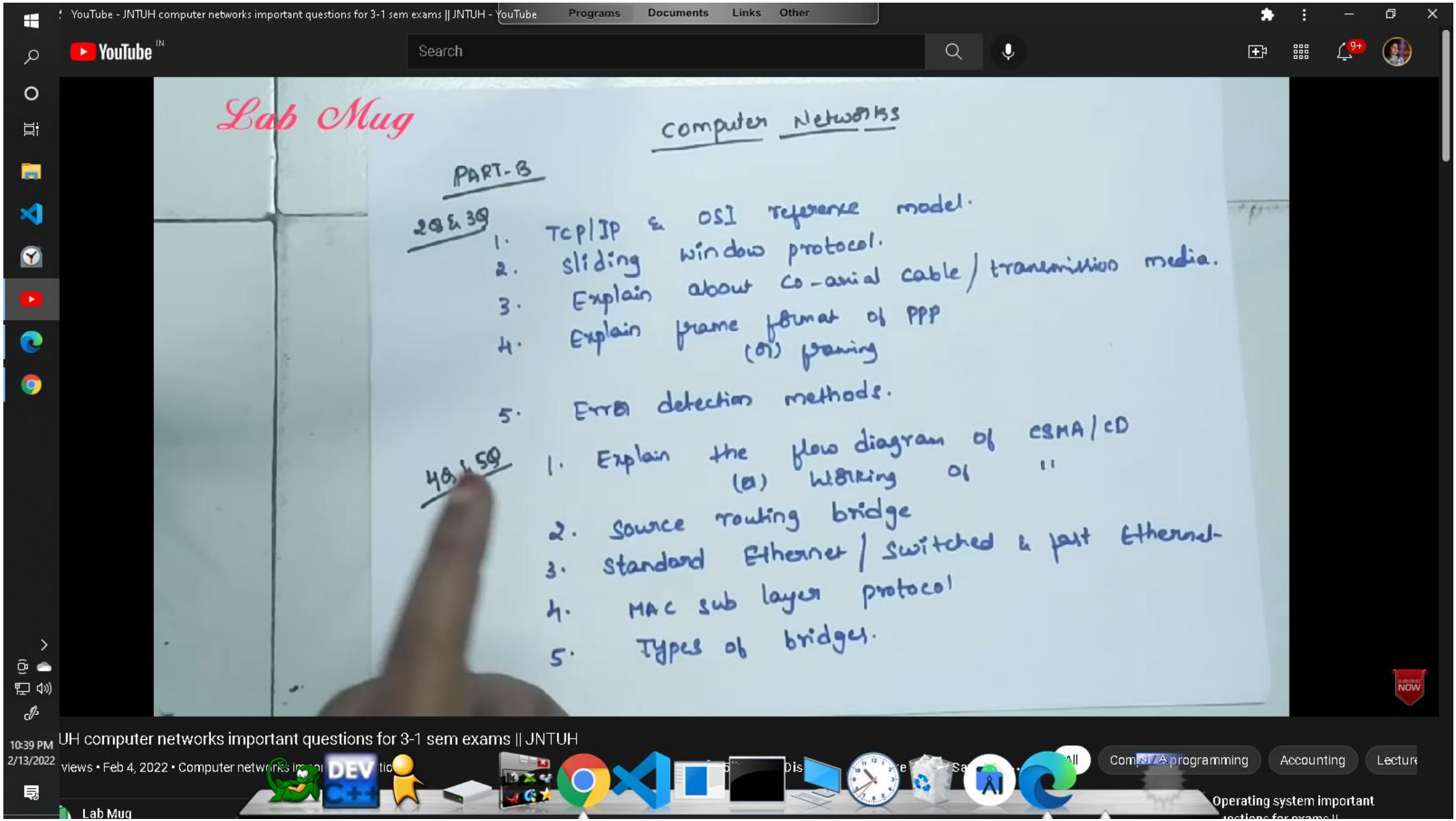
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PART-B
28 & 39
1. TCP/IP & OSI reference model.
2. sliding window protocol.
3. Explain about co-axial cable / transmission media.
4. Explain frame format of PPP (or) framing
5. Error detection methods.
48 & 59
1. Explain the flow diagram of CSMA/CD (or) working of "
2. Source routing bridge
3. Standard Ethernet / switched & fast Ethernet
4. MAC sub layer protocol
5. Types of bridges.
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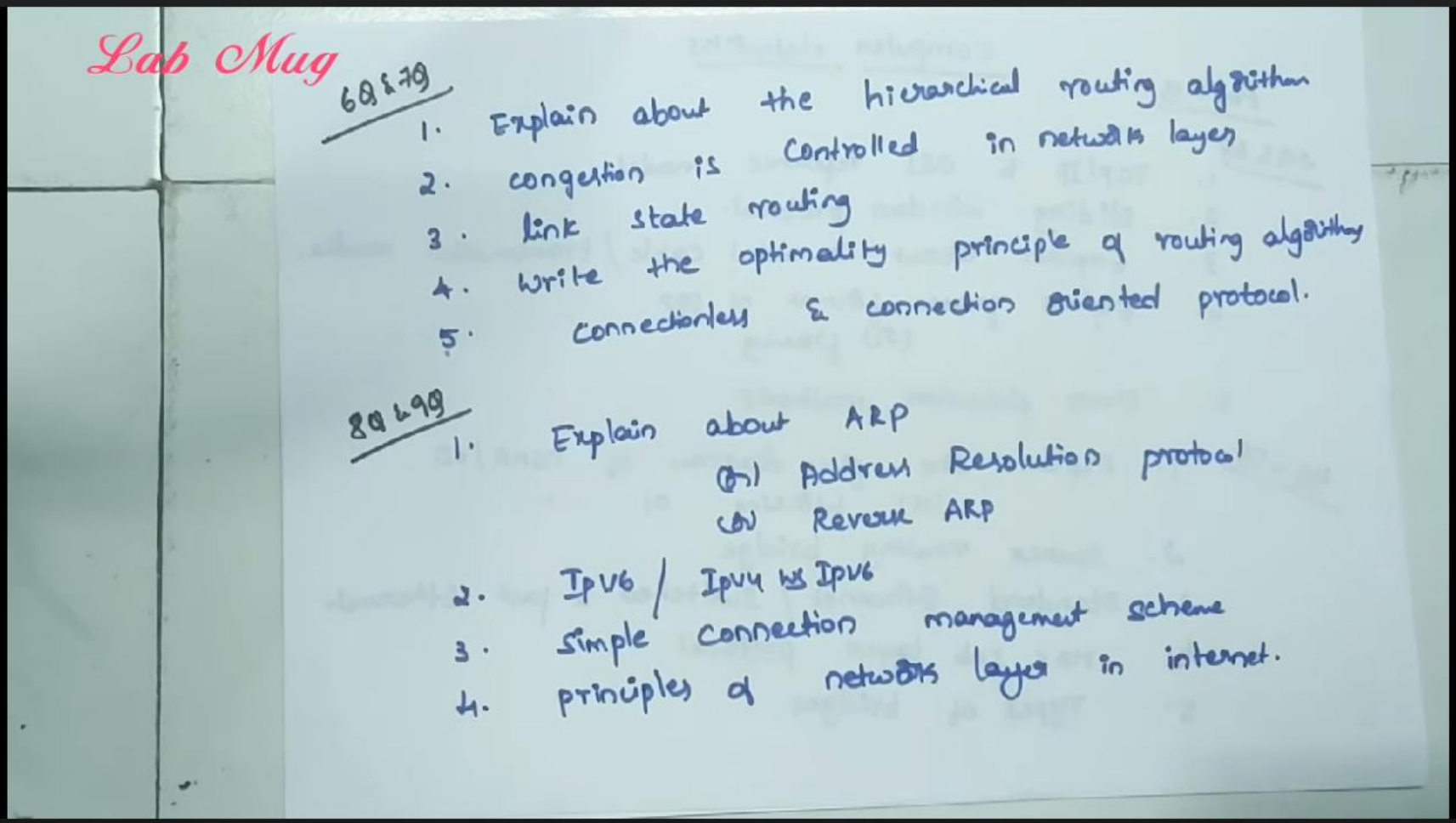

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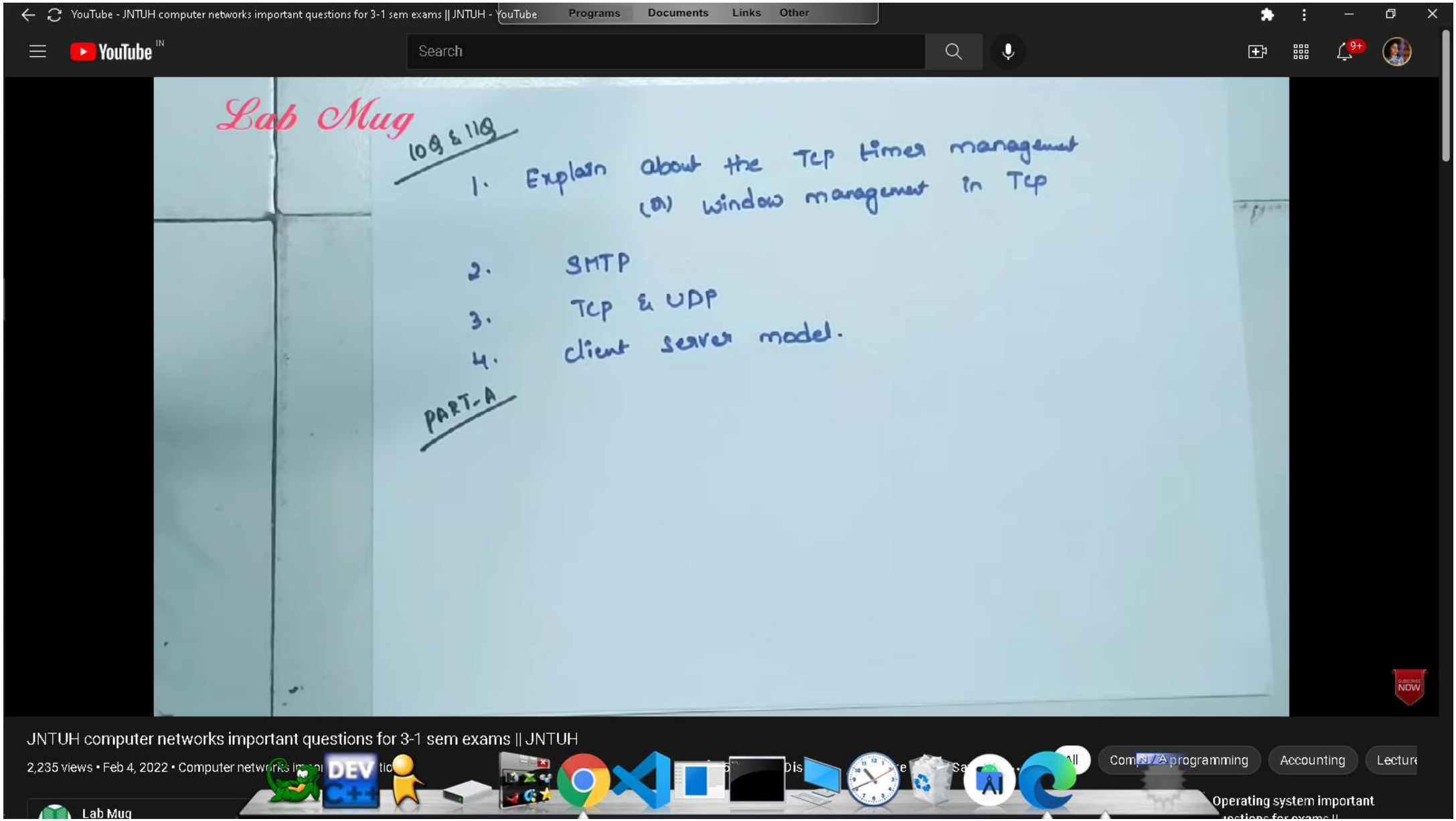
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109 & 119
1. Explain about the TCP timer management
(or) window management in TCP
2. SMTP
3. TCP & UDP
4. client server model.
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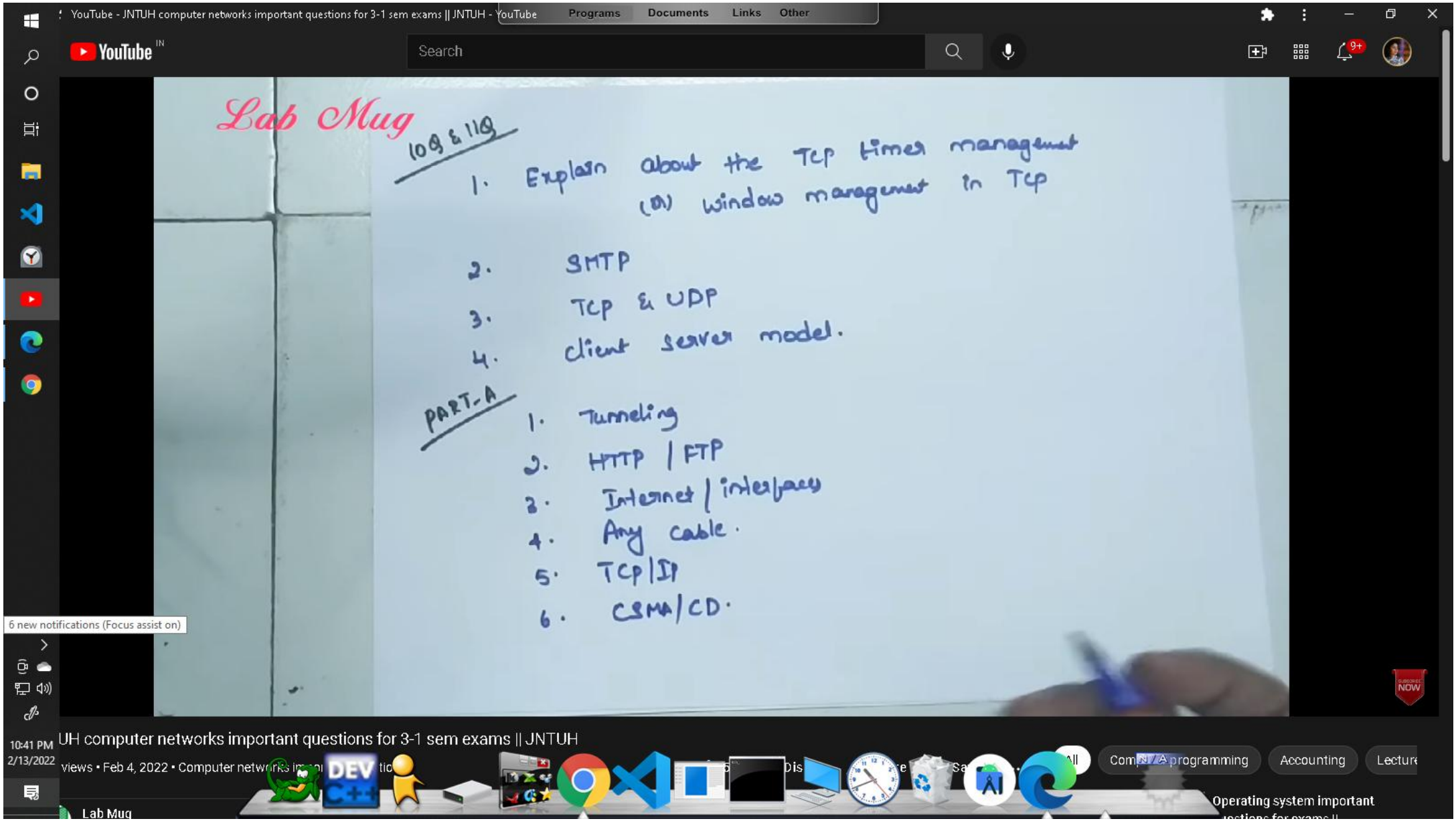
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10Q & 11Q
1. Explain about the TCP times management (or) window management in TCP
2. SMTP
3. TCP & UDP
4. client server model.
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1. Tunneling
2. HTTP / FTP
3. Internet / interfaces
4. Any cable.
5. TCP/IP
6. CSMA/CD.
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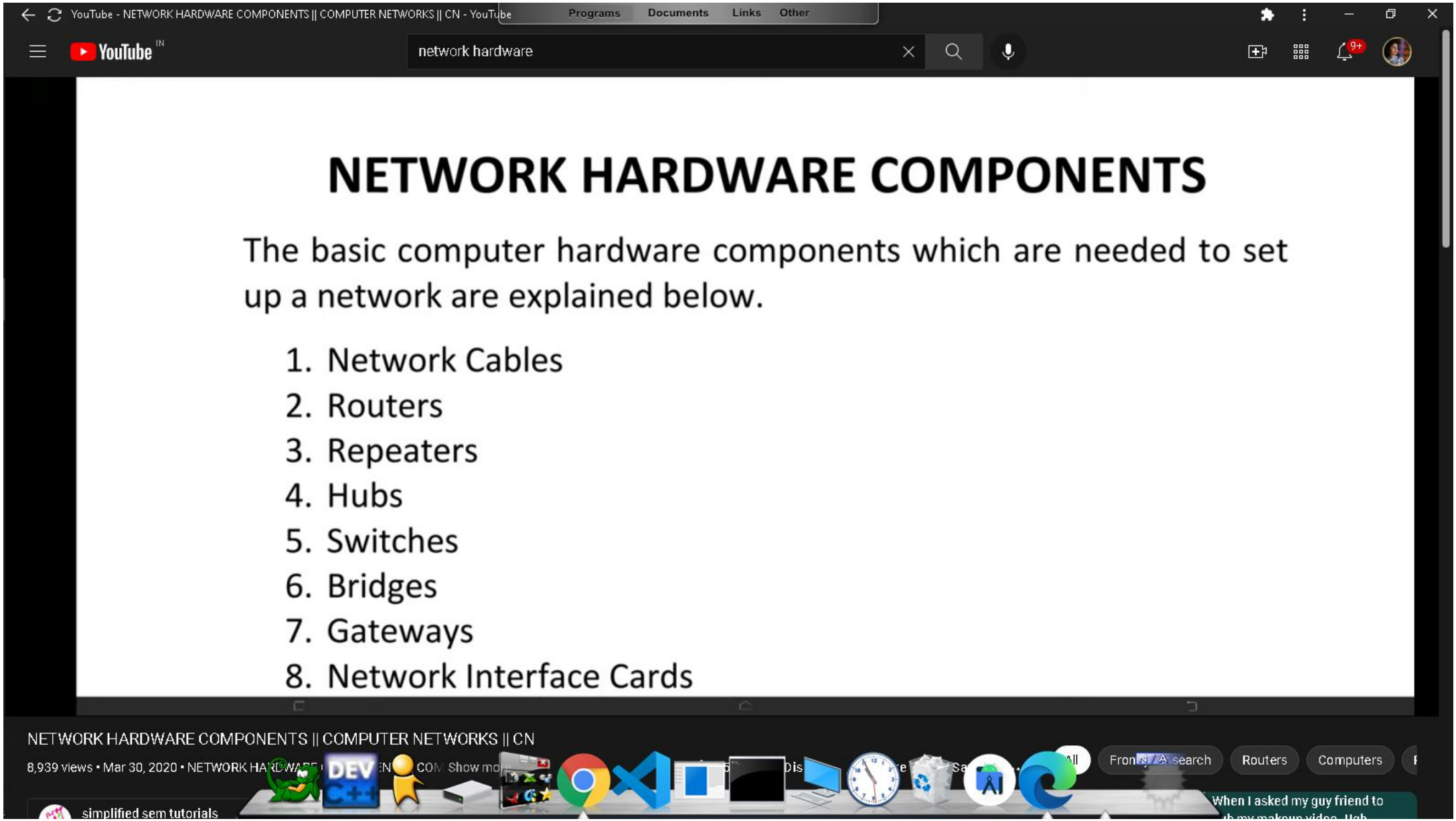
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The basic computer hardware components which are needed to set up a network are explained below.
1. Network Cables
2. Routers
3. Repeaters
4. Hubs
5. Switches
6. Bridges
7. Gateways
8. Network Interface Cards
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1.NETWORK CABLES:

Network cables are the transmission media to transfer data from one device to another.

A commonly used network cable is category 5 cable with RJ – 45 connector, as shown in the image below:

2.ROUTERS:

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2.ROUTERS:

A router is a connecting device that transfers data packets between different computer networks.

Typically, they are used to connect a PC or an organization's LAN to a broadband internet connection.

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3.REPEATERS:

A repeater receives a weak signal from one side and amplifies the signal regenerates it before re-transmitting to other side so that it can travel longer distances.

4.HUBS :

A hub provides common connections for the network cables

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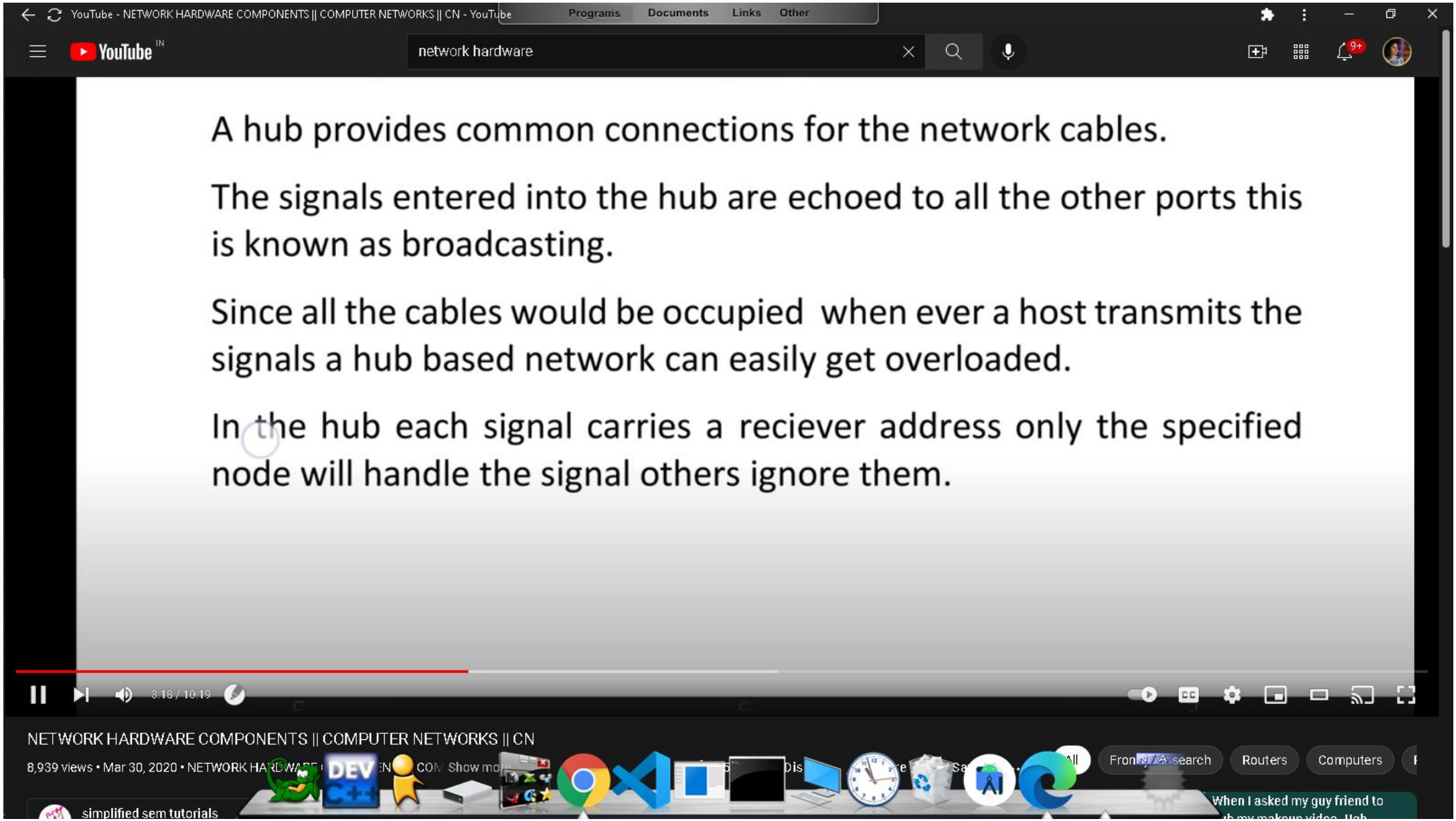
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A hub provides common connections for the network cables.
The signals entered into the hub are echoed to all the other ports this is known as broadcasting.
Since all the cables would be occupied when ever a host transmits the signals a hub based network can easily get overloaded.
In the hub each signal carries a reciever address only the specified node will handle the signal others ignore them.
3:18 / 10:19
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5.SWITCHES:

A switch receives data from a port, uses packet switching to resolve the destination device and then forwards the data to the particular destination, rather than broadcasting it as a hub.

NETGEAR 5 Port Network Switch

ComputerHope.com

6.BRIDGES:

A bridge connects two separate Ethernet network segments.

It forwards packets from the source network to the destined network.

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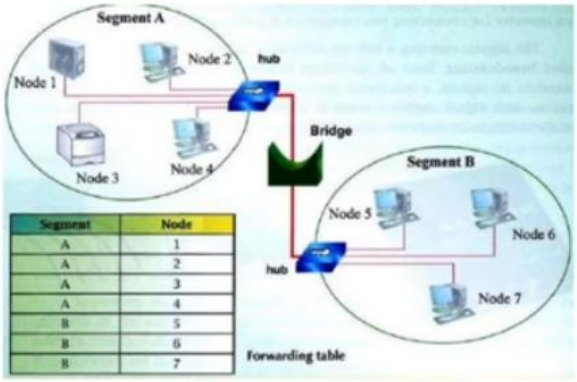
A bridge connects two separate Ethernet network segments.

It forwards packets from the source network to the destined network.



Segment	Node
A	1
A	2
A	3
A	4
B	5
B	6
B	7

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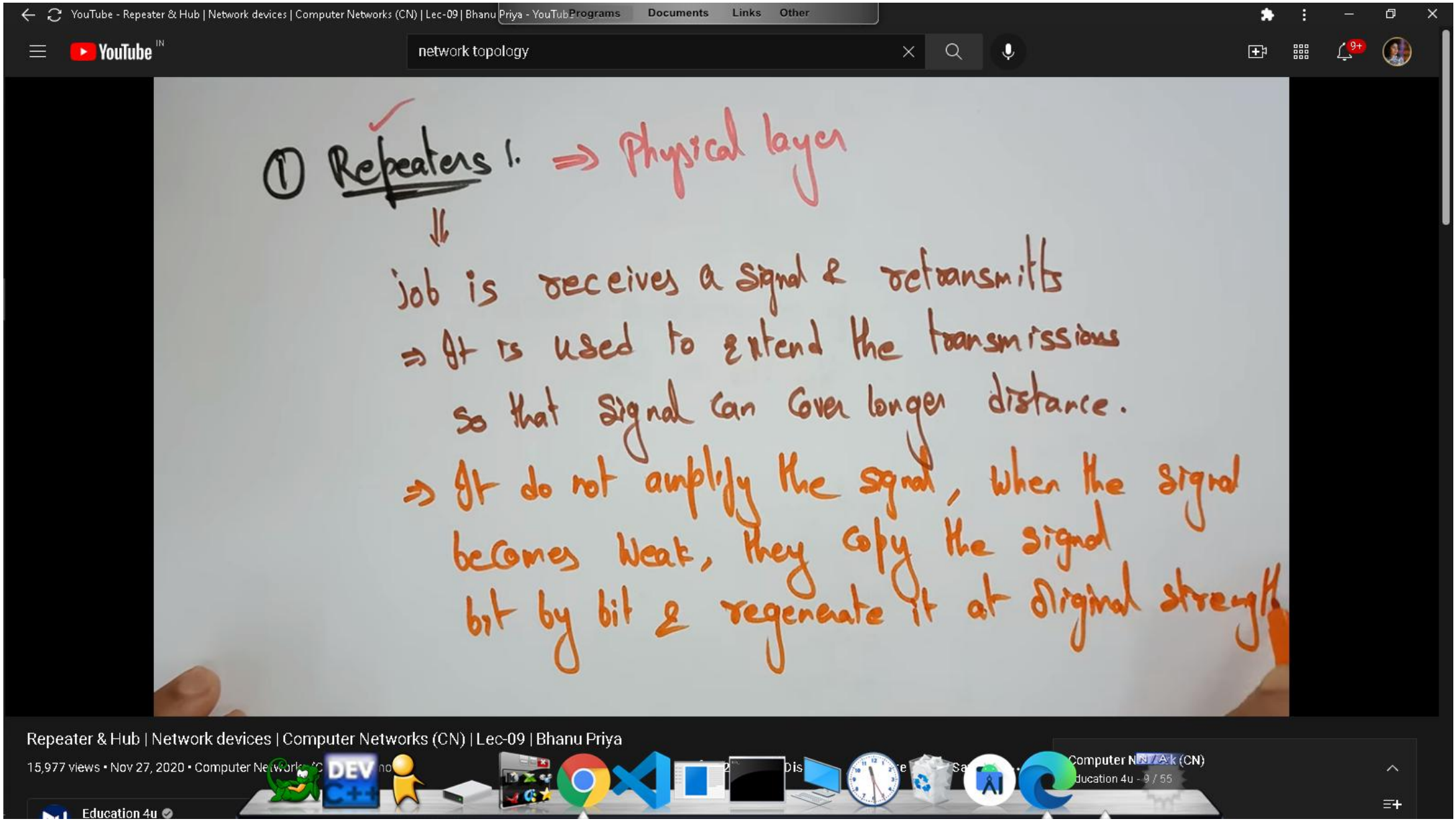
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① Repeaters :- ⇒ Physical layer
Job is receives a signal & retransmitts
⇒ It is used to extend the transmissions so that signal can cover longer distance.
⇒ It do not amplify the signal, when the signal becomes weak, they copy the signal bit by bit & regenerate it at original strength
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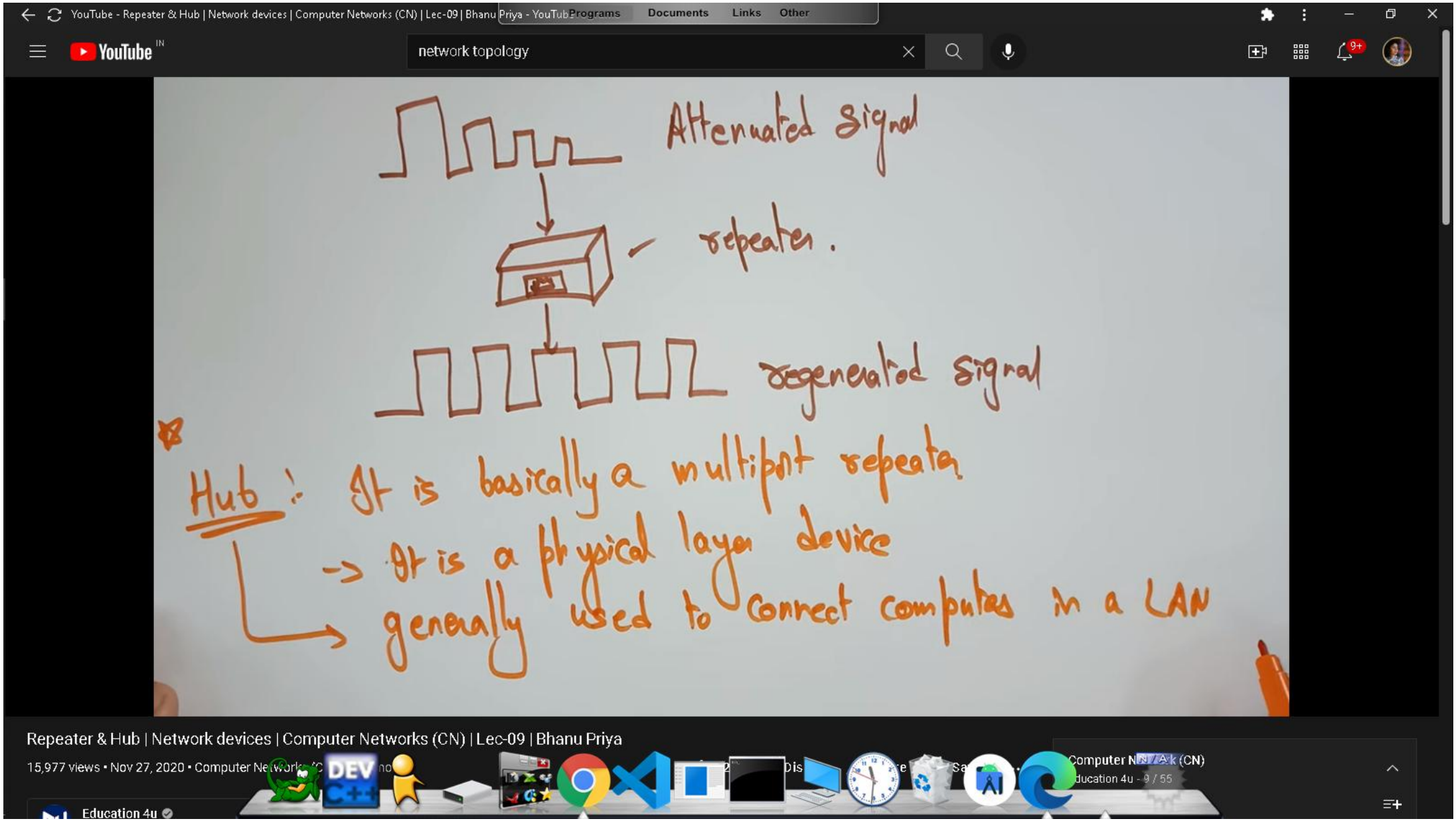
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network topology
Attenuated Signal
repeater.
regenerated signal
Hub :
It is basically a multiport repeater
-> It is a physical layer device
generally used to connect computers in a LAN
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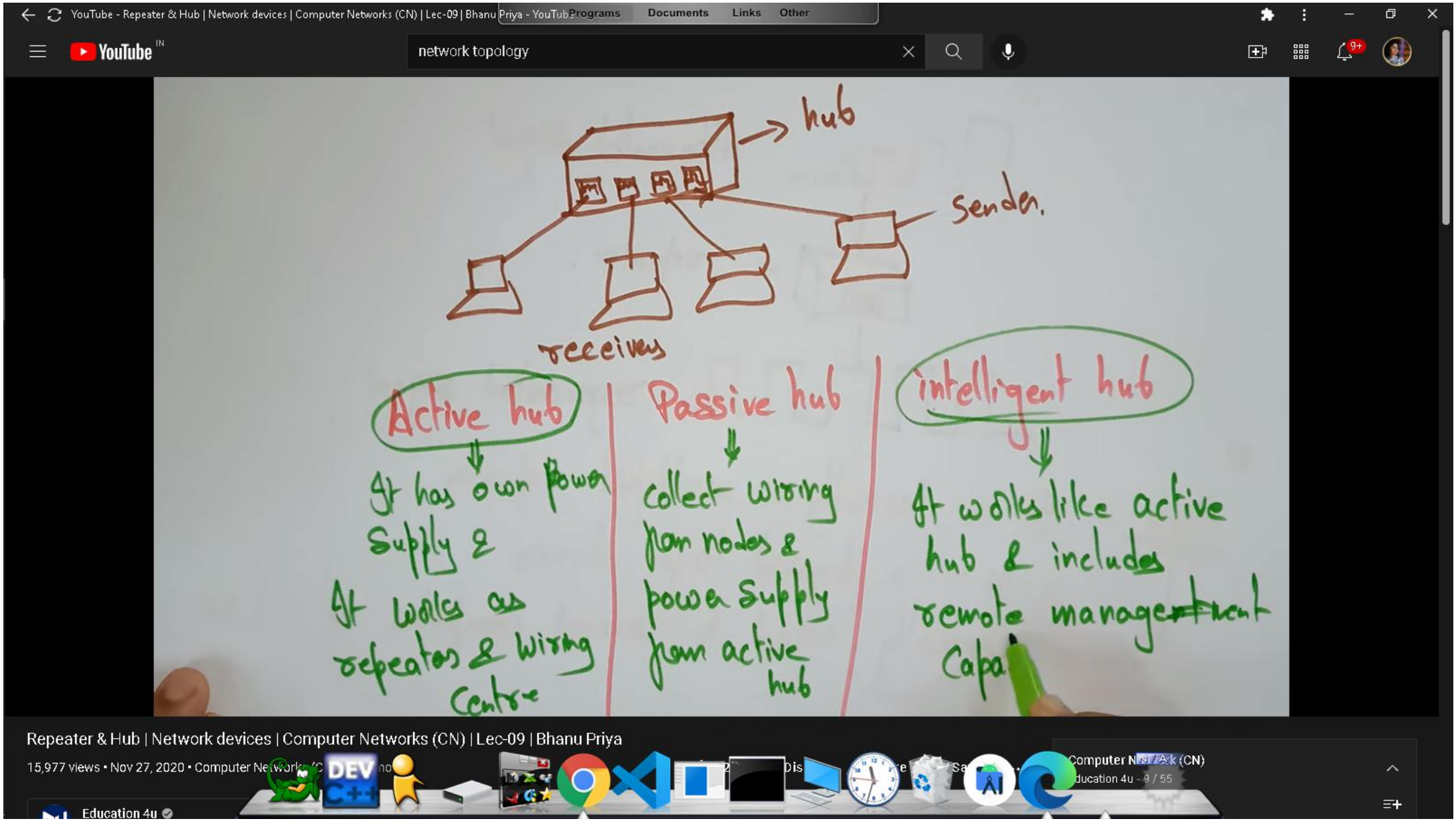
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network topology
hub
Sender
receivers
Active hub
It has own power Supply &
It works as repeaters & Wiring Centre
Passive hub
collect wiring from nodes & power Supply from active hub
intelligent hub
It works like active hub & includes remote management Capa
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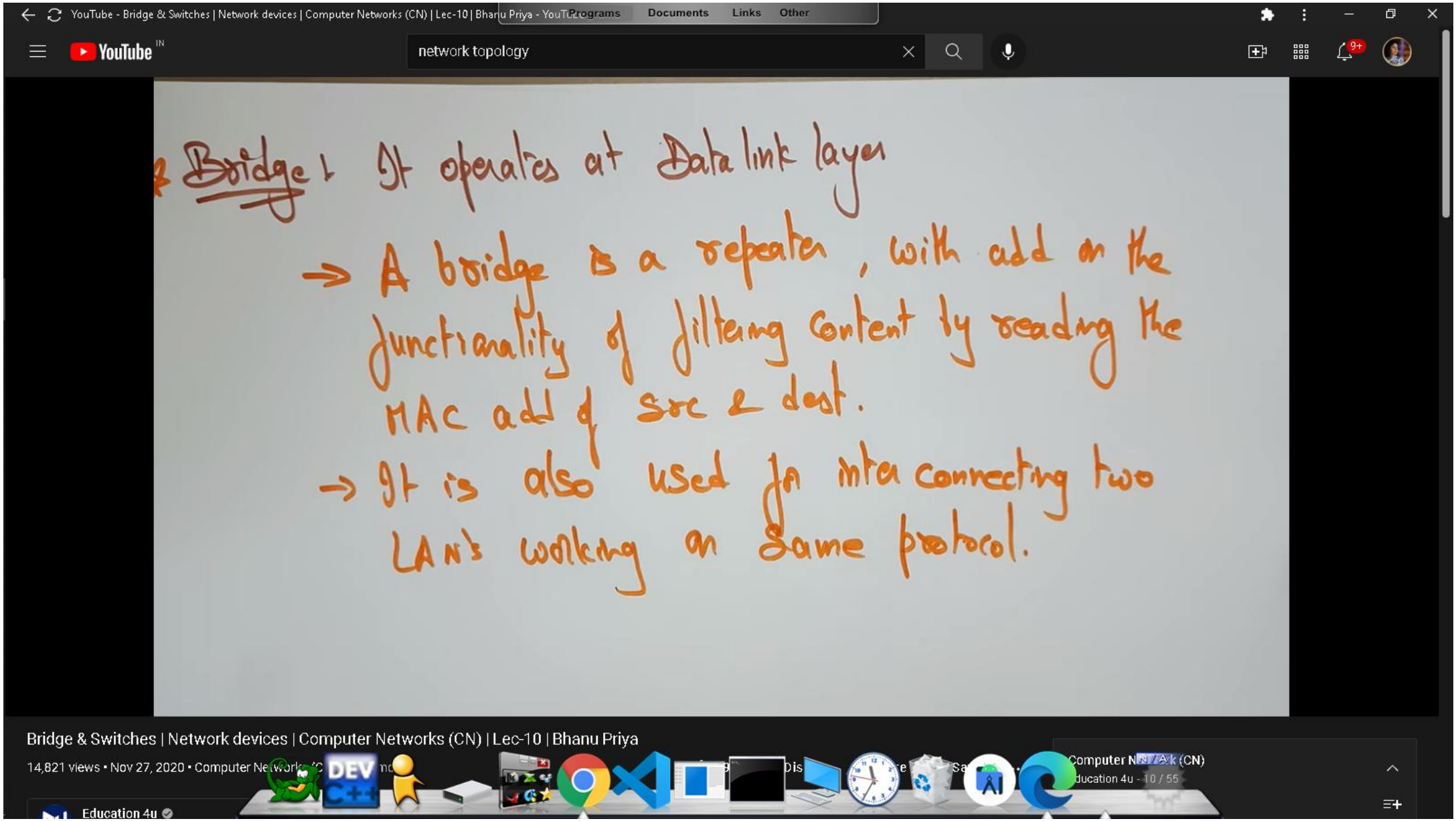
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Bridge : It operates at Data link layer
→ A bridge is a repeater, with add on the functionality of filtering content by reading the MAC add of src & dest.
→ It is also used for interconnecting two LAN's working on same protocol.
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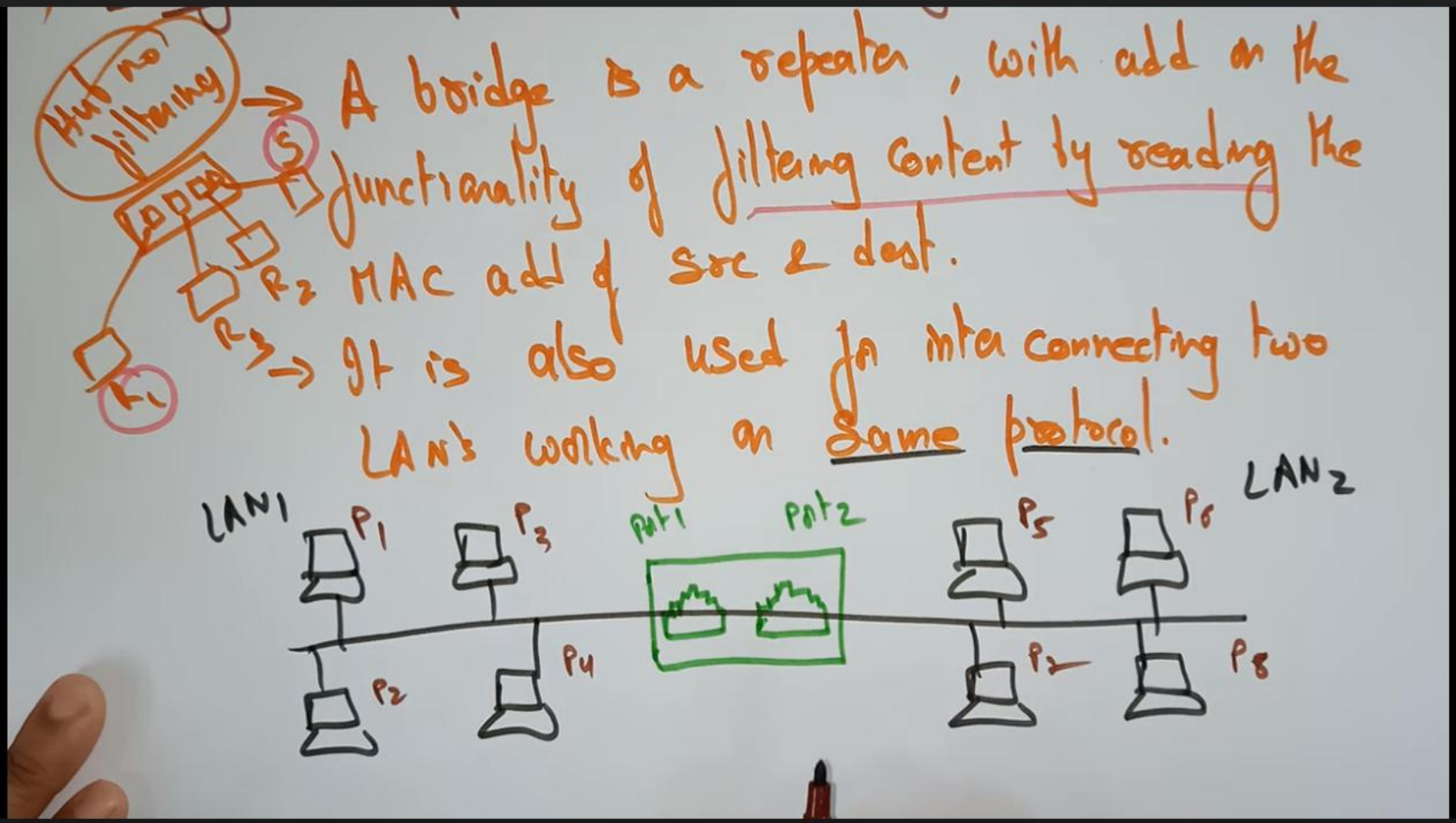

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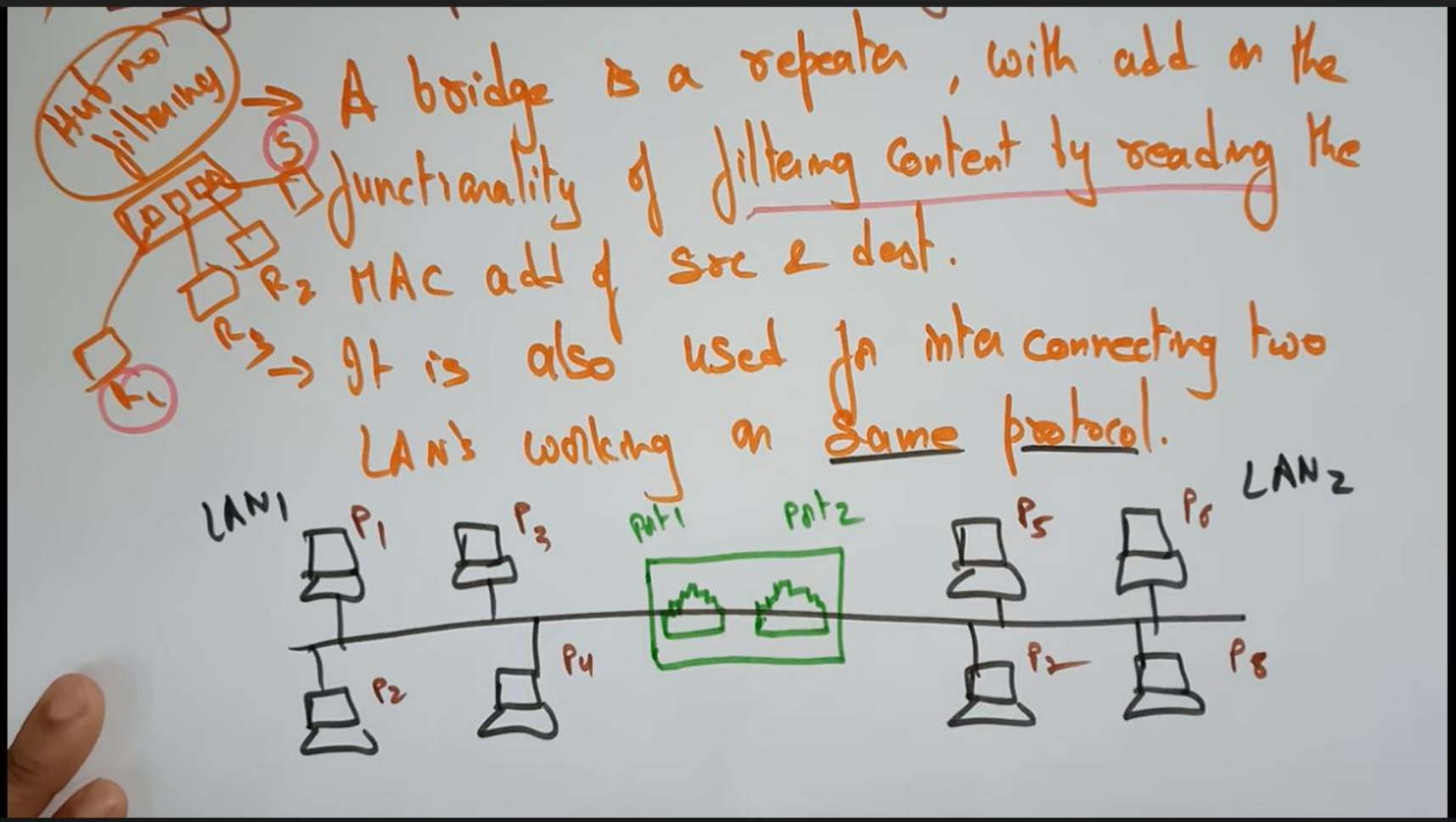

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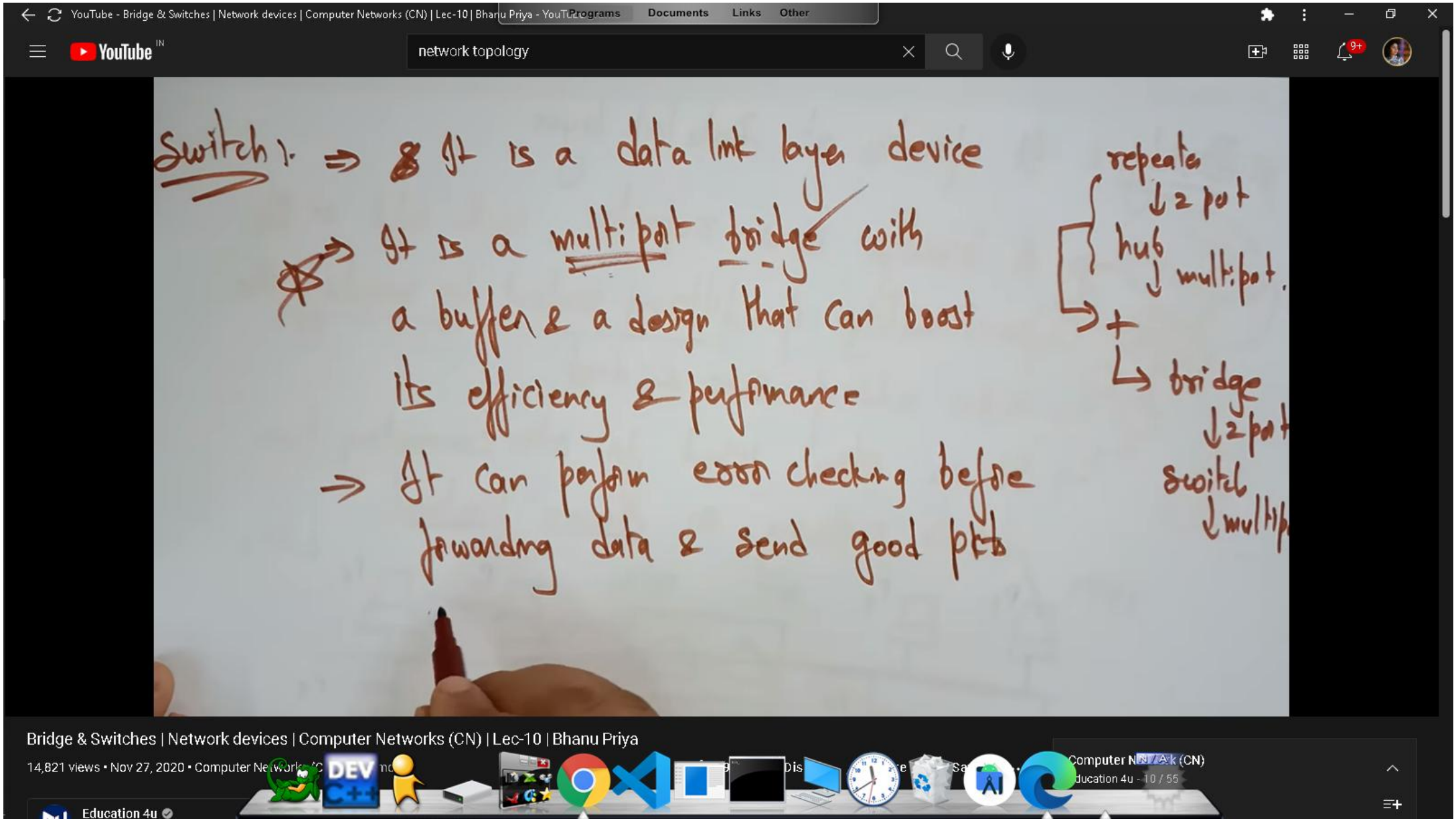
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network topology
Switch :-
⇒ It is a data link layer device
⇒ It is a multiport bridge with
a buffer & a design that can boost
its efficiency & performance
⇒ It can perform error checking before
forwarding data & send good pkts
repeate
2 port
hub
multiport.
+
bridge
2 port
Switch
multip
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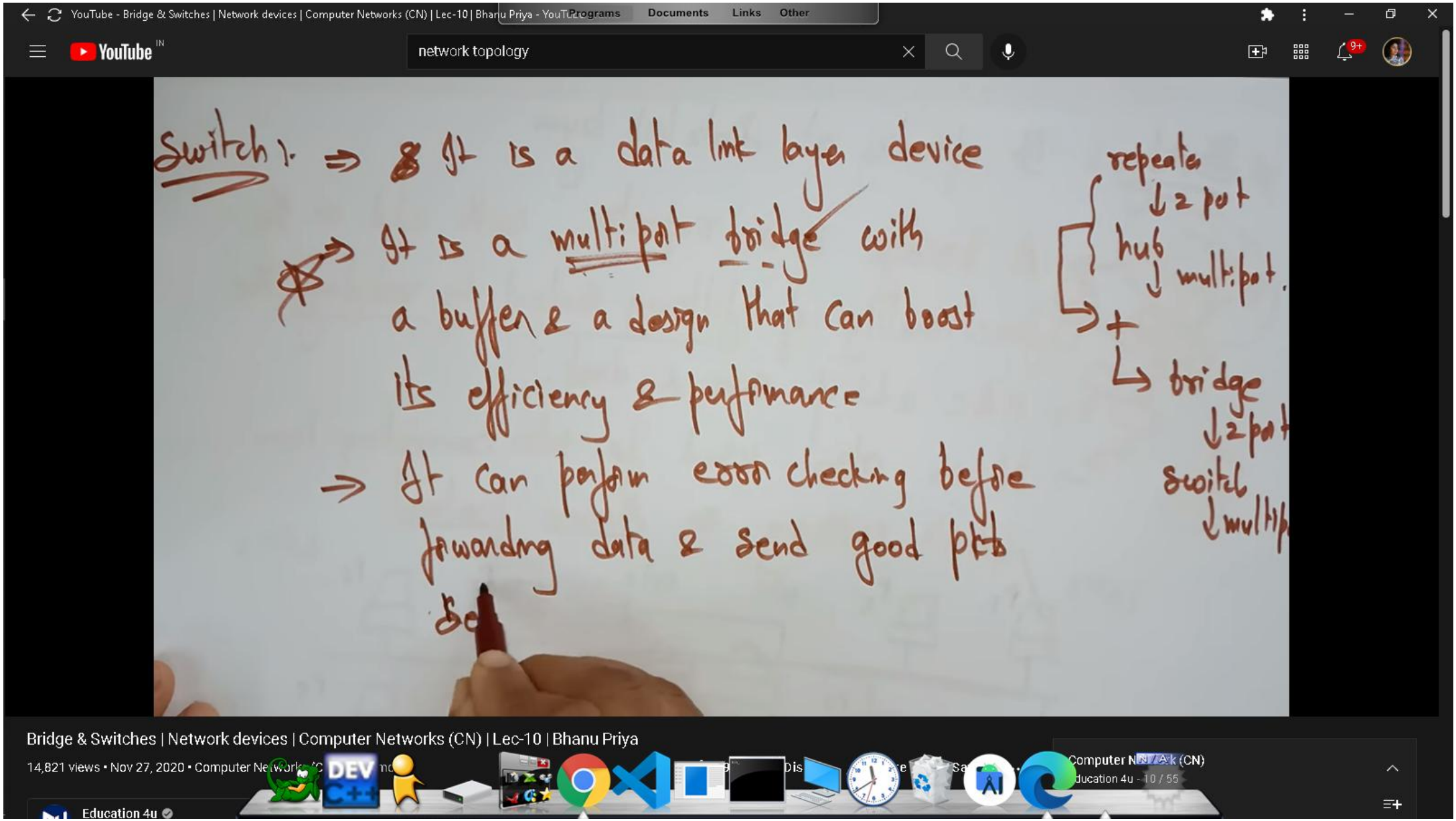
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repeater
2 port
hub
multiport
bridge
2 port
switch
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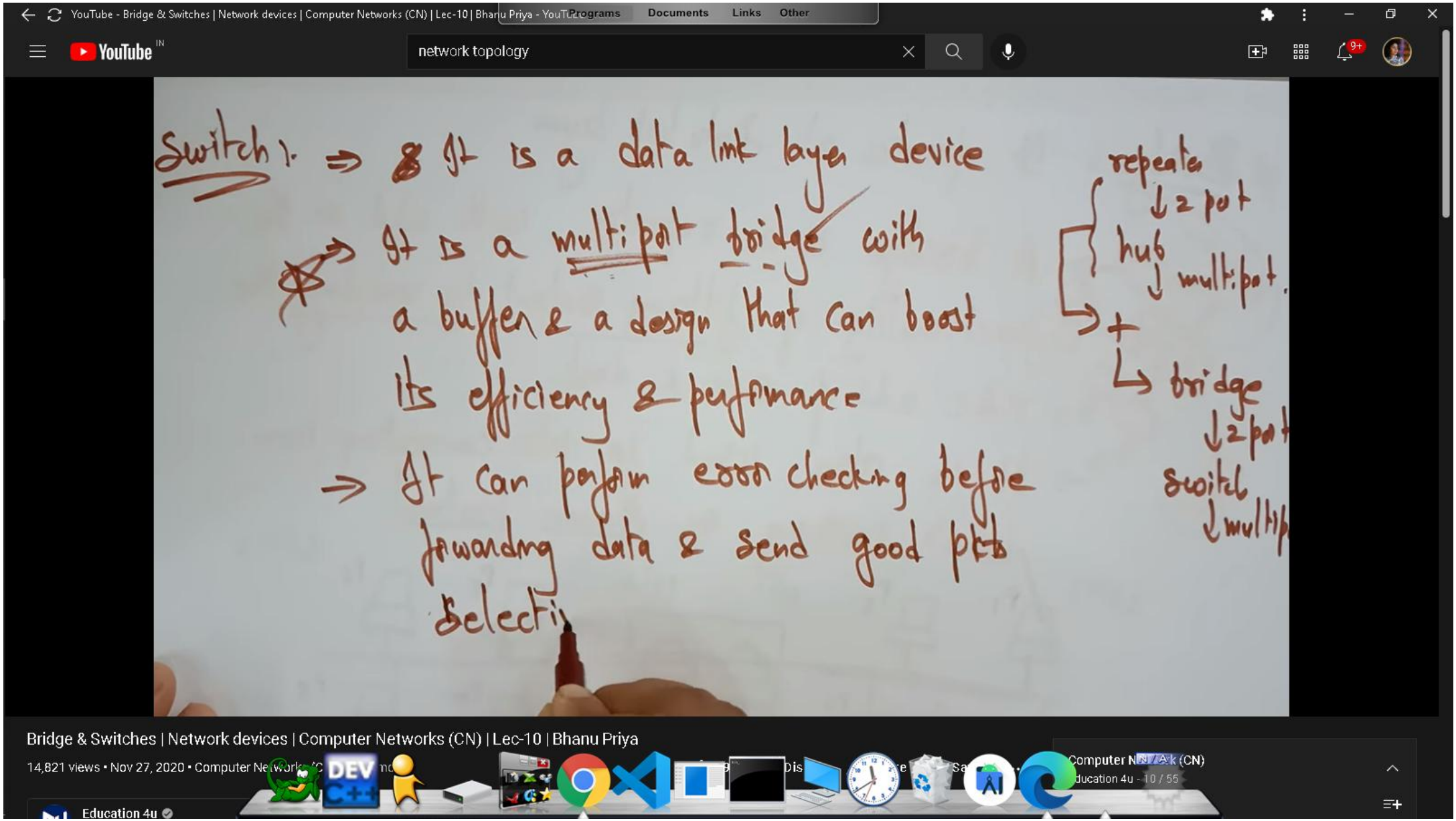
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⇒ It can perform error checking before
forwarding data & send good pkts
Selecti
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2 port
Switch
multip
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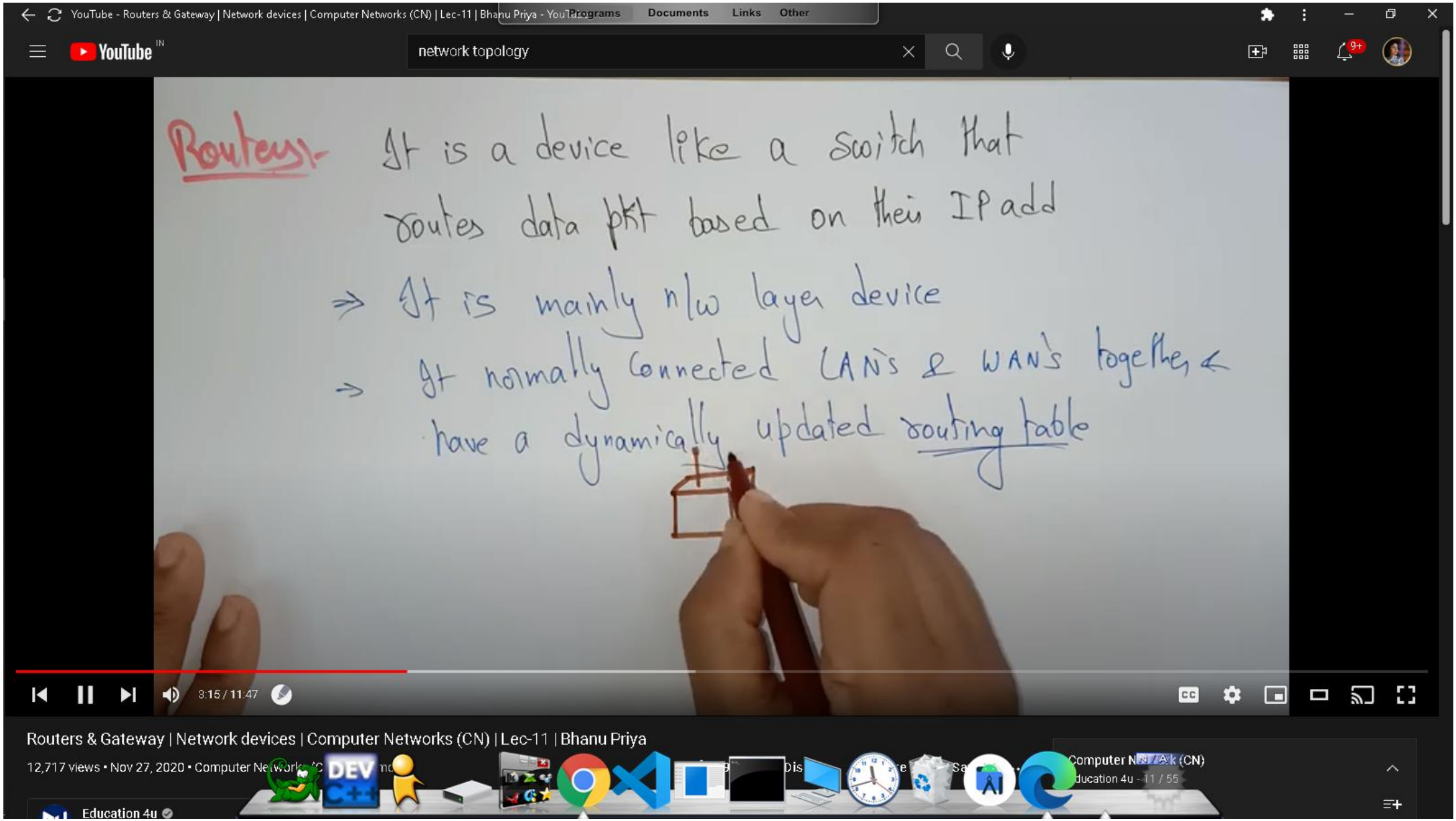
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network topology
Routers:-
It is a device like a switch that
routes data pkt based on their IP add
⇒ It is mainly n/w layer device
→ It normally connected LAN's & WAN's together
have a dynamically updated routing table
3:15 / 11:47
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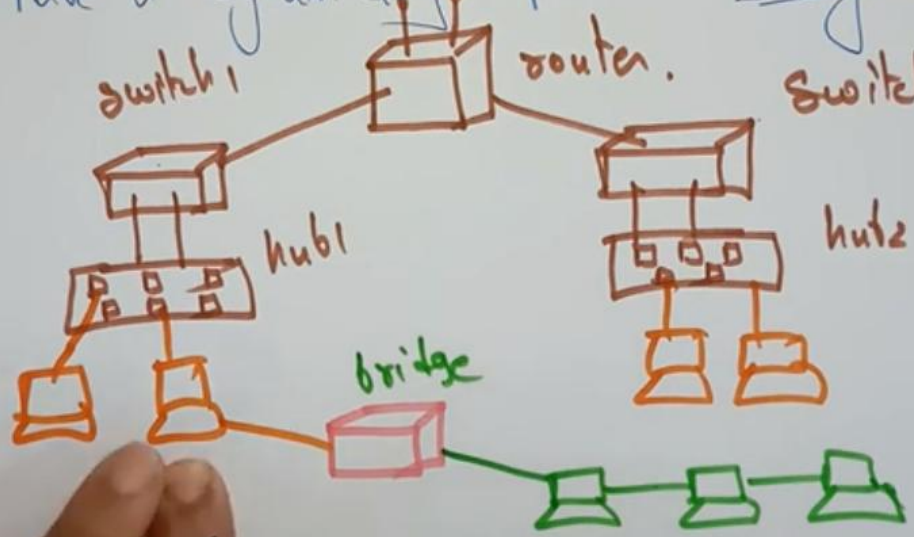
routes data pkt based on their IP add

⇒ It is mainly n/w layer device

→ It normally connected LAN's & WAN's together ←

have a dynamically updated routing table



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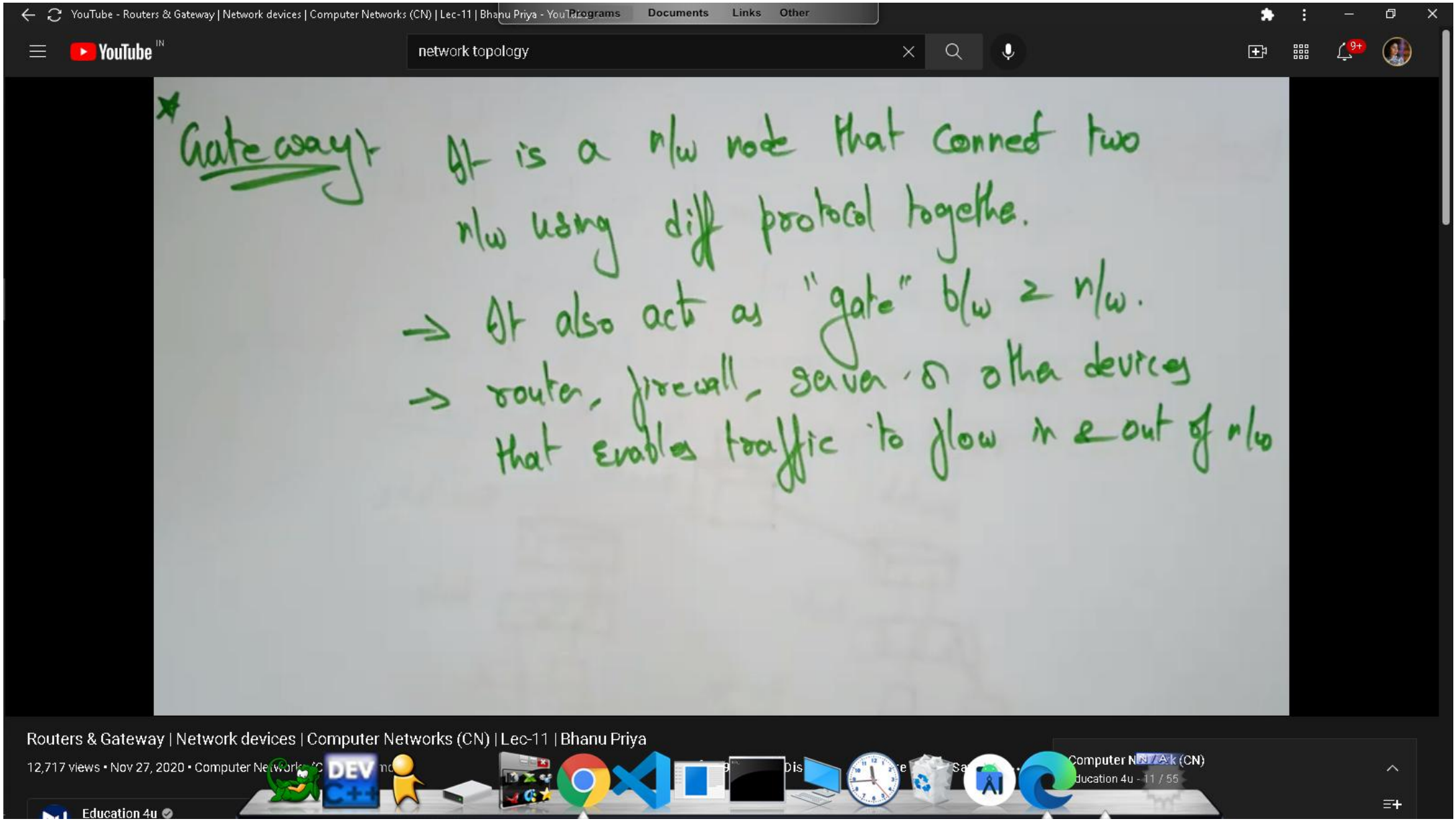
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network topology
Gateway: It is a n/w node that connect two n/w using diff protocol togethe.
→ It also act as "gate" b/w 2 n/w.
→ router, firewall, server, or other devices that enables traffic to flow in & out of n/w
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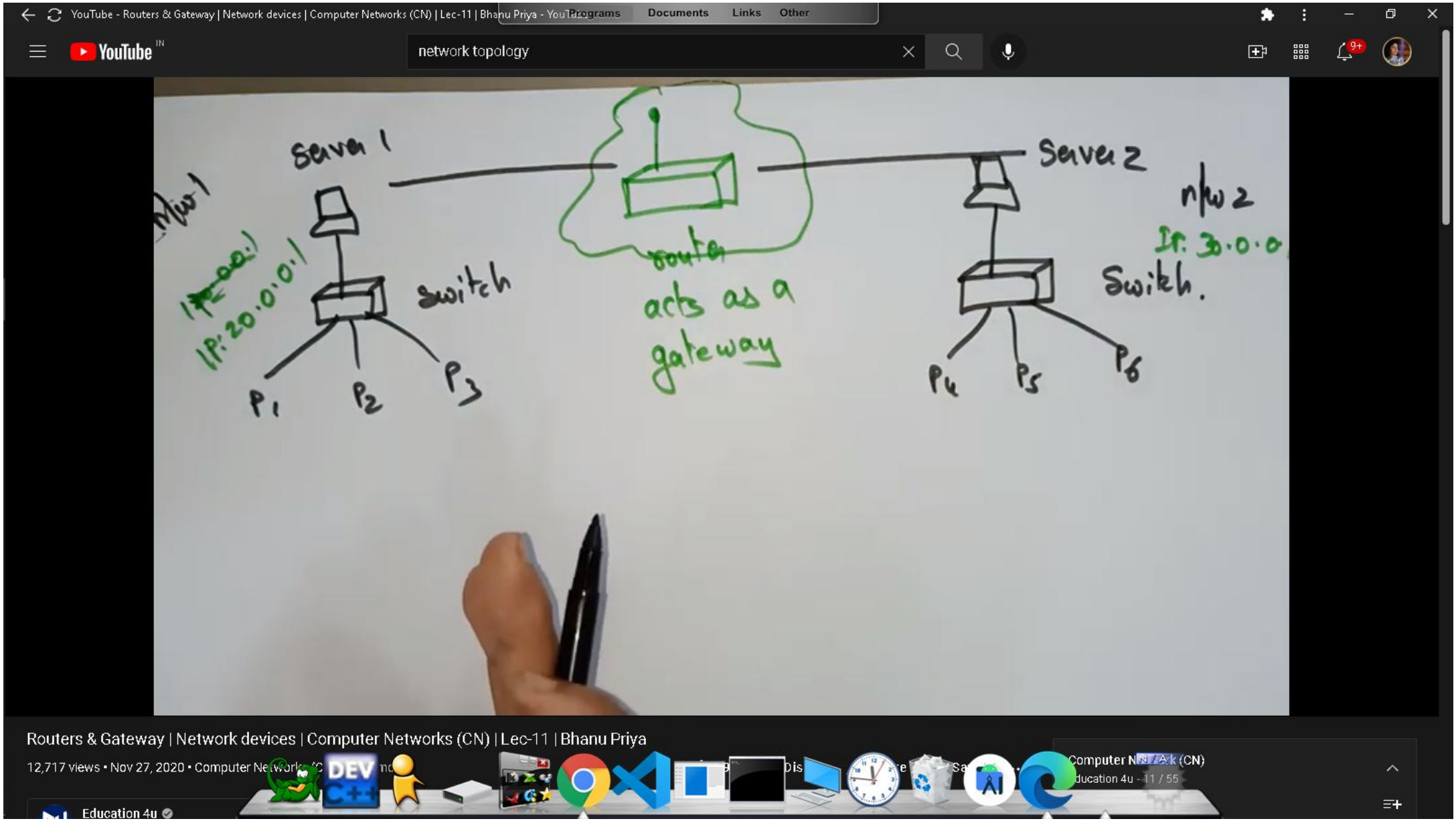
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network topology
Server 1
Server 2
nw 1
nw 2
switch
switch.
router
acts as a
gateway
P1
P2
P3
P4
P5
P6
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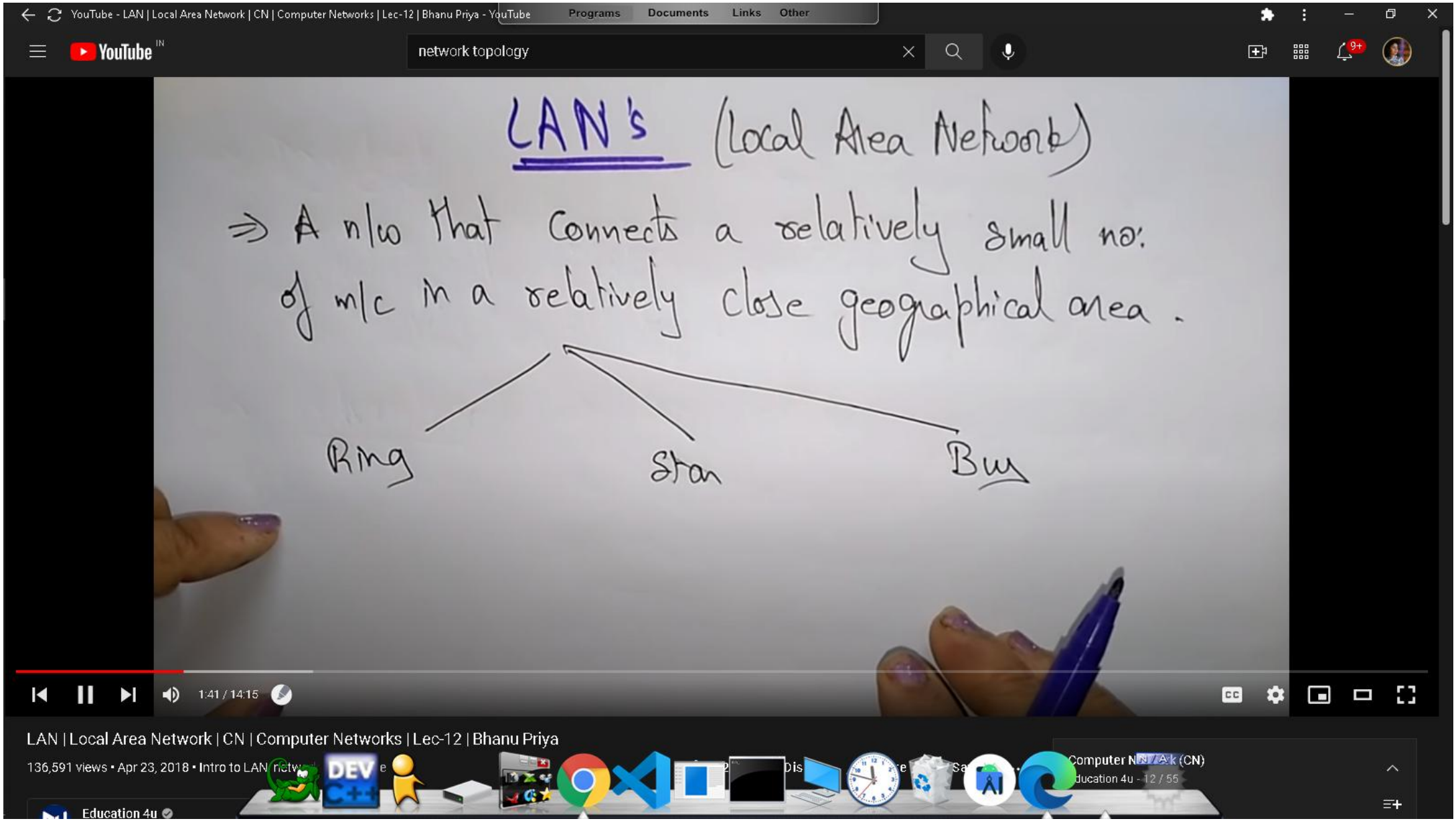
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network topology
LAN's (Local Area Network)
⇒ A n/w that Connects a relatively small no. of m/c in a relatively close geographical area.
Ring
Star
Bus
1:41 / 14:15
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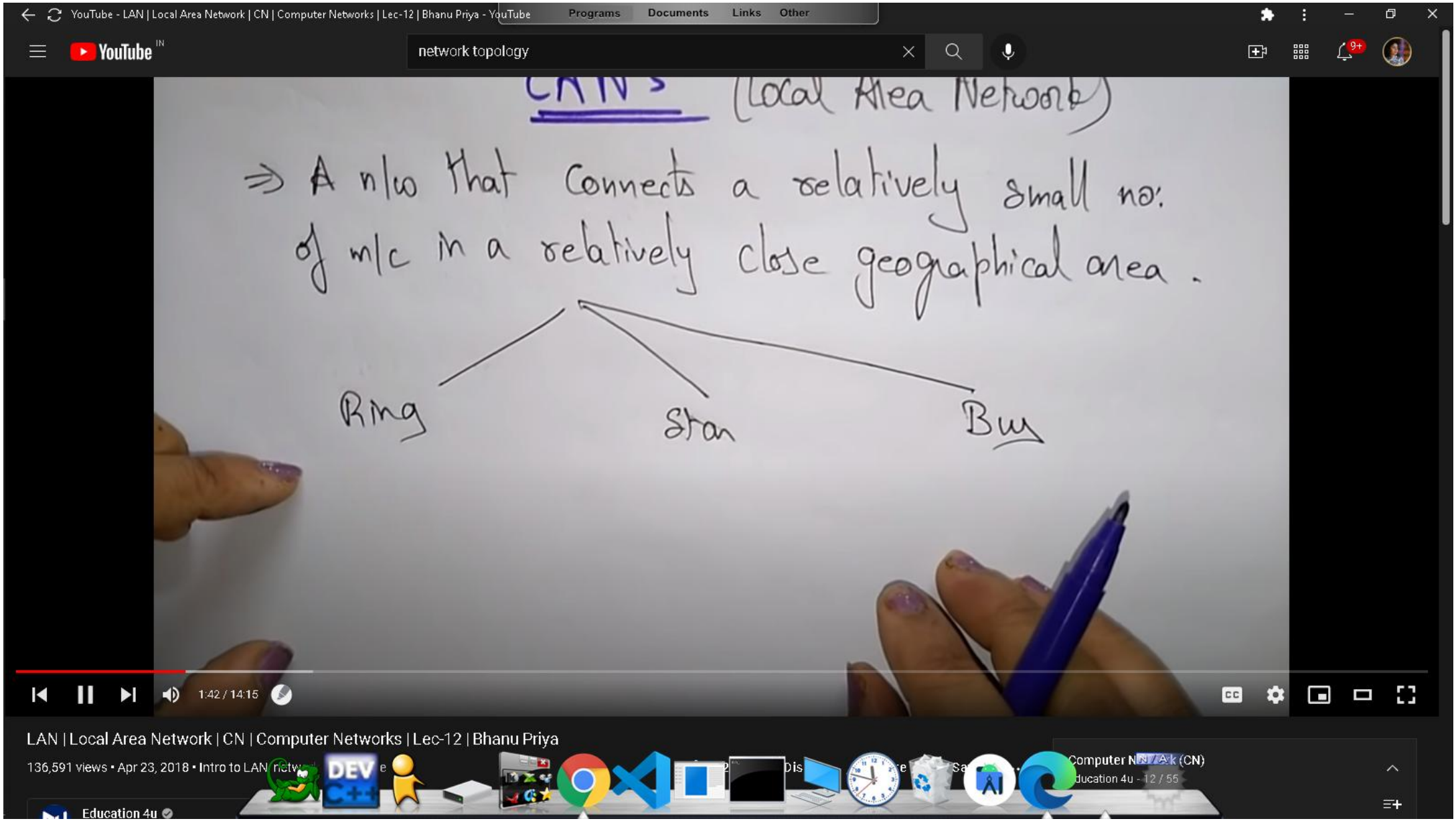
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network topology
LANs (Local Area Network)
⇒ A n/w that connects a relatively small no. of m/c in a relatively close geographical area.
Ring
Star
Bus
1:42 / 14:15
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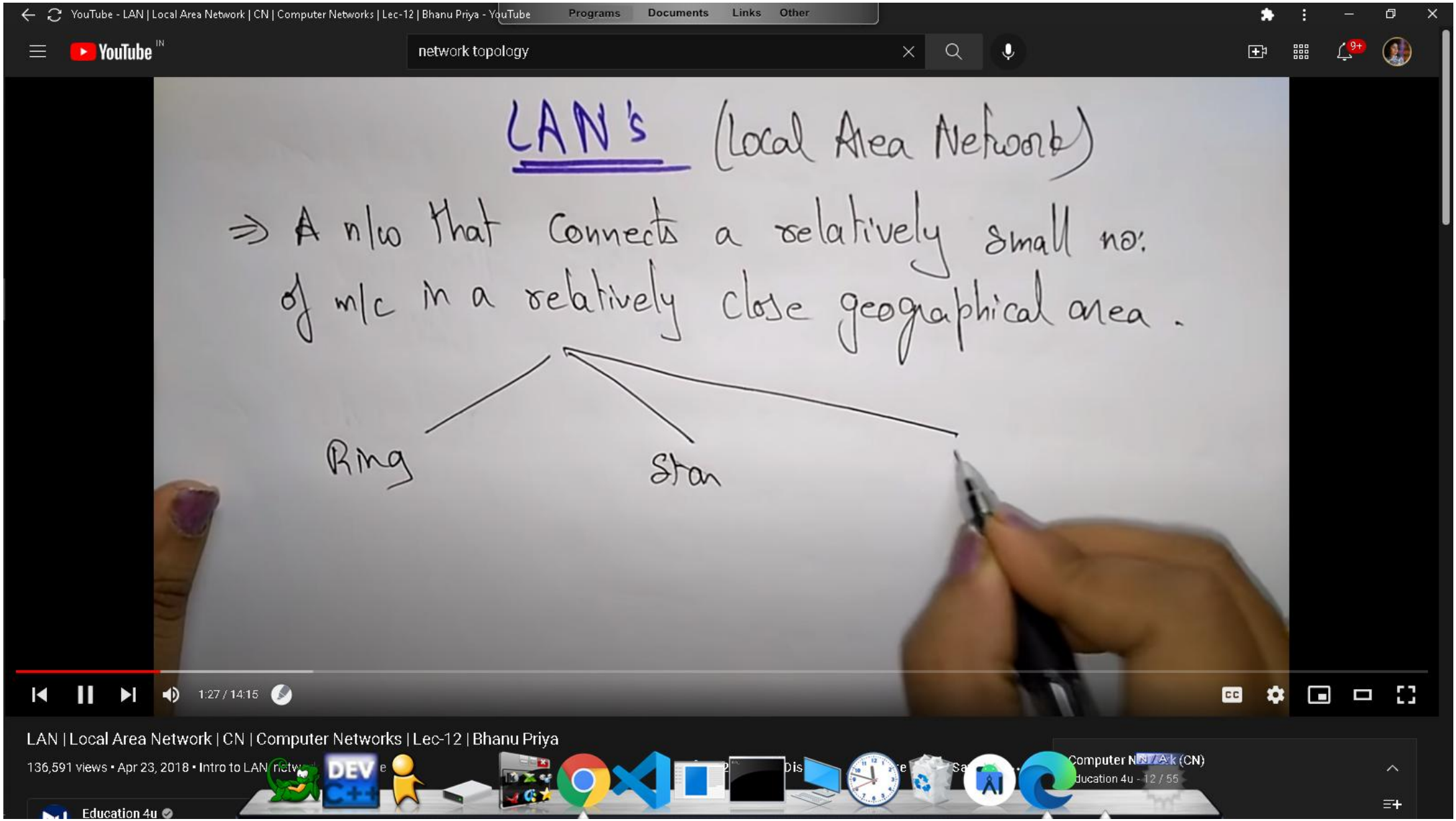
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network topology
LAN's (Local Area Network)
⇒ A n/w that connects a relatively small no: of m/c in a relatively close geographical area.
Ring
Star
1:27 / 14:15
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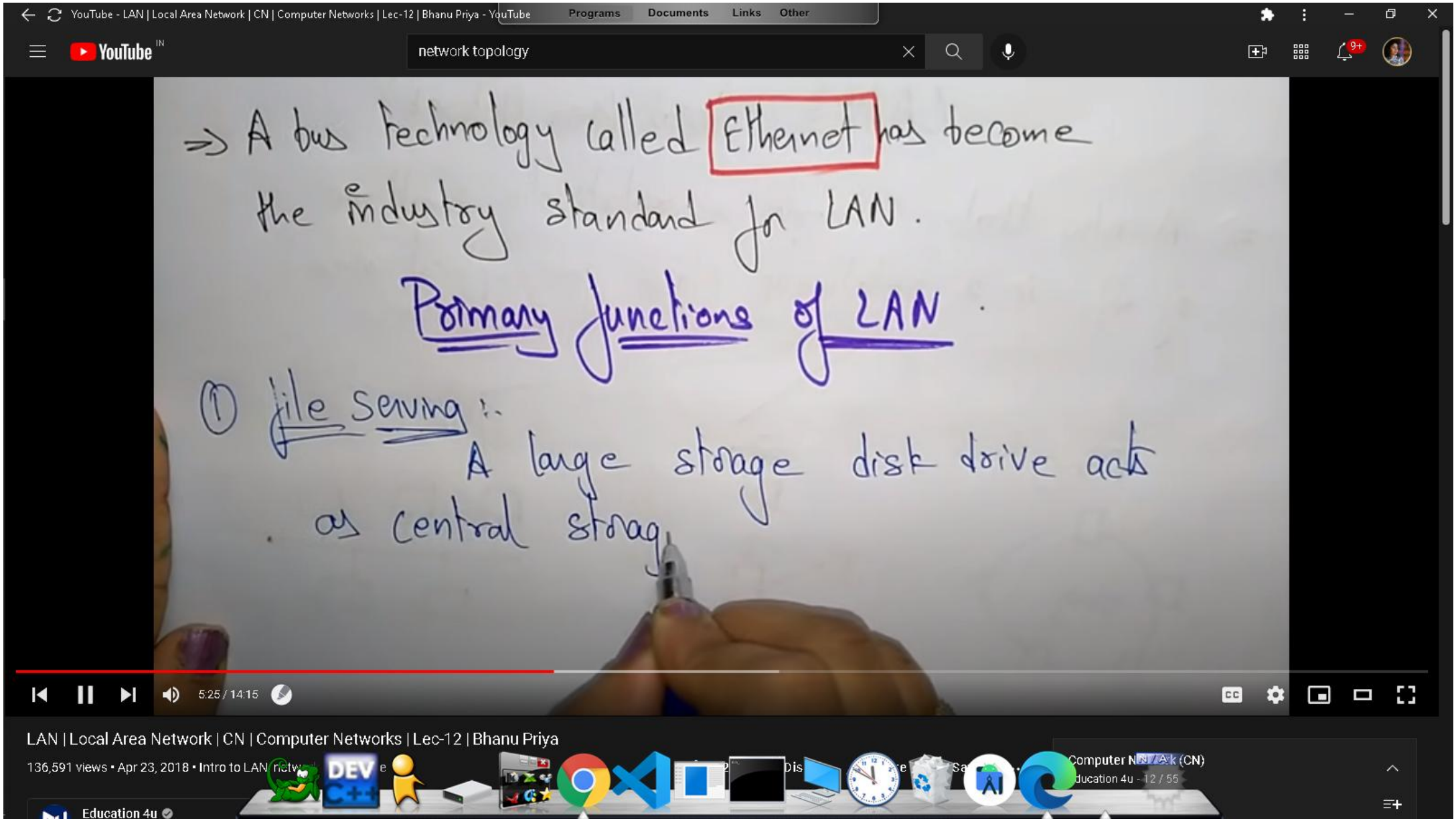
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network topology
=> A bus technology called Ethernet has become the industry standard for LAN.
Primary functions of LAN.
(1) File Serving :-
A large storage disk drive acts as central storag
5:25 / 14:15
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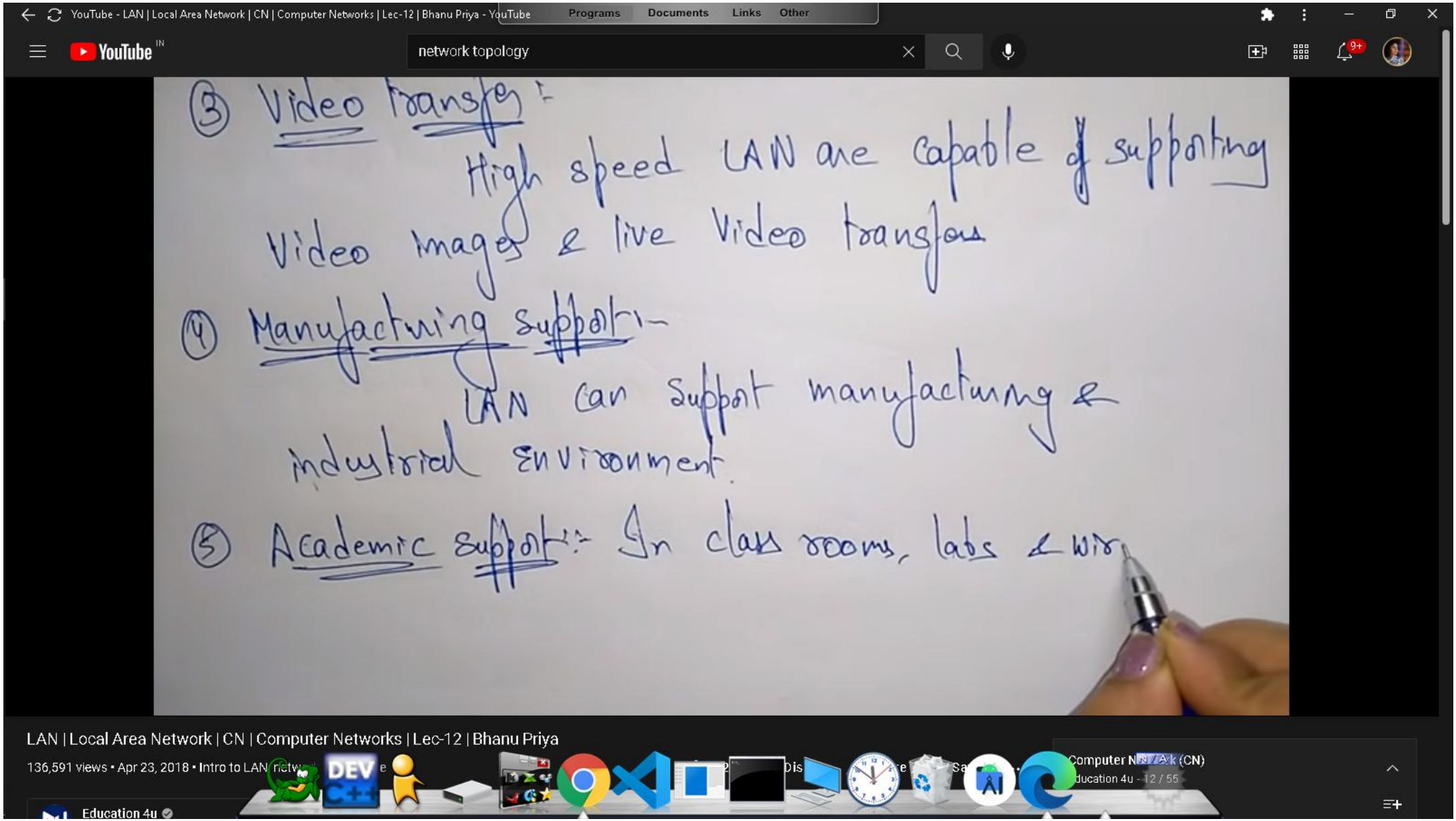
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network topology
③ Video transfer :-
High speed LAN are capable of supporting
video images & live video transfers
④ Manufacturing support :-
LAN can support manufacturing &
industrial environment.
⑤ Academic support :- In class rooms, labs & wir
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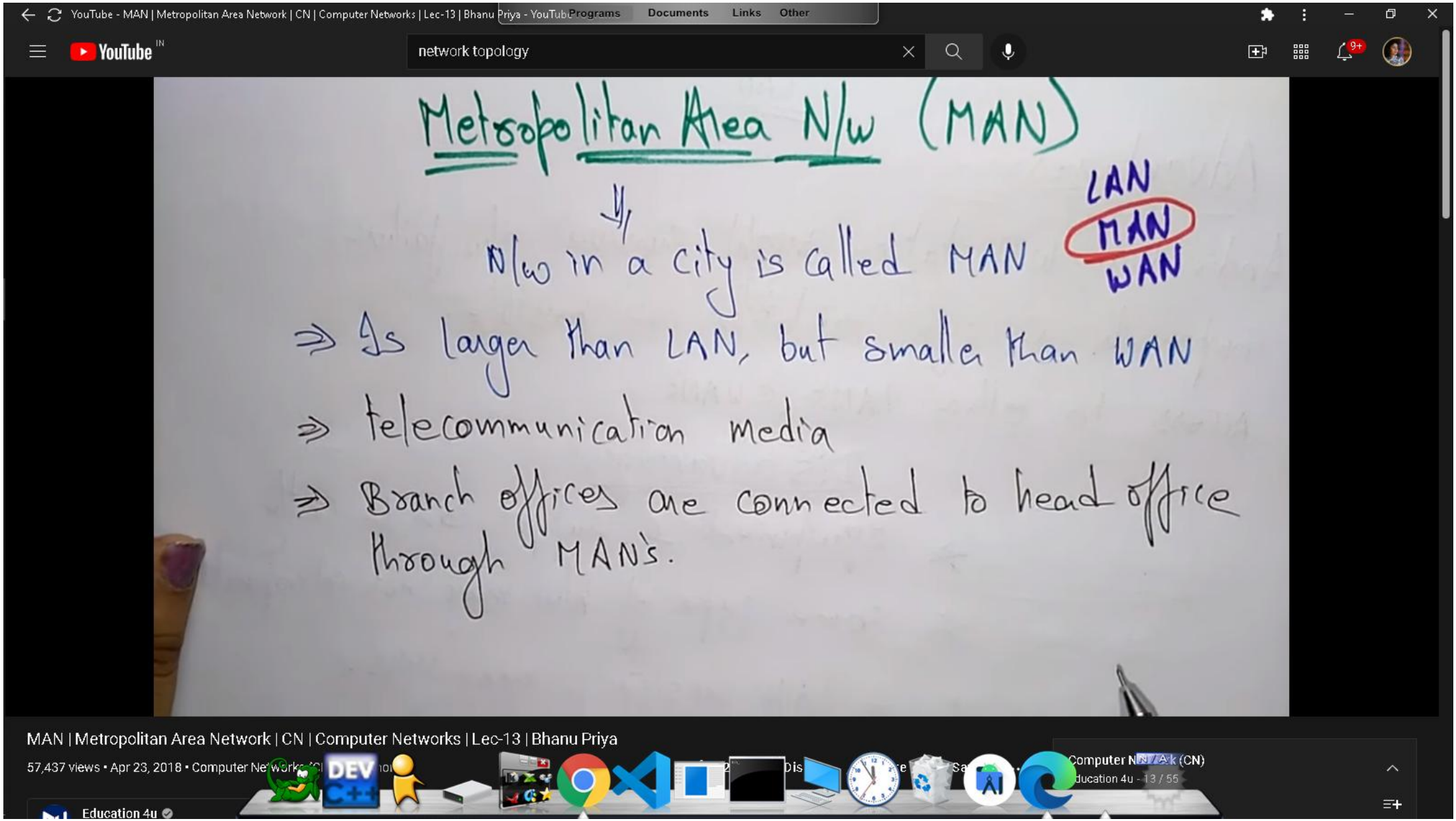
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network topology
Metropolitan Area N/w (MAN)
N/w in a city is called MAN
LAN
MAN
WAN
⇒ Is larger than LAN, but smaller than WAN
⇒ telecommunication media
⇒ Branch offices are connected to head office through MAN's.
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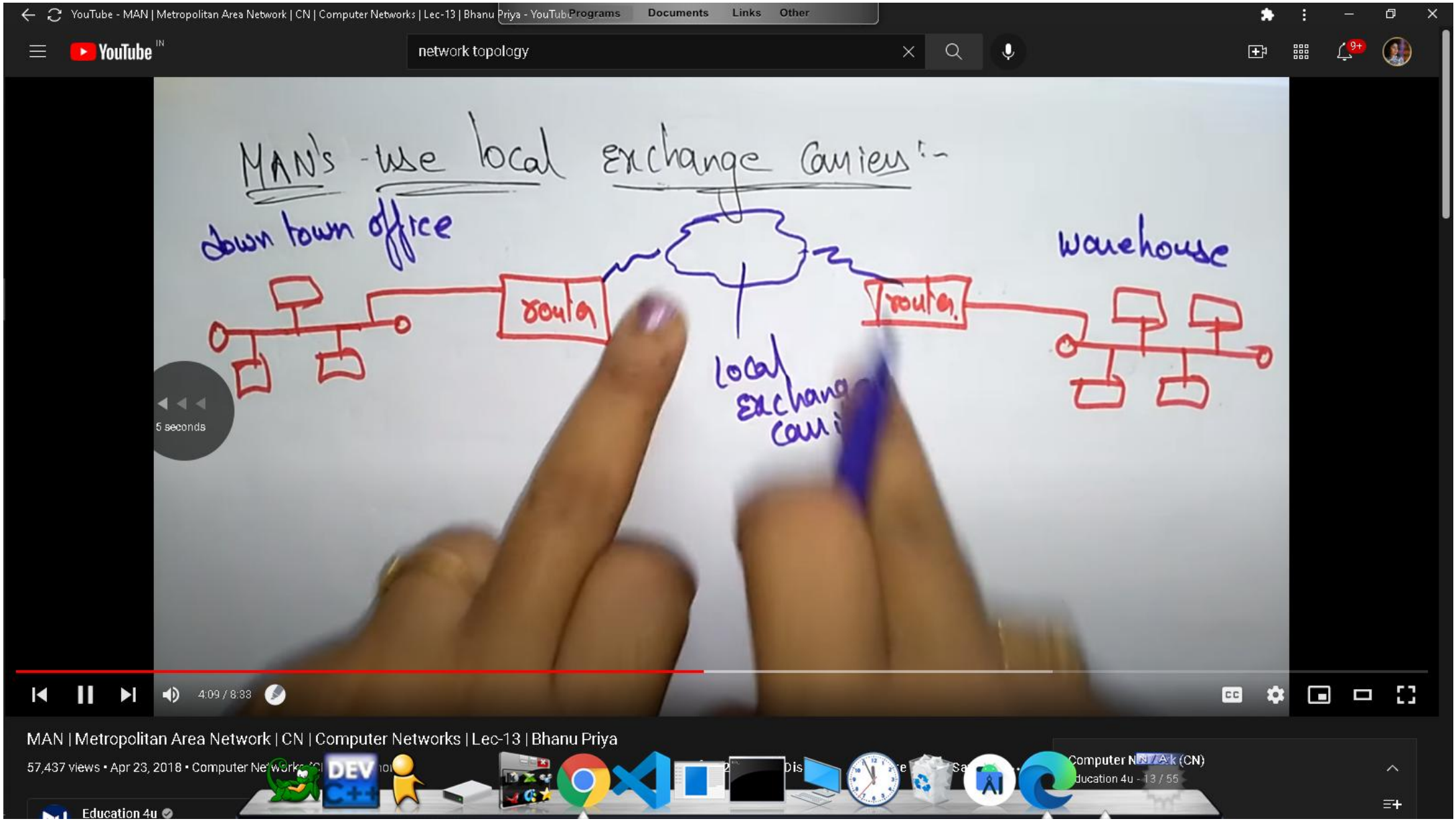
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network topology
MAN's - we local exchange carriers :-
down town office
router
router
warehouse
local exchange carri
5 seconds
4:09 / 8:33
MAN | Metropolitan Area Network | CN | Computer Networks | Lec-13 | Bhanu Priya
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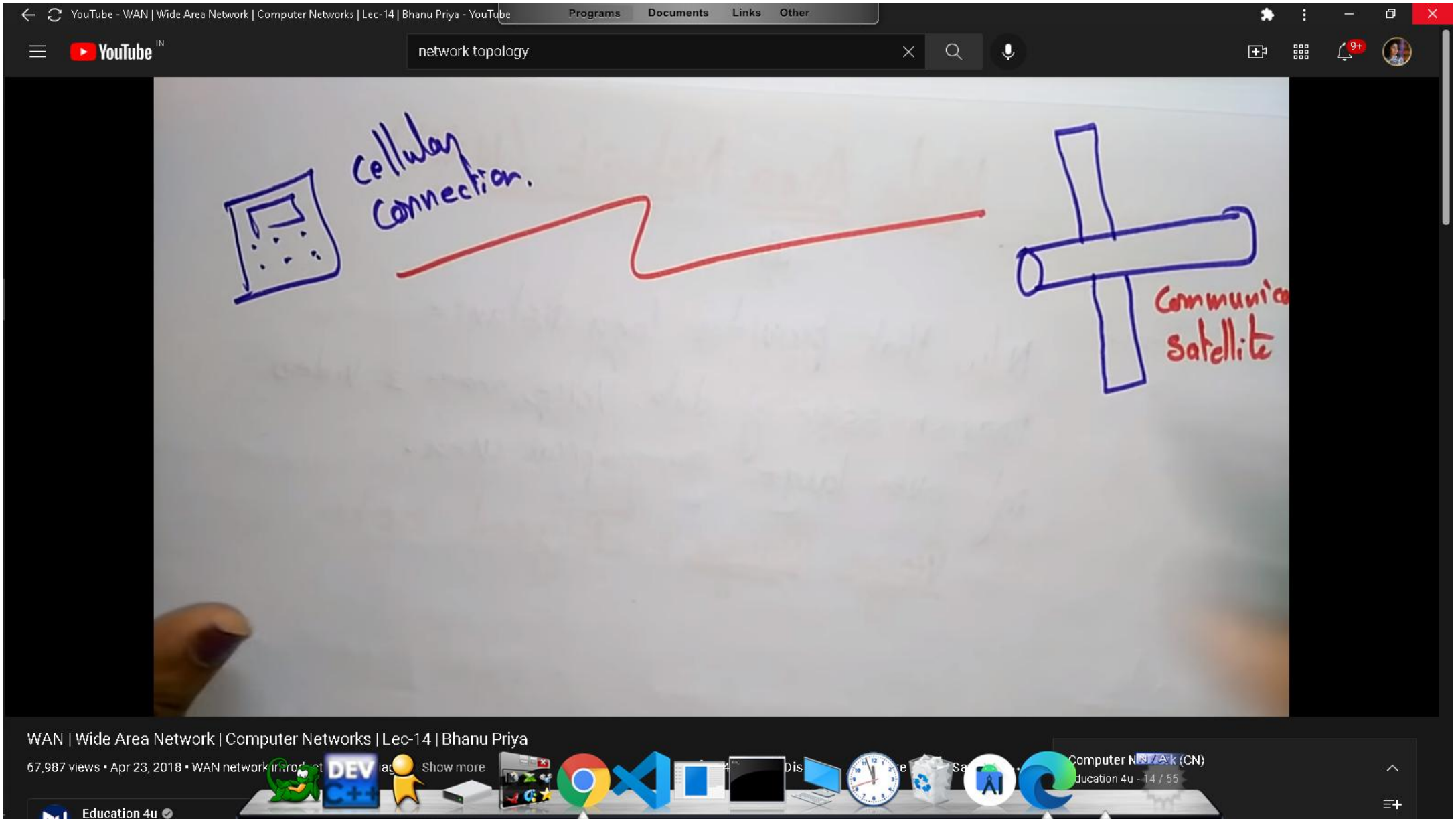
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Cellular connection.
Communica
satellite
WAN | Wide Area Network | Computer Networks | Lec-14 | Bhanu Priya
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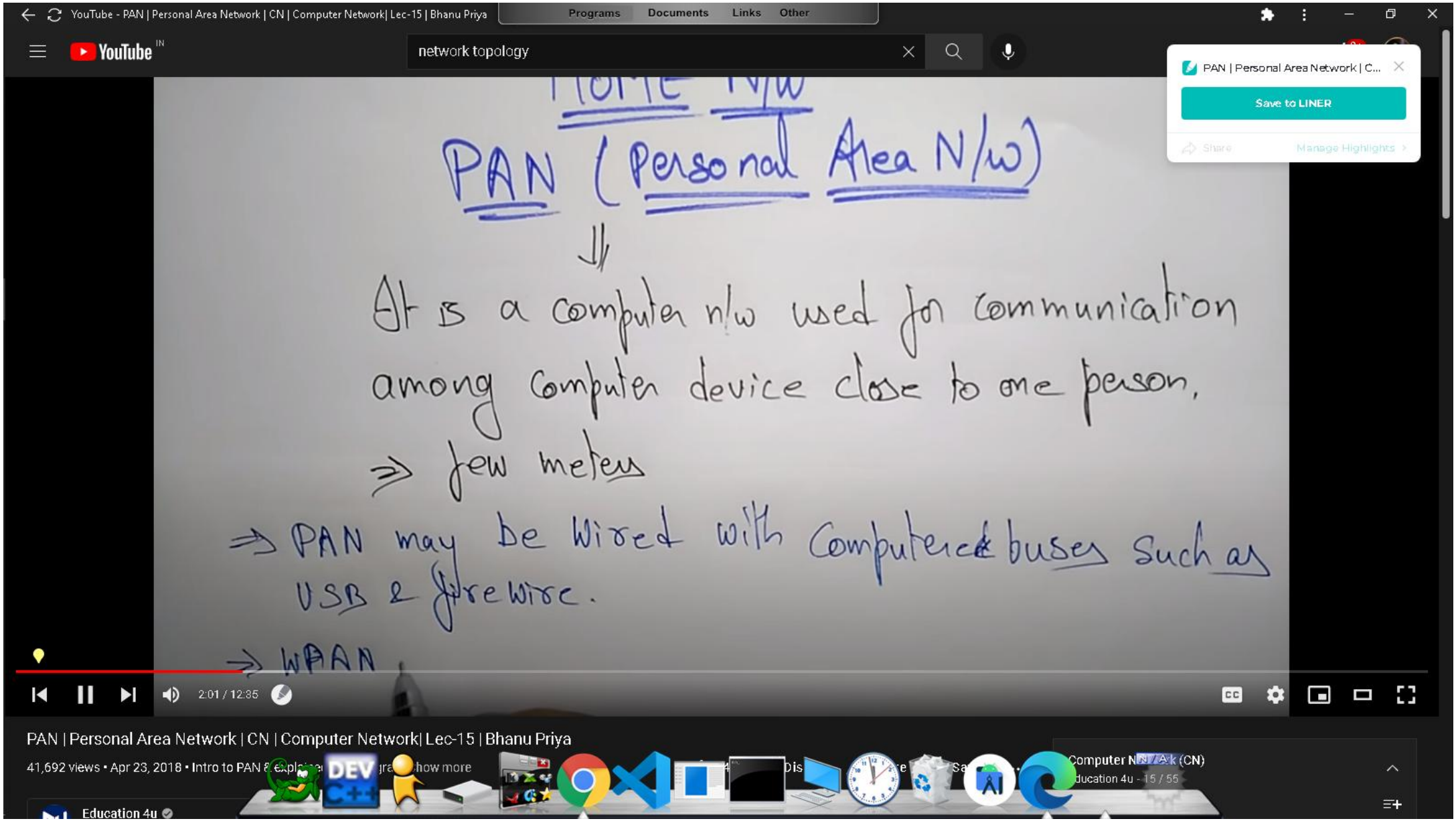
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network topology
PAN | Personal Area Network | C...
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PAN (Personal Area N/w)
It is a computer n/w used for communication among computer device close to one person.
⇒ few meters
⇒ PAN may be wired with computer buses such as USB & firewire.
⇒ WPAN
2:01 / 12:35
PAN | Personal Area Network | CN | Computer Network| Lec-15 | Bhanu Priya
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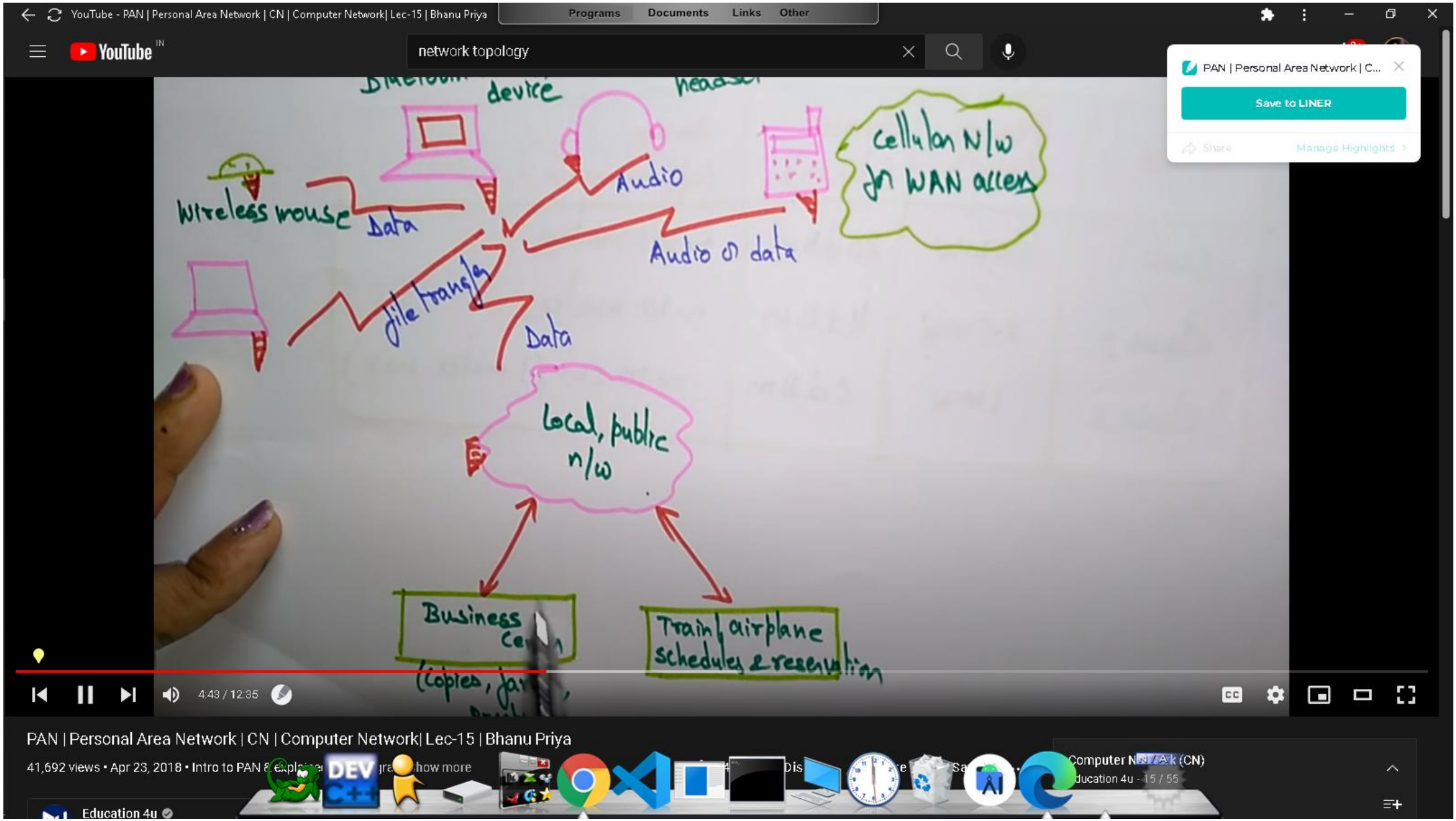
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PAN | Personal Area Network | C...
Save to LINER
Share
Manage Highlights
device
Wireless mouse
Data
Audio
Audio & data
cellular N/w for WAN access
file transfer
Data
local, public n/w
Business
Train, airplane schedules & reservation
4:43 / 12:35
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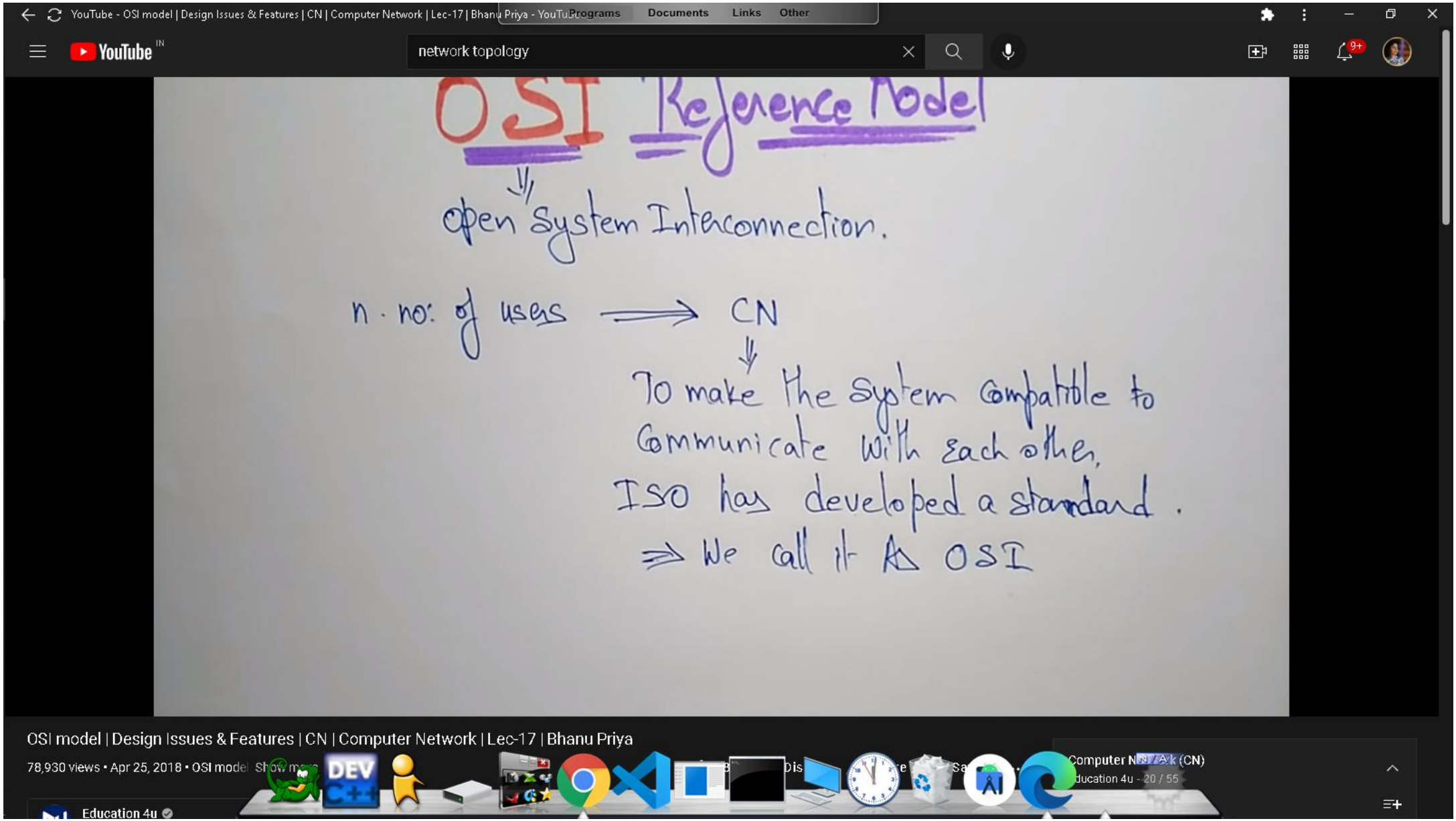
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network topology
OSI Reference Model
Open System Interconnection.
n. no: of users ⟹ CN
To make the system compatible to
Communicate with each other,
ISO has developed a standard.
⇒ We call it As OSI
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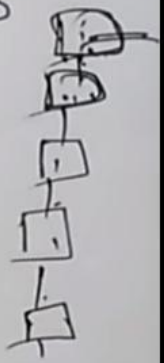
network topology

The design principle of OSI reference Model:

1. Where a diff abstractions are needed, a layer has to be created
2. Each layer should perform a well defined function.
3. Func of layer should be international standard
4. To minimize the inf flow across the interface
5. The no: of layers should be not too large or not too small.



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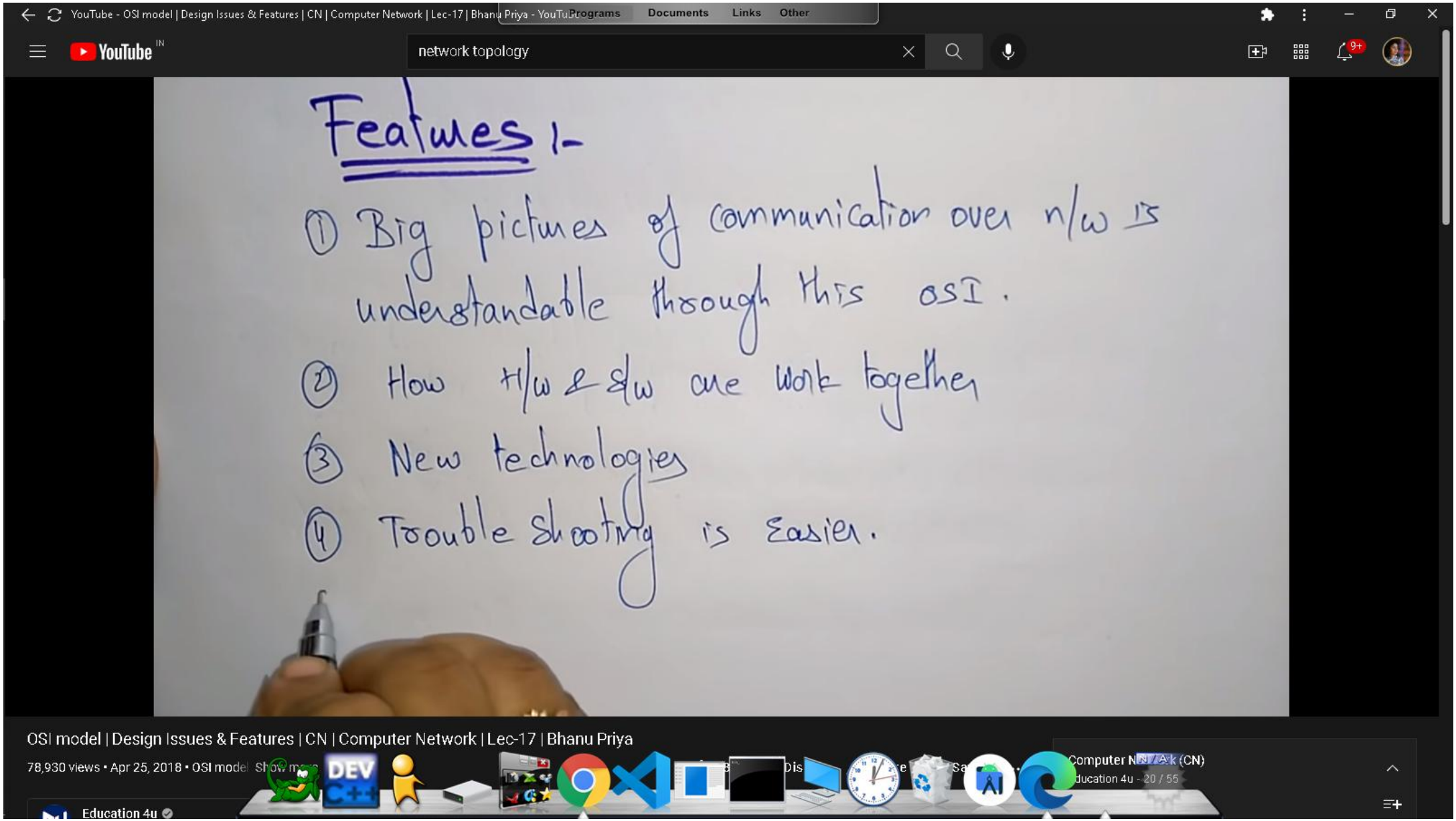
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network topology
Features :-
① Big pictures of communication over n/w is understandable through this OSI.
② How H/w & S/w are work together
③ New technologies
④ Trouble Shooting is Easier.
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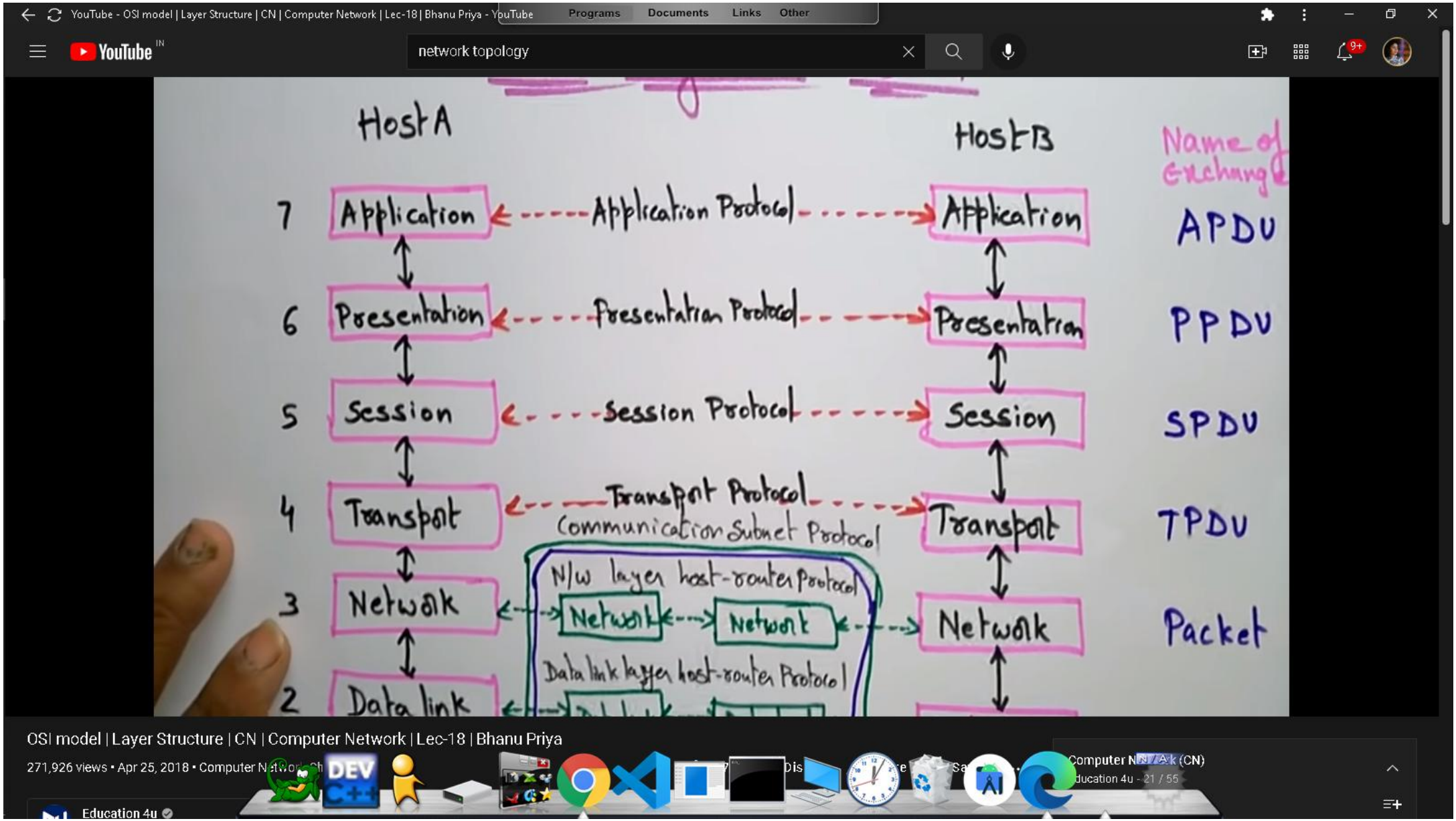
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network topology
Host A
Host B
Name of Exchang
7 Application
Application Protocol
Application
APDU
6 Presentation
Presentation Protocol
Presentation
PPDU
5 Session
Session Protocol
Session
SPDU
4 Transport
Transport Protocol
Transport
TPDU
Communication Subnet Protocol
N/w layer host-router Protocol
3 Network
Network
Network
Network
Packet
Data link layer host-router Protocol
2 Data link
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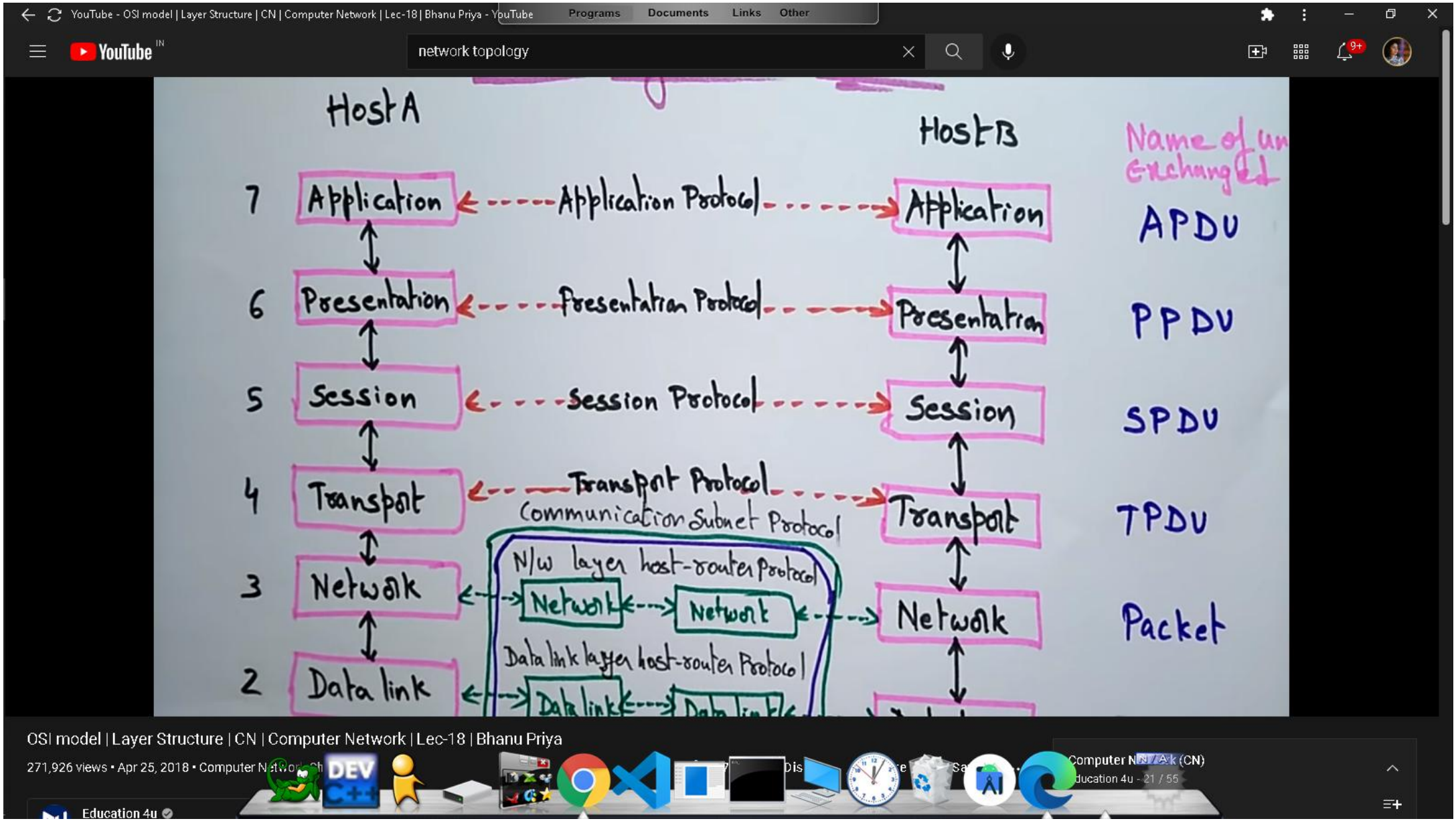
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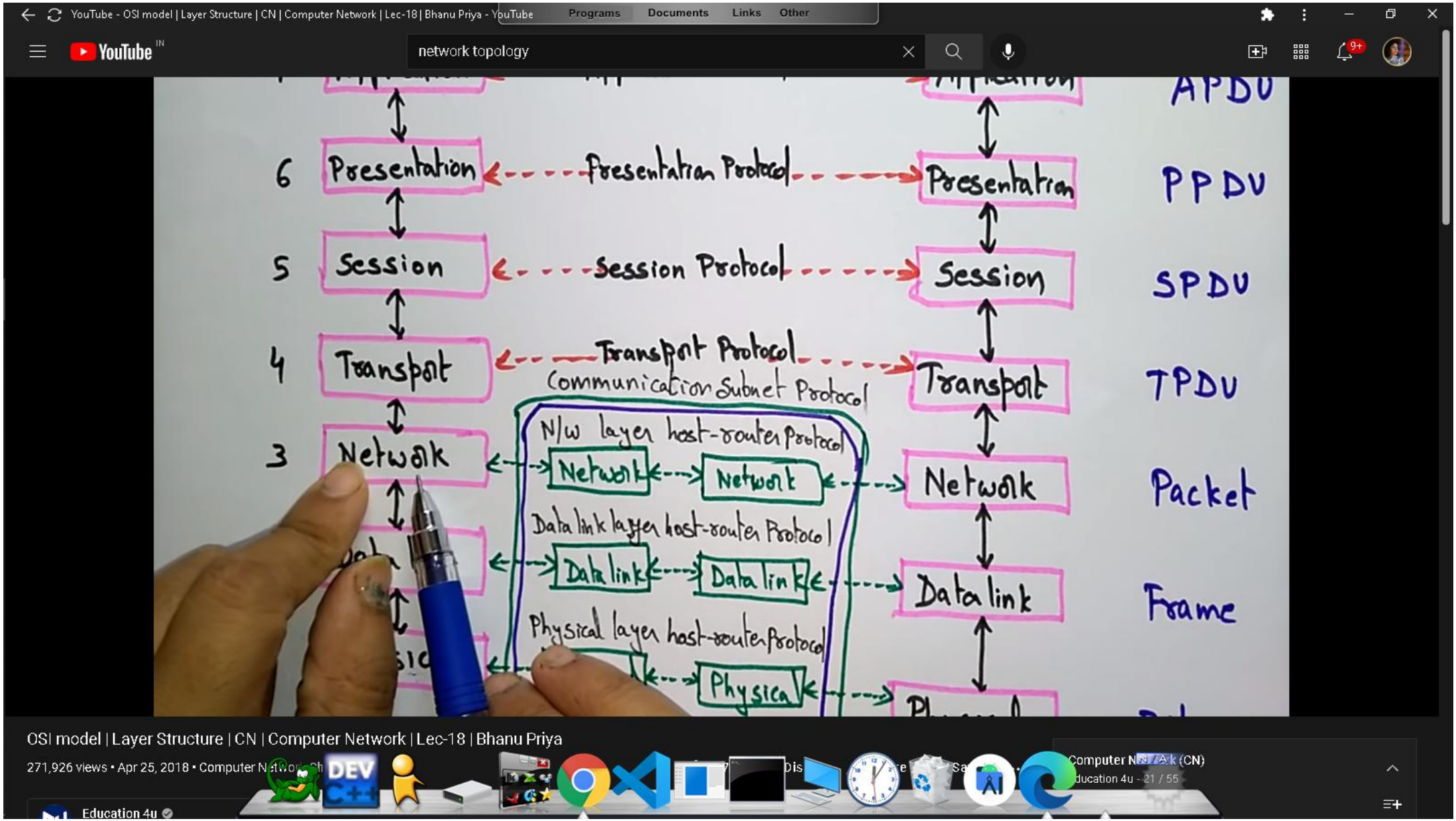
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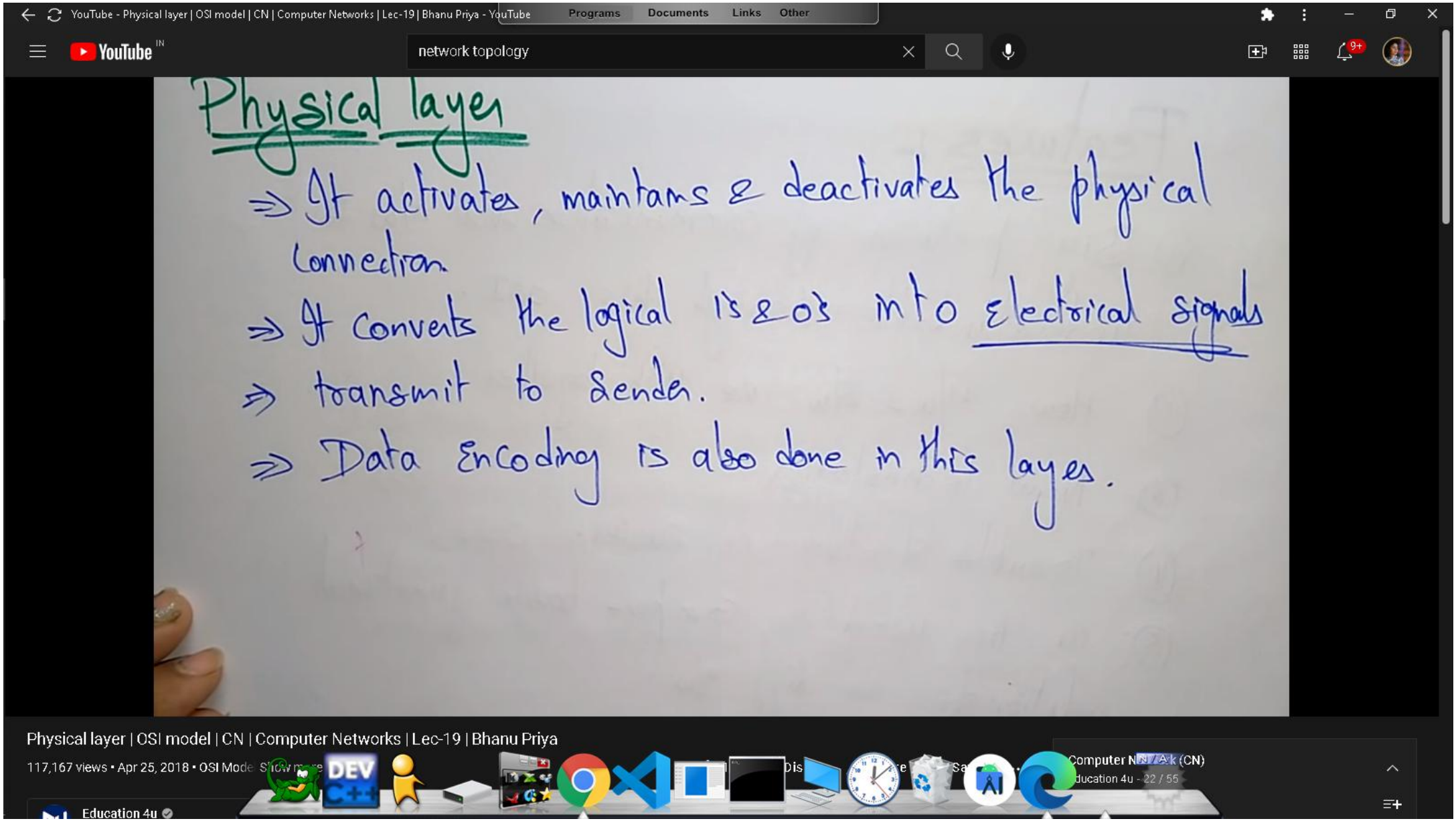
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network topology
Physical layer
⇒ It activates, maintains & deactivates the physical connection.
⇒ It converts the logical 1's & 0's into electrical signals
⇒ transmit to sender.
⇒ Data Encoding is also done in this layer.
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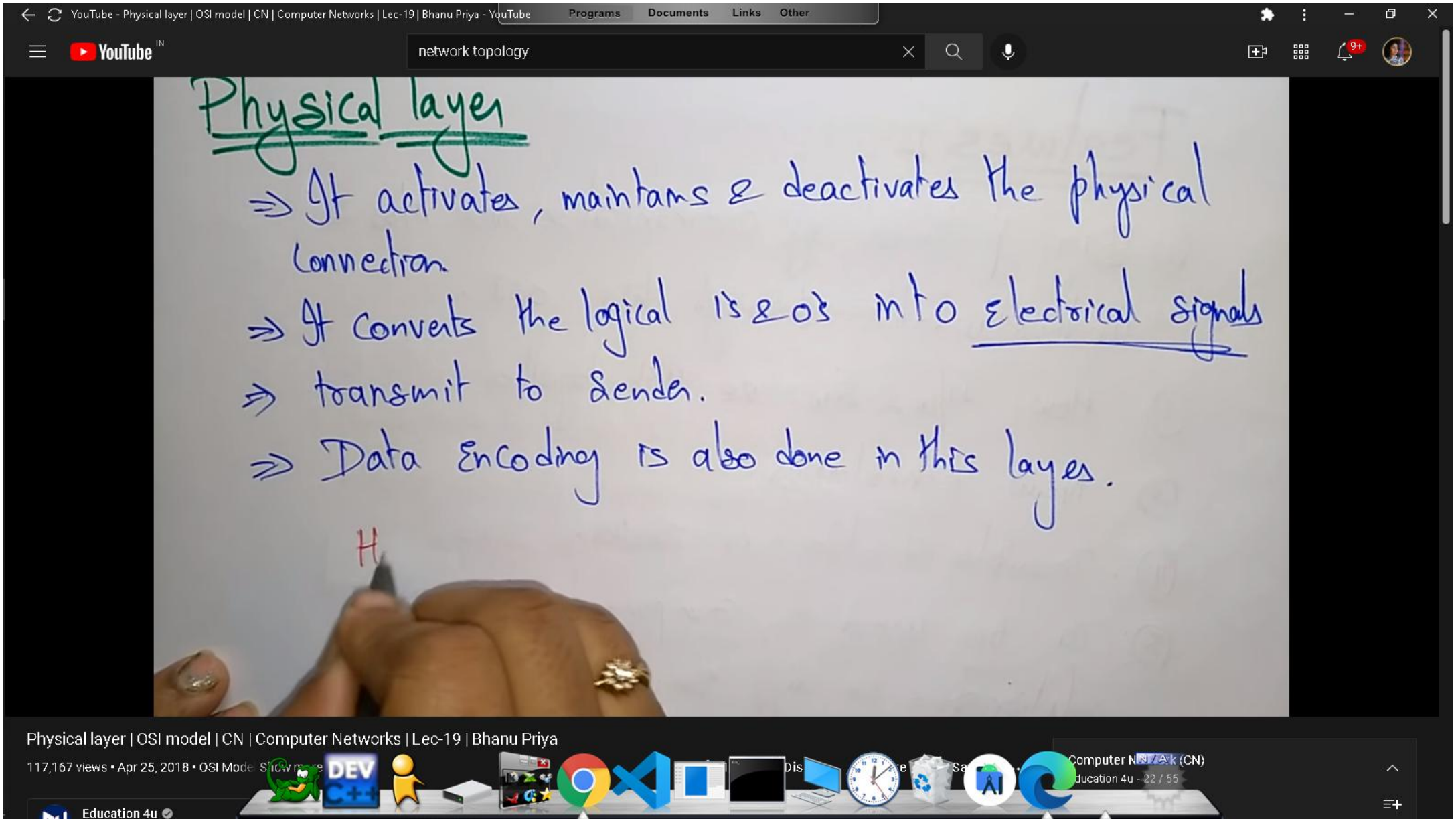
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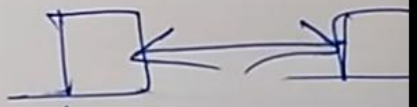
network topology

Functions of physical layer :-

1. bit Synchronization :- clock.
2. bit rate control :- no: of bits sent per second
3. Physical topologies :- Arranging diff devices/nodes in n/w
   ⇒ bus, star, or mesh topology
4. Transmission Mode :- 3 Modes



Simplex half duplex full dupl

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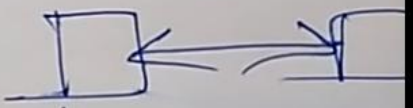

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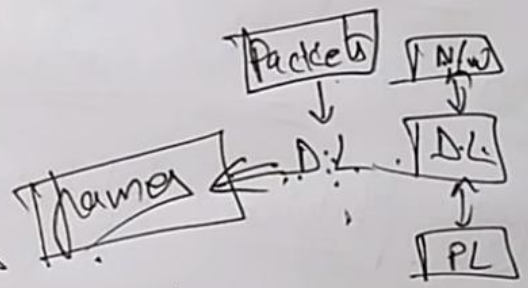
network topology

Data link layer

⇒ It is responsible for node to node delivery of message

⇒ Error free

⇒ Pkt received from N/w layer is further divided into frames depending on frame size of NIC (n/w interface card)



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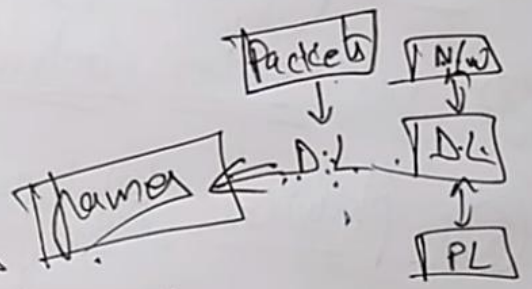

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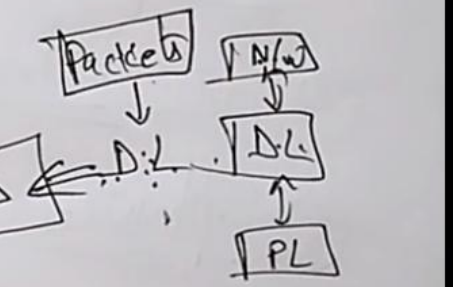
network topology

- It is responsible for node to node delivery of message
- Error free
- PKt received from N/w layer is further divided into frames depending on frame size of NIC (n/w interface card)
- When frame buffer is full, it stop the transmitting signal
- Switches & bridge are DLL devices



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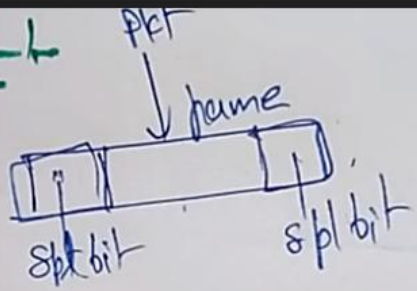
network topology

Functions of DLL

1. Framing ⇒



2. physical addressing ⇒ DLL adds physical add of Sender / receiver in the header of Each frame.

3. Error Control

4. Flow Control

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3. Obtain the skills of subnetting and routing mechanisms.
4. Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.

UNIT - I

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.

Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT - II

Data link layer: Design issues, framing, Error detection and correction.

Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel.

Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols.

Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT - III

Network Layer design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcasting, Quality of Service,

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Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet.

UNIT - IV

Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.

UNIT - V

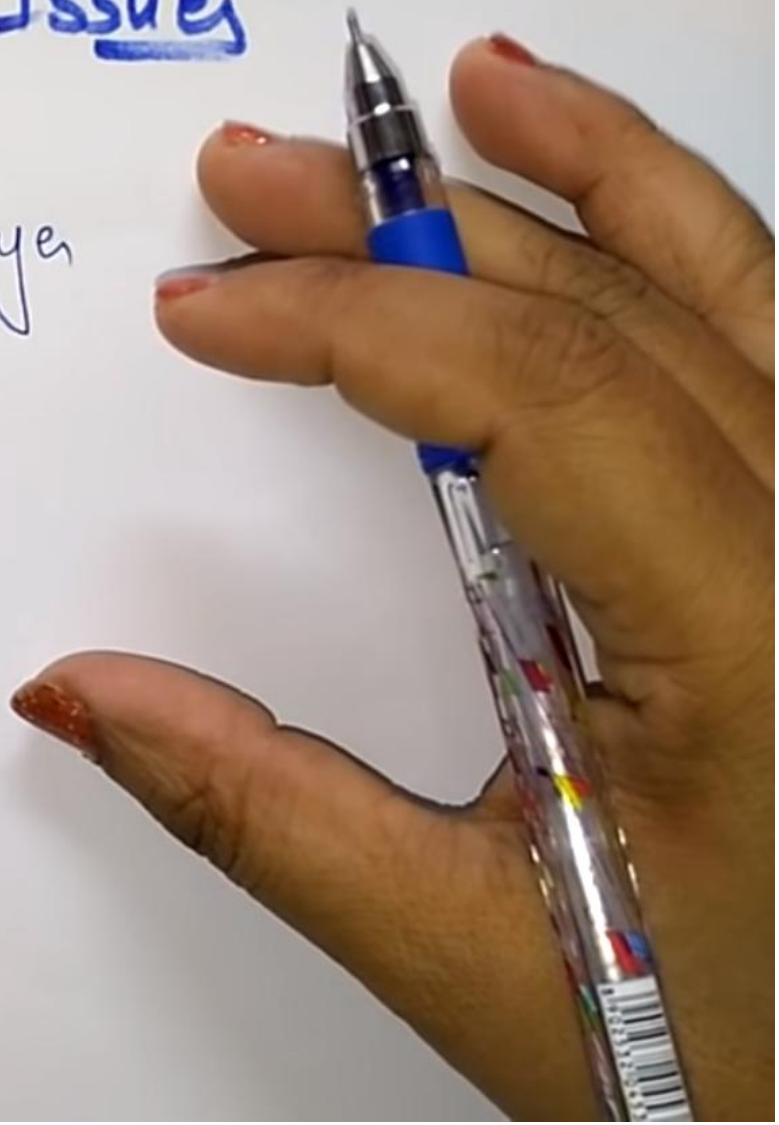
Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.

TEXT BOOK:

1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Edu[illegible]

Data link layer Design Issues

- Services provided to N/w layer
- Framing
- Error Control
- Flow Control



- Services provided to N/w layer
- Framing
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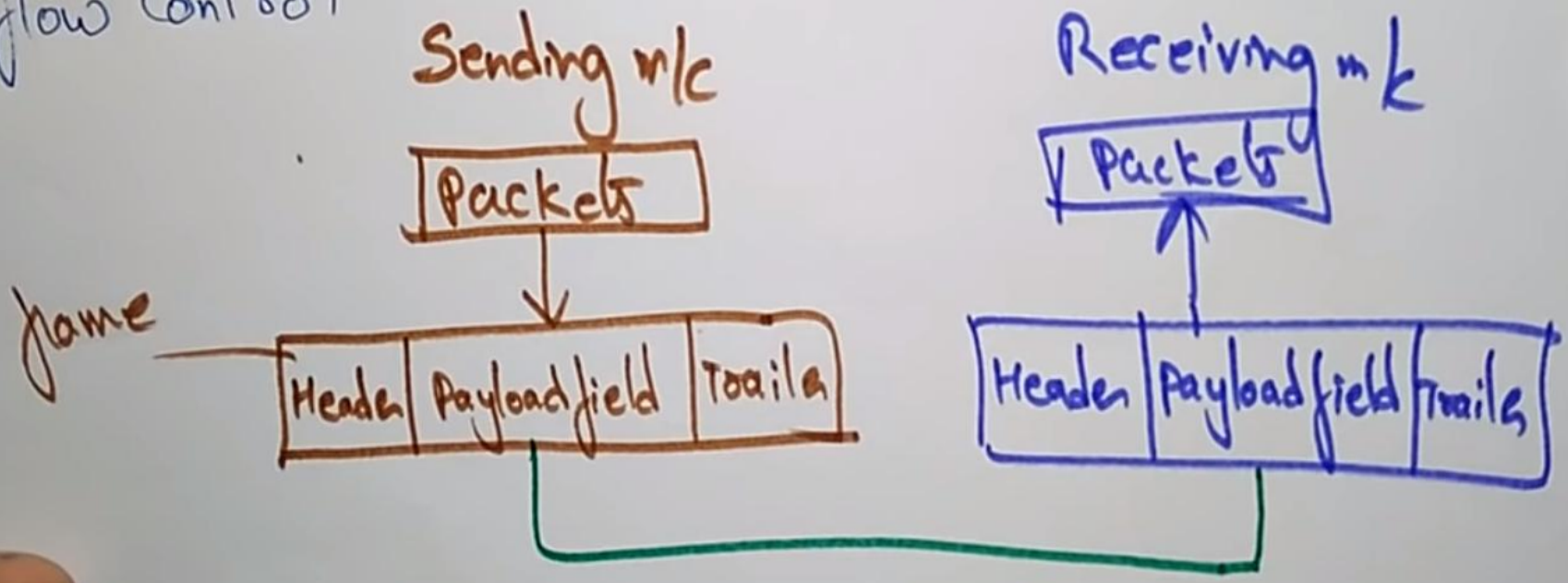
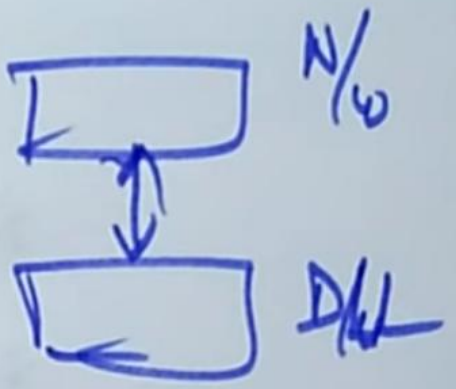
- Flow Control

Functions of DLL



Services Provided to N/w layer :-



⇒ Unacknowledge Connectionless service

⇒ Acknowledge Connectionless service

⇒ Acknowledge Connection Oriented service

Framming in Data link layer

↓

Framming is a function of DLL which provides away for a sender to transmit a set of bits that are meaningful to the receiver.

S $\xrightarrow{0100101}$ R.

Framing

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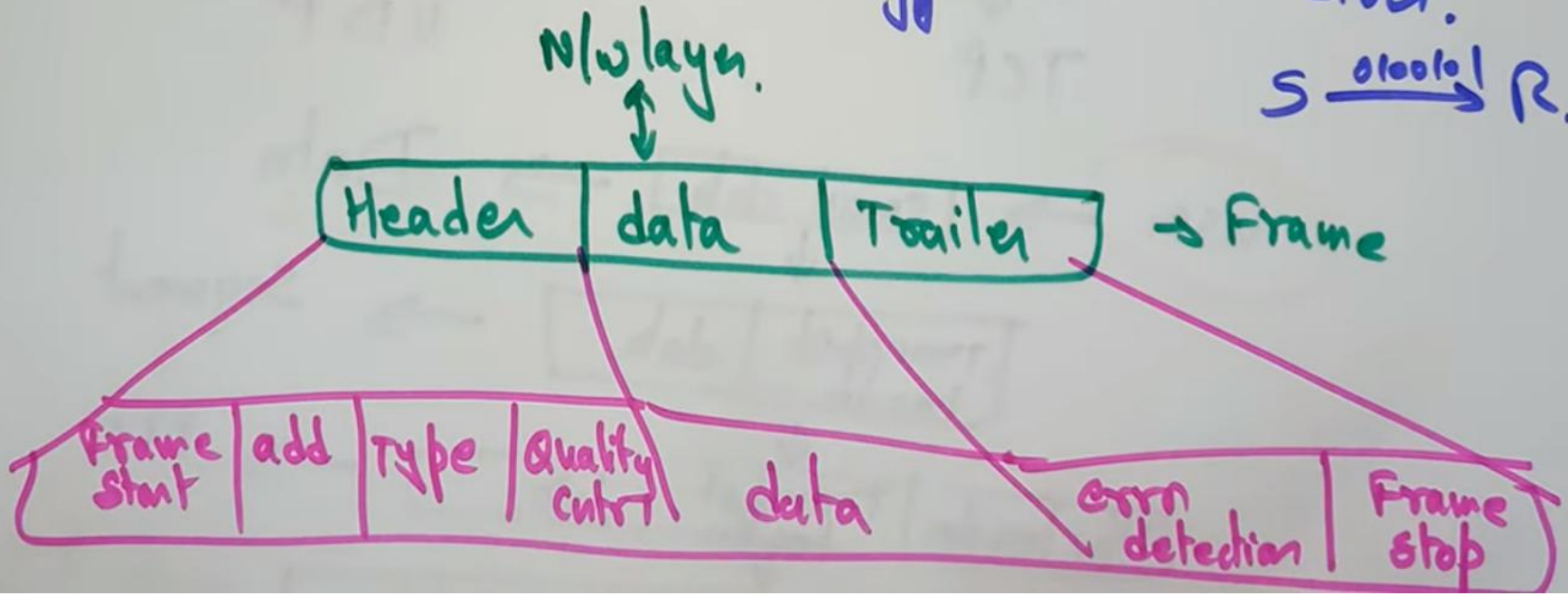
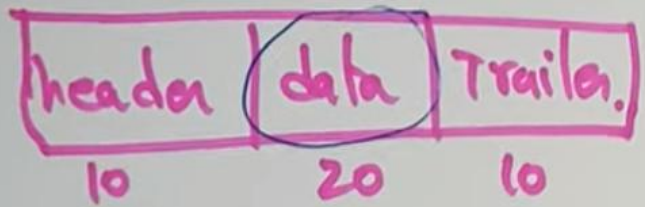
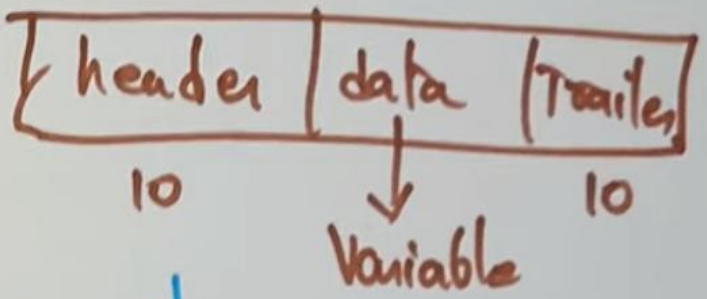


Types of frames:

① fixed length



② Variable length



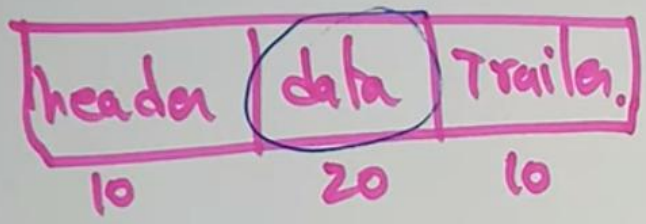
Eg: 200 bits of data to transmit

fixed length (how many frames ?) $20 \times (10) = 200$

Variable length (... ") 10 frames

→ only 1 fra...

① fixed length



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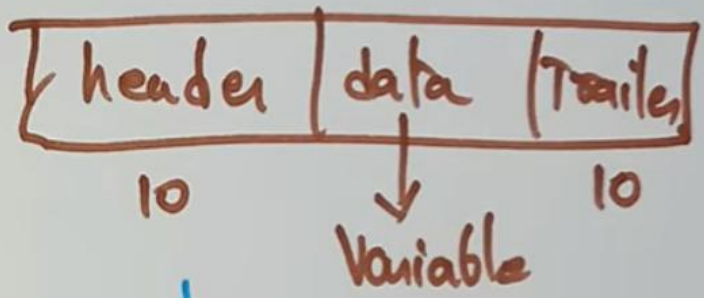

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→ only 1 frame

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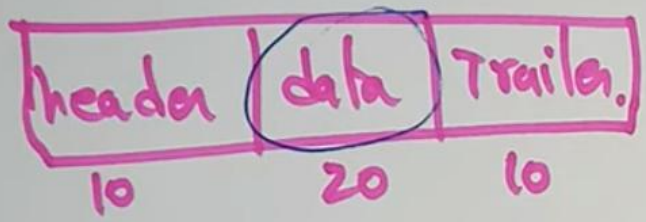
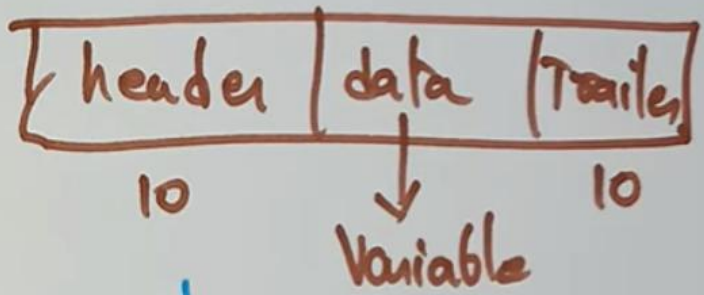
① fixed length

② Variable length





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↓

10 frames

Variable length (... ") → only 1 frame

4 methods can be used to mark the start & end of each frame

- Character count
- byte stuffing
- bit stuffing
- physical layer coding violation.

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- ✱ byte stuffing
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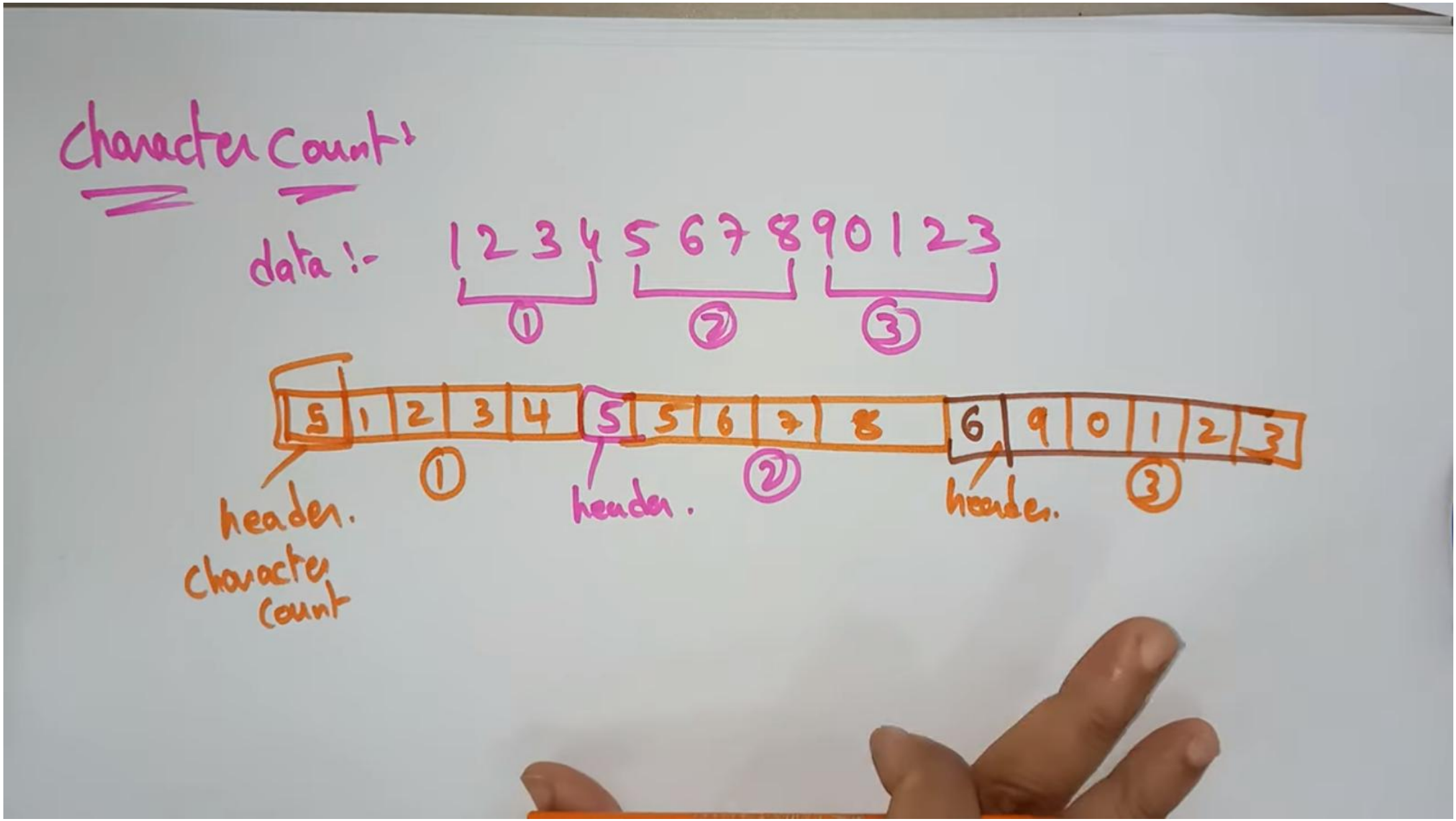
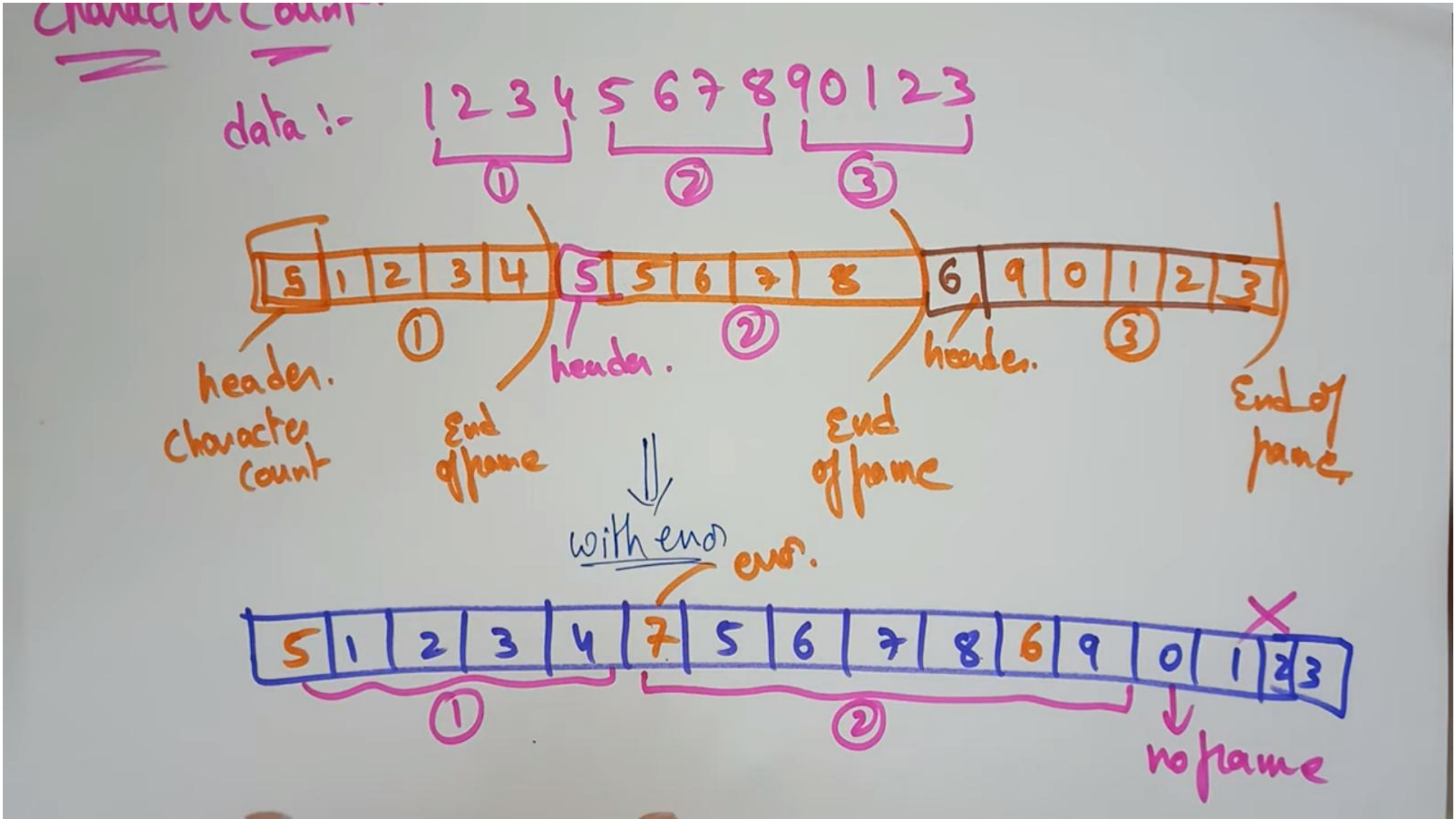

Character Count:
data :- 1 2 3 4 5 6 7 8 9 0 1 2 3
① ② ③
5 1 2 3 4 5 5 6 7 8 6 9 0 1 2 3
① ② ③
header.
Character count
header.
header.


Character Count
data :- 1 2 3 4 5 6 7 8 9 0 1 2 3
1
2
3
5 1 2 3 4 5 5 6 7 8 6 9 0 1 2 3
header.
Character count
End of frame
header.
End of frame
header.
End of frame
with end
end.
5 1 2 3 4 7 5 6 7 8 6 9 0 1 2 3
no frame

(2) Flag bytes with byte / char stuffing :-

⇒ Each frame start & end with special bytes - Flag byte

⇒ If the flag bytes occurs in the frame, stuff an extra Escape byte (ESC)

Framing in data link layer | Flag byte with byte stuffing | Part-2/4

⇒ Each frame start & end with special bytes – Flag byte

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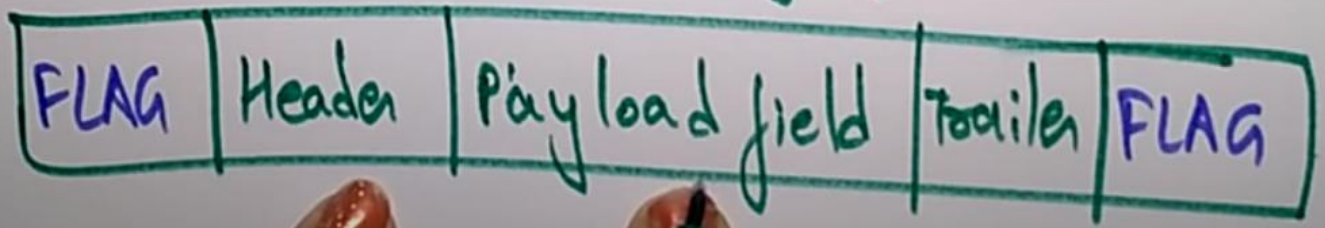
(a) A frame delimited by flag bytes



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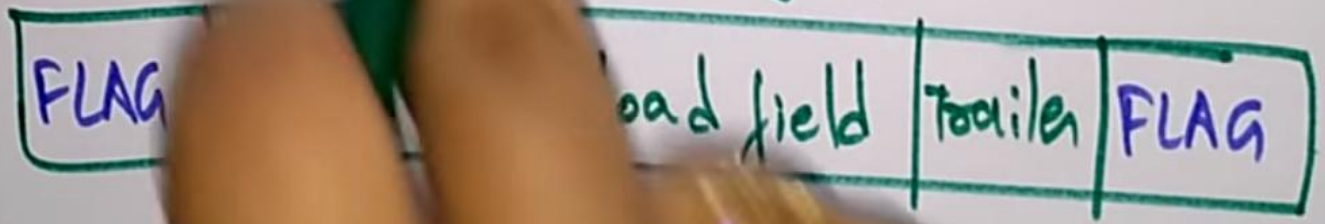
(a) A frame de[illegible]d by flag bytes



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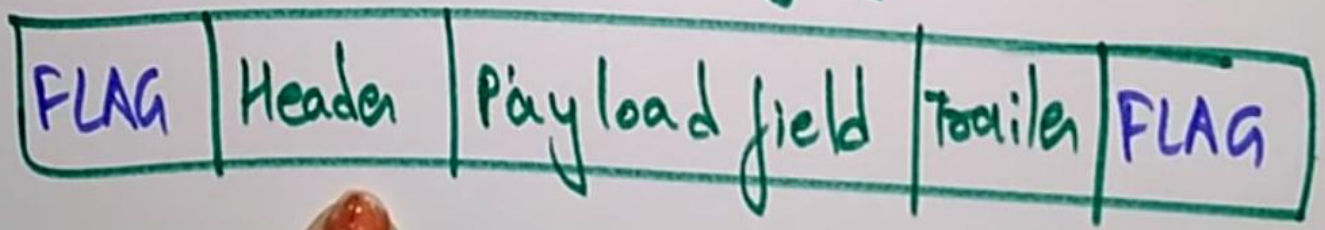
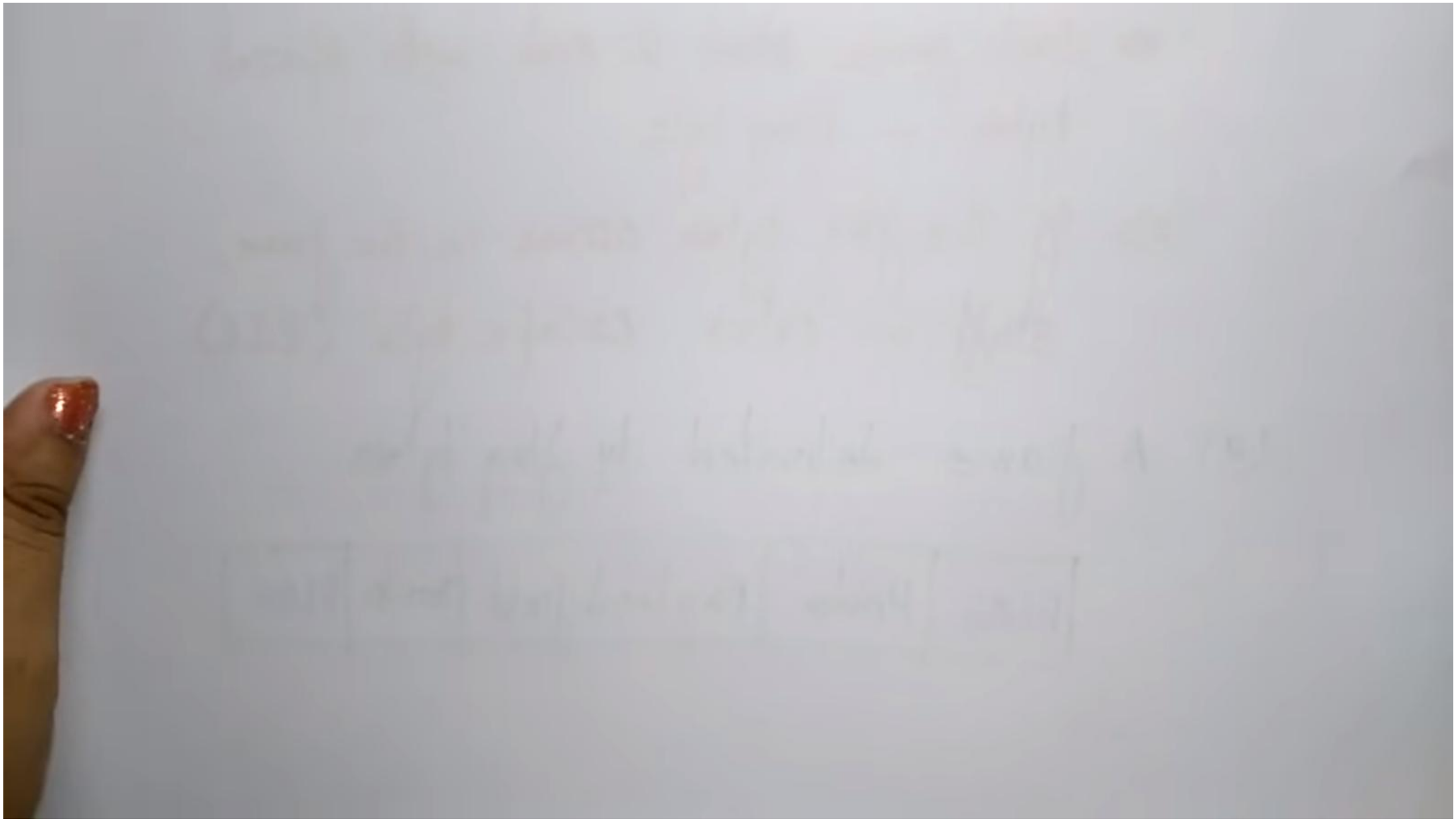



(a) A



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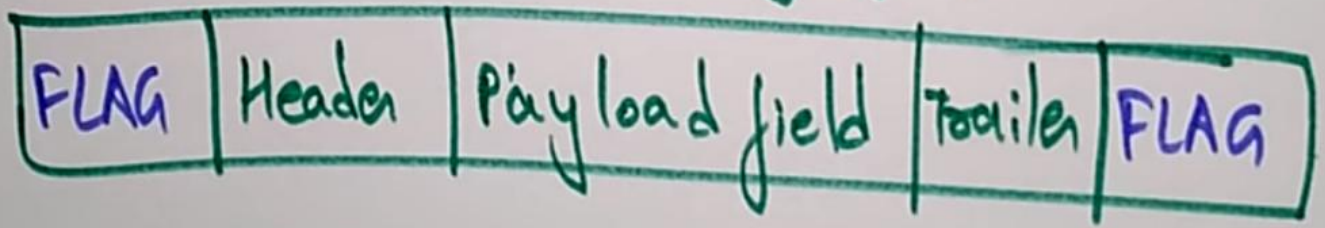
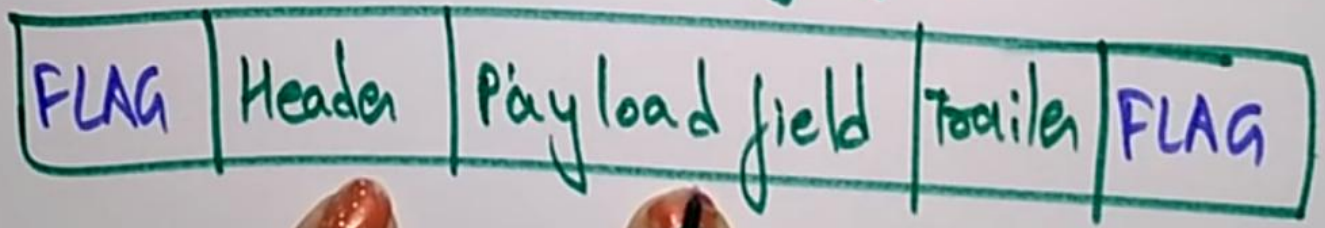
(a) A frame delimited by flag bytes

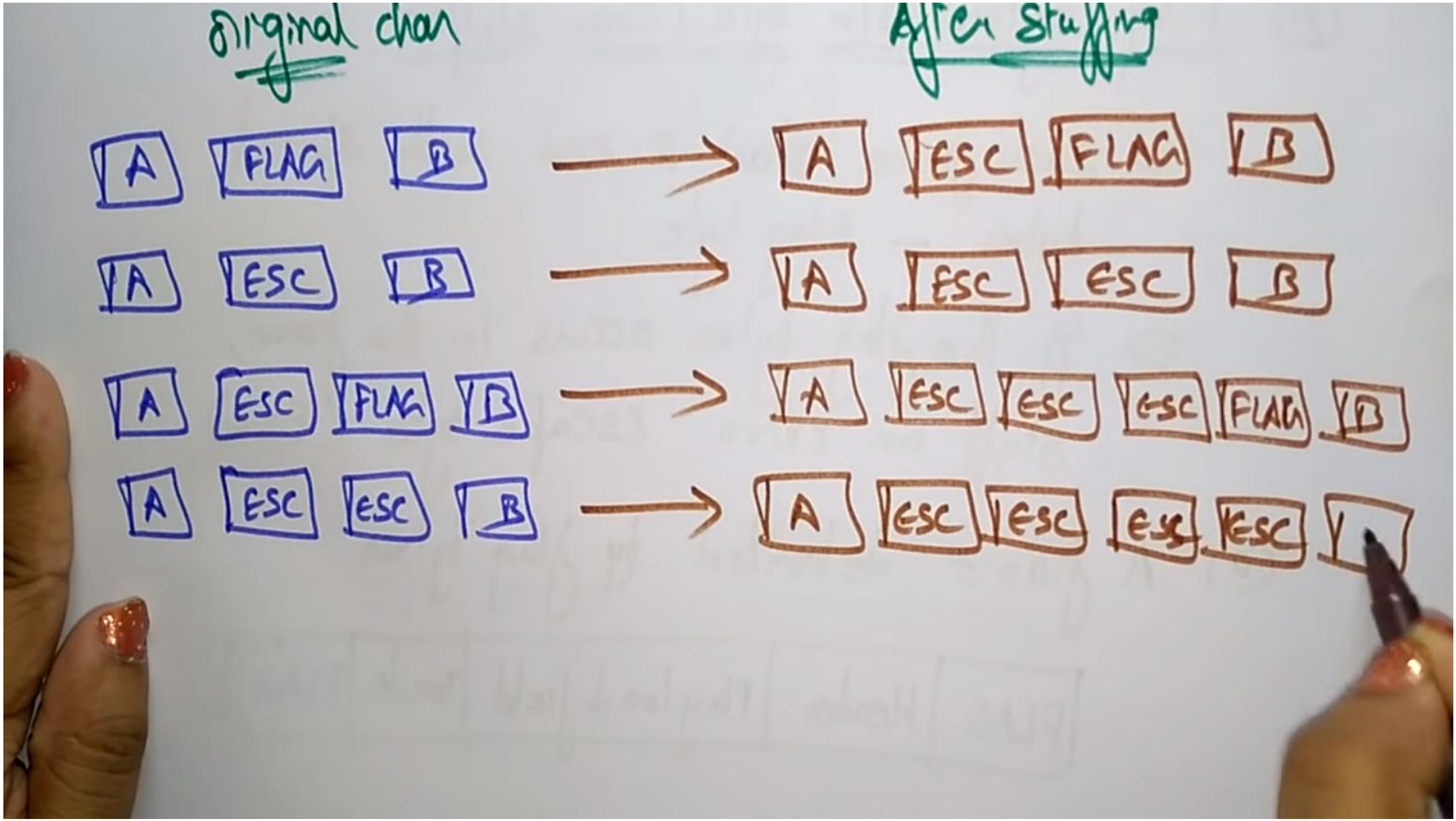


⇒ Each frame start & end with special bytes - Flag byte

⇒ If the flag bytes occurs in the frame, stuff an extra Escape byte (ESC)

(a) A frame delimited by flag bytes




Original char
After Stuffing
A
FLAG
B
A
ESC
FLAG
B
A
ESC
B
A
ESC
B
A
ESC
FLAG
B
A
ESC
ESC
FLAG
B
A
ESC
ESC
B
A
ESC
ESC
ESC
ESC

Bit Stuffing

↓

the beginning & end of each frame.

a specific bit pattern

01111110 ⇒ flag byte

Bit Stuffing

↓

the beginning & end of each frame.

a specific bit pattern

01111110 ⇒ flag byte

Bit Stuffing

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the beginning & end of each frame.

a specific bit pattern

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Bit Stuffing

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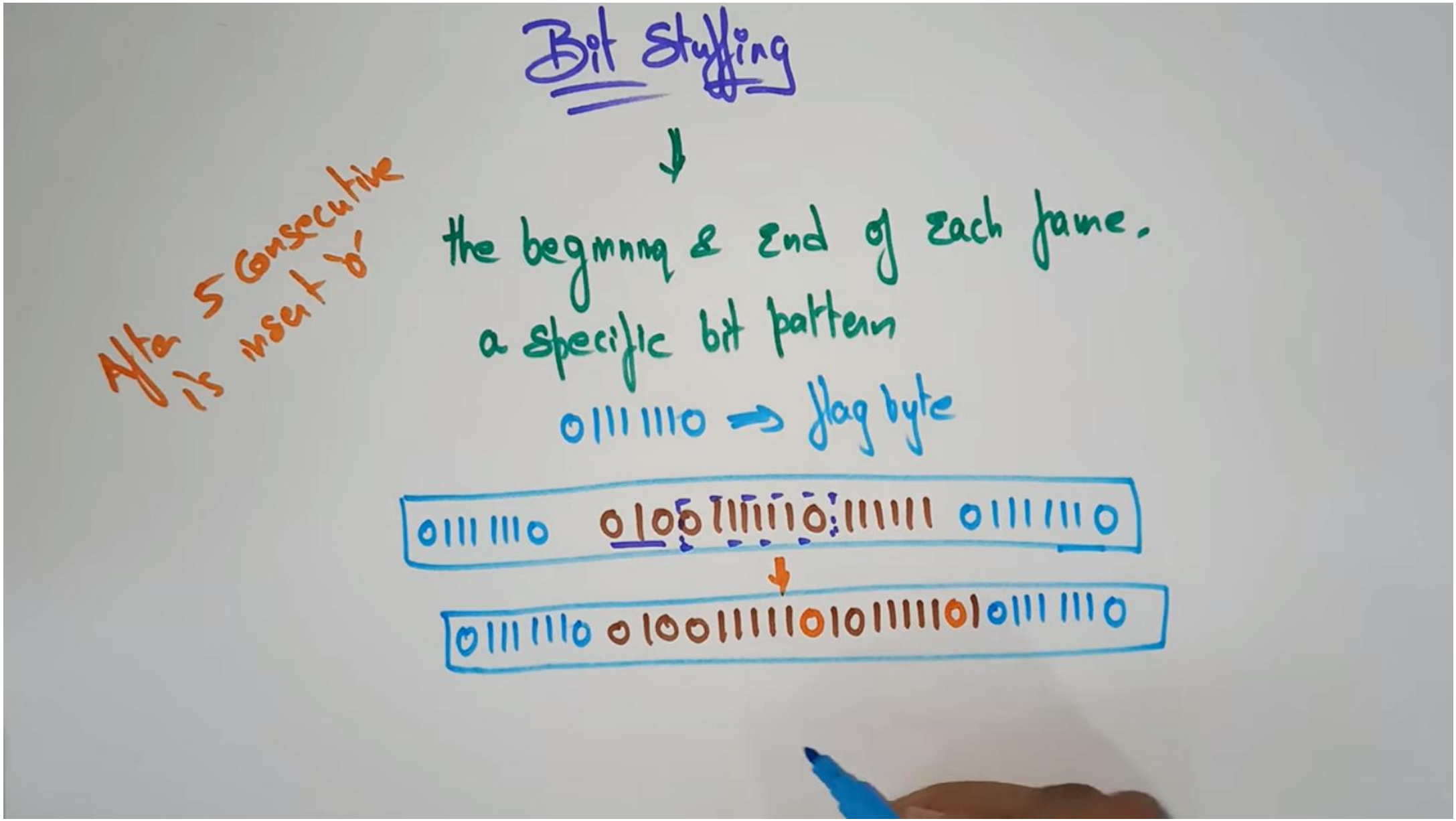
the beginning & end of each frame.

a specific bit pattern

01111110 → flag byte


Bit Stuffing
After 5 Consecutive 1's insert 0
the beginning & end of each frame.
a specific bit pattern
01111110 → flag byte
01111110 01001111101111101 01111110
01111110 01001111101011111010 01111110

Bit Stuffing

↓

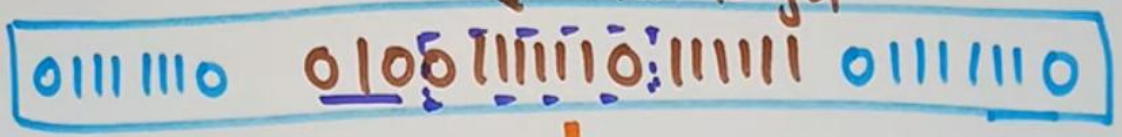
the beginning & end of each frame.

a specific bit pattern

After 5 Consecutive 1's insert 0

01111110 → flag byte

↓ n/w layer

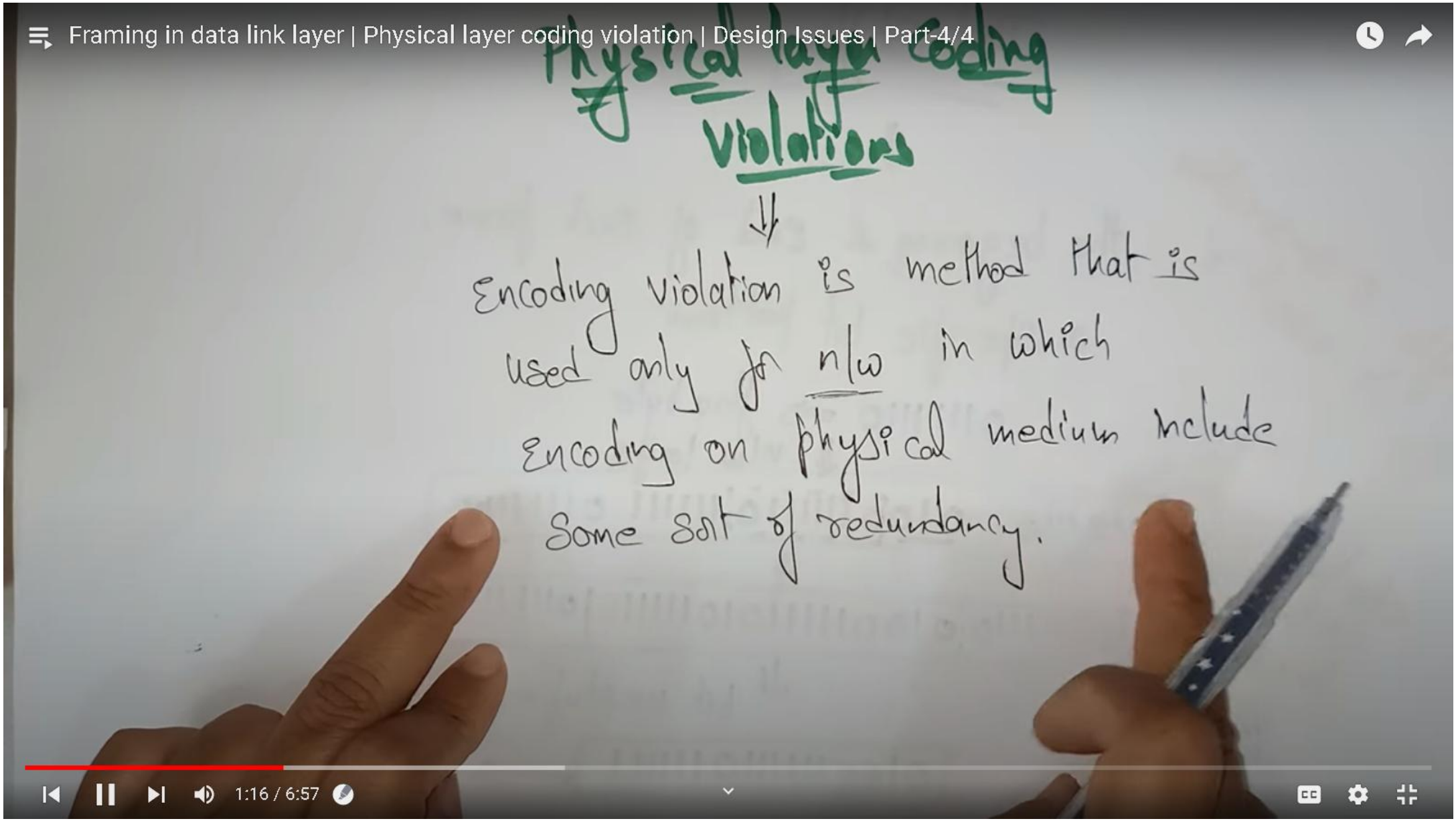


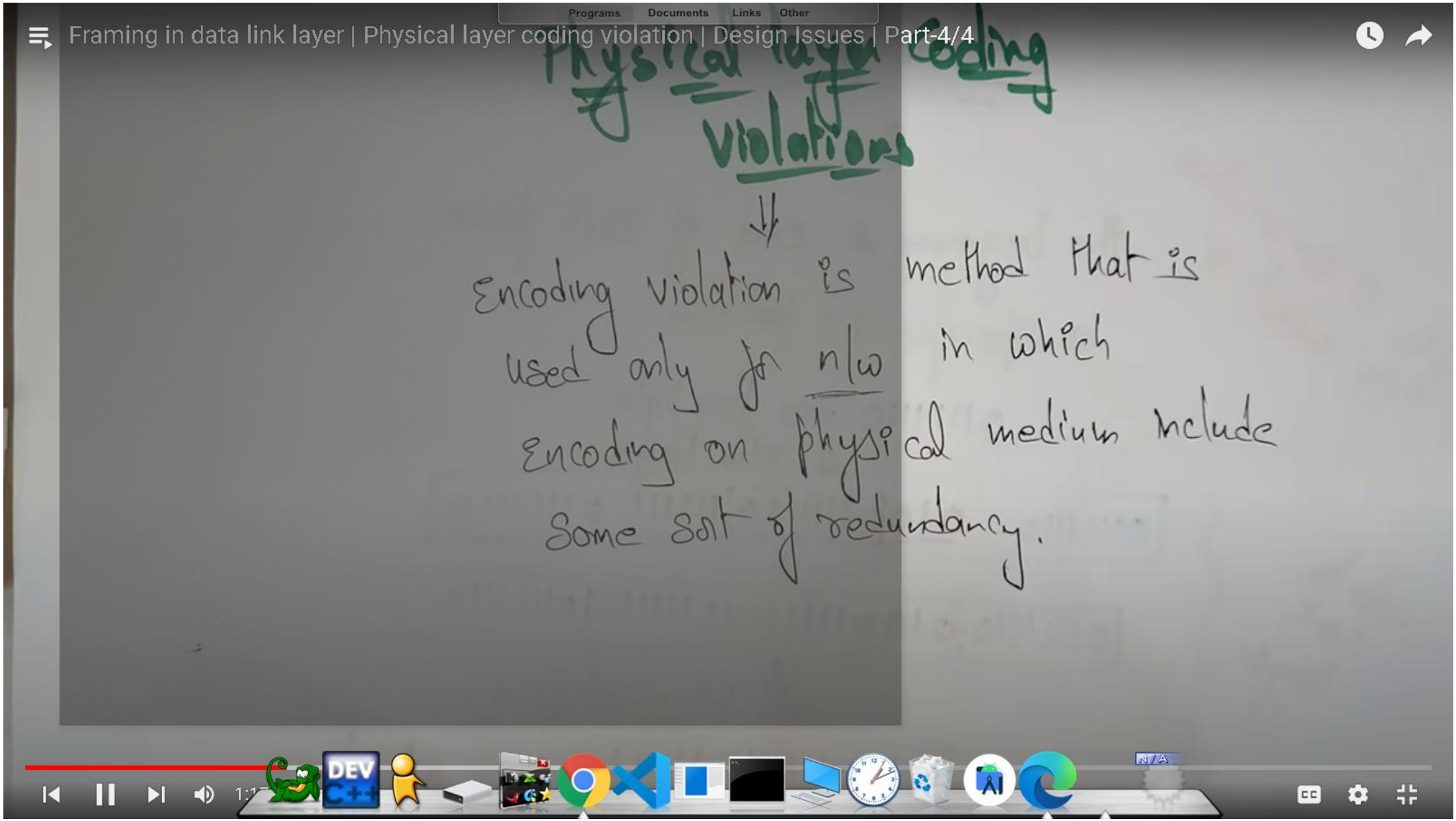
↓

Data link layer.

↓ bit unstuffing

→ n/w layer.


Framing in data link layer | Physical layer coding violation | Design Issues | Part-4/4
Physical layer coding violations
Encoding violation is method that is used only for n/w in which Encoding on physical medium include Some sort of redundancy.
1:16 / 6:57


Programs Documents Links Other
Framing in data link layer | Physical layer coding violation | Design Issues | Part-4/4
Physical layer coding violations
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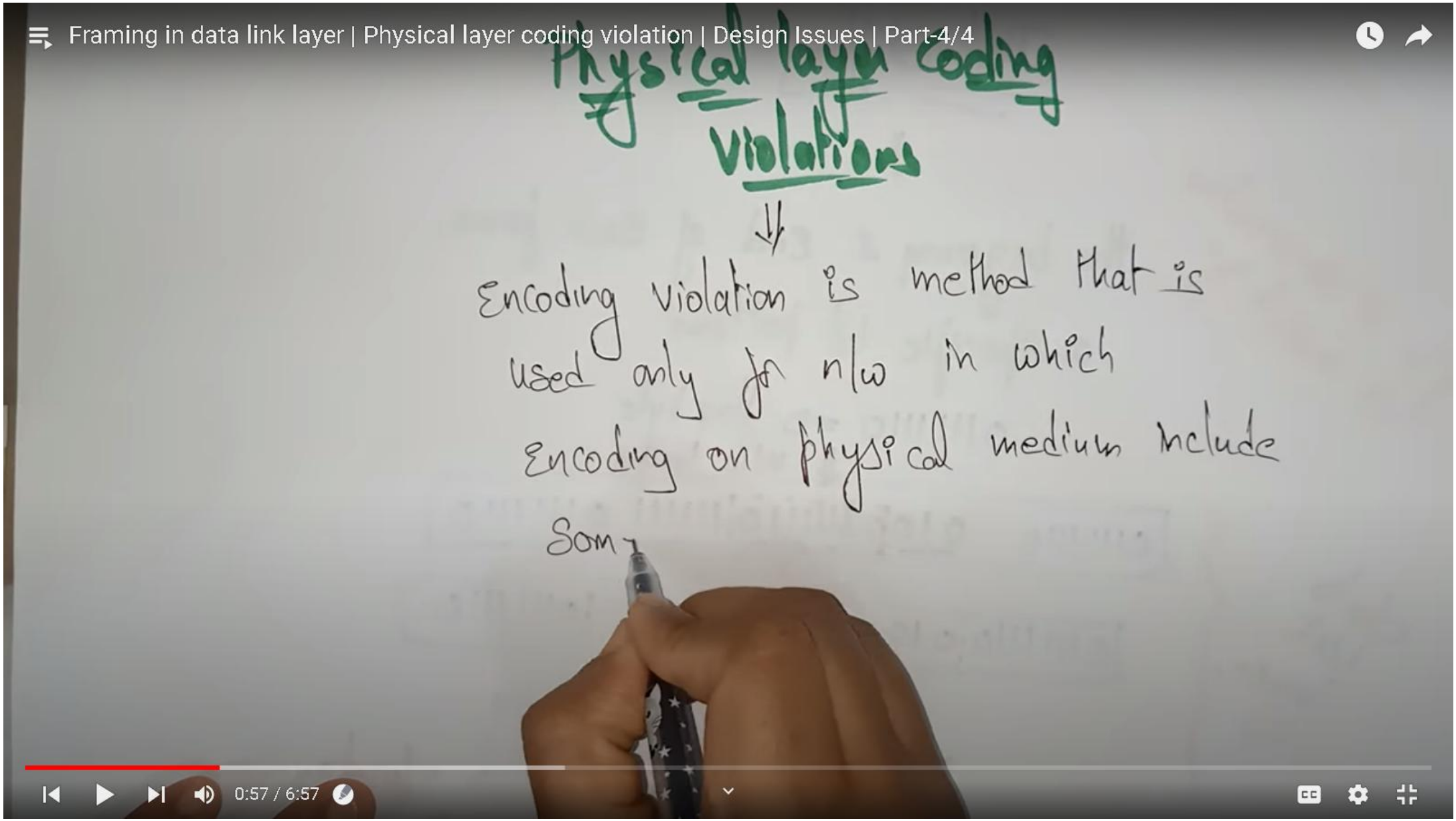
Framing in data link layer | Physical layer coding violation | Design Issues | Part-4/4
Physical layer coding violations
Encoding violation is method that is used only for n/w in which encoding on physical medium include
Som
0:57 / 6:57

Eg: Manchester's encoding

⇒ 1 ⇒ 10 {high-low}

⇒ 0 ⇒ 01 {low-high}

low-low ⇒ 00
high-high ⇒ 11
} not used for data, may use for frame boundaries

⇒ In order to operate a division b/w frames in DLL this approach exploits the redundancy. So encodes 00 & 11 can be used as escape b/w DL frames thus violating physical layer encoding

Error Detection & Correction

Design Issues of D.L.L

1. Service provided to N/w layer
2. framing
3. Error detection & correction
4. flow control

Error Detection & Correction

Design Issues of D.L.L

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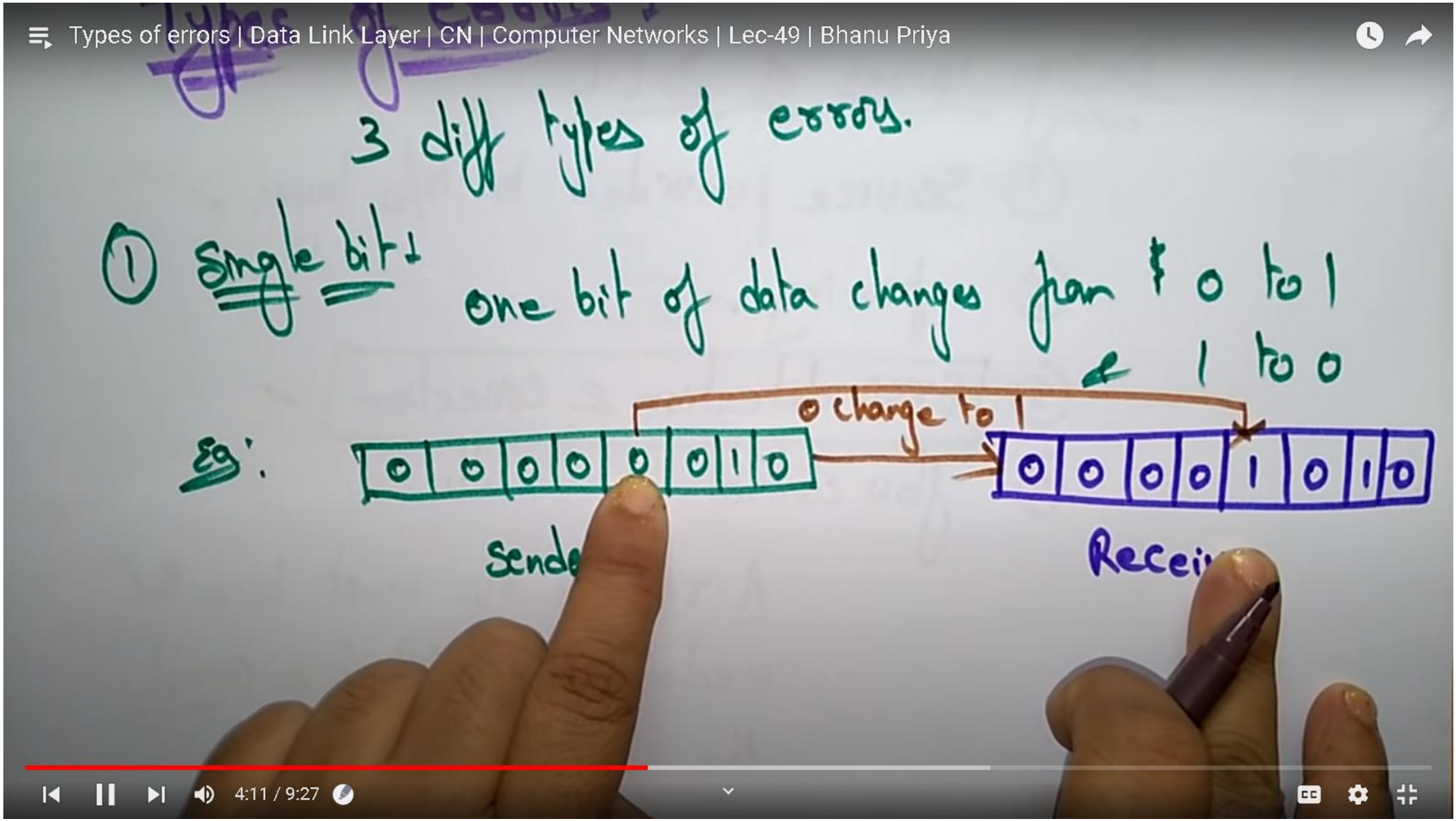
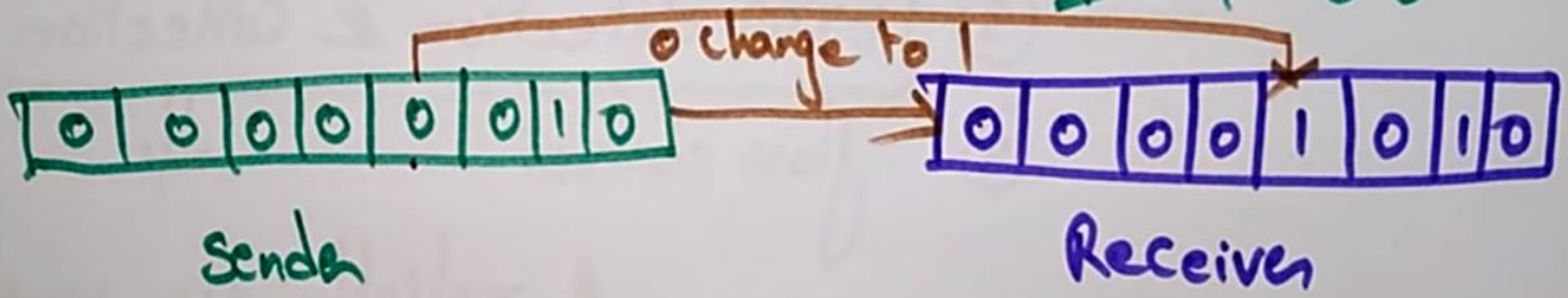

Types of errors | Data Link Layer | CN | Computer Networks | Lec-49 | Bhanu Priya
3 diff types of errors.
① Single bit:
one bit of data changes from 0 to 1 & 1 to 0
Eg:
0 change to 1
0 0 0 0 0 0 1 0
0 0 0 0 1 0 1 0
Sende
Recei
4:11 / 9:27

Types of errors

3 diff types of errors.

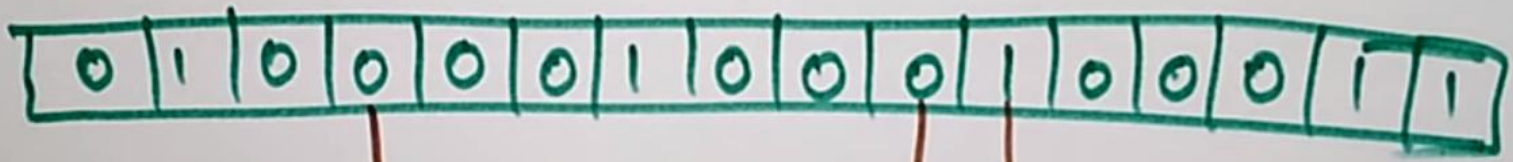
① Single bit: one bit of data changes from 0 to 1 or 1 to 0

Eg:

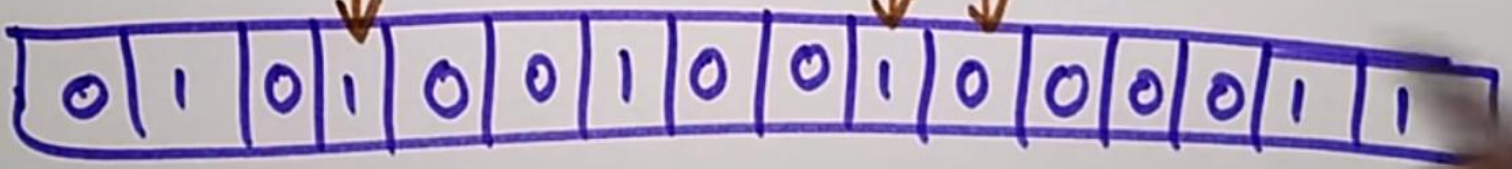


- 2 or more non-consecutive bits in a data unit have changed from 1 to 0 or 0 to 1

Eg: Sent



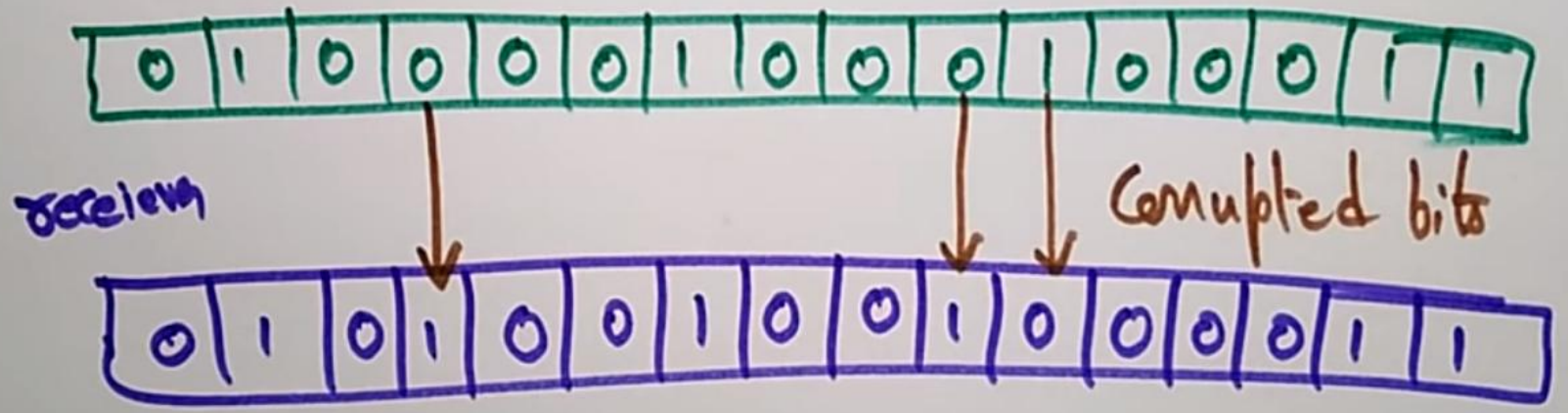
Received



② Multiple bit :

- 2 or more non-consecutive bits in a data unit have changed from 1 to 0 or 0 to 1

Eg: Sent



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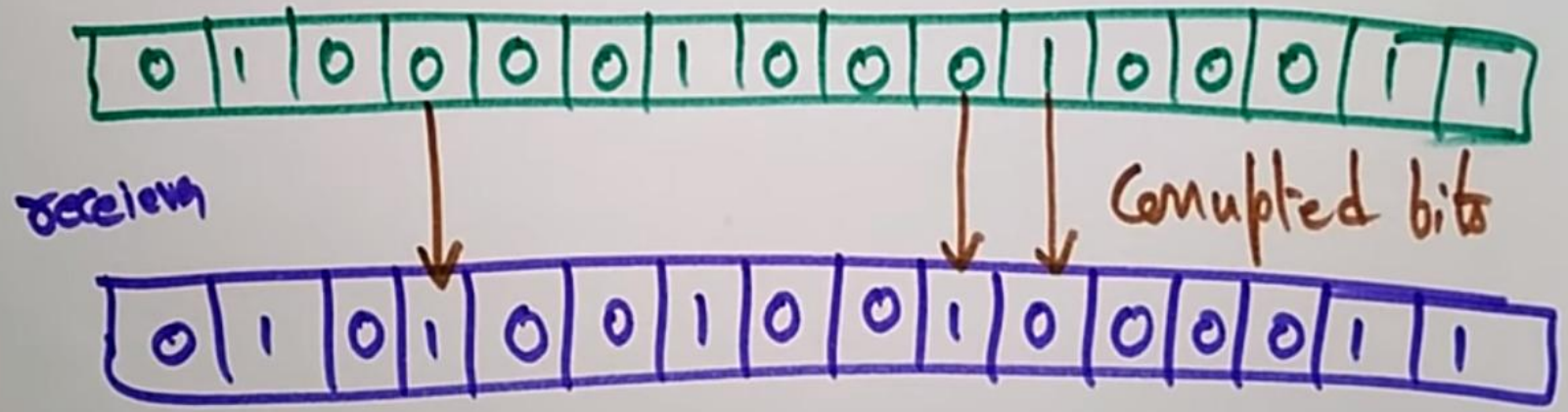
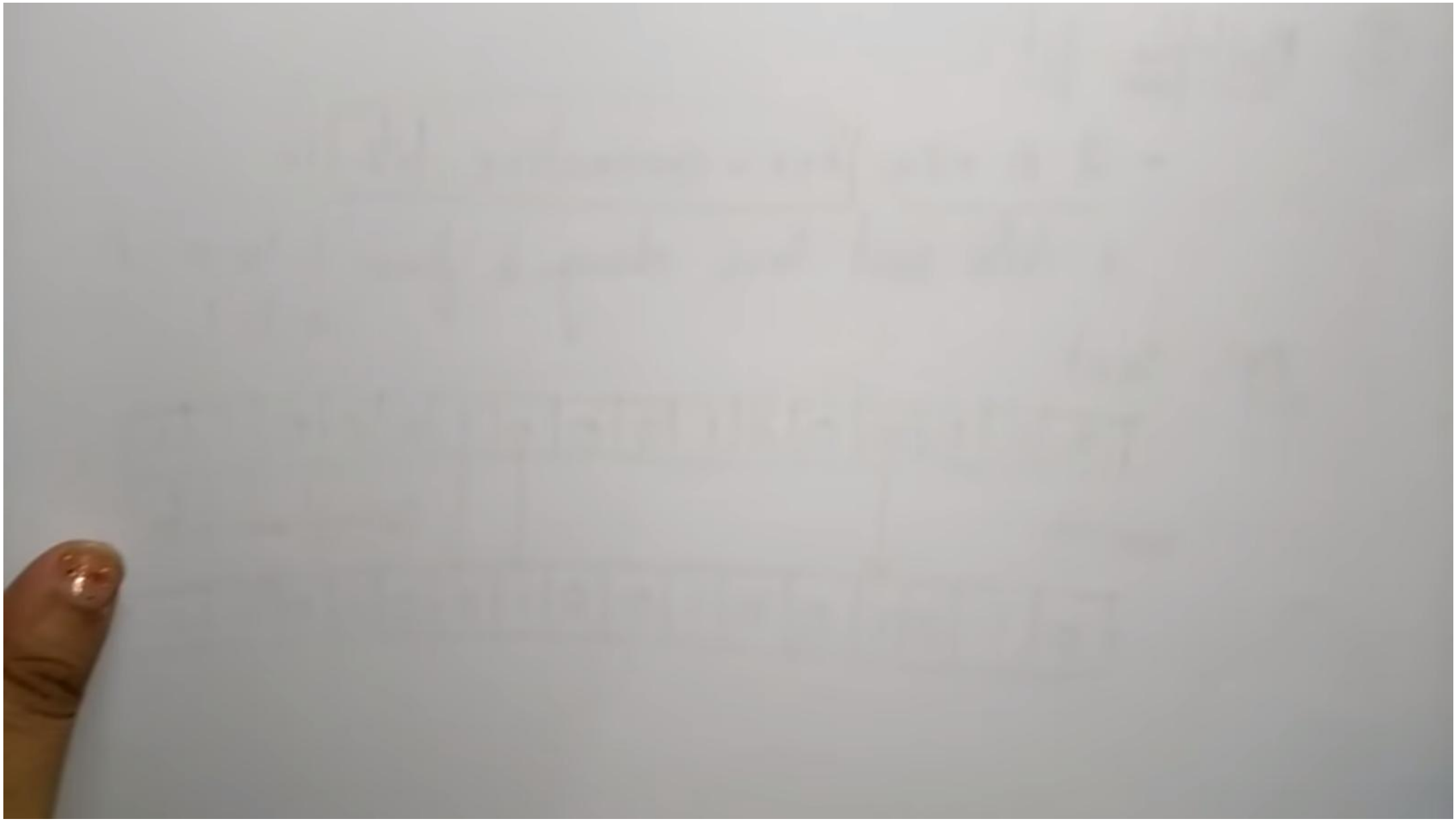
eg: Sent





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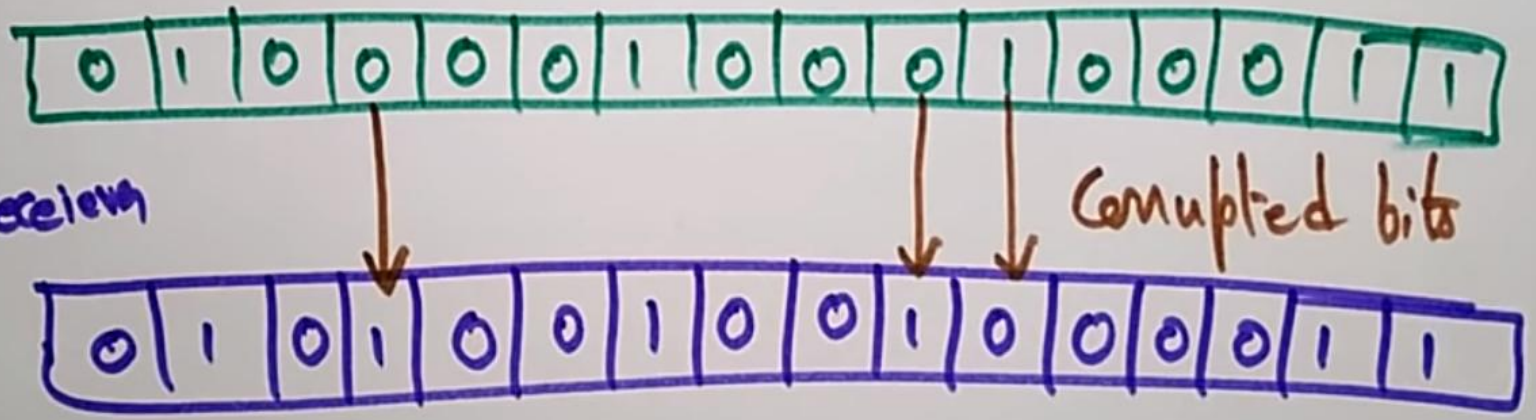
- 2 or more non-consecutive bits in a data unit have changed from 1 to 0 or 0 to 1

Eg: Sent



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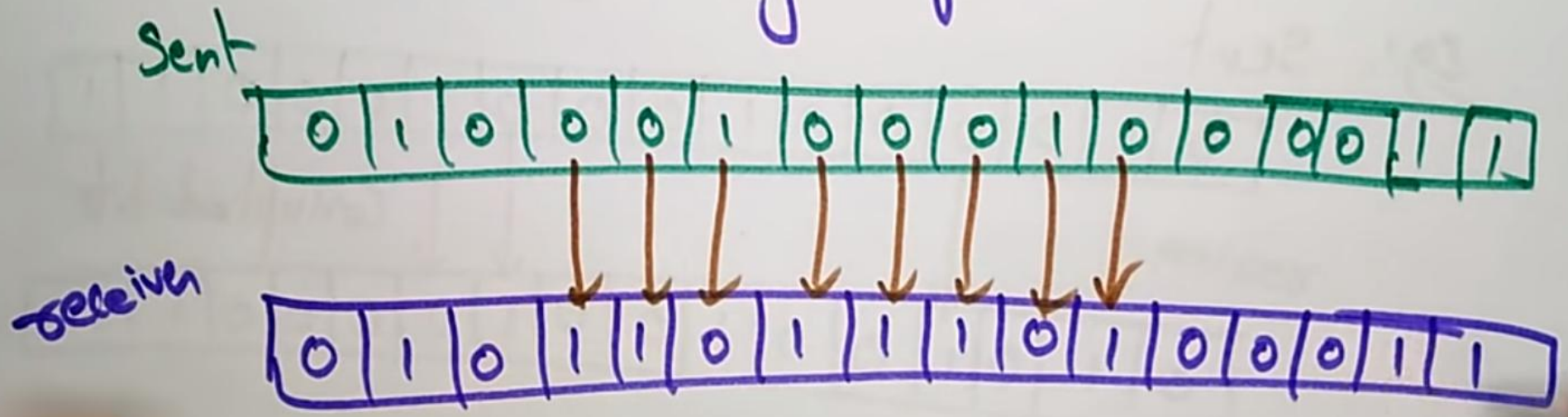
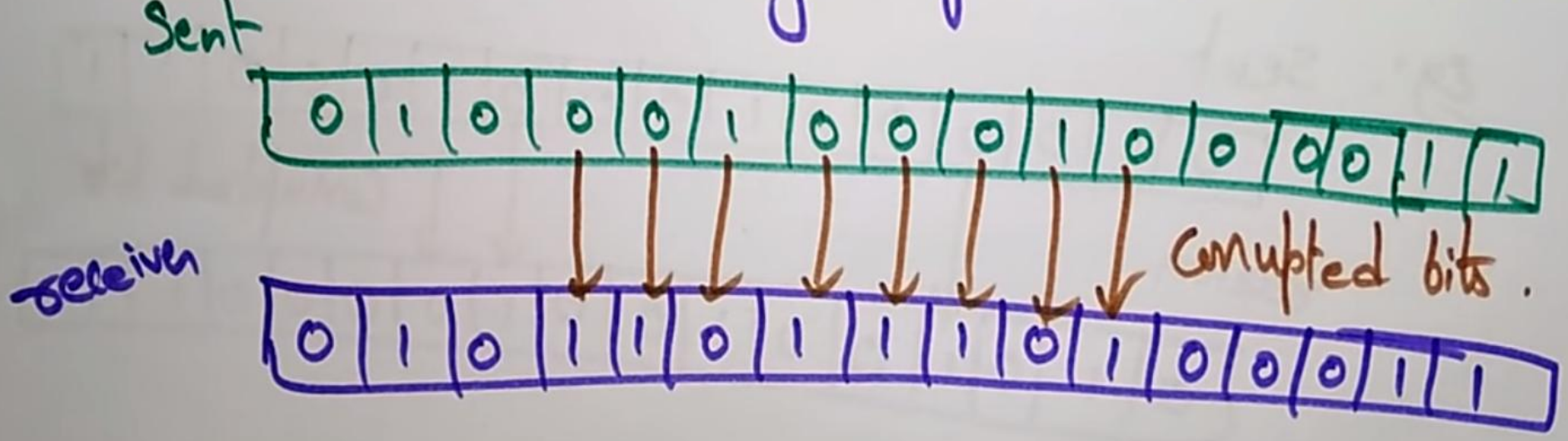


③ Burst error:-

- 2 or more consecutive bits in the data unit have changed from 1 to 0 & 0 to 1



Error detection & Correction | Data link layer | CN | Computer Networks | Lec-50 | Bhanu Priya

Error Detection

① Redundancy :- It is the main technique to detect errors.

⇓

group of bits adding to end of data unit

2:11 / 8:45

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⇓

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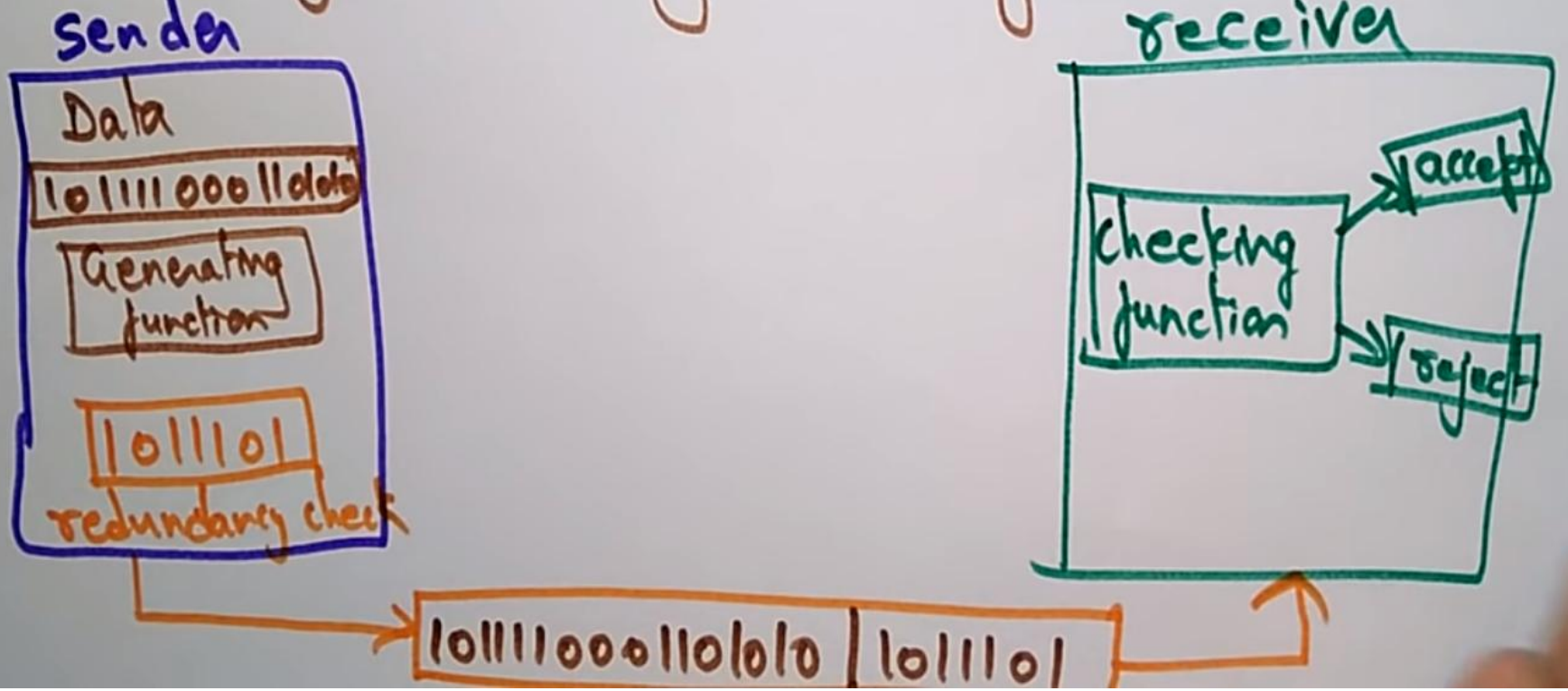

② Exact-Count Encoding :-

- The no: of 1's in the data unit are same
- In the destination side it count the no: of 1's received same or not to determine the transmission error.

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Error correction :-

1. When the error is discovered, the receiver ask the send to retransmit the same data
2. Receiver can use an error correcting codes to detect & correct errors.

Error Detecting & Correcting Techniques

- Parity checker
- Checksum
- Cyclic Redundancy check

Error Detecting & Correcting Techniques

- ⇒ Parity checker
- ⇒ checksum
- ⇒ Cyclic Redundancy check

- ⇒ Hamming code

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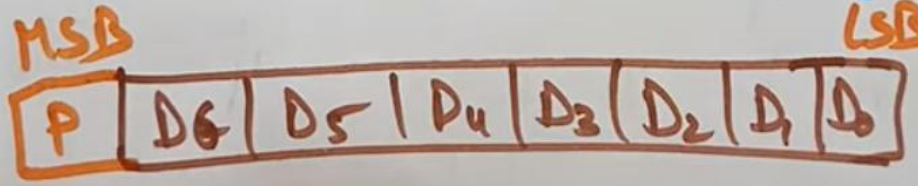
⇒ Parity checker

⇒ check sum

⇒ cyclic Redundancy check

⇒ Hamming code

☆ Parity checker ⇒ Simplest tech. for error detection.



⇒ 8 bit word.

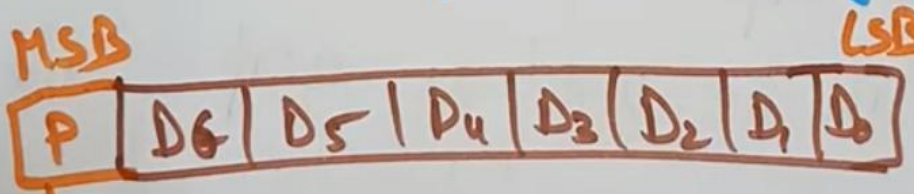
⇒ Parity checker

⇒ check sum

⇒ Cyclic Redundancy check

⇒ Hamming code

★ Parity checker ⇒ Simplest tech. for error detection.



⇒ 8 bit word.

Parity bit

$D_6 - D_0$ ⇒ even no's (1)s ⇒ P = 0

$D_6 - D_0$ ⇒ odd no (1)s ⇒ P =

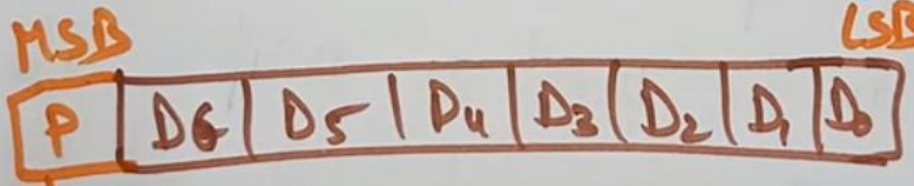
⇒ Parity checker

⇒ check sum

⇒ Cyclic Redundancy check

⇒ Hamming code

★ Parity checker ⇒ Simplest tech. for error detection.

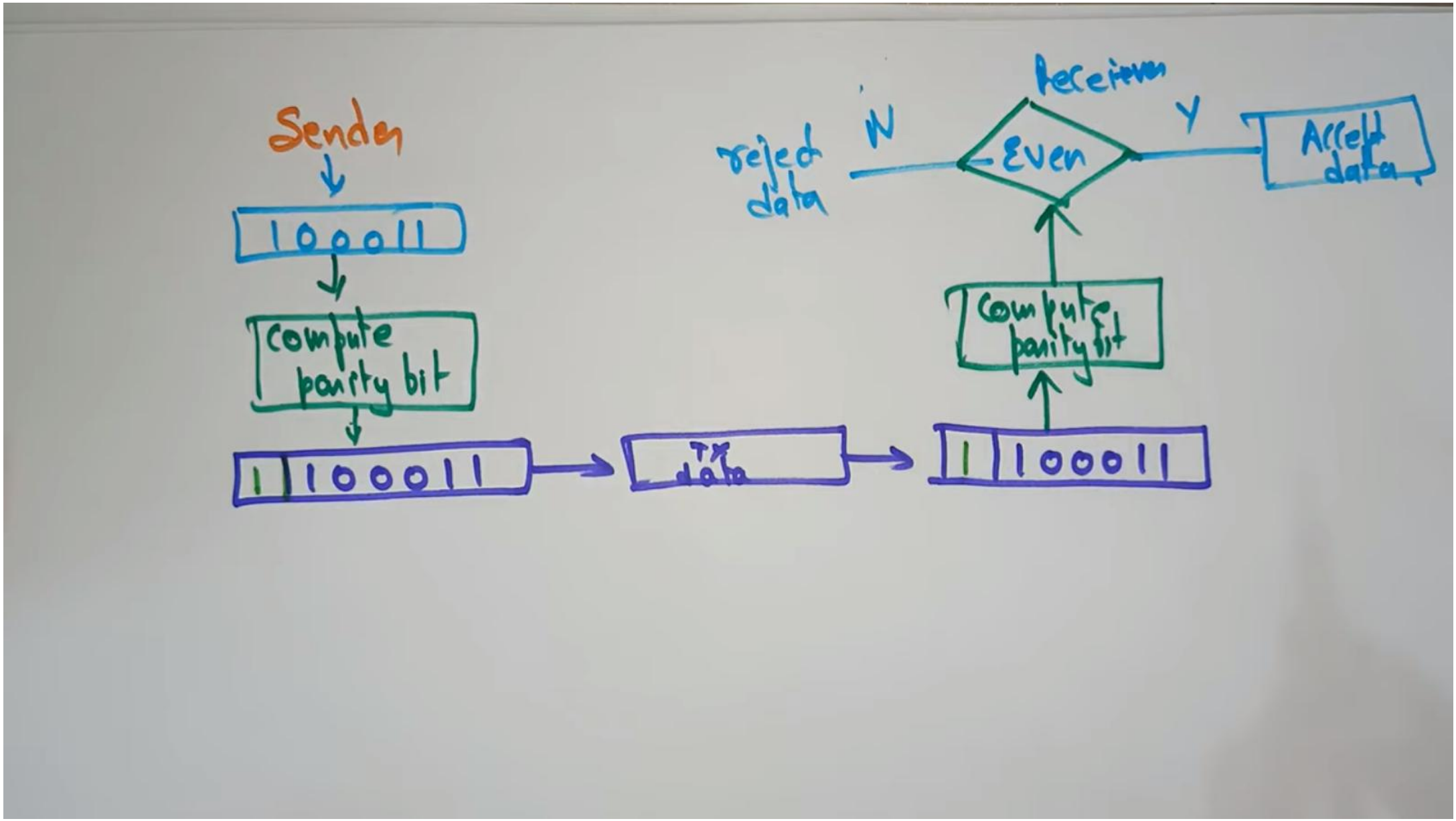


⇒ 8 bit word.

Parity bit

$D_6 - D_0$ ⇒ even no's (1)s ⇒ P = 0

$D_6 - D_0$ ⇒ odd no (1)s ⇒ P = 1


Sender
100011
compute parity bit
1 100011
TX data
1 100011
compute parity bit
Even
N
reject data
Y
Accept data

Check Sum {error detection technique}

→ In checksum error detection scheme, the data is divided into k segments each of m bits

→ In the Sender's end the seg are added using 1's complement arithmetic to get the sum. The sum is complemented to get the checksum

→ Now, checksum seg is sent along with data segment

→ At receiver's end, all received seg are added using 1's complement arithmetic to get the sum. The sum be is complemen

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1:40 PM
2/14/2022

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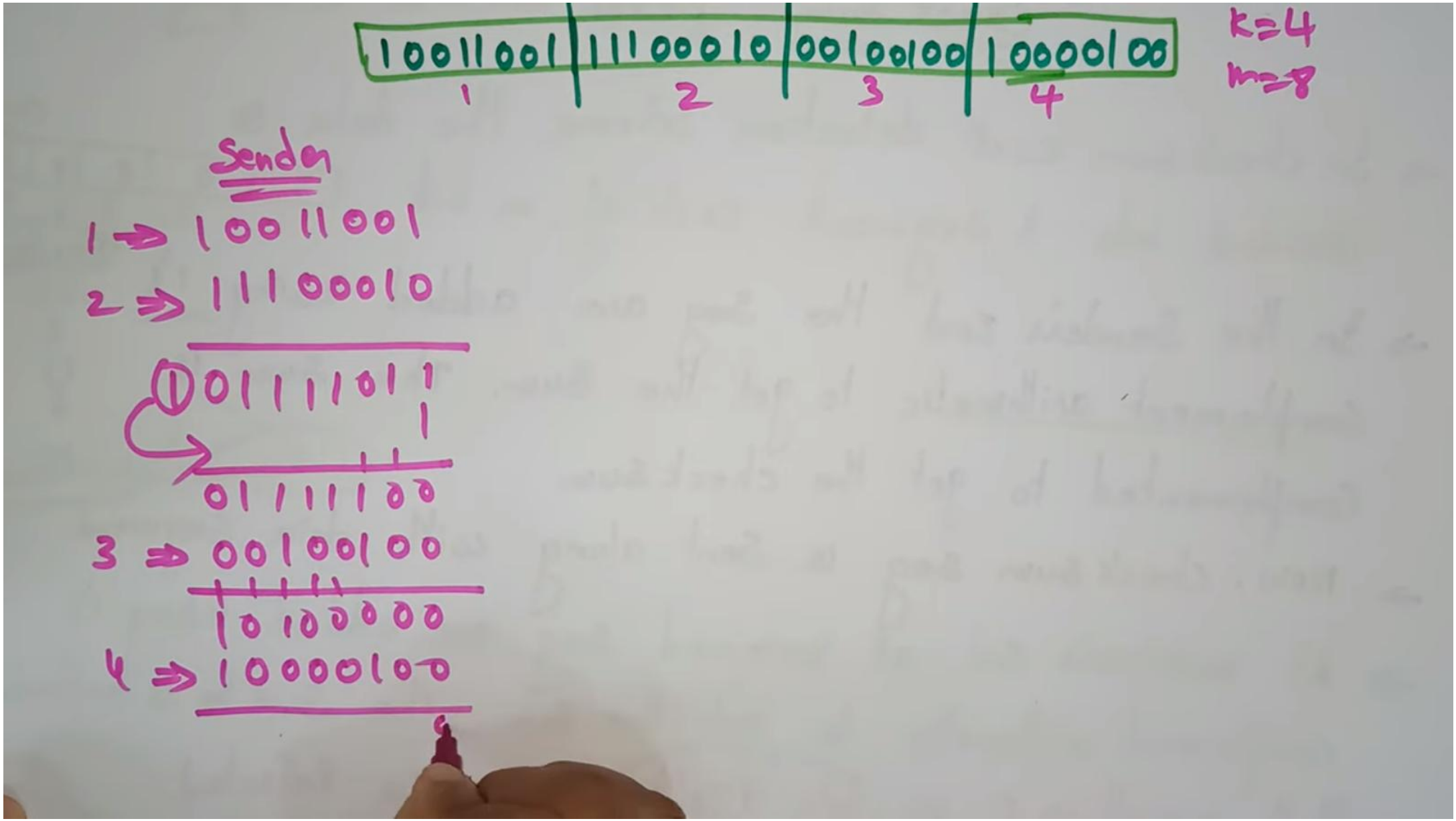
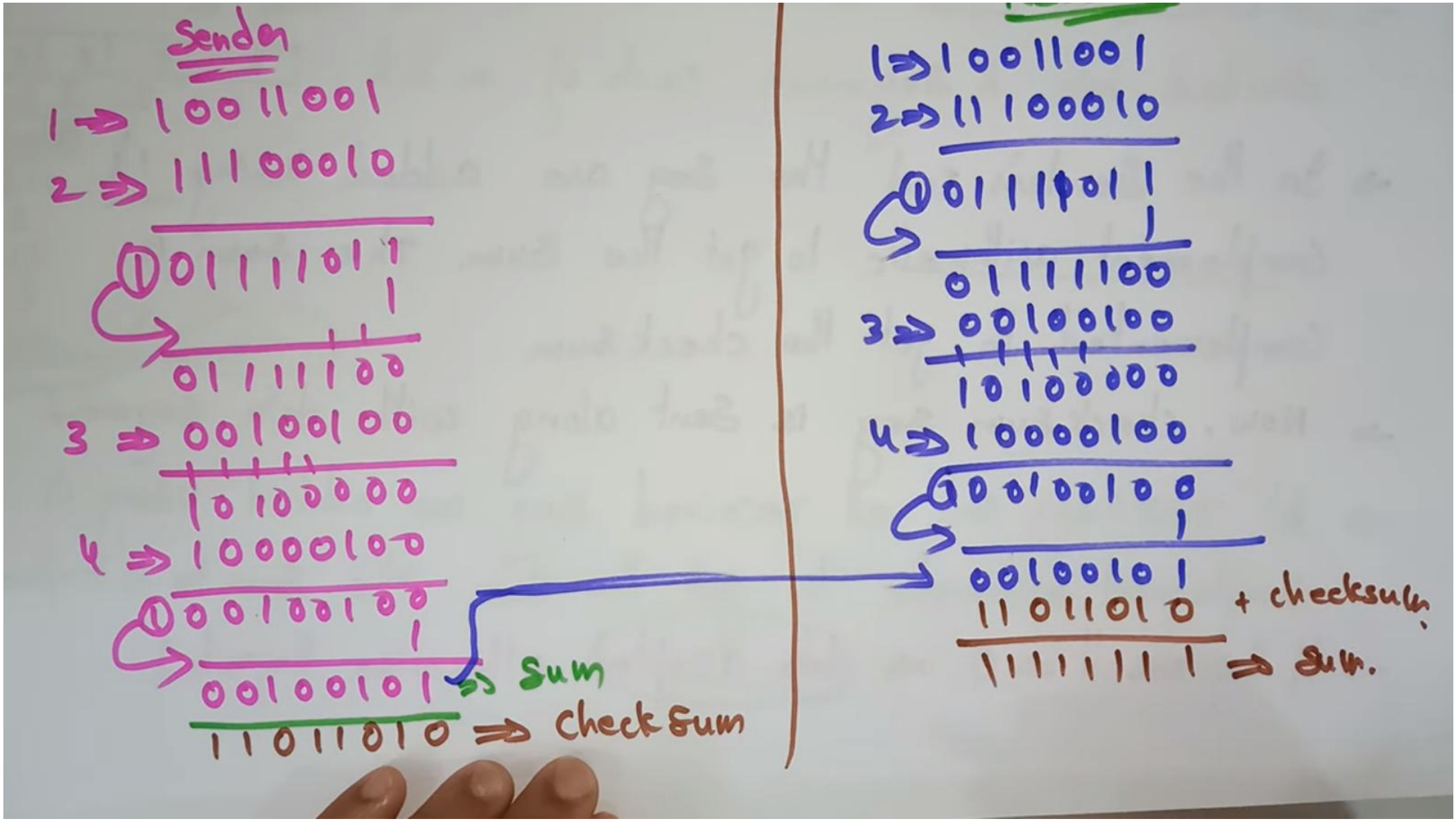
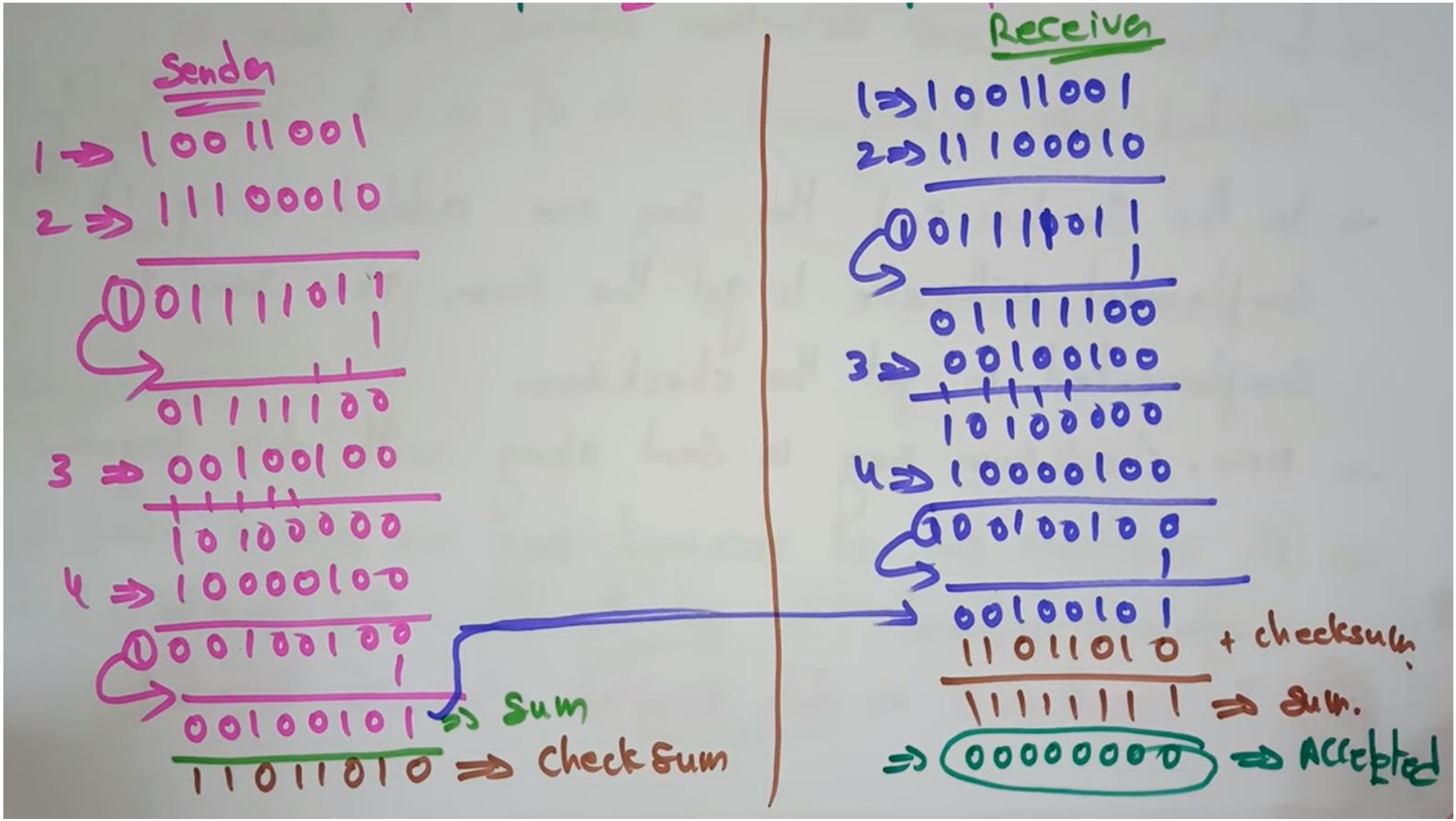

10011001 | 11100010 | 00100100 | 10000100
1
2
3
4
k=4
m=8
Sender
1 → 10011001
2 → 11100010
01111101 1
1
01111100
3 → 00100100
10100000
4 → 10000100


Sender
1 → 10011001
2 ⇒ 11100010
01111101 1
01111100
3 ⇒ 00100100
10100000
4 ⇒ 10000100
00100101
Sum
11011010 ⇒ Check Sum
1 ⇒ 10011001
2 ⇒ 11100010
01111101 1
01111100
3 ⇒ 00100100
10100000
4 ⇒ 10000100
00100101
11011010 + checksum
11111111 1 ⇒ Sum.


Sender
1 → 10011001
2 ⇒ 11100010
01111101
01111100
3 ⇒ 00100100
10100000
4 ⇒ 10000100
00100101
00100101 ⇒ Sum
11011010 ⇒ Checksum
Receiver
1 ⇒ 10011001
2 ⇒ 11100010
01111101
01111100
3 ⇒ 00100100
10100000
4 ⇒ 10000100
00100101
00100101
11011010 + checksum
11111111 ⇒ Sum.
⇒ 00000000 ⇒ Accepted

Cyclic Redundancy Check (CRC)

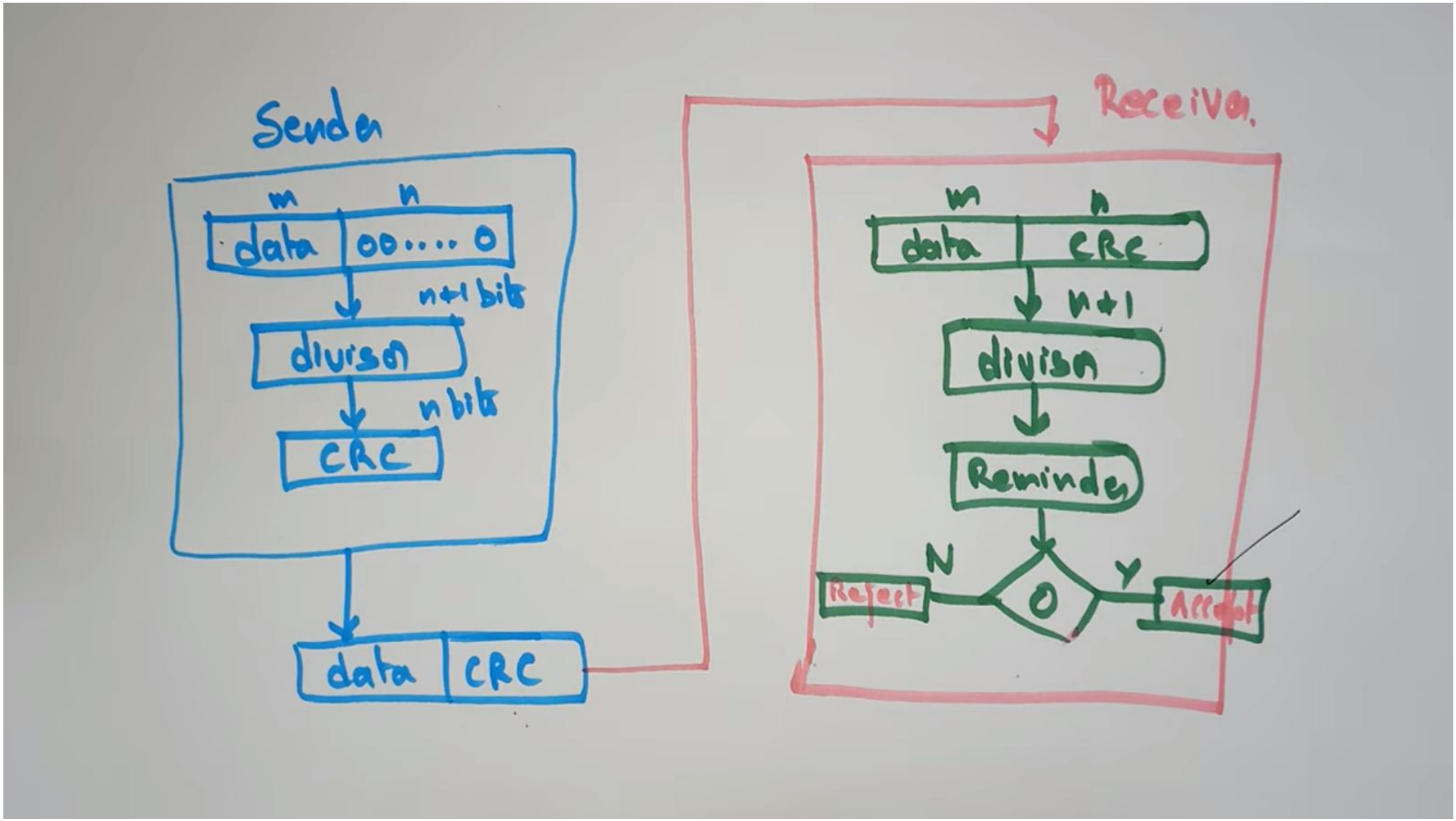
→ It is an error detection method based on binary division

→ In CRC, a seq of redundant bits called cyclic redundancy check bits are appended to the end of data, so that the resulting data unit becomes exactly divisible by second, predetermined binary no:

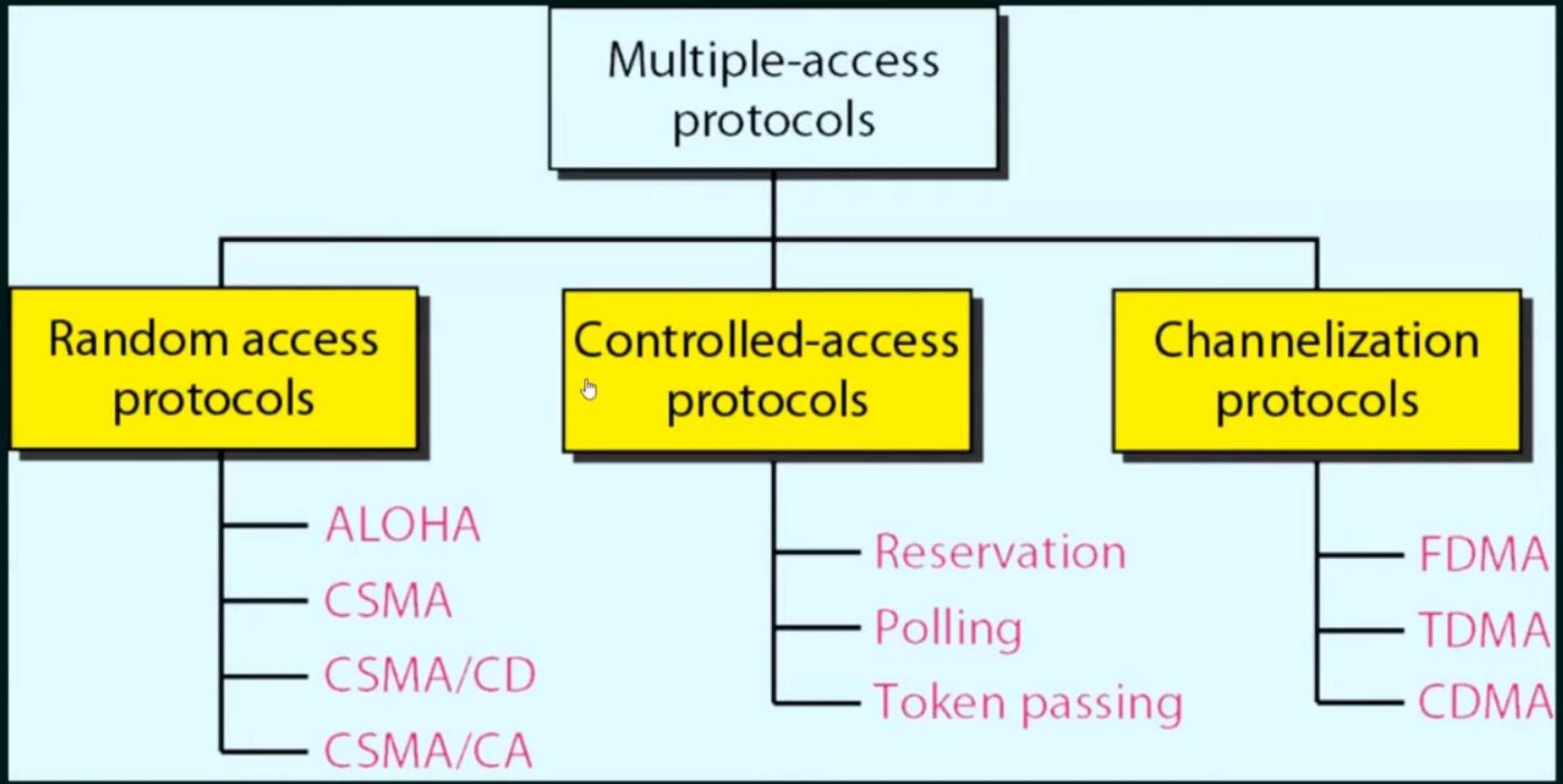
→ At the destination, the incoming data is divided by the same no:

If the remainder is '0' → data is accepted

otherwise


Sender
m
n
data
00.... 0
n+1 bits
divisor
n bits
CRC
data
CRC
Receiver
m
n
data
CRC
n+1
divisor
Reminder
N
Y
Reject
0
Accept

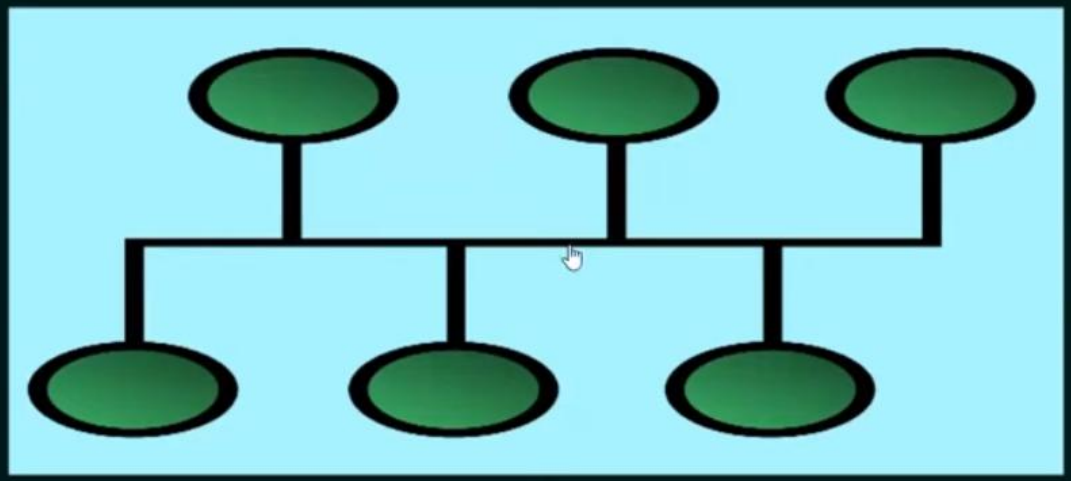
Multiple Access Protocols



NESO ACADEMY

CSMA PROTOCOL

- ★ Carrier Sense Protocol.
- ★ To minimize the chance of collision and, therefore, increase the performance, the CSMA method was developed.
- ★ Principle of CSMA: "sense before transmit" or "listen before talk."



NESO ACADEMY

CSMA PROTOCOL

- ★ Carrier Sense Protocol.
- ★ To minimize the chance of collision and, therefore, increase the performance, the CSMA method was developed.
- ★ Principle of CSMA: "sense before transmit" or "listen before talk."
- ★ Carrier busy = Transmission is taking place.
- ★ Carrier idle = No transmission currently taking place.

NESO ACADEMY

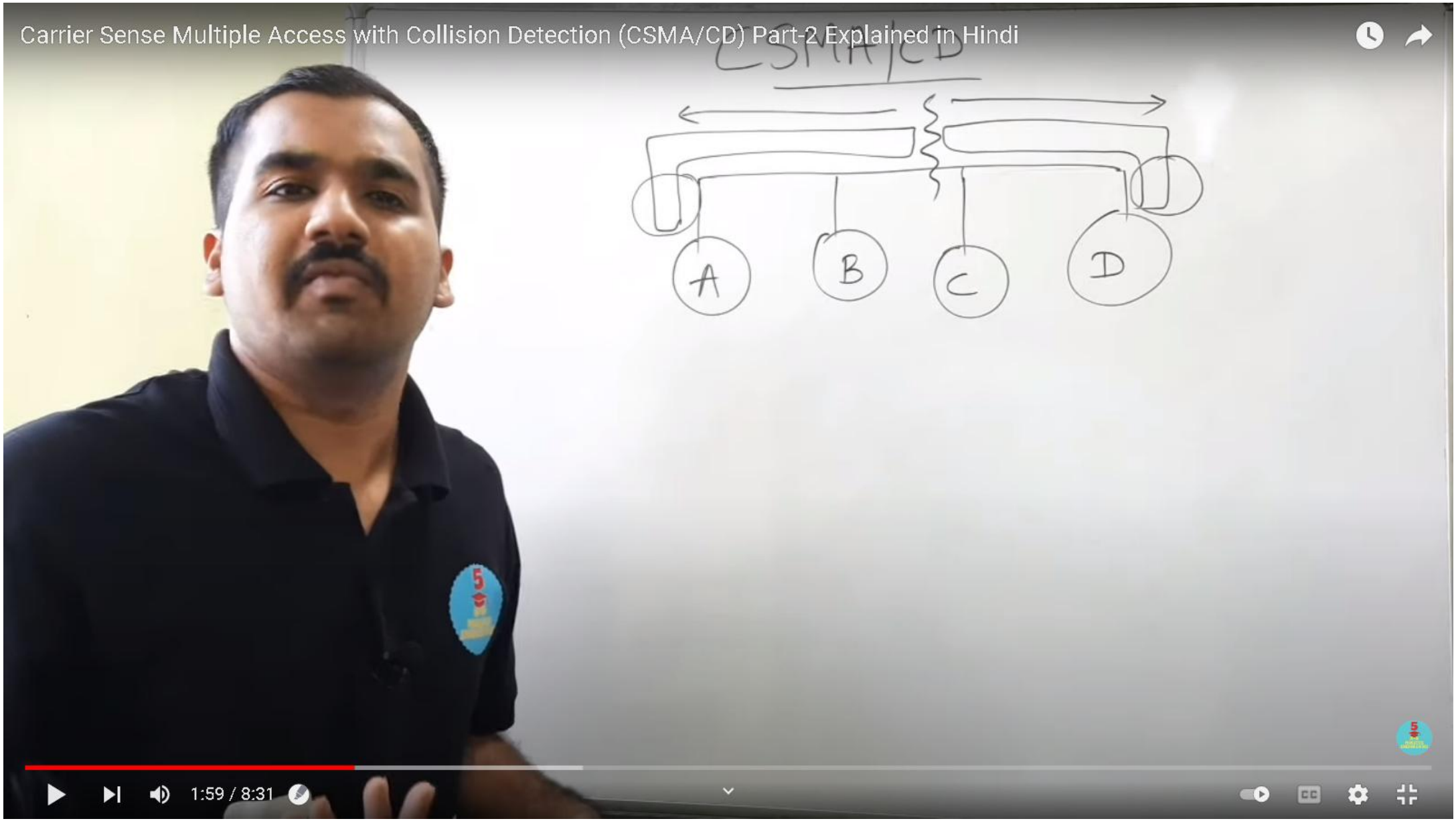
Types of CSMA

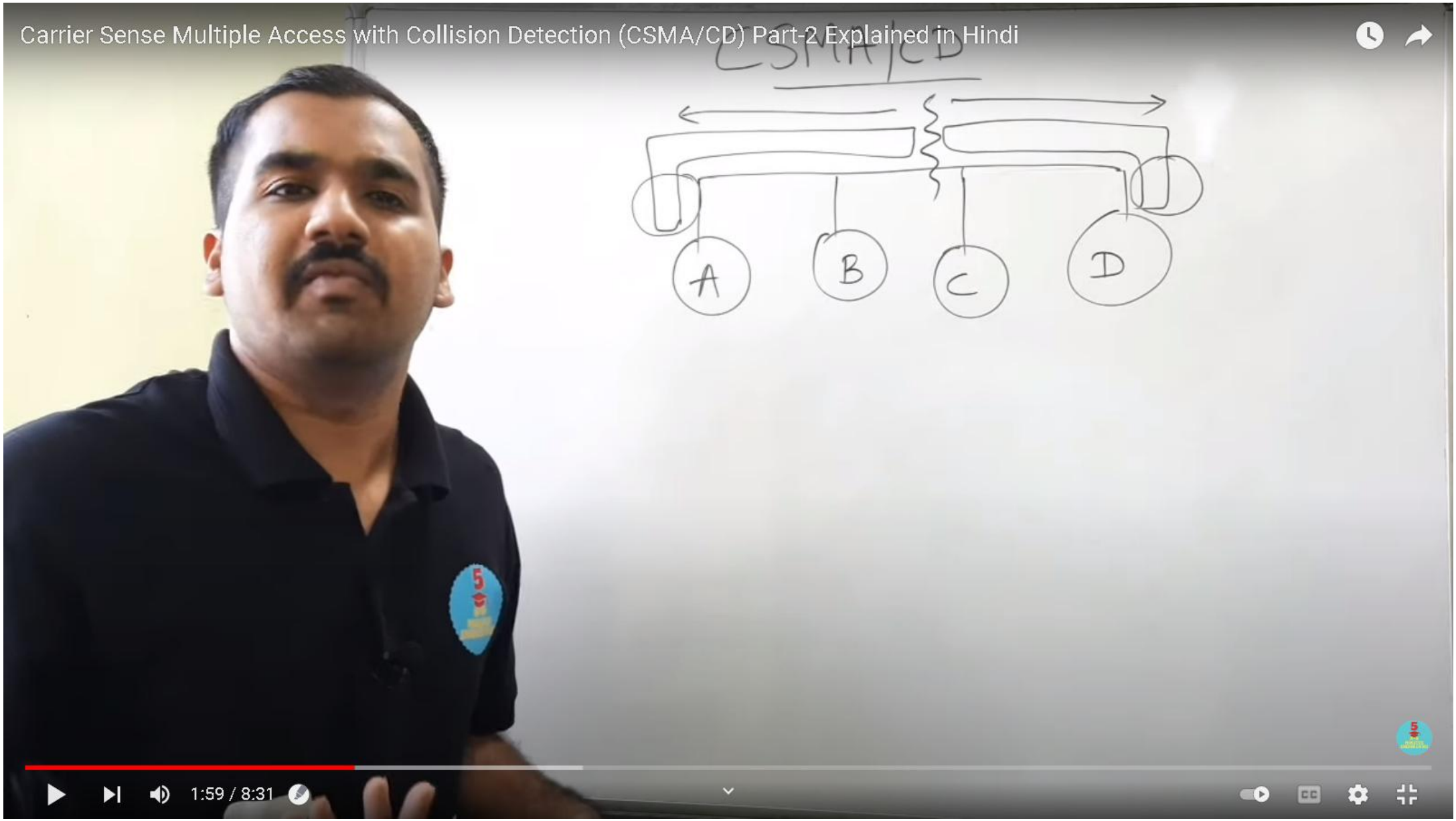
1. 1-Persistent CSMA
2. P-Persistent CSMA
3. Non-Persistent CSMA
4. O-Persistent CSMA

CSMA/CD (CSMA with Collision Detection)

CSMA/CA (CSMA with Collision Avoidance)

NESO ACADEMY


Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Part-2 Explained in Hindi
CSMA/CD
A
B
C
D
1:59 / 8:31


Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Part-2 Explained in Hindi
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Algorithms

The algorithm of CSMA/CD is:

- When a frame is ready, the transmitting station checks whether the channel is idle or busy.
- If the channel is busy, the station waits until the channel becomes idle.
- If the channel is idle, the station starts transmitting and continually monitors the channel to detect collision.
- If a collision is detected, the station starts the collision resolution algorithm.
- The station resets the retransmission counters and completes frame transmission.

The algorithm of Collision Resolution is:

- The station continues transmission of the current frame for a specified time along with a jam signal, to ensure that all the other stations detect collision.
- The station increments the retransmission counter.
- If the maximum number of retransmission attempts is reached, then the station

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PHP
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- The station resets the retransmission counters and completes frame transmission.

The algorithm of Collision Resolution is:

- The station continues transmission of the current frame for a specified time along with a jam signal, to ensure that all the other stations detect collision.
- The station increments the retransmission counter.
- If the maximum number of retransmission attempts is reached, then the station aborts transmission.
- Otherwise, the station waits for a backoff period which is generally a function of the number of collisions and restart main algorithm.

The following flowchart summarizes the algorithms:

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HTTP

- HTTP stands for **HyperText Transfer Protocol**.
- It is a protocol used to access the data on the World Wide Web (www).
- The HTTP protocol can be used to transfer the data in the form of plain text, hypertext, audio, video, and so on.
- This protocol is known as HyperText Transfer Protocol because of its efficiency that allows us to use in a hypertext environment where there are rapid jumps from one document to another document.
- HTTP is similar to the FTP as it also transfers the files from one host to another host. But, HTTP is simpler than FTP as HTTP uses only one connection, i.e., no control connection to transfer the files.
- HTTP is used to carry the data in the form of MIME-like format.
- HTTP is similar to SMTP as the data is transferred between client and server. The HTTP differs from the SMTP in the way the messages are sent from the client to the server and from server to the client. SMTP messages are stored and forwarded while HTTP messages are delivered immediately.

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Comparison		
Definition	TCP establishes a virtual circuit before transmitting the data.	UDP transmits the data directly to the destination computer without verifying whether the receiver is ready to receive or not.
Connection Type	It is a Connection-Oriented protocol	It is a Connectionless protocol
Speed	slow	high
Reliability	It is a reliable protocol.	It is an unreliable protocol.
Header size	20 bytes	8 bytes
acknowledgement	It waits for the acknowledgement of data and has the ability to resend the lost packets.	It neither takes the acknowledgement, nor it retransmits the damaged fram