



→ Network



→ Data Comm o's is

- 1. Performance
 - delivery
 - Accuracy
- 2. Reliability
 - freq of failure
 - Tolerance
- 3. Security

no. of devices
mode
noise
msg size
dst



Components :-



1) Sender



4) msg



2) Receiver

What
When
How

Syntax
Semantic
Timing

Multipoint / Multidrop



Broadcast

Line Configuration:-

Point-to-point



Secure accuracy speed

Blue pen





Broadcast



Secure accuracy speed

Transmission mode-

direction

1) Simplex (Uni) A B

2) Half duplex(Bidirectional) A B

3) Full Duplex A B

channel media line
medium link

categories

org

LAN

Broadcast

MAN

cable

WAN

Internet

city

link

static

dynamical
cen

decon



45:03 / 45:28



Indresh P



Vasuu Gambhir



Pavan Kumar Thota



Priyanshu Dangi



Kalash Hari



Nithya B

Topologies:-

- 1) reliability
- 2) low cost path
- 3) responsive time & throughput

S D

↓ intermediate
channel

max amt of data

Types:-

1. Mesh
2. Star
3. Tree
4. Bus
5. Ring

6. Hybrid



7:30 / 47:42

+51

SS

PS

PT

AS

Advai Swamy

RS

PY

Mohan Kumar

Indresh P

Subhasree G

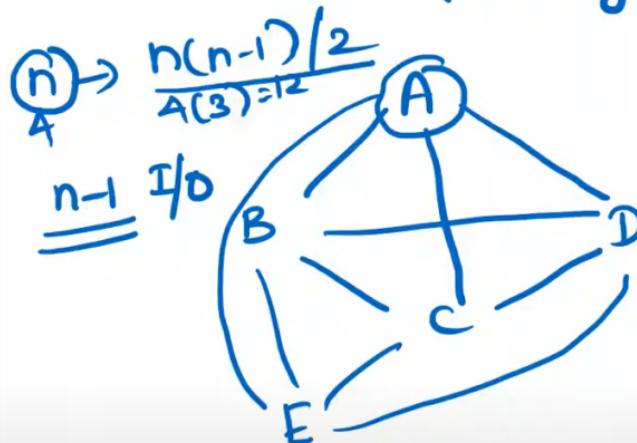
Nithya B

HD

NB

more amt of data b. Hybrid

Mesh:
Fully
partially



1. dedicated link
2. pre planning X
- 3.

Adv -
 1. Secure
 no single pt failure
 ↑ reliability

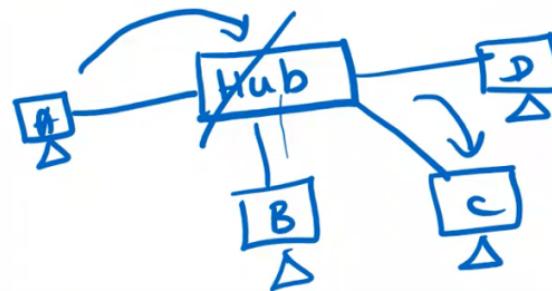
Dis

↑ cost
 Scalability ↓





Star:-



Ds

$\uparrow \text{cost}$
Scalability \downarrow

Dis

single pt failure

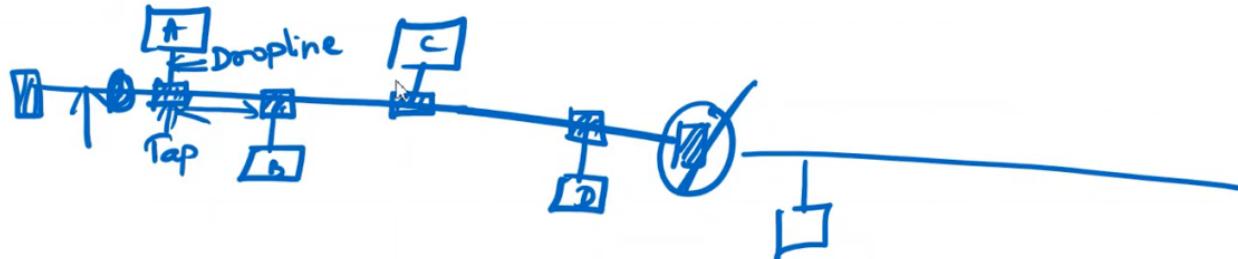
Ad.

$\uparrow \text{sca}$
 $\downarrow \text{cost}$





Bus :-



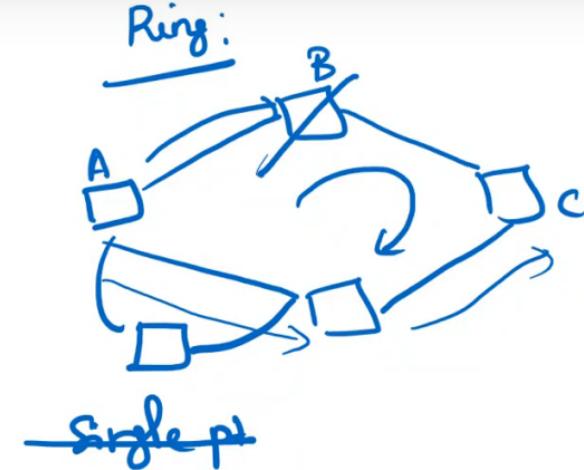
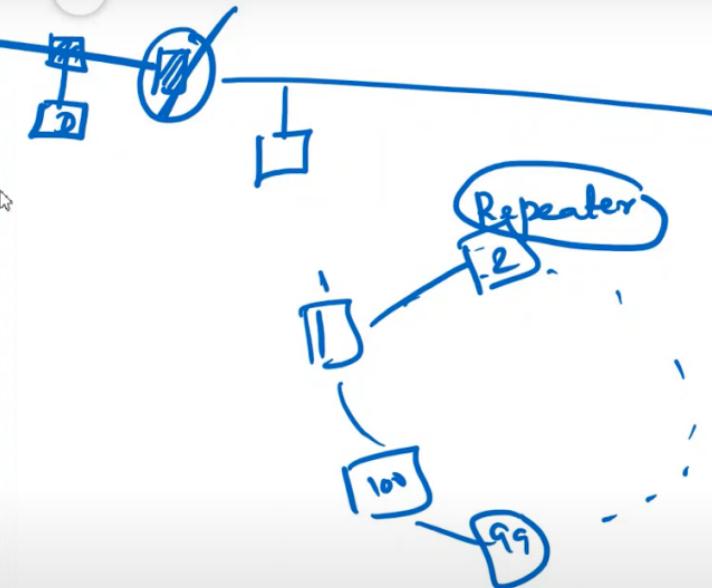
Adv
↓ cost

scalability

Dis :-

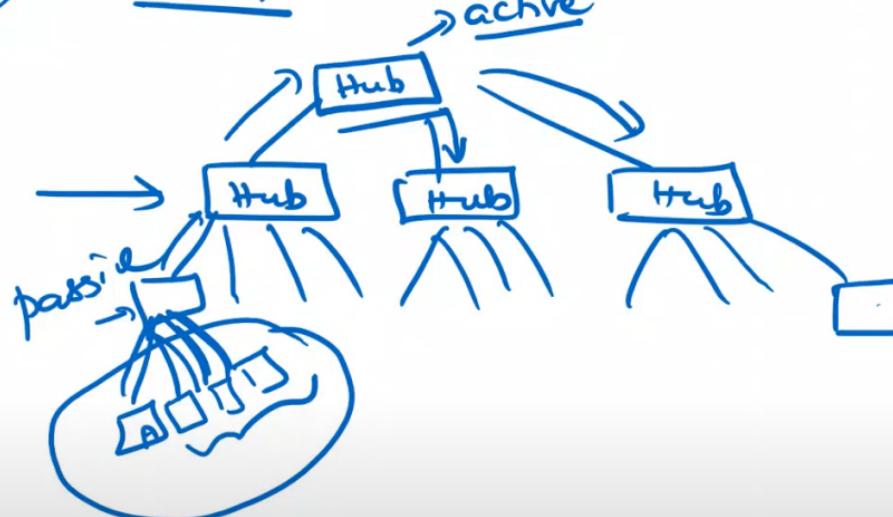
Security
Fault iden



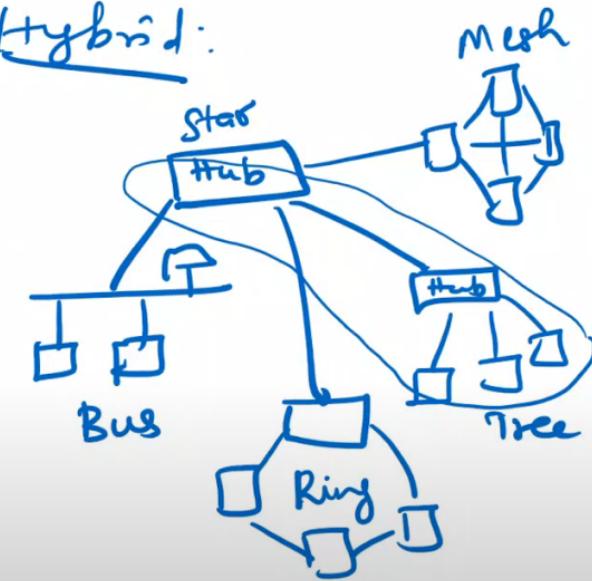




1.75

Tree:-

traffic -

Hybrid:-

46:26 / 47:42



Advai Swamy

AS

Kartikay Agarwal

KH

HH

AW

NB

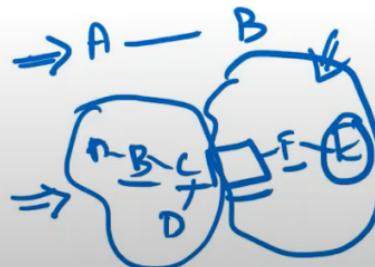


OSI Model ISO

Open System Interconn

open Spec

- { 1) Interconn layers
- 2) Standard names
- 3) Fns



TCP/IP



1 PDU
PPDU

A
P

S

T

Use
support
layer

Appn
Presentation
Sessions

→ Transport

N/w
Support
layer

3 Network
2 Data link
1 Interface
proto
L1 (Physical)

N

D

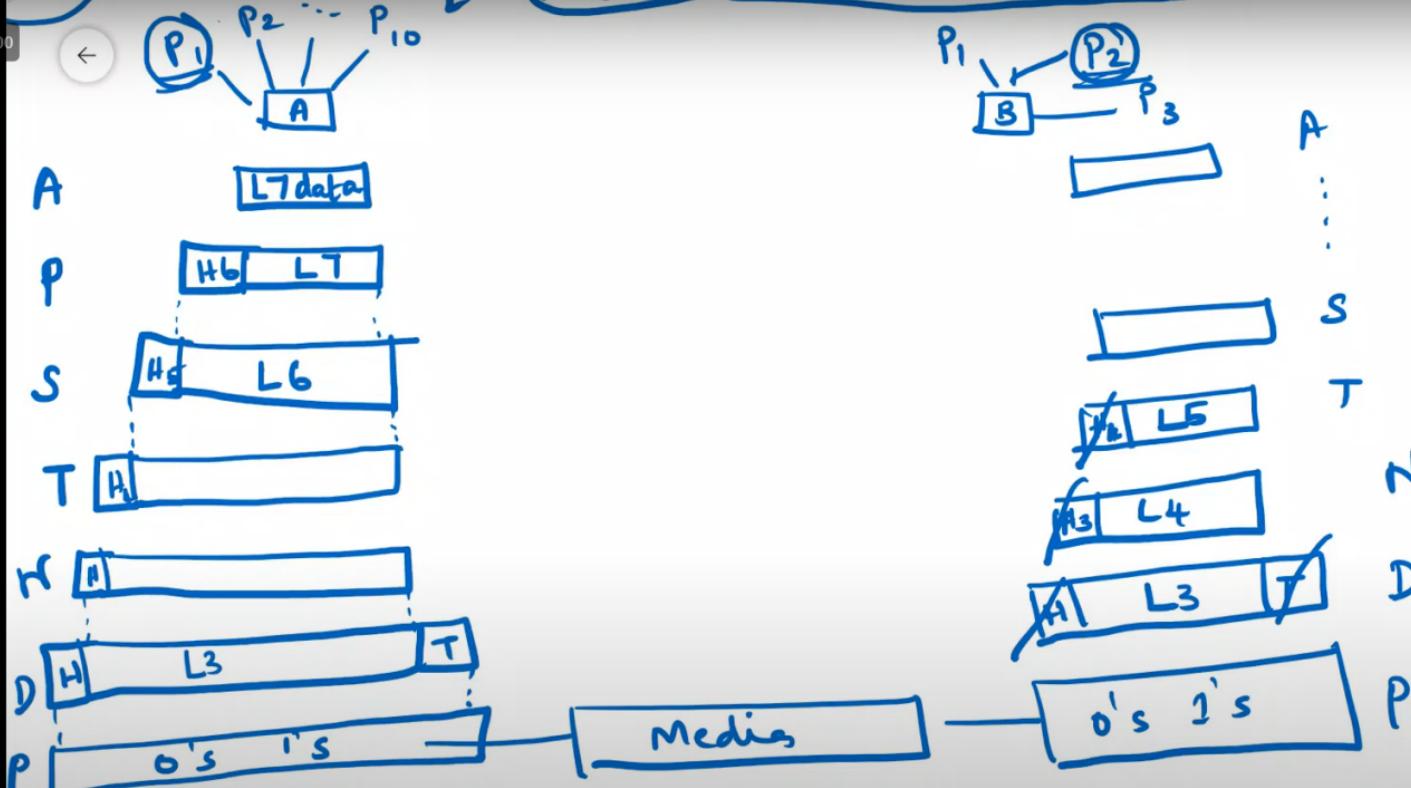
P

selectable
end-to-end

N/w
Support
layer

3 Network
2 Data link
1 Interface
proto
L1 (Physical)





.00



1) Connection Oriented → Connection Estab —

2) Data

3) Connection Released

2) Connectionless

M
 $\underline{P_1} \quad \underline{P_2} \quad \underline{P_3}$

$P_2 \quad P_1 \quad \cancel{P}$

(1) reliable

(2) connection ori msg Sequence

(3) reli conn oriented byte stream

2	256-byte	1	512	X
2	256bytes	1	512	✓
2		2	256	✓
4		4	128	✓



$\overline{P_2} \overline{P_1} \overline{P}$

(1) reliable

(2) " connection ori msg Sequence

2 256-byte | 512

(3) reli conn oriented byte stream

2 256bytes		512
2		256
4		128

(4) Unreliable datagram service

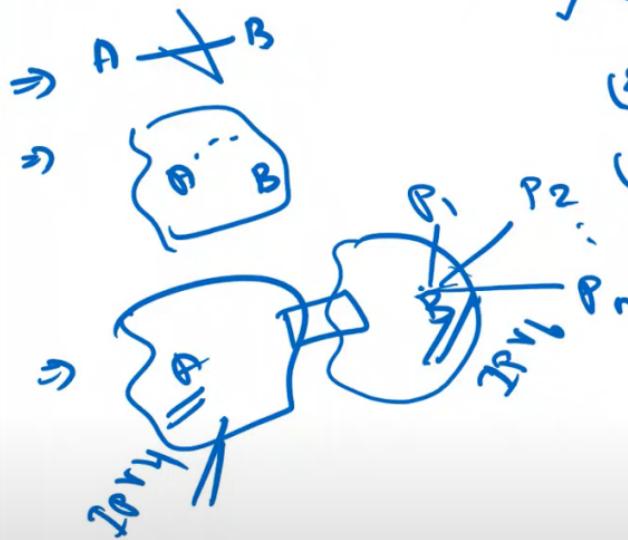
(5) reliable "

(6) seq - reply



o's i's

P



(1) Addressing

(2) Data transf

(3) Error ctrl

↓
det + corre

(4) Flow ctrl
fast sender - slow recv

(5) long msg — 64 byte
↳ min (1) routing 1024 → P1, P2

(4) Unreliable delivery

(5) reliable "

(6) seq - reply





Physical d.layer:-

line conf

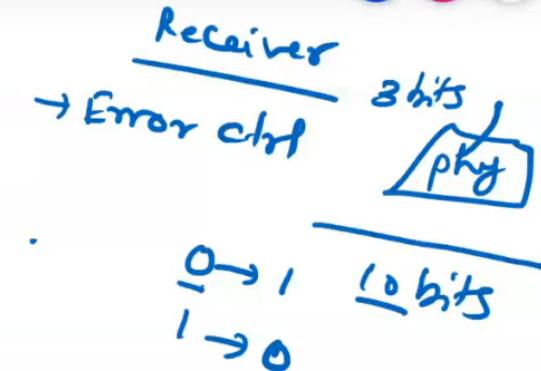
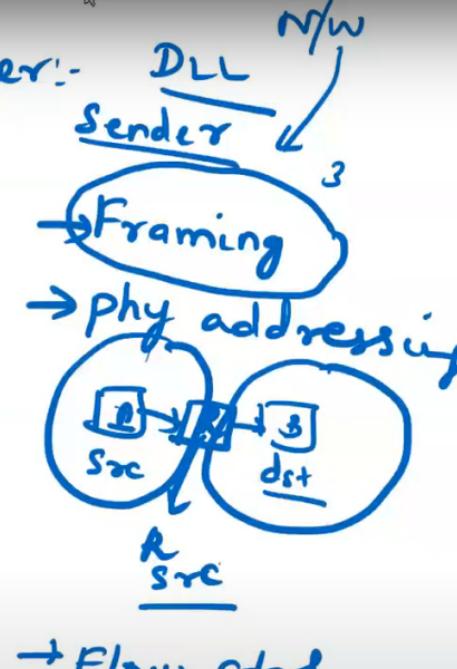
phy top

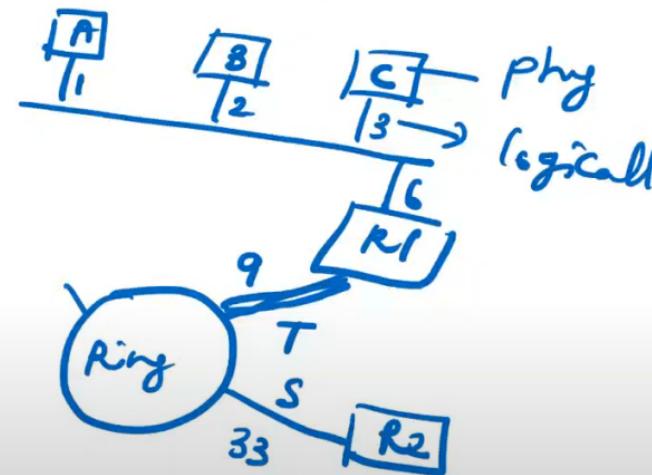
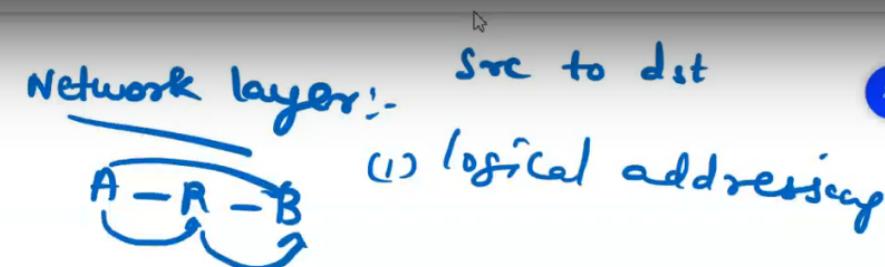
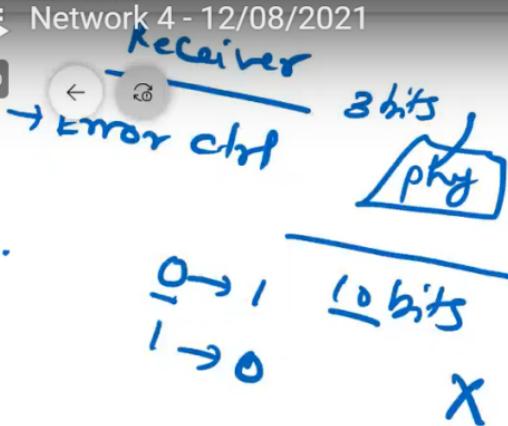
— Mode

Rep bit $\leftarrow 0$

Data rate

Syn

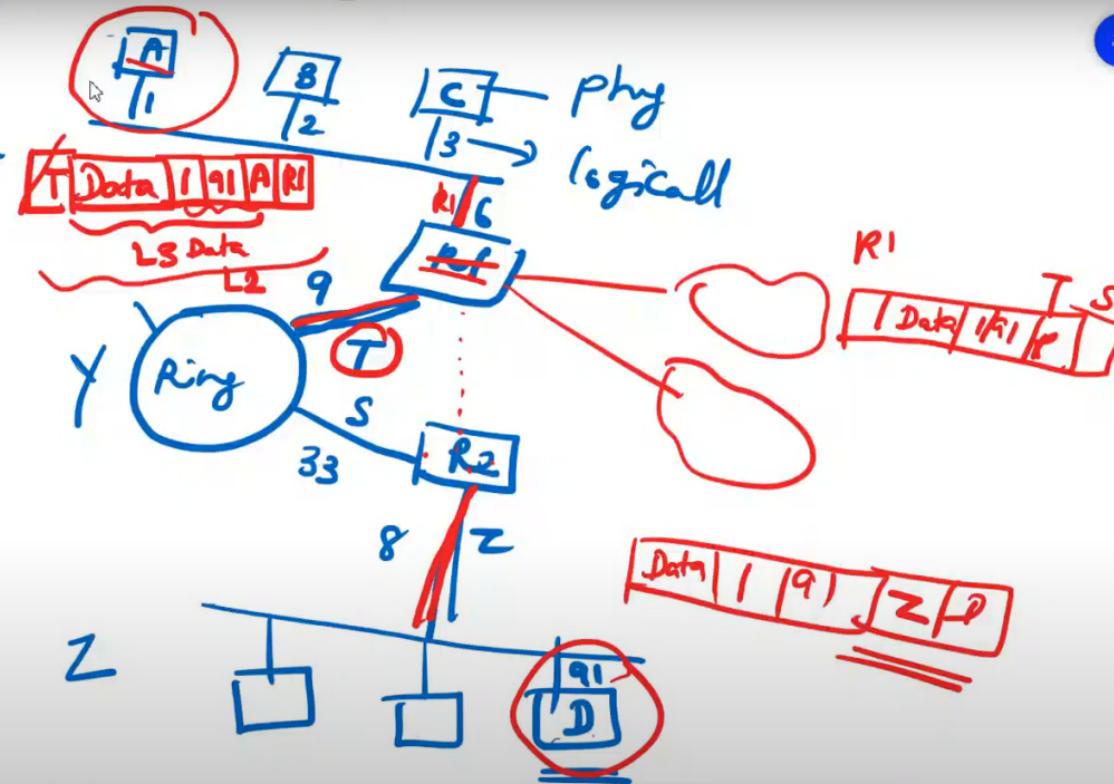


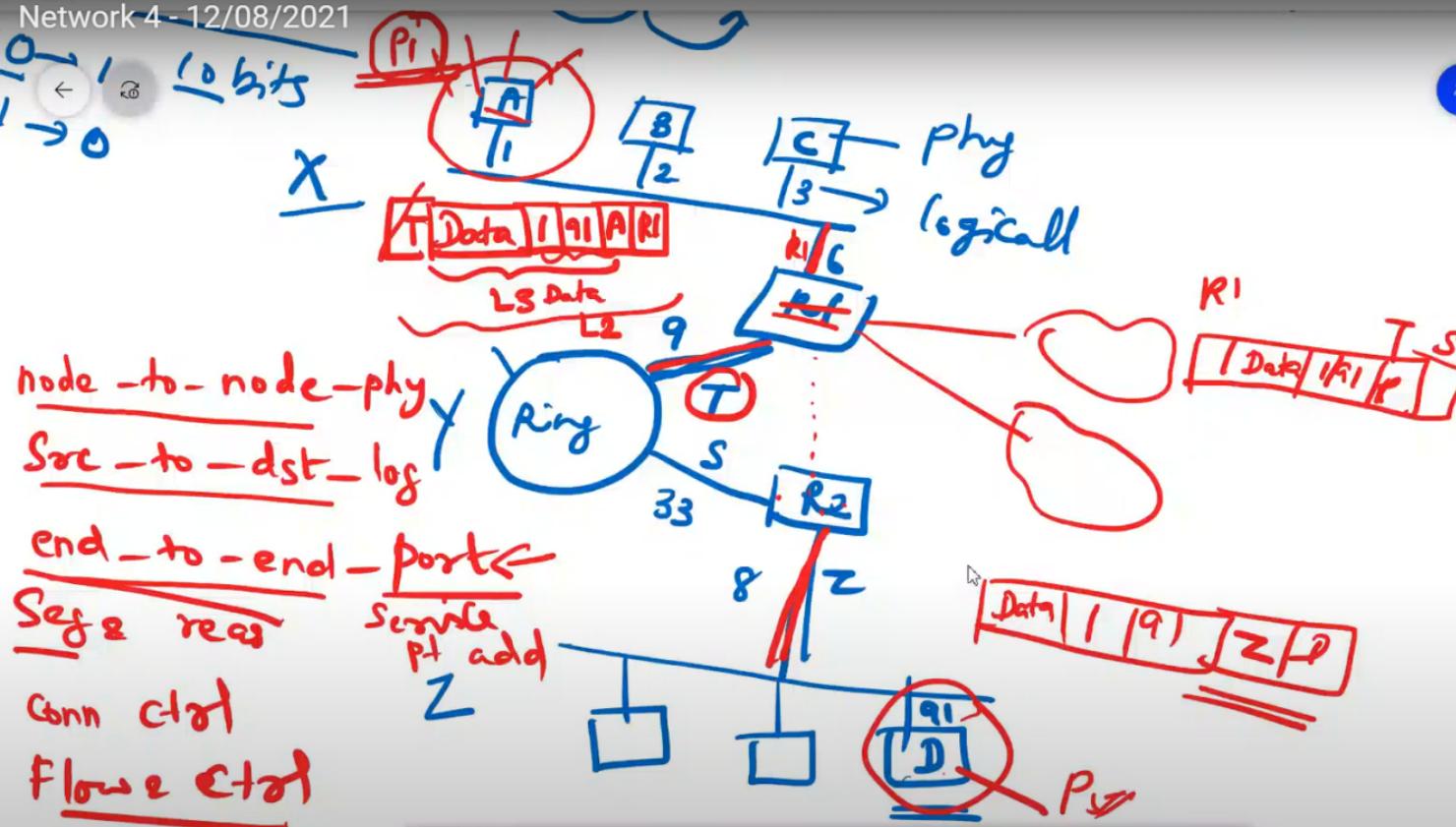


2.00

10 bits

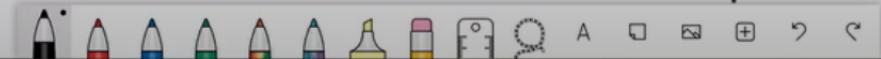
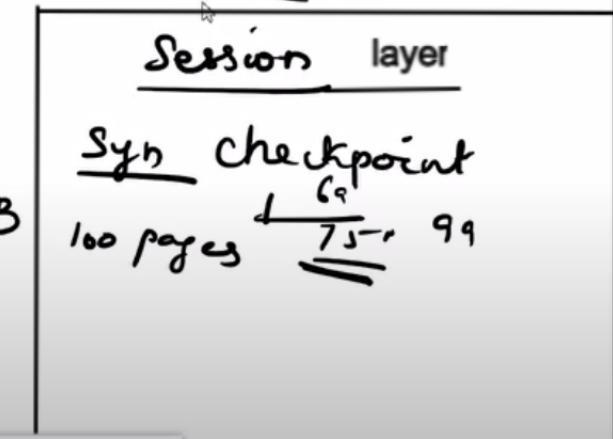
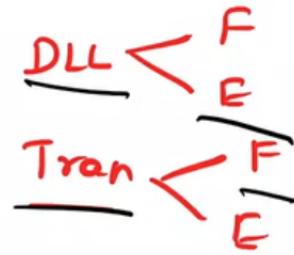
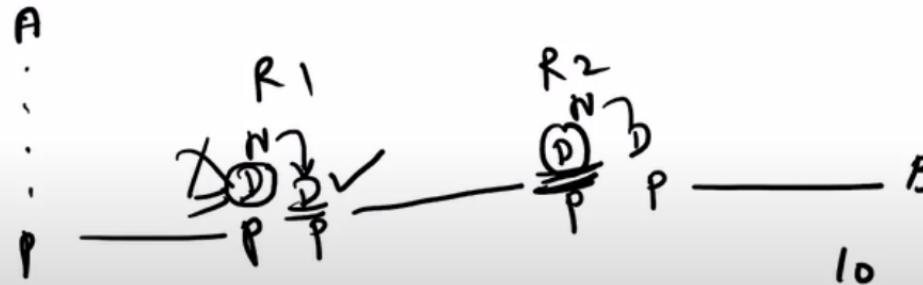
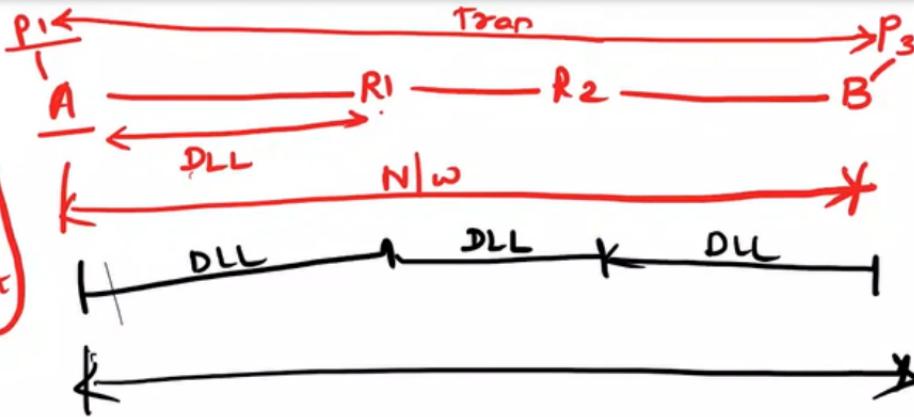
X





1.00

←
Phy
Logi
Port



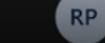
Subhasree G



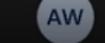
Aditi Swamy



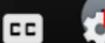
Indresh P



RAINEESH PANDEY



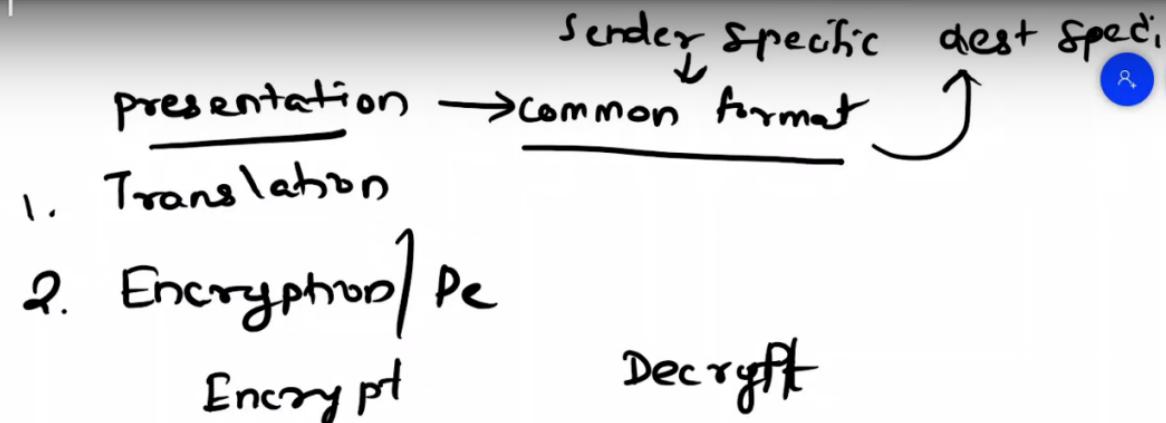
Aryan Wadhavekar



Anirudh V S



Nithya S



Syn checkpoint 3. compression

100 pages $\frac{60}{75} = 99$

Appln
file
file
Remote
E-mail

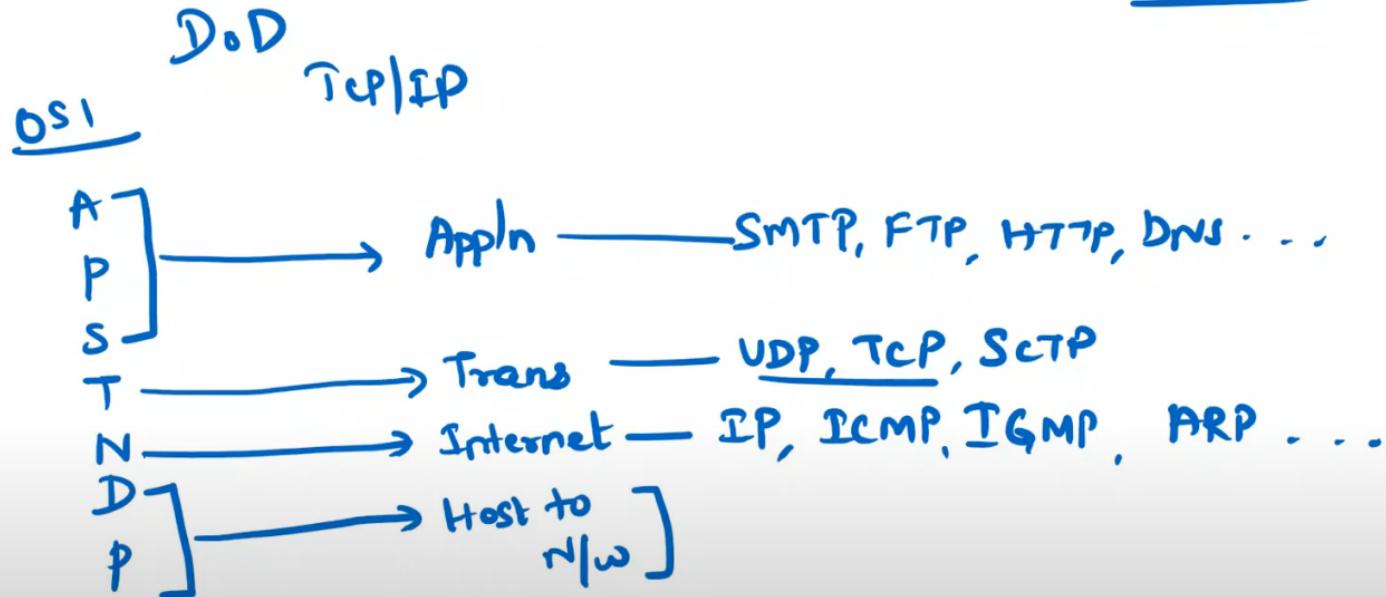
Layered Archi :-





TCP/IP:

ARPA → TCP/IP





1.00

OSI

1) layered

vs... 2) protocol indep

3) model → protocol

ARP ... 4) both

5) ↑↑ Strict layering

6) hidden / !fix

7)

TCP/IP

"

protocol-model

connectionless

→ loose layering

fix Protocol

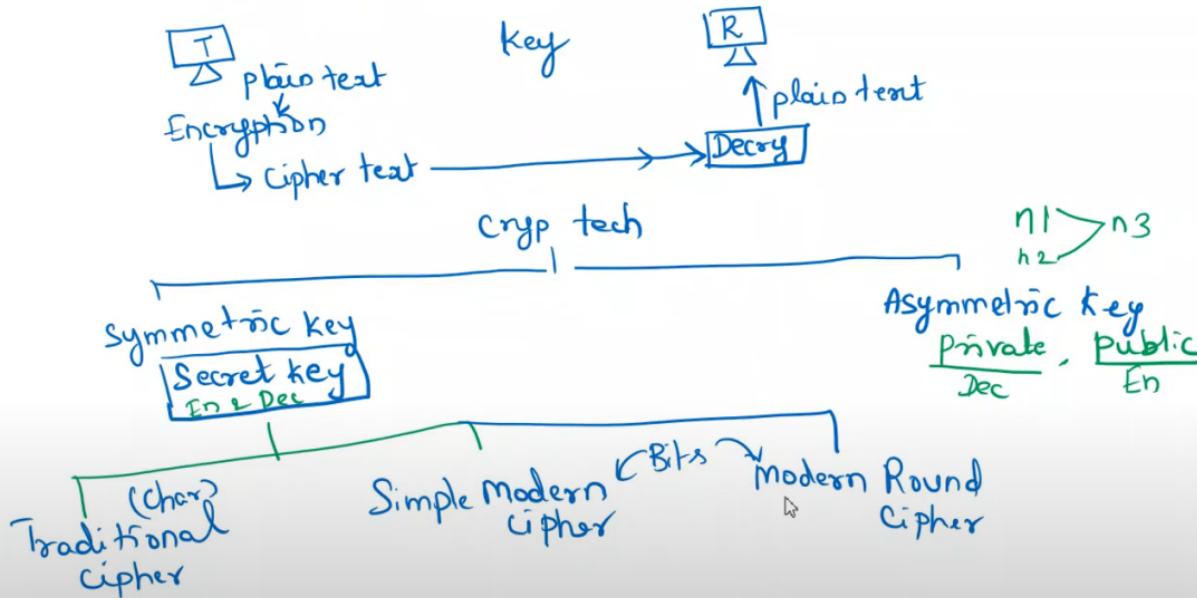


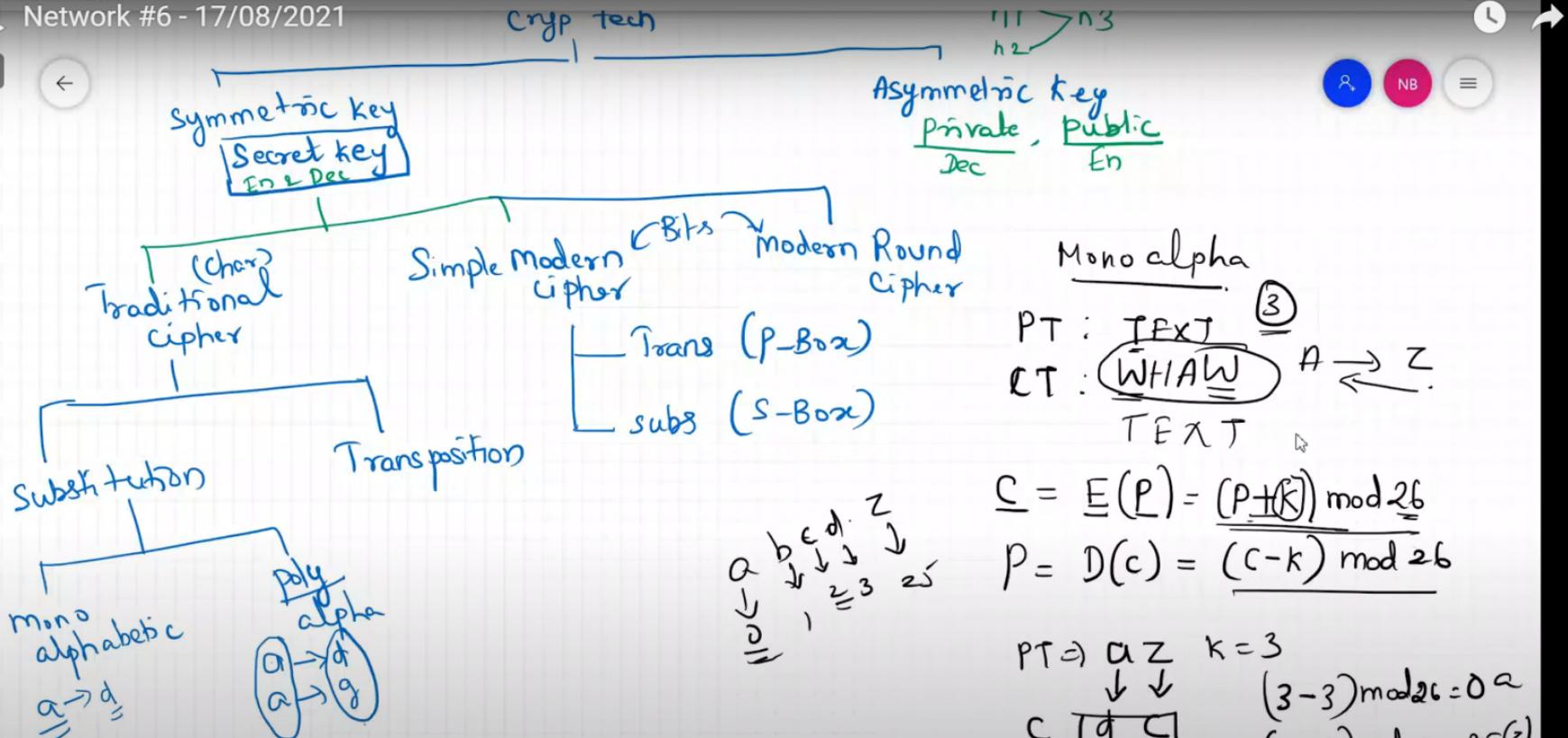
45:51 / 50:04



HD

Cryptographic Tech.







2.00

only



ab cd

a

b

c

d

e

f

g

h

i

j

k

l

m

n

o

p

q

r

s

t

u

y z

a b c d

b c d e

c d e f

d e f g

e f g h

f g h i

g h i j

h i j k

i j k l

j k l m

k l m n

l m n o

m n o p

n o p q

o p q r

p q r s

q r s t

r s t u

s t u v

t u v w

u v w x

v w x y

y z

z a

a b

b c

c d

d e

e f

f g

g h

h i

i j

j k

k l

l m

m n

n o

o p

p q

q r

r s

s t

t u

u v

k = b c x y

b c x y

b c

a b c d b c

b c d

b c e

b c

a b c

a b c

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a b c

a b c

a b c

a b c

a b c

a b c

a b c

a b c

a b c

a b c

a b c

Blue pen



35:37 / 49:17

Aryan Wadhavekar

Vishal Jaiswal

Kartikey Agarwal

Subhasree G

Shreyas K

Advali Swamy

Nithya B



NB

2.00
 $\begin{array}{c} \leftarrow x \ y \\ b \ c \quad x \ y \quad b \ c \\ a \ b \quad c \ d \quad b \ c \end{array}$

\downarrow
 $\begin{array}{c} b \ d \geq b \ c \ e \\ \downarrow \\ a \ b \ c \dots \end{array}$

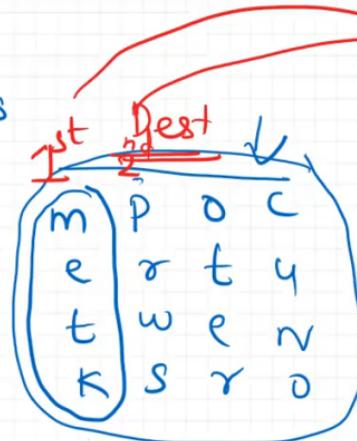
Transportation
 key \rightarrow 4 3 1 2 ^{1st} ^{2nd} ^{3rd} ^{4th}

PT : Computer Networks

1 2 3 4
4 3 1 2

c o m p

PT \Rightarrow U t e r
 N e t w
 o r k s

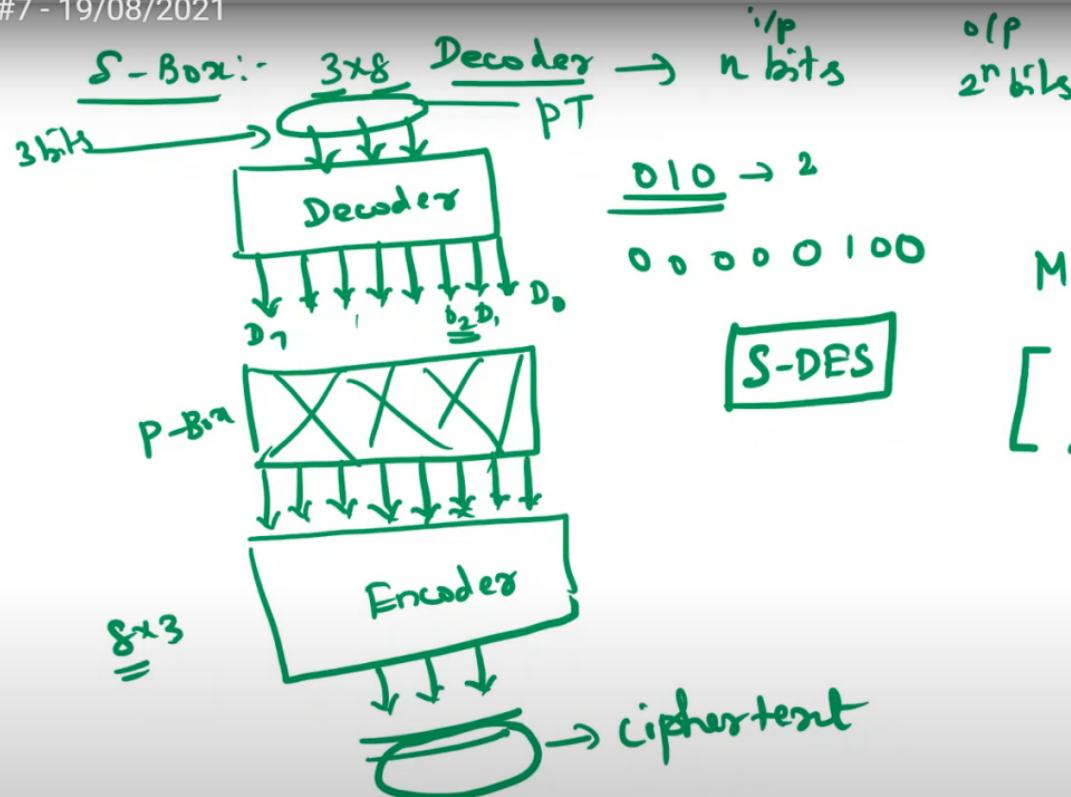


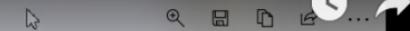
CT \Rightarrow

1 2 3 4
c o m p
u t e r
n e t w
o r k s

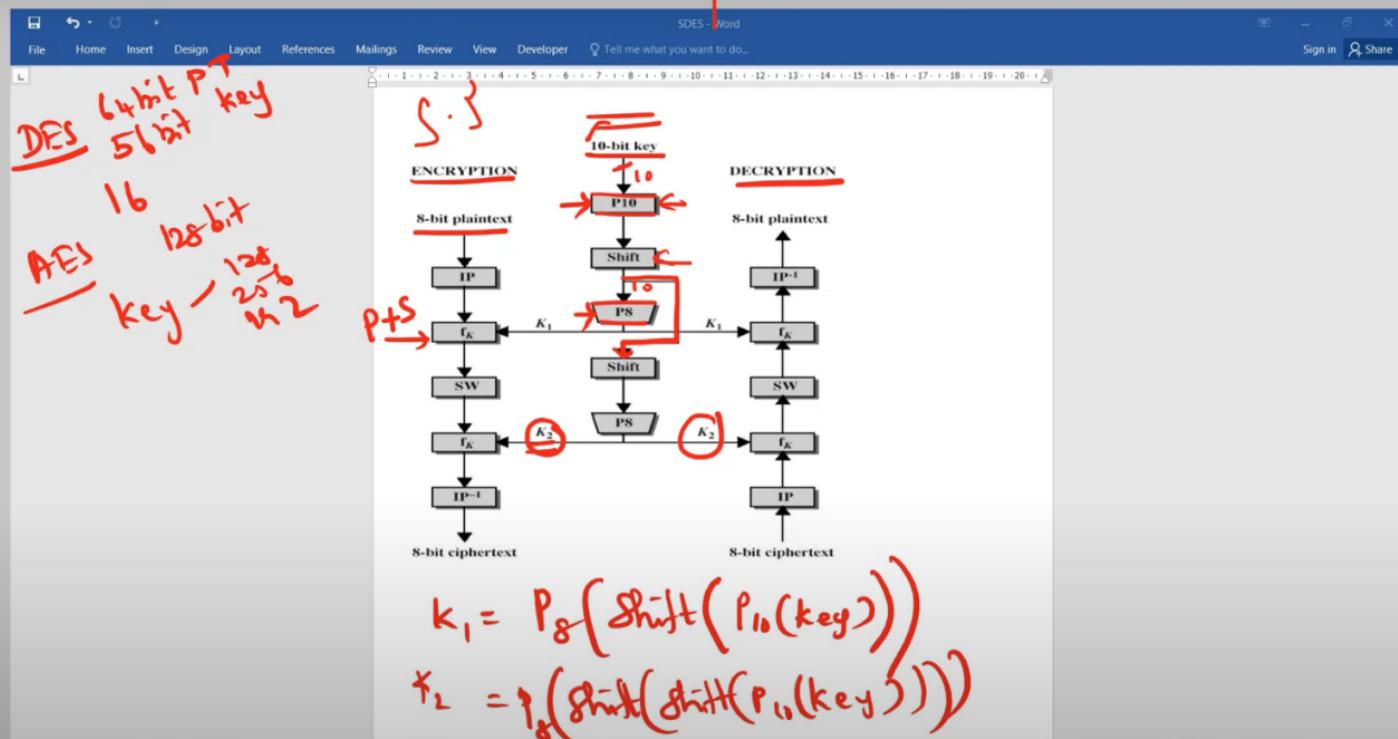
m p o c e r t u t w e n k s r o
metkprws ...







2.00





2.00

SDES - Word

File Home Insert Design Layout References Mailings Review View Developer Tell me what you want to do... Sign in Share

P₁₀: 3 5 2 7 4 10 19 8 6 Key Generation

P₈: 6 3 7 4 8 5 10 9

Key: 1 0 1 0 0 0 0 0 1 0

P₁₀: 1 0 0 0 0 0 1 1 0 0

Shift: 0 0 0 0 1 1 0 0 0 0

P₈ => 1 0 1 0 0 1 0 0 K₁

shift: 1 2 3 4 5 6 7 8 9 10

P₈: 0 1 0 0 0 0 1 1

K₂

10-bit key

P₁₀

LS-1 LS-1

LS-1 LS-1

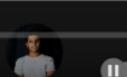
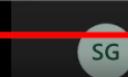
P₈

LS-2 LS-2

P₈

K₁ ← S
K₂ ← S

Figure: key generation for S-DES



$K_1 = 10100100$ $K_2 = 01000011$ $IP = 4\ 1\ 3\ 5\ 7\ 2\ 8\ 6$ $IP: 2\ 6\ 3\ 1\ 4\ 8\ 5\ 7$ $E/P: 4\ 1\ 2\ 3\ 2\ 3\ 1\ 1$ $S_0 = \begin{bmatrix} 1 & 0 & 2 & 3 & 2 \\ 3 & 2 & 1 & 0 \\ 0 & 2 & 1 & 3 \\ 3 & 1 & 0 & 2 \end{bmatrix}$ $\rightarrow S_1 = \begin{bmatrix} 0 & 1 & 2 & 3 \\ 2 & 0 & 1 & 3 \\ 3 & 0 & 1 & 0 \\ 2 & 1 & 0 & 3 \end{bmatrix}$ $P_4 = \begin{bmatrix} 2 & 4 & 3 & 1 \end{bmatrix}$ 