CS & IT ENGINEERING

COMPUTER NETWORKS

Flow Control

Lecture No 7

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- Concept OF Pipelining
- sliding window
- GB-N

Maximum window size = $(1+2a)$ PKt

minimum sequence Number required = $(1+2a)$

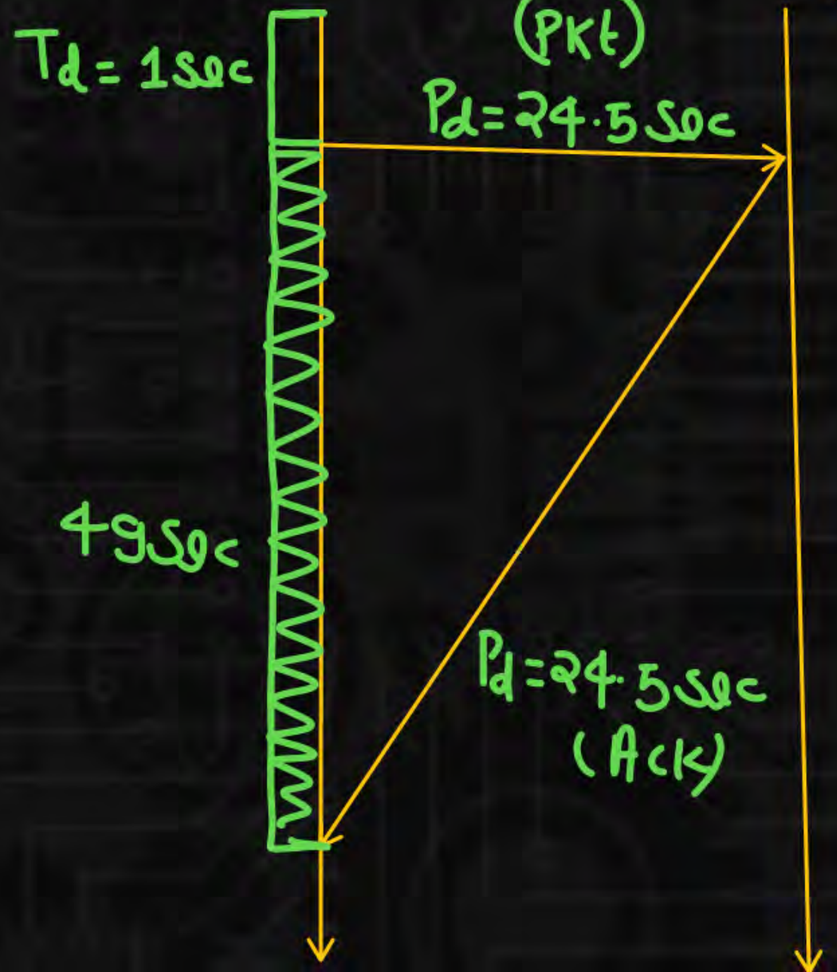
minimum No. OF bits required in the sequence Number field = $\lceil \log_2(1+2a) \rceil$

Q: $T_d = 1$ sec, $P_d = 24.5$ sec

maximum window size = $(1+2a)$ Pkt

$= 1 + \frac{2 \times 24.5}{1}$

$= 50$ Pkt



min Seq No required $= (1+2a) = 50$

min No. of bits required in the sequence Number of field $= \lceil \log_2 (1+2a) \rceil$

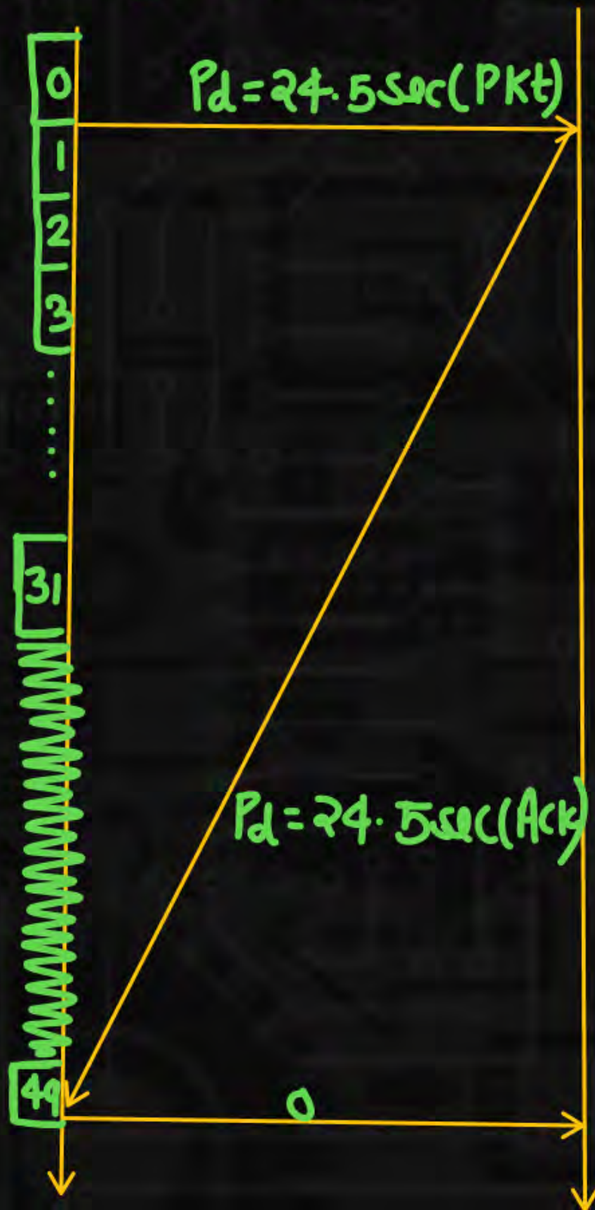
$= \lceil \log_2 50 \rceil$

$= \lceil 5.8 \rceil = 6$ bits

Case 1

Seq No. (k) = 5 bit

Total sequence No. = $2^5 = 32$ (0 — 31)



Waiting time = 18 sec

$$\text{efficiency} = \frac{32}{50} = 0.64 = 64\%$$

$$W_s = \min\{(1+2a), 2^k\}$$

$W_s = \min\{50, 2^5\}$

$W_s = \min\{50, 32\}$

$W_s = 32$

Case II Sequence No (k) = 4 bit

Total sequence Number $= 2^4 = 16 (0-15)$

Waiting time = 34 sec

$$\eta = \frac{16}{50} = 0.32 = 32.1\cdot$$

$$W_s = \min\{(1+2\alpha), 2^k\}$$

$$= \min\{50, 2^4\}$$

$$= \min\{50, 16\}$$

$$\boxed{W_s = 16}$$

Sliding window:

In the sliding window concept instead of sending one packet and wait for the acknowledgement, we send 'w' packet and wait for the Acknowledgement. Where 'w' is the sender window size.

GB-N (N>1)

1. In the GB-N the sender window size is N itself

   i.e GB-(5) → sender window size

2. In the GB-N the receiver window size is equal to one always ($W_R = 1$)

1. GB-10

   $W_S = 10$

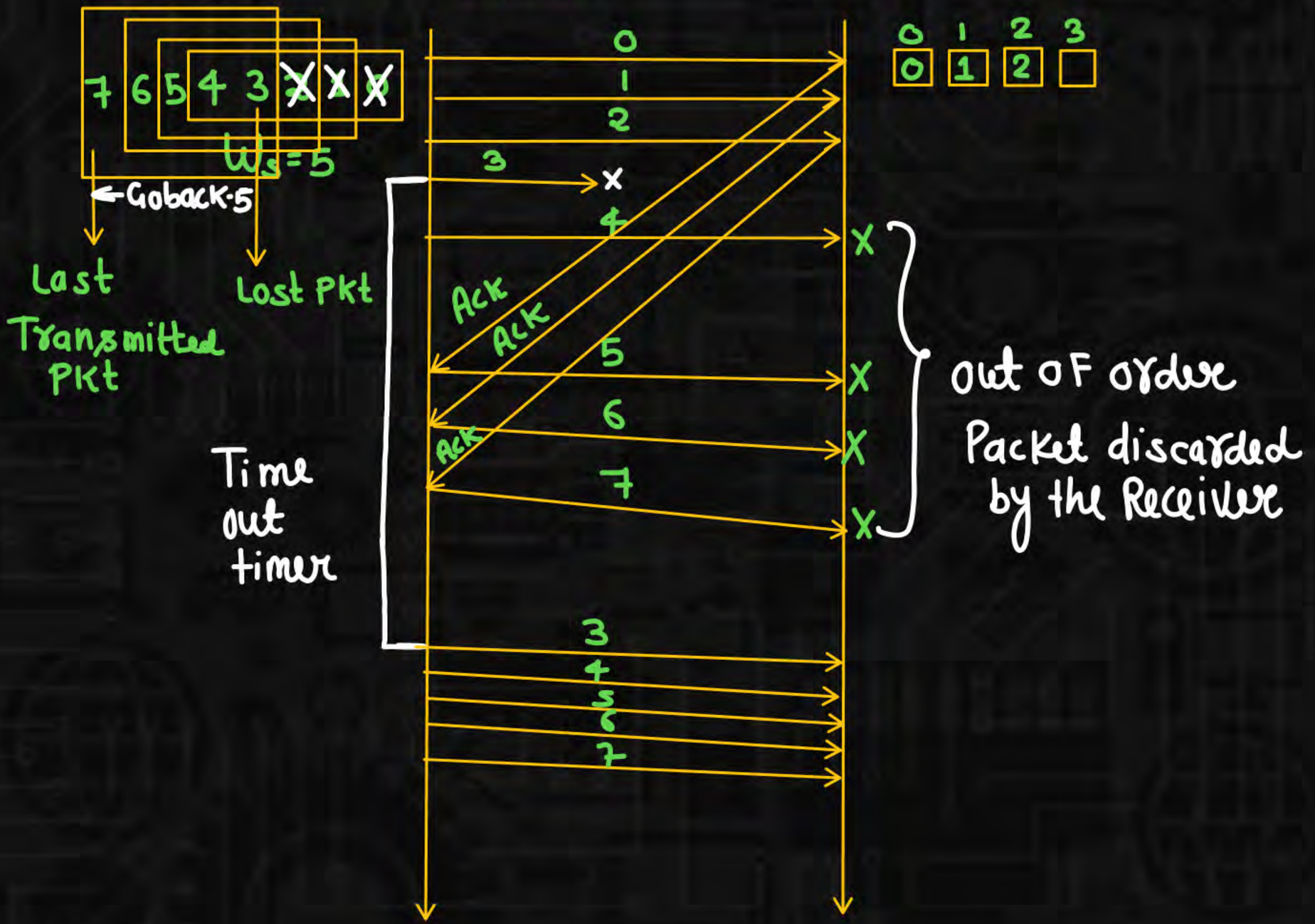
   $W_R = 1$

2. GB-15

   $W_S = 15$

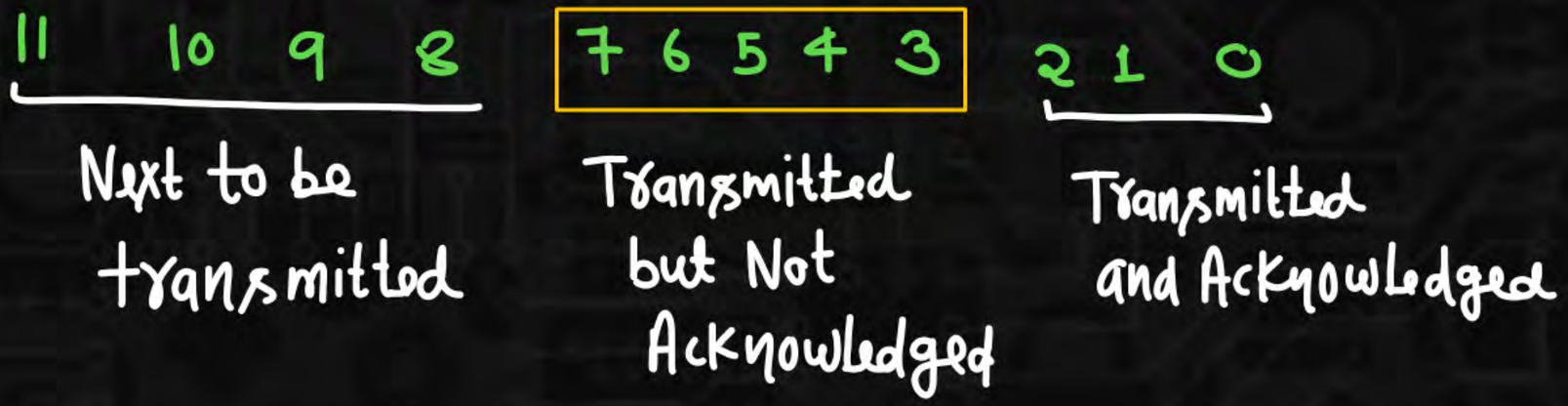
   $W_R = 1$

GB-5


7 6 5 4 3 X X X
Ws = 5
Goback-5
Last Transmitted Pkt
Lost Pkt
0 1 2 3
0 1 2 3
0
1
2
3
X
4
X
Ack
Ack
5
X
6
X
Ack
7
X
Time out timer
out of order
Packet discarded by the Receiver
3
4
5
6
7

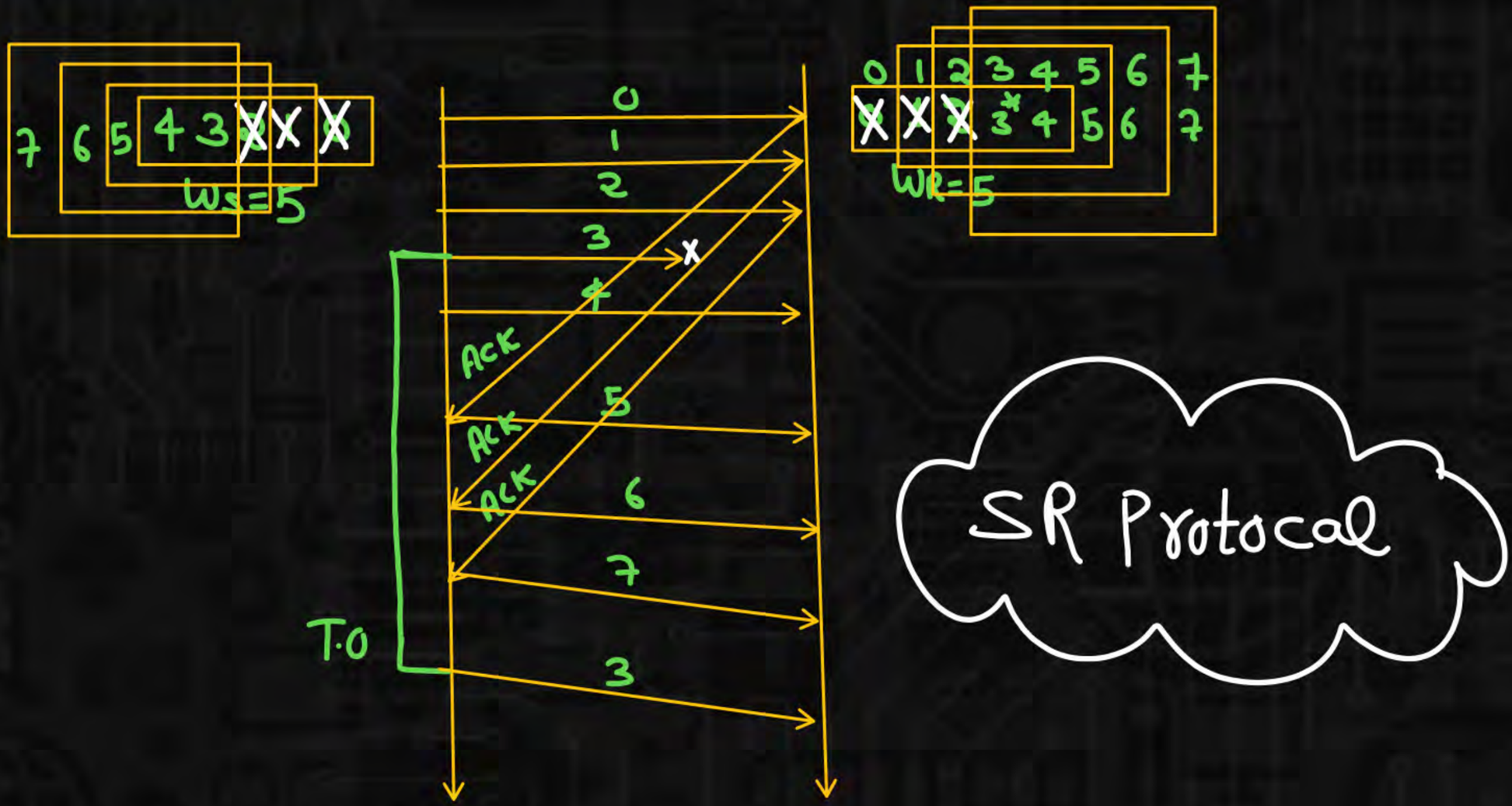
Note

① Go back-N is From Last transmitted Packet



NOTE

1. Out of order packet is not received by the receiver
2. Timer is maintained only for the first frame(Right most)in the window because if its timer expire then sender assume that rest of the frames are not received by the receiver(because out of order packet is rejected)

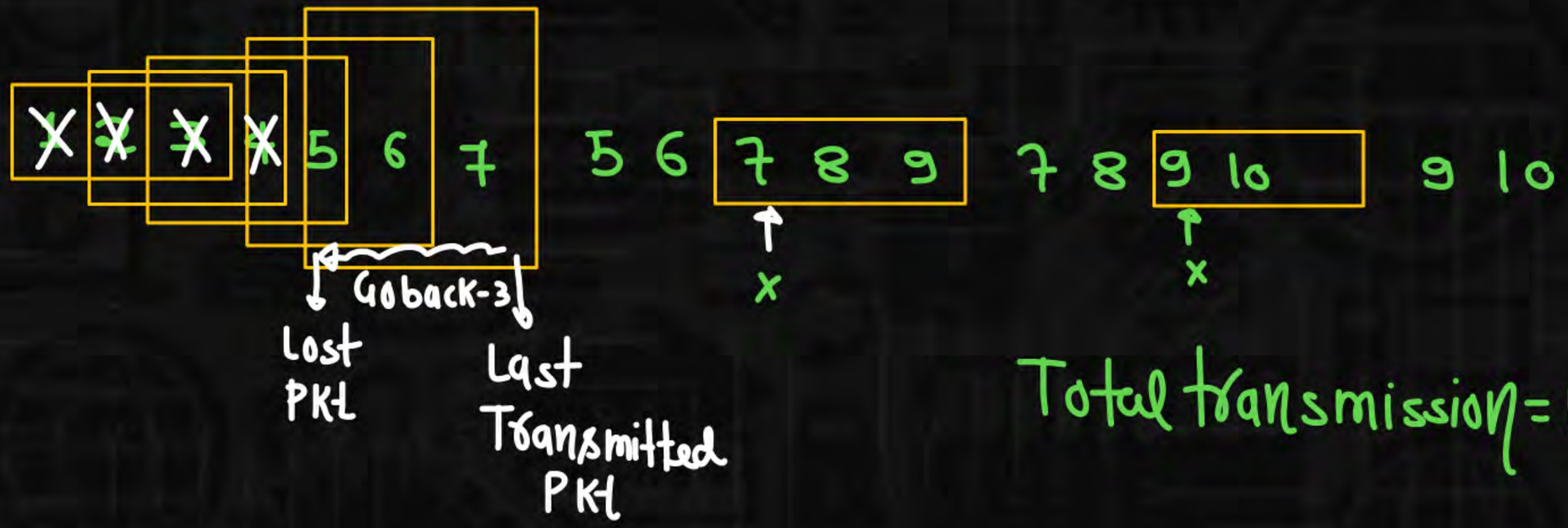

7 6 5 4 3 X X X
Ws=5
0 1 2 3 4 5 6 7
X X X 3* 4 5 6 7
WR=5
0
1
2
3
X
4
Ack
5
Ack
Ack
6
7
T.O
3

SR Protocal

Q.1

In GB-3, If every 5th packet that is being transmitted is lost and If we have to send 10 packet, then How many transmission are required

GB-3, 5th lost , 10Pkt



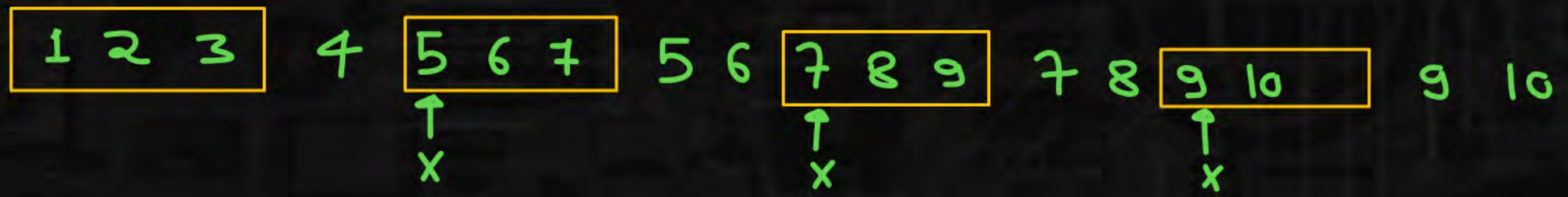
Total transmission = 18

Q.1

In GB-3, If every 5th packet that is being transmitted is lost and If we have to send 10 packet, then How many transmission are required

shortcut

GB-3, 5^{th} lost, 10PKt

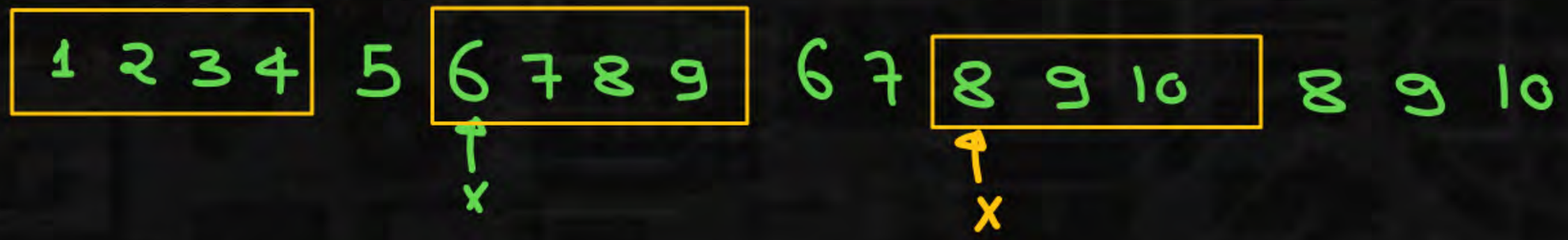


Total transmission = 18

Q.2

In GB-4 If every 6th packet that is being transmitted is lost and If we have to send 10 packet then how many total transmission are required.

GB-4, 6th lost, 10PKT



total transmission = 17

Q.3

H.w

In GB-3, If every 4^{th} packet that is being transmitted is lost and if we have to send 10 packet then how many total transmission are required.

Q.4

Station (A) needs to send a message of 9 packets where send windows = 3. All packets are ready and immediately available for transmission. By using GBN strategy, if every fifth packet gets lost, then what is the number of packets that station (A) will transmit for sending all its message ____.

Gate-2016

Q.5

Station A needs to send a message consisting of 15 packets to station 'B' using a sling window (window size 4) and go-back-N error control strategy. All packets are ready and immediately available for transmission. If every 6th packet that 'A' transmits gets lost (but no Acks from 'B' every gets lost), then what is the number of packets that 'A' will transmit for sending the message to 'B' ?

H.W

A 29

B 33

C 27

D 28


THANK YOU
GW
SOLDIERS !