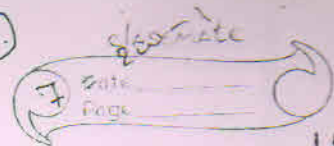Ques: If 3 bit Sequence number is used, what is Maximum the window size in case of.

ⓐ Sliding window Protocol

ⓑ Selective Repeat Protocol

ⓒ Go-back N protocol

Ans↳

Sliding Window Protocol:-

$$MAX \; SEQUENCE = 2^3 - 1 = 7 \quad (111)$$

$$Window \; Size - 1 = MAX \; SEQUENCE$$
$$W = 7 + 1 = 8 \qquad \boxed{W = 8}$$

Selective Repeat Protocol :-

$$2w - 1 = MAX \; SEQUENCE$$
$$w = \frac{7+1}{2} = 4 \qquad \boxed{w = 4}$$

Go-back-N protocol :-

$$W = MAX \; SEQUENCE$$
$$w = 7 \qquad \boxed{w = 7}$$

. 3 bit ka Smallest Number 4 hota hai aur Largest 7 (in decimal). Aur minimum window size puche hai toh 7 ki place 4 ... lite.

Ques:- CS- 2005 : 25

Ans = ⓑ

Ques:- Through

Throughput :-

Now yeh throughput kya hota hai, throughput joh bhi aap task karrahai hai, per unit of

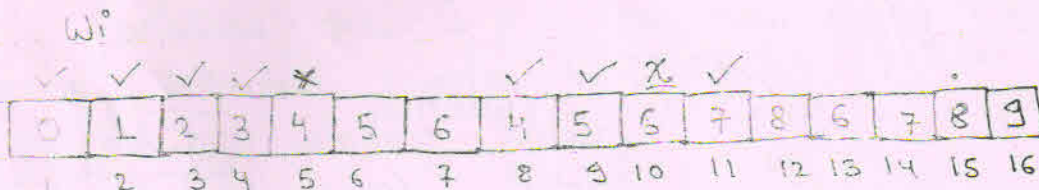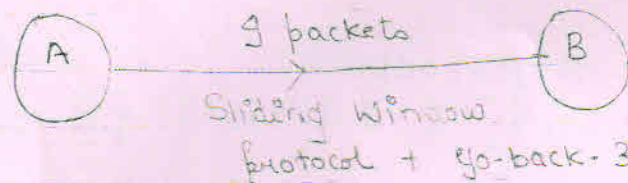time woh task aap kitana perform kar pate ho.
i.e your throughput.

• per unit of time hum kitane bits transfer karte hai woh hamara kya hota throughput.

Thp! ≠ η * Effect

| /Goodput | Throughput = η * data transfer Rate (actual) Effective data Rate / Channel eff |

Ques: 46   CS- 2006
Ans :→

A → 9 packets → B

Sliding Window protocol + go-back- 3

Wi

0	1	2	3	4	5	6	4	5	6	7	8	6	7	8	9
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

✓ ✓ ✓ ✓ ✗   ✓ ✓ ✗ ✓

Ans Ⓒ → 16.

Ques: 44   CS- 2006
Ans:→

128 Kbps
A → 32 byte → B
Sliding window protocol
$2t_p = 80ms$
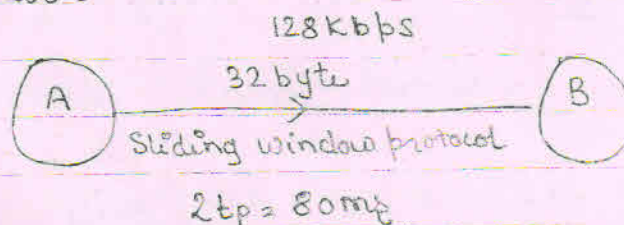
$$\eta = \frac{W t_x}{t_x + 2 t_p} \qquad t_x = (32*8)|128*10^3$$

W/P windows upperbound.

$$t_x = \frac{L}{D} = \frac{32 * 8}{128 * 10^3} = 2ms$$

$$L = \frac{W * 2}{2 + 82} = \frac{84}{2} = W \Rightarrow 42$$

Ques: A 3000 km long, 1.54 Mbps channel is used to transmit 64 byte frame using Selective Repeat protocol, if propogation speed is 6 µs per km. How many bits the sequence number be 2?

Ans:-

$$t_x = \frac{L}{D} = \frac{64 * 8}{1.54 * 10^6} = 332.46 \text{ µs}$$

$$6 \text{ µS} \rightarrow 1 \text{ km}$$
$$6 * 3000 \text{ µS} \rightarrow 3000 \text{ km}$$
$$18000 \text{ µS} = t_p$$

$$\eta = \frac{w t_x}{t_x + 2 t_p} \quad = \quad 1 = \frac{w t_x}{t_x + 2 t_p} \Rightarrow t_x + 2 t_p = w t_x$$

$$\frac{t_x + 2 t_p}{t_x} = w$$

$$\lceil 109.28 \rceil \doteq w = 110$$

Selective Repeat :→

$$MAX \text{ Sequence} = 2w - 1$$
$$MAX \text{ Sequence} = 219$$

No. of bits required to store $= \lceil \log_2 219 \rceil + 1 = 8$
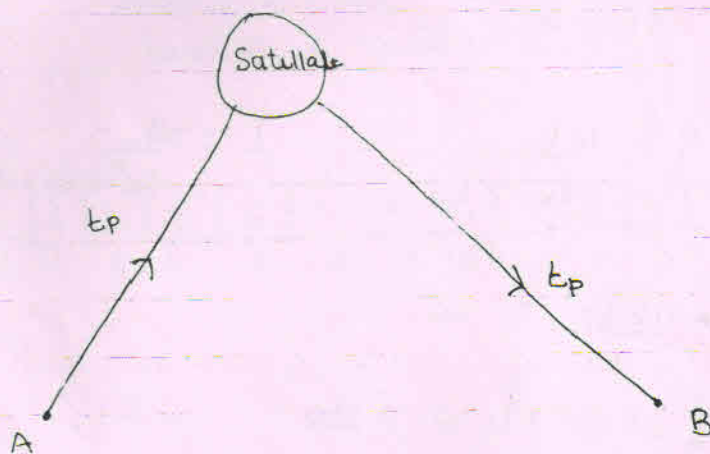MAX Sequence

Ans = 8 bit Long

- Agar efficiency nahi de aur humko lag raha hai efficiency ki jarurat to take $\eta = 1$.

Que :→ ~~Bits~~ Frames of 1000 bits are to be transmit over a 1 Mbps channel using a satellite whose propogation time from the earth is 270 ms. If 3 bit sequence number is are used, what is the maximum acheivable channel utilization?? If protocol is go-back N ??

Ans ⤵

$$\eta = \frac{w\, t_x}{t_x + 2 t_p}$$

$$t_x = \frac{1000}{1 * 10^6} = 10^{-3}\ sec = 1ms$$

Window Size = MAX SEQUENCE = $2^3 - 1 = 7$

$$\eta = \frac{7 * 1}{1 + 270 * 2} = \frac{7}{541} = 0.0129$$

$$\text{Throughput} = \eta * R = (0.012 * 1) * 10^3\ Kbps$$

$$\text{Ans} → \quad 12.9\ Kbps$$

参Missing content

Ques: Frames / of / 1000 bits are to be trans se

Ques: Frames of 1000 bits are send over a 1 Mbps Channel using a Satallite whoes propogation time from the earth is 270 ms. Acknowledgements are always piggybacking. If 3 bit sequence number are used, what is the maximum acheivable Channel utilization?? If protocol used is Selective Reject protocol :-

Ans:-

Pipeback :→

If it is 2-way communication ie both are recievers and both are sender. A sender bhi aur reciever bhi hai aur B sender bhi hai aur reciever bhi hai.

- Sabse pabale A ne frame B ko bheje, Now aab B ko A ko do chij bhejna hai, ek toh data frame send karna hai aur ack frame send karna hai.

- Toh kya B yeh dono chij Separate bhejega, agar piggybacking ka concept use kiya hai matlab acknowledgement bits are attached to data bits. No need to send separate acknowledgement frame, ack are attach with data frames.

→ $RTT = \underbrace{t_x + t_p}_{Sender} + \underbrace{t_x + t_p}_{Reciever}$ (piggybacking)
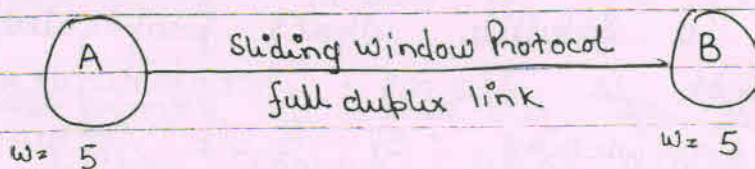
$RTT = 2[t_x + t_p] = 2[1 + 270] =$

$\eta = \dfrac{W t_x}{RTT} = \dfrac{W * 1}{2[271]} = \dfrac{42}{2 * 271}$ $\left\{ \begin{array}{l} 2w-1 = 7 \\ w = 4 \end{array} \right\}$

$Throughput = 1 * 2 * 10^3 \ kbps = 7.38 \ Kbps$

Ques:→ CS-2003 84| (b)

Ans:→

$$A \xrightarrow[\text{full duplex link}]{\text{Sliding window Protocol}} B$$

$w = 5$ $w = 5$

Data length = 1000 bytes

$$t_x = 50 \,\mu sec$$

$$t_p = 200 \,\mu S$$

$$\eta = \frac{5 * 50}{50 + 400} = \frac{5}{9}$$

1000 bytes → 50 μS

$10^6 * \dfrac{1000}{50}$ byte → ~~500 *~~ 1 sec

throughput = $\dfrac{5}{9} * \dfrac{1000}{50} * 10^6 = 11 \cdot 11 M$ bytes per sec

Ques:- 57 CS- 2009

Ans:→ (d)

$$W \, t_x = t_F$$

$$W * 1 = 25$$

$$\boxed{W = 25}$$

$$A \underset{\text{duplex}}{\overset{\text{1000 bits} \quad 10^6 \, bbs}{\rightleftarrows}} B$$
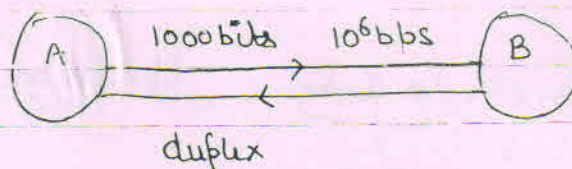
MAX Sequence $= W - 1 = 24$

No. of bits $= \lfloor \log_2 24 \rfloor + 1 = 5 \, bit$
for Max sequence

CS-58) CS-2009

Ans:- Ⓒ

frame

acknowledgement

$$RTT = t_x + t_p + t_x + t_p = 1 + 25 + 1 + 25 = 52\,ms$$

$$Useful\ time = W t_x = 2^5 * 1 = 32\,ms$$

$$Waiting\ Time = (52 - 32)\,ms = 20\,ms$$

- Agar Channel ko free nahi rakna hai toh $W t_x = t_p$ wali condition satisfy hogi.

- Now aab hum discuss kar rahai about MAC Layer :→

→ Data-Link further divide into two sublayers

LLC   MAC
(Logical Link   (Medium Access
Control)   Control)

| MAC |
| LLC |

| LLC |
| HAC |
| Physic |

- LLC gate k course mein nahi hai isliye hum LLC ko discuss nahi karrahai hai, hum discuss karegey MAC layer ko.

- MAC layer kya kare hai iska purpose kya hai.

B

A   C
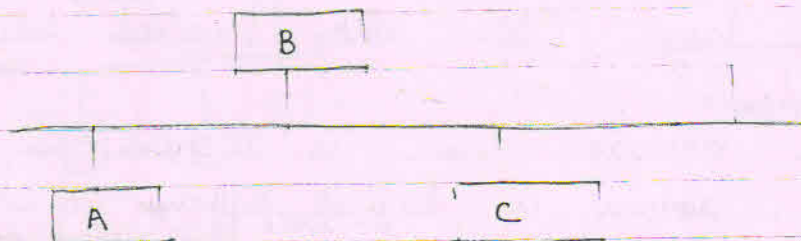
PPP → data link protocol

Suppose yeh hamari bus topology :

→ Suppose System A ne frame send ki for System C, obviously frame cable par rakhi, toh woh frame B k pass bhi aayegi aur C k pass bhi pachuchegi.

• Toh aab C ko kaise pata chalega ki frame uske liye hai.

• Aur B kaise identify karega ki given frame joh transmit hue hai wooh B k liye nahi hai.

• Toh System ko differentiate karne k liye we assign an address to every System.

• TCP/IP Mein there exist 2-level of addressing. do layer hai toh different addresses se deal karte hai ↗
↗

→ Ek layer konsi hoti hai MAC layer joh address se deal karte hai.

→ Aur dusri layer konsi hoti hai Network layer which deals with addressing.

→ MAC layer deals with physical address, MAC address

• Aur Network layer is address ko handle karte hai, that address is logical address ya IP address.

• Physical address hai toh System mein physically

Kahi exist karta hai. Logical address hai matlab, address assign by some software/ some authority.
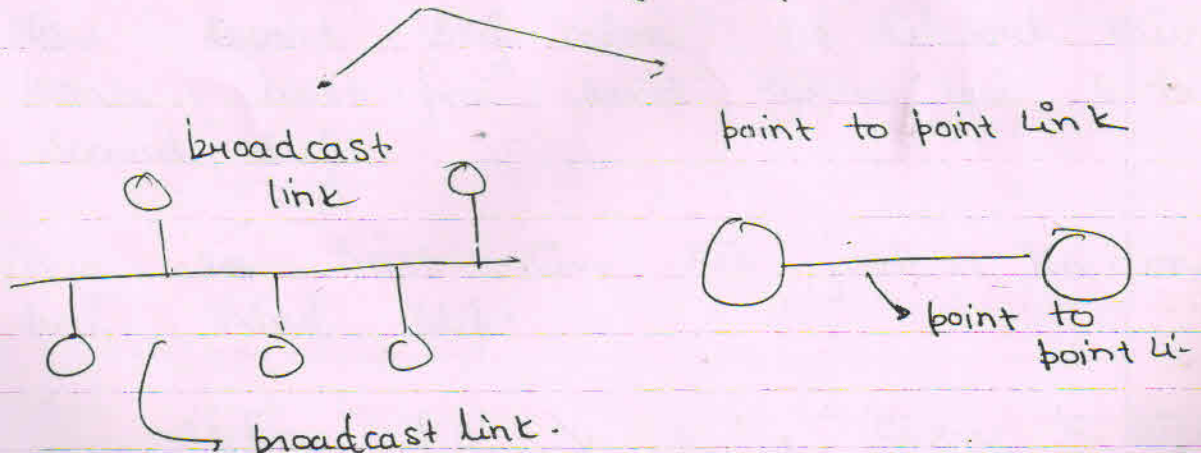
- Port Number:-

HTTP	Port 80	TCP
FTP	Port 21/20	TCP
Telnet	Port 23	TCP
DNS	Port 53	Both TCP + UDP
SMTP →	Port 25	TCP
DHCP →	Port 67/68	TCP
RIP →		UDP ✓
SNMP	161	UDP ✓
TFTP →	Port 69	UDP ✗
POP3	Port 110	TCP
RIP →	Port 520	UDP.

- realtime multimedia - UDP.
  RPC   UDP.

- Every system will recieve all the frames, this type of system is known as broadcasting System:

- There exist two types of links :-

broadcast link   point to point link

→ broadcast link.

→ point to point li.