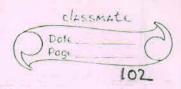
- · Joh sendur K buffer mein kya hai fl, f2, and f3.

 how aab jaischi fl ka acknowledgement aagaya.

 toh yeh fl kya hojayegi sender ki window
 se bhan.
- · Joh aab Sendur Ki window min Kya aagayi f2, f3 and f4.
- Now f2 ka acknowledgement aggaya, toh aab Send k window min kya hoga f3, f4 & f5.
- · Joh Sender Ki fran window min konsi frame Hahati hai foh Sender send toh kar chuka hai likin unka acknowledgement hahi aaya hai.
 - Jaisihi Kisi frami ka adequatedgement ada hai toh woh frame gender window si bhar hojati hai.
- Hun jab tak won frame transmit nahi hur hai, won bhi sendur window ka fart nahi hai.
- Jaha sendur ne usko transmit kiya, aur jab tak uska acknowledgement nahi aaya, won frame sendur window ka fart hogi.
- · Agan senden window size 3 hai it means senden window will contain thru un acknowledgement frames.
- · John Now Stiding window protocol ki efficiency kitanii
 hote hai -



Efficiency of Stiding window buotocol:

Agan hum window size w le, toh efficiency is define ap-

$$\eta = \frac{\text{wtx}}{\text{tx} + 2\text{tp}}$$

W → window Size

Yaha fan Sliding word Kyo use kiya beceme yaha fan window Slide ho Mahî haî, exchange hoti jarahai haî change hoti jarahaî haî.

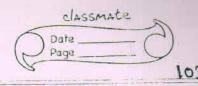
Aslige is protocol to Sliding window protocol talva gaya hai.

Ours: Consider a channi with the Speed of 446/s and one-way propogation delay of 20 ms. If frame size is to bits, then what is the efficiency of the protocol, if sliding window protocol is used with window size of LO.

Ans l l $tx = \frac{L}{D} = \frac{164}{41 \times 103} = 4me$

Ans: $\eta = \frac{10*4}{4+40} = \frac{40}{44} = 0.9090 = 90.90\%$

Ows: Consider above question data, for what window Size dot we will get Loo! Efficiency ya phin bola hai Ki what will be the oftimal window



Ans. Joh Oftimal window Size kaise nikalegy, toh uske live lige efficiency kitani Hak do one:

 $\eta = \frac{1}{2} =$

= 4 + 40 = W * 4 = 44 = W = 4

Oftemal window Size = LL

Agan w=12 kan di toh efficiency kitane hojayegi more than one, toh efficiency more than one fossible nahi have

· Par yet joh efficiency ka formula hai yet toh Huturn karega efficiency ki ralu more than one.

Agan efficiency ek se jada jarahai hai toh hamara formada kgaz hotaz koù efficiency kitani hogi one.

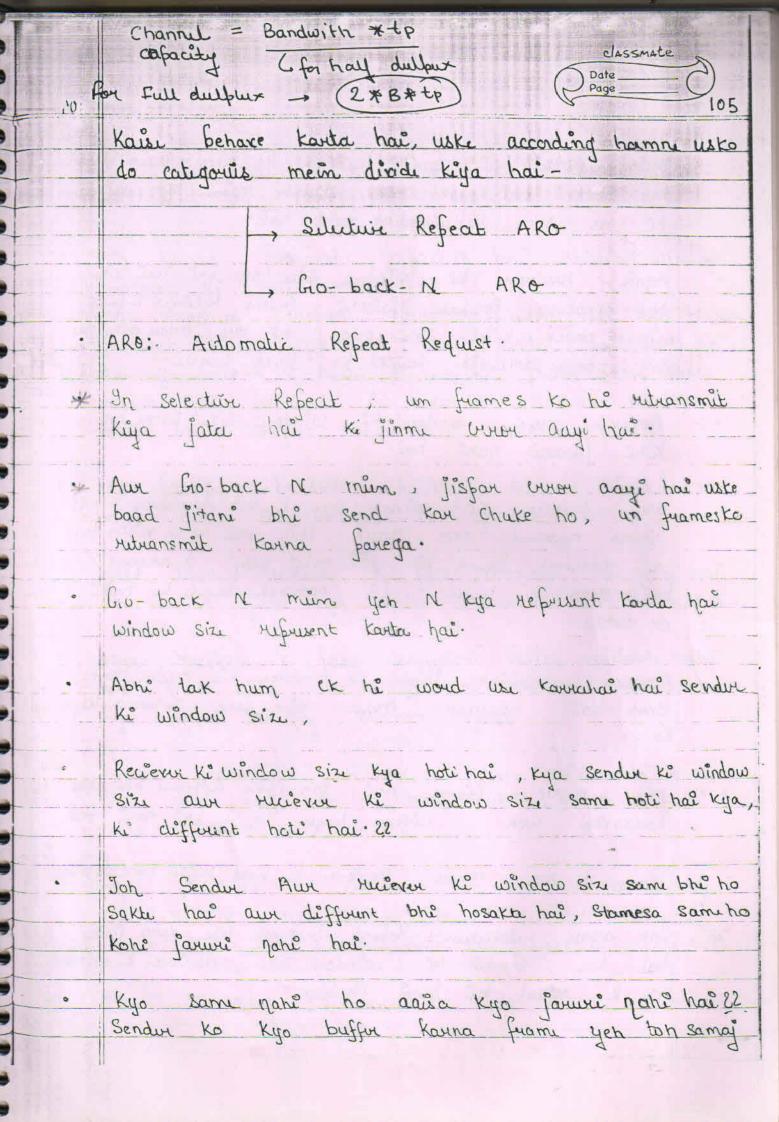
Stiding' window brotocok man first france sond w.

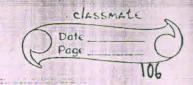
Now Stiding window fratowd hai, Sender ne bahub Saari frame send ki, first ka ack aagaya, second lost hogi, third ka ack aagaya toh aab Heriever ko kaise fata chaliga ki, second frame is lost or a farticular frame is lost. Ya fhire kohi frame Hefeat hogayi toh yeh kaise fota Chaliga ki

-

won nefeat hogayi hai.

- Joh Cleanly is broblem to dur kann k hije aafto kya kanna faruga han fram to ck sequence number dena faruga.
 - Joh Sliding window brotocol muin bhi har frame ko ek Sequence number allocate hote hai.
- Usually hamani Seduna number Ki scheme Kya hotis hai, ki agar window size 4 hai, toh aab Kya Seduna number use kara 0,1,2,3.
 - Pahali frame aayi with frame sedunce numbers, then f1 then f2 then f3. Now 5th frame ka sedunce humber again kitana hojayeda 0, 6th frame ka again kitana hojayeda one and so on Hopeat hote Jawegey.
- starts from 0 to w-1.
 - Sender no frame 0, 1, 2, 3 sind king Recever ko frame 0 mili , 1 nahi mili , 2 mil gay: 3 nahi mili , kyo 22 cruor cane k karan nahi mili
 - Euror aan far hum frank Kossel window mûn jitanî frame hai sub Ko & rutuansmît kangi Ki, sulutirity jis frame mûn vurbraayî hai usko hê rutuansmît kangey.
 - · On an Error aapka Sliding Window frotocol





Mun aata hai, fan Huiever ko frames aaf ne fars Kyo Makni hai, usko waa buffer min kyo natne Ki as such Hedwirement nahi hai.

Agan Huiever ki window size one bhi hai toh bhi chaliga. Because jaisehi frame Hecerer k foss aaye check kiya kohi vuon hai kya agan nahi hai toh toan Network layur ko fass kandi.

Reciever aux sendur ki window size same ho Kohi jaruri nahi hai.

Now Reviewer Ki window size I kab problem kongi. frame number one acyi thik hai usne kisko de di network layer ko, 2 nahi acyi 3 acyayi, toh data link layer f3 network layer to nahi de sakter.

Because datalink layor ko framı kis ordur mün dena hai Sequence ordur min dına Network layor ko.

yen nayî frame har ton isko discard bhi nahî karsakta avr. Higher layer ko de bhi nahî çakta.

Joh is case mein Reviewn K pass buffer hona Chahuje.

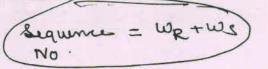
Joh agan Selvetwie Refeat frotocol use Kiya jata hai toh Sender ki window size, Herever K window size K equal he hone Chahiyo. * lekin agan hum yo-back N fratocol use kannahai hai, toh necievu ki window size one bhi hogi toh bhi Chalega.

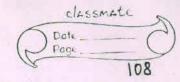
- Joh Konsa frotocol efficient hai sliding window frotocol Ki yo-back N.
- → Joh Selection Repeat jada efficient hai kyo become homore lige memory Kohi matur, nahi konte hai, but yo-back N min hamari bandwidth waste homaha hai because joh correct recieve hur hai unko bhi wafas se fend kanna parega.
- better hat as compare to go-back N.
 - · But agan ruseru K fass memony hi jahi hai, toh aafke fass kya oftion backata hai Go-back Ni.
 - Agan Heieren k fass Sufficient buffen available nahi hai, then only we furfer 40-back N otherwise hum Kya furfer kaniguy selective Hefeat.
 - Agan Sendur Ki window size aux Me acever ki window size same hat toh yo-back N use kanna ka kohi sense hi nahi hai:
- Agan Hucieven ki window size one hai tabhi dage go-back Ni use kanna januri hai, Othurwise as such uski kohi requirement Jahi hai.
 - Now Efficiency Kirtan hogi, -

1(1)

* lekin agan hum yo-back N fnotocol use kannahai hai, toh necievu ki window size one bhi hogi toh bhi chaliga.

- Joh Konsa Brotocol efficient hai sliding window brotocol Ki yo-back N.
- Joh Selective Repeat jada efficient hai kyo become homane lige Memory Kohi maltur nahi kante hai, but yo-back N min hamani bandwidth waste honaha hai because joh correct recieve hur hai unko bhi wafas se send kanna parega.
- Joh broßer bandwidth K lige solictive Refeat protocol better hat as compare to yo-back N.
 - But agan ruseru K fass memony hi jahi hai, toh aafke fass kya oftion bachata hai Go-back N.
 - Agan Heieren k fass Sufficient buffer available nahis hai, then only we freshe go-back N otherwise hum Kya fursin konegy solutive Hebeat.
 - Agan Sendur Ki window size awn He werever ki window size same hai toh yo-back N use karna ka kohi sense hi nahi hai:
- Agan rucievu ki window size one hai tabhi dag go-back N use kanna jaruri hai, Othuroise as Such uski kohi requirement Jahi hai.
 - Now Efficiency Kirtani hogi, -





Efficiency mun W Kiski window size Hefment Karda Sender Ki window Size

Stiding window frotocol mein sequence number Kaha se kaha tak vary hote hai-

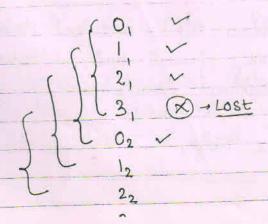
10 to w-L

Joh Langest Sequince number kya hoga w-1, usto Ko hum kya kaha Maha hai MAX Sequince Number

Jaha = W-1 = MAX SEQUENCE

W= MAX SEQUENCE TL

Lekin agan hum Solution refeat use kanto hai oun hamne yehi Scheme follow Ki > Ki agan w=4 hai to'n Sedwine number kaha se kaha tak hai to'n Sedwine number kaha se kaha tak problem wany hogey 0 to 3 to f is scineme se problem kya hogi -



121

Now agan 3, ka ack lost hogaya toth, woh sent therework fass factuate gaye but uska ack therework foss nati factuation how received kya aku exect except kan raha ki frame 3 aayegi set ki

Put Since 31 & Ka · ack nation how top sender nu phin se 31 send to now ado reciever kya except tan maha f3 but 2 set to but were first set to mil gaye our moierer ussi his second set. Ki 3th frame samaj to mat lega.

· Joh islige froblem to avoid kanne to live - aaf tya Kano Ki John Sequence number aaf I set mein use kan rahai ho usto fecond set mein use hi mat kano.

In Selective respect window size aux sequence Number muin kya Alationship hai-

MAX SEGUENCE = LW-L

TAX SEGUENCE +1 ZW

For Back Nythologiship 1+ Lingbow Size MAX Sequence

Ous:-	9f Window Size is 5, What Should be the Maximum Sequence Number for-
(a)	Stiding Window Grotocol Selective Refeat Protocol Go-Back N protocol
	MAX Sequence = W-L 2 → Sliding Window = 5-41=4) Protocol
H	Selection Refeat Protocol:
	MAX SEGUENCE -= 2W-L = 2*5-L = 89 9
#	MAX SEQUENCE = W = 5
Ansor	gour sequence number be 22 For- Go Stiding Window Protocol B Selective Repeat Protocol C Go-Back N Protocol C Stiding Window Protocol Log2 (4) t L = 3 bit
	B Selective Repeat Protocal:
	[log_(9)] + L = 3+1= 46L
	@ Go- Back-N Protocol:
	[log ₂ 5] + 1 = 2+1 = 3 bit