

CS & IT ENGINEERING

Computer Network

Flow Control

DPP-01 (Discussion Notes)



By- Ankit Doyla Sir

TOPICS TO BE COVERED

01 Question

02 Discussion

Q.1

Which of the following is/are the true statement (s) about the type of acknowledgement in stop & wait protocol? [MCQ]



☒ A.

It supports cumulative acknowledgement

☒ B.

It supports Individual acknowledgement

☒ C.

It supports cumulative as well as individual acknowledgement

☒ D.

None of the above

Q.2

If the bandwidth of the line is 100 mbps, RTT is 50 usec and frame size is 50 bits the find out the link utilization in stop & wait.



[MCQ]

- A. 2%
- B. 4%
- C. 10%
- ☒ D. 1%

$$B = 100 \times 10^6 \text{ bits/sec}$$

$$RTT = 50 \mu\text{sec} = 50 \times 10^{-6} \text{ sec}$$

$$\text{Frame size} = 50 \text{ bits}$$

$$T_d(F) = \frac{50 \text{ bits}}{100 \times 10^6 \text{ bits/sec}}$$

$$= 0.5 \times 10^{-6} \text{ sec}$$

$$= 0.5 \mu\text{sec}$$

$$\eta = \frac{\text{Useful time}}{\text{total time}}$$

$$= \frac{T_d(F)}{RTT}$$

$$\frac{0.5 \mu\text{sec}}{50 \mu\text{sec}}$$

$$= \frac{5}{500} = \frac{1}{100} = 0.01$$

$$= 1\%$$

Q.3

In stop & wait protocol, sender wants to transmit 15 data packets to the receiver. Out of these 15 packets, every 5th data packet is lost calculate the total number of packets sent by sender. [NAT]

15 PKT, 5th lost

1 2 3 4 ~~5~~ 6 7 8 ~~9~~ 10 11 12 ~~13~~ 14 15
↑ ↑ ↑

total transmission = 18

Q.4



A stop & wait ARQ protocol is used by the sender to send frames in a dependable manner. The frames are transmitted at 100 kbps rate and have a 1000 bytes size. The size of acknowledgement is 10 bytes and receiver receives it at 10 kbps transmission rate. The propagation delay in one direction is 50 m sec. Calculate the sender throughput in bytes/sec (to the closest integer). **[NAT]**

Assume that no frame is being lost.

(sender) $B = 100 \times 10^3 \text{ bits/sec}$

Frame size = 1000 Byte = 8000 bits

$$T_d(F) = \frac{8000 \text{ bits}}{100 \times 10^3 \text{ bits/sec}}$$

$$= 80 \times 10^{-3} \text{ sec}$$

$$= 80 \text{ msec}$$

($P_d = 50 \text{ msec}$)

Ack size = 10 Byte = 80 bits

$(B)_{\text{Recv}} = 10 \times 10^3 \text{ bits/sec}$

$$T_d(A) = \frac{80 \text{ bits}}{10 \times 10^3 \text{ bits/sec}}$$

$$= 8 \times 10^{-3} = 8 \text{ msec}$$

$$\text{Throughput} = \frac{\text{Framesize}}{\text{total time}}$$

$$= \frac{1000 \text{ Byte}}{T_d(F) + 2 \times P_d + \cancel{Q_d} + \cancel{P_u} + T_d(A)}$$

$$= \frac{1000 \text{ Byte}}{80 + 2 \times 50 + 8 \text{ msec}}$$

$$= \frac{1000 \text{ Byte}}{188 \times 10^{-3} \text{ sec}}$$

$$= 5.319 \times 10^3 \text{ Byte/sec}$$

$$= 5319 \text{ Byte/sec}$$

Q.5

Assume that in stop and wait protocol the probability of frame being lost is N then what will be mean number of transmission of a frame?

[MCQ]

A.

$$\frac{1}{N}$$

B.

$$\frac{1}{1-N}$$

C.

$$\frac{1}{N-1}$$

D.

$$N$$

Q.6



Stop and wait protocol is used for transmitting data between two devices over a communication channel. It is a simple protocol consider the following statements about stop and wait protocol.

- ✓ S1 : Stop and wait protocol offers the flow control.
- ✓ S2 : Sender and receiver window size is 1. ✓
- ~~S3~~ : Sender and receiver window size is N.
- ✓ S4 : Stop and wait protocol is half duplex.

Which of the following statement (s) is/are true?

[MCQ]

- A. S1, S3
- B. S1, S2, S3, S4
- ✓ C. S1, S2 S4
- D. S2, S3, S4

Q.7

The bit rate of a channel is 8 kbps, and one-way propagation delay is 40 msec. The protocol used for the channel is stop and wait. The acknowledgement frame transmission time is negligible. The minimum frame size needed to achieve channel efficiency of at least 50% is _____ bytes.

[NAT]

$$B = 8 \times 10^3 \text{ bits/sec}, P_d = 40 \times 10^{-3} \text{ sec}, \text{Frame size} = ? \quad , \quad \eta \geq 50\% \left(\eta \geq \frac{1}{2} \right)$$

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

$$\frac{\text{Useful time}}{\text{total time}} \geq \frac{1}{2}$$

$$\frac{T_d(F)}{T_d(F) + 2 * P_d} \geq \frac{1}{2}$$

$$2 * T_d(F) \geq T_d(F) + 2 * P_d$$

$$T_d(F) \geq 2 * P_d$$

$$\frac{\text{Frame size}}{B} \geq 2 * P_d$$

$$\text{Frame size} \geq 2 * P_d * B$$

$$\geq 2 * 40 * 10^3 \text{ sec} * 8 * 10^3 \text{ bits/sec}$$

$$\text{Frame size} \geq 2 * 40 * 8 \text{ bits}$$

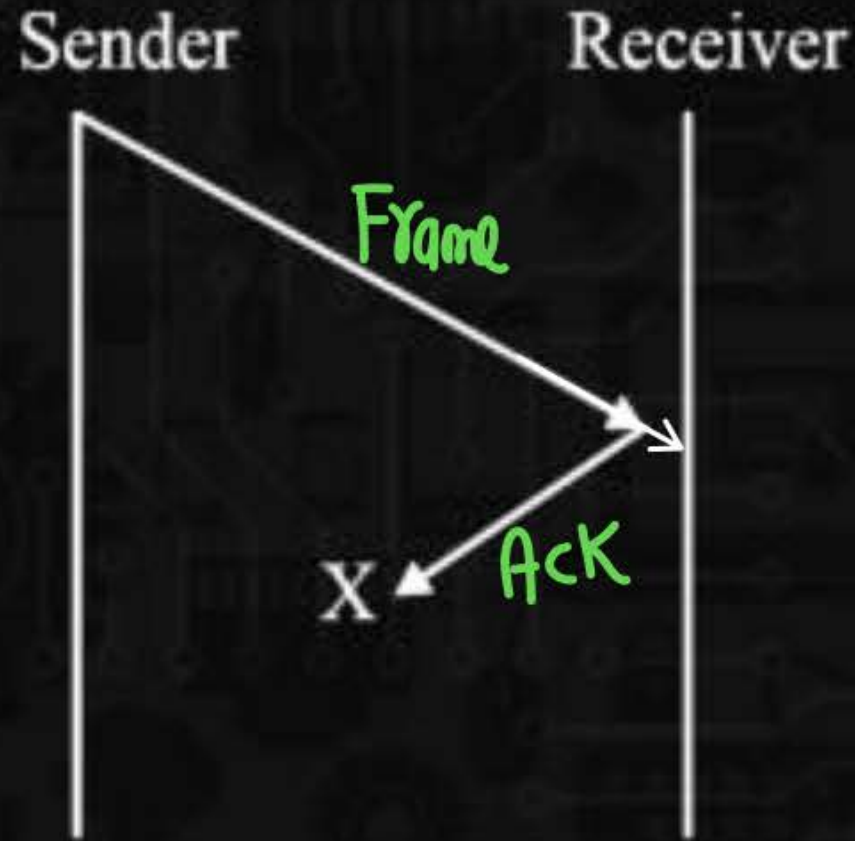
$$\geq \frac{2 * 40 * 8}{8} \text{ Byte}$$

$$\text{Frame size} \geq 80 \text{ Byte}$$

Q.8

Consider the following diagram:

[MCQ]



Among the problems is stop and wait protocol. Which of the following problems represented by the give diagram.

A.

Lost data

☒ B.

Lost acknowledgement

C.

Delayed acknowledgement

D.

Delayed data

