Assignment 4

Due 23 Nov at 10:59 **Points** 12 **Questions** 12 **Time limit** None

Submission details:

Time:	4 minutes
Current score:	12 out of 12
Kept score:	12 out of 12

Instructions

While working on this assignment, you certify that you have neither given help to nor received help from any other person.

Attempt history

	Attempt	Time	Score
LATEST	Attempt 1	4 minutes	12 out of 12

ⓘ Correct answers are hidden.

Score for this quiz: **12** out of 12
Submitted 13 Nov at 9:55
This attempt took 4 minutes.

Question 1 — 1 / 1 pts

Suppose that the roundtrip delay between sender and receiver is constant and known to the sender. Would a timer still be necessary in protocol rdt 3.0, assuming that packets can be lost?

- ◉ Yes, a timer would still be necessary in the protocol rdt 3.0. If the round trip time is known then the only advantage will be that, the sender knows for sure that either the packet or the ACK (or NACK) for the packet has been lost, as compared to the real scenario, where the ACK (or NACK) might still be on the way to the sender, after the timer expires. However, to detect the loss, for each packet, a timer of constant duration will still be necessary at the sender.
- ○ No, a timer will not be necessary in the protocol rdt 3.0.

Question 2 — 1 / 1 pts

Suppose two TCP connections are present over some bottleneck link of rate R bps. Both connections have a huge file to send (in the same direction over the bottleneck link). The transmissions of the files start at the same time. What transmission rate would TCP give to each of the connections?

- ○ R
- ◉ R/2

Question 3 — 1 / 1 pts

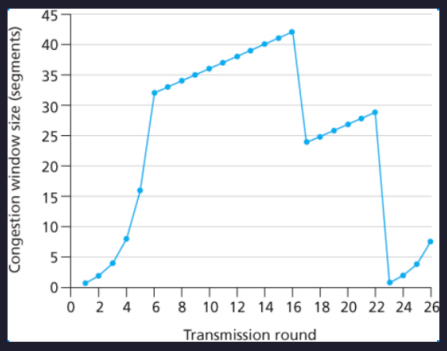
In the description of TCP congestion control , the value of the threshold, ssthresh, is set as ssthresh=cwnd/2 in several places and ssthresh value is referred to as being set to half the window size when a loss event occurred. Should the rate at which the sender is sending when the loss event occurred be approximately equal to cwnd segments per RTT?

- ○ No, the sending rate is always roughly cwnd/2RTT.
- ◉ Yes, the sending rate is always roughly cwnd/RTT

Question 4

1 / 1 pts

For the following TCP congestion window size drawn as a function of time, which of the following represent the intervals of time when TCP slow start is operating:

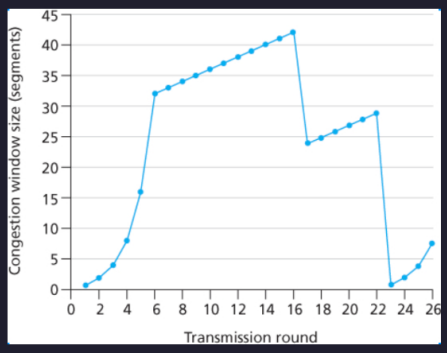


- [1,6] and [23,26]
- [1,6] and [17,22]

Question 5

1 / 1 pts

For the following TCP congestion window size drawn as a function of time, which of the following represent the intervals of time when TCP congestion avoidance is operating:



- [6,16]
- [6,16] and [17,22]

Question 6

1 / 1 pts

Suppose an application uses rdt 3.0 as its transport layer protocol. As the stop-and-wait protocol has very low channel utilization, the designers of this application let the receiver keep sending back a number of alternating ACK 0 and ACK 1 even if the corresponding data have not arrived at the receiver. Would this application design increase the channel utilization and what if any are potential problems with this approach?

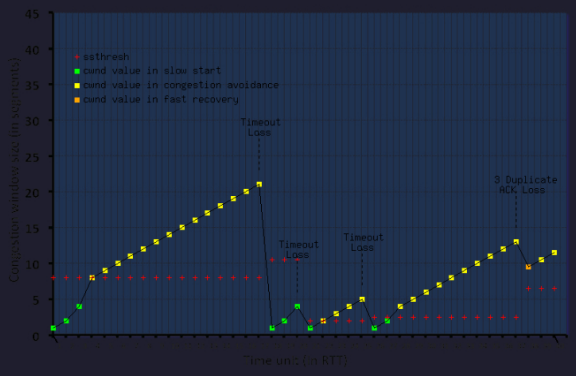
- Yes. Causes the sender to send a number of pipelined data into the channel. One potential problem: If data segments are lost in the channel, then the sender of rdt 3.0 won't re-send those segments, unless there are some additional mechanism in the application to recover from loss.

No, the channel utilization will not increase and no potential problems.

Question 7

1 / 1 pts

Consider the figure below, which plots the evolution of TCP's congestion window at the beginning of each time unit (in RTT). TCP sends a "flight" of packets of size *cwnd* at the beginning of each time unit. The result of sending that flight of packets is that either *(i)* all packets are ACKed at the end of the time unit, *(ii)* there is a timeout for the first packet, or *(iii)* there is a triple duplicate ACK for the first packet. Assume the initial value of *cwnd* is 1 and the initial value of *ssthresh* (shown as a red +) is 8. Match the component of TCP congestion control to the times in which TCP operates.



TCP is in slow start — 1,2,3,18,19,20,21,26,27

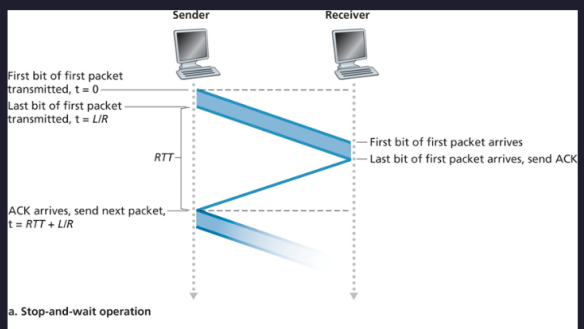
TCP is in congestion avoidance — 4,5,6,7,8,9,10,11,12,13,

TCP is in fast recovery — 38

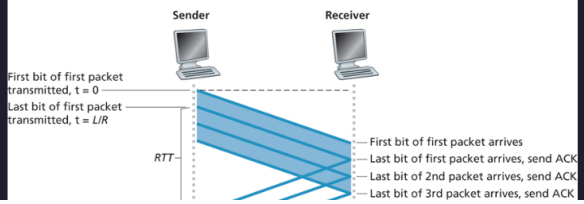
Question 8

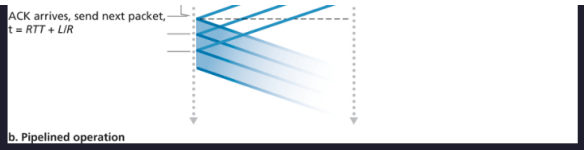
1 / 1 pts

Given the following Stop-and-wait and pipelined operations. Assume the propagation delay is equal to 15 msec, the size of the packet L is 8000 bits, and the capacity of the link is 1 Gbps. What is the effective throughput of the link using the Stop-an-wait protocol?



a. Stop-and-wait operation



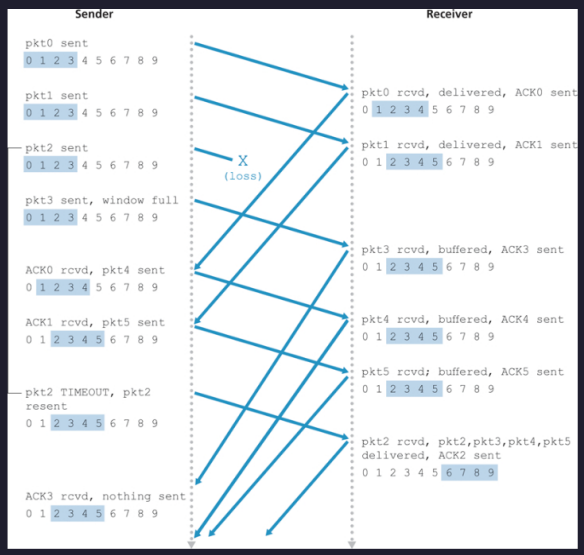


- 276 Kbps
- 267 Kbps
- 500 Kbps
- 1 Gbps

Question 9

1 / 1 pts

Given the following sender-receiver operation, select what protocol is used?



- reliable data transfer rdt2.2
- Selective repeat
- reliable data transfer rdt3.0
- Go-back-N

Question 10

1 / 1 pts

TCP provides a flow-control service to its applications to eliminate the possibility of the sender overflowing the receiver's buffer. This is implemented by having the *sender* maintaining its transmission of packets within the receive's window "rwnd". The sender keeps track of the difference between the two variables, `LastByteSent` and `LastByteAcked`, which obviously equal to the amount of unacknowledged data, which needs to be kept less than or equal to rwnd.

- True
- False

Question 11

1 / 1 pts

What is the Internet checksum of the following two 16-bit words?

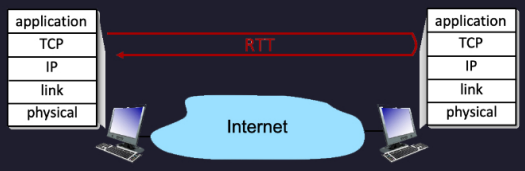
01000101 10000011 *this binary number is 17795 decimal (base 10)*
11000110 01101011 *this binary number is 50795 decimal (base 10)*

- 00001011 11101111
- 10001011 11101111
- 00001011 11101110
- **11110100 00010000**

Question 12

1 / 1 pts

Given the following diagram. Suppose that TCP's current estimated value for the round trip time (*estimatedRTT*) is 310 msec. Suppose that the measured value of the RTT is 230 msec. Which of the following represent the TCP's new value of *estimatedRTT*? Use the values of α = 0.125.



- **300**
- 284.06
- 287.5
- 310

Quiz score: **12** out of 12

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