Communication Networks 2
Exercise 2 - TCP and UDP

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Problem 1 Flow Control vs Cogestion Control

Describe the concept of Flow Control. Also describe the concept of Congestion Control. What are the differences between both principles?

Problem 2 Rate Limit

How could a TCP sender limit the rate at which it sends traffic into its connection?

Problem 3 Cogestion Indication

How could a TCP sender perceive that there is congestion on the path between itself and the destination?

Problem 4 Bandwith Probing

How does TCP probe for the maximal available bandwidth?

Problem 5 Average Throughput

What is the average throughput of a TCP connection in steady state? (Assume no slow start is happening and a constant path capacity)

Problem 6 Cogestion Control Phases

What are the three states of TCP congestion control?

Problem 7 Slow Start

In slow start phase, what is the initial value of the congestion window? What is the increment rate for this window?

Problem 8 Slow Start-Cont.

In slow start phase, when should the exponential growth of *cwnd* end?

Problem 9 Congestion Avoidance

In congestion avoidance phase, what is the initial value of the congestion window and what is the increment rate for this window?

Problem 10 Congestion Avoidance 2

In congestion avoidance phase, when should the congestion avoidance's linear increase (of 1 MSS per RTT) end?

Problem 11 Fast Recovery

Wwhat happens in fast recovery phase? Please give a detailed explaination.

Problem 12 Congestion Control vs Stop And Wait

There exists a stop-and-wait algorithm for reliable data transmissions which sends a segment and waits for its corresponding acknowledgment before sending the next segment. Discuss main disadvantages of this stop-and-wait algorithm in comparison to *cwnd* based approaches.

Problem 13 Congestion Control Simulation

Simulate the congestion control algorithm of TCP. It is sufficient to implement the two states slow start and congestion avoidance.