

18-345 Introduction to Telecommunication Networks

Quiz 5 Solution

Problem 1

Describe the following terms (6 Points)

a. MTU

Maximum Transmission Unit- maximum packet size that can be handled by a given network.

b. IPv6 (why necessary, improvements over IPv4)

Necessary because IPv4 will run out of addresses, improvements include increased speed, improved security, QoS support, mobility, helps multicasting

c. AIMD – Additive Increase Multiplicative Decrease

This is the congestion control algorithm used by TCP: if there is no sign of congestion (no packet loss), the sender increases its congestion window (transmission rate) incrementally (by adding a fixed constant to it every RTT). When there is congestion (packet) loss, it reduces the congestion window in a multiplicative way by multiplying it by a number small than 1.

Problem 2

Why are timeouts so expensive and what is a method for reducing the number of timeouts that occur (2 Points)

Timeouts require the connection to go through slow start again. Fast retransmit can resend a packet when it receives duplicate ACKs to prevent a timeout.

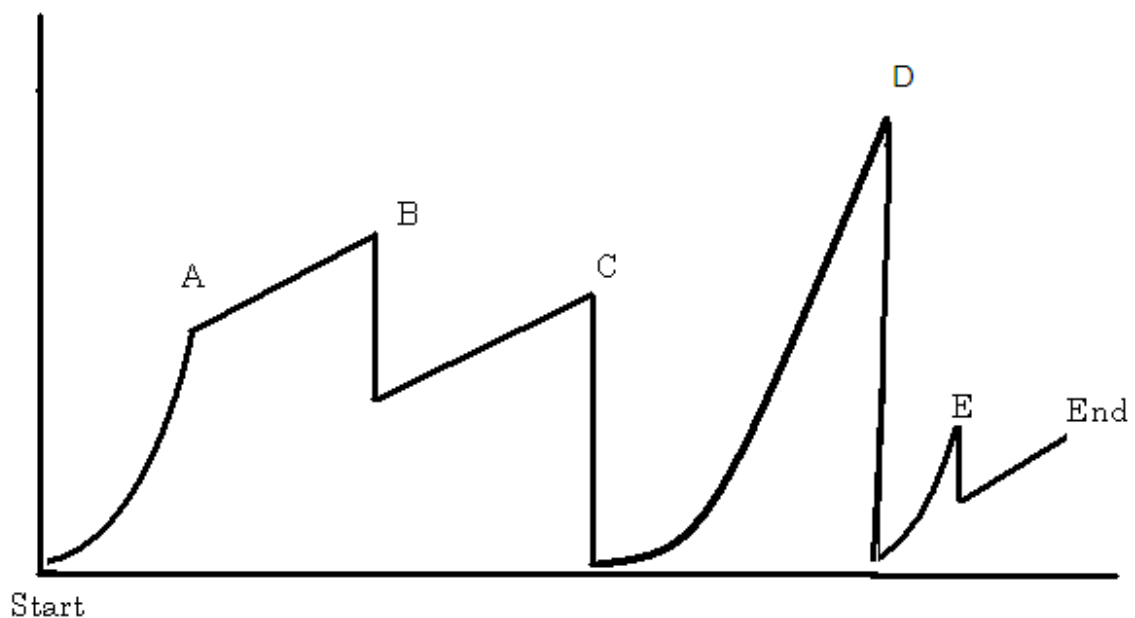
Problem 3

Certain classes of internet addresses have been set aside for private use. What is the method used for translating these to public addresses. Why is it necessary to translate them. (4points)

NAT (network address translation) is used to map the private addresses to public addresses. This is necessary because routers in the global Internet will discard packets with private addresses.

Problem 4

Consider the following TCP Plot below. There are timeouts, but they are not marked.



a. At what regions in the plot is the TCP connection in slow start? Please mark regions as "X -> Y". (3 points)

Start -> A
C->D
D->E

b. At what regions in the plot is TCP in congestion avoidance (3 points)

A-> B
B-> C
E-> End

c. Explain the event that occurred at point C? At what other point in the plot did the same event occur? (2 points)

Packet loss detected due to Timeout. Also occurred at D.