Quiz 3 [CS5700 Fall 2019]

Name: Yuanjie Yue Score: _____

[Q1] Answer the following questions about UDP

- [5 pts] Does UDP provide reliable data transfer?

No

- [5 pts] There is source_port_number and destination_port_number fields in the UDP header. What's the purpose of having these port numbers?

We need port number to help us distinguish different process, the source port number is the port who deals with the process that sending UDP packets, while destination port number helps to find the process that receiving the UDP packets.

- [5 pts] There is checksum field in the UDP header. What's its purpose?

Checksum is the one's complement sum of the UDP header and the data. It provides us a way to check whether the packet received is corrupt or not.

- [10 pts] Name two application protocols that use UDP protocol, and tell me why they choose UDP protocol?

DNS and DHCP.

Because UDP is non-connect orientated protocol, it is faster than TCP. Besides, the requests in these two protocols are usually very short, which are suitable for UDP to do this job and they do not need a reliable data transfer.

[Q2] Answer the following questions about reliable data transfer

- [40 pts] There are several building blocks we developed in class which are crucial to build reliable data transfer protocols. Please state what they are and why they are needed?
  - sequence number

Sequence number help us numbered the packets, thus the receiver would know if any of the packets are lost or of wrong order, then it would send a proper ACK to the sender to let it know that packet is not well received, so the sender would resend those packets.

  - ack

Ack is short for acknowledged, therefore it serves as a way for the receiver to let the sender know whether a packet is well received or not, thus the sender will know if there is a need to resend the packet.

  - checksum

Checksum is the one's complement sum of the header and the payload, it serves as a way to help both sender and receiver to check if the current packet is corrupt or not.

  - timeout

Timeout is crucial because there is a scenario that the current packet is lost or its ack is lost or corrupt, in this case, the sender would resend the packet when timeout.

● [10 pts] The ack has different semantics in go-back-n and selective-repeat. Please explain their difference.
In go-back-n, the receiver sends cumulative ack, while in selective-repeat, the receiver sends individual ack for every packet.

[Q3] Answer the following questions about TCP protocol
● [15 pts] TCP provides reliable data transfer. So it has timeout mechanism to deal with packet loss. Please explain what strategy does TCP use to set timeout value?
The timeout should be longer than RTT. Meanwhile, it should not be too short to avoid higher rate of retransmit or too long to avoid longer timer of waiting.

● [10 pts] Besides reliable data transfer, TCP also provide flow control and congestion control. What's the difference between them? Do they mean the same thing?
Flow control is to make sure the data is not transmitting to quickly between a pair of sender and receiver. While congestion control is to make sure the network is not transmitting too much data at a time, so it is about the control of the traffic of the network.