

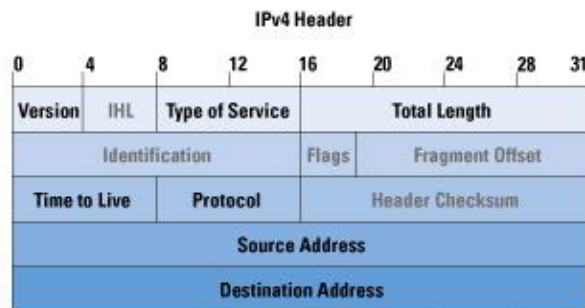
Name: _____ Student ID: _____

CSE123 Fall 2016 Homework #2
Instructor: Stefan Savage

Due Wednesday 10/26 **at the beginning of class**

1. IP Checksum

Below is a diagram of the IPv4 packet header format. The header is protected using a separate checksum (the “Header Checksum” field below) using the IP Checksum algorithm we described in class.



Consider a packet with the following content (in hex):

4500 003a 39b1 0000 3c11 5889 896e 2462 2c8e 121b

- What is the value of checksum carried in this packet?
- Is it correct? (show your work to calculate the IP checksum for this data; note that the checksum field itself is set to zero when calculating the checksum)
- What will this same packet look like after it is forwarded by a router for one hop? (show the packet contents in hex and describe what fields have changed and why)

2. Reliable Transmission

Suppose we use a sliding window protocol for transferring data over a 2Mbps point-to-point link with a round-trip time of 40ms. Assume each packet carries 1000bytes and that there is infinite data to send and the receiving application is always ready to accept data. Given this:

- a) Assuming the Receiver Window Size and the Sender Window Size are the same size, what is their maximum value in packets (i.e., the size above which there will be no improvement in efficiency).
- b) If the Receiver Window Size is 1 packet, what is the maximum value for the Sender Window Size?
- c) If we use stop-and-wait instead, what is the maximum efficiency we can obtain on this link?
- d) What might a reasonable value be for the retransmission timeout on this link? Explain why.

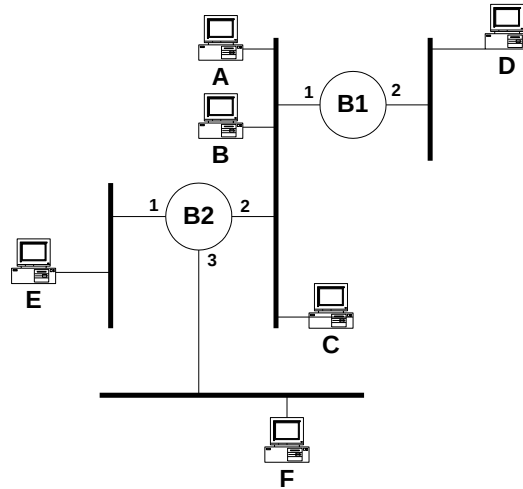
3. Media access

Consider a slotted Aloha system with two nodes X and Y in which each node has infinite data to send and the same packet size. Node X is configured to transmit its packets with probability p (as per the slotted Aloha algorithm). Given this, if you wish Node Y to transmit twice as quickly as Node X, what should its transmission probability be (specify in terms of p).

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4. Bridging

Consider the network connected by learning bridges B1 and B2 shown below. Each LAN is connected to the bridge with a listed port number and each host is indicated with a letter.



Assuming that the initial forwarding tables are empty, show the forwarding table in each of the bridges after the following sequence of transmissions:

a) E sends to F

Bridge B1	
Destination	Port number

Bridge B2	
Destination	Port number

b) D sends to E

Bridge B1	
Destination	Port number

Bridge B2	
Destination	Port number

c) B sends to D

Bridge B1	
Destination	Port number

Bridge B2	
Destination	Port number

d) What single transmission, from this point, would cause both bridges to populate with the correct port for node C?