

Network Architectures 3329
Fall 2018
12/06/2018

Name: _____
Homework 5
Due 12/11

- **Print** your name.
- Homework submitted in class in a timely fashion. Check <https://cis.temple.edu/~tug29203/teaching/fall2018-3329/index.html> for late policy.

Problem	Points	Score
1	2	
2	3	
3	3	
4	2	
Total:	10	

1. (2 points) Suppose the information content of a packet is the bit pattern 1110 0110 1001 1101 and an even parity scheme is being used. What would the value of the field containing the parity bits be for the case of a two-dimensional parity scheme? Your answer should be such that a minimum-length checksum field is used.

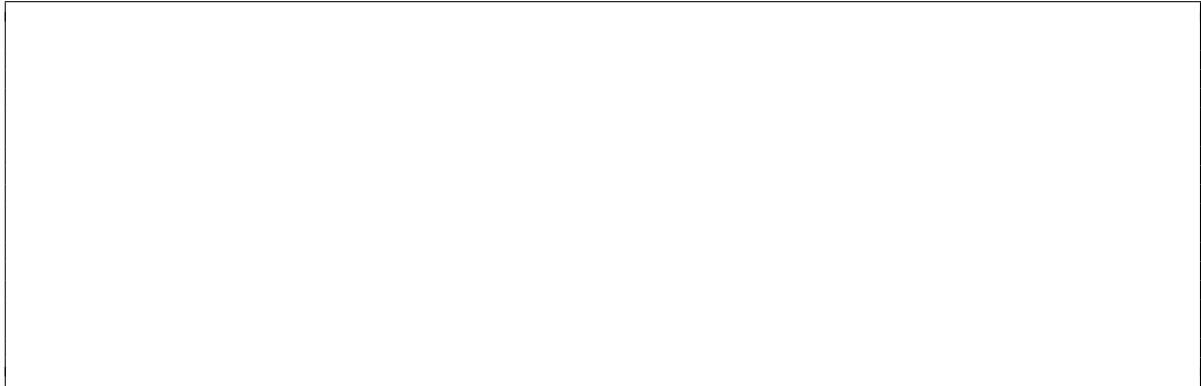
2. Suppose four active nodes A, B, C and D are competing for access to a channel using slotted ALOHA. Assume each node has an infinite number of packets to send. Each node attempts to transmit in each slot with probability p . The first slot is numbered slot 1, the second slot is numbered slot 2, and so on.

(a) (1 point) What is the probability that node A succeeds for the first time in slot 5?

(b) (1 point) What is the probability that some node (either A, B, C or D) succeeds in slot 4?

(c) (1 point) What is the probability that the first success occurs in slot 3?

3. (3 points) Let's consider the operation of a learning switch in the context of a network in which 6 nodes labeled A through F are star connected into an Ethernet switch. Suppose that (i) B sends a frame to E, (ii) E replies with a frame to B, (iii) A sends a frame to B, (iv) B replies with a frame to A. The switch table is initially empty. Show the state of the switch table before and after each of these events. For each of these events, identify the link(s) on which the transmitted frame will be forwarded, and briefly justify your answers.



4. (2 points) In this problem, you will put together much of what you have learned about Internet protocols. Suppose you walk into a room, connect to Ethernet, and want to download a Web page. What are all the protocol steps that take place, starting from powering on your PC to getting the Web page? Assume there is nothing in our DNS or browser caches when you power on your PC. (Hint: the steps include the use of Ethernet, DHCP, ARP, DNS, TCP, and HTTP protocols.) Explicitly indicate in your steps how you obtain the IP and MAC addresses of a gateway router.

