

# Homework 4

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*CST 311, Introduction to Computer Networks, Spring 2020*

**READ INSTRUCTIONS CAREFULLY BEFORE YOU START THE HOMEWORK.**

This homework is due on Sunday, Apr 12, 2020.

Homework must be submitted electronically through iLearn on <https://ilearn.csumb.edu> by 11:55 pm on the due date. Late homeworks will not be accepted.

Homework must in pdf format only. Any other formats will not be accepted. You must submit a single file for the entire homework. The naming convention of the file should be HW4\_yourlastname.pdf. **Put your name in the document as well.** Your homework submission should present the problems in the original order and be properly labeled.

This homework is worth 50 points. Each part of a question carries equal weight unless specified otherwise.

Name (1 points): \_\_\_\_\_Adam Ayala\_\_\_\_\_

## Network Layer

1. (12 points) Suppose you want to send forward a datagram that is 5500B long over a network where the MTU is 820 B. Assume the header size is 20B.
  - a. How many fragments will it take to send the entire datagram across?

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- b. Draw all fragments and give the offset value and fragmentation flag of each fragment.

820	1	0
820	1	100
820	1	200
820	1	300
820	1	400
820	1	500
700	0	600

2. (12 points) Let's say you want to setup a network with 12000 hosts and assuming you are using classful addressing,

- a. What kind of addresses would you give out to maximize address space utilization?

Class B would give 65,000+ hosts which would be way too many.

Class C would give 254 hosts which is way too little.

So, you would need to give 48 class C addresses. This would give you 12,192 hosts.

- b. Give an example of address space for 12000 hosts.

192.0.0.1 - 192.0.47.63

3. (25 points) Suppose a router has built up the routing table shown in table below. The router can deliver packets directly over interfaces 0 and 1, or it can forward packets to routers R2, R3, or R4. Assume that the router does the longest prefix match. Describe what the router does with a packet addressed to each of the following destinations:

- a. 128.96.171.92  
i. Interface 0
- b. 128.96.167.151  
i. R2
- c. 128.96.163.151  
i. R4
- d. 128.96.169.192  
i. Interface 1
- e. 128.96.165.121  
i. R3

SubnetNumber	SubnetMask	NextHop
128.96.170.0	255.255.254.0	Interface 0
128.96.168.0	255.255.254.0	Interface 1
128.96.166.0	255.255.254.0	R2
128.96.164.0	255.255.252.0	R3
<default>		R4