## Math 121 Final Practice

Note: This is a set of useful practice problems and it is not meant to exactly mimic the final itself. It focuses on material covered after the midterm. You should also use homeworks, the midterm, and the practice midterm as study aids.

## Question 1

Below, write code for a function doublefile that takes as input the name of a text file (in the same directory as the program). The function should create a new file equal which contains the same text as the first file, twice. (That is, it should be twice as long, with the contents being two copies of the first file.) The new file should have as its name the same name as the first file, but with a 2 at the end. (The 2 should come before the .txt extension.)

## Question 2

Write a function squares that on input $n$ creates a new file called squares.txt (in the same directory as the program) that contains the first $n$ squares ( $1,4,9$, etc.) each on its own line.

## Question 3

Write code for the bubble sort function.

## Question 4

Write a function logger that be haves as follows: logger (func, in) should run func on input in. The program should be have exactly as if func (in) was called instead, in that func should be run with input in. The one difference is that the program should write to a file called log.txt a message saying whether or not there was an error. In particular, log.txt should always end up containing "success" if no error occurred, or "failure" if an error occurred. (Nothing else should change - in particular, the person running the code should still see the same error message they would have seen if they had run func (in) instead.)

## Question 5

What is the asymptotic run time of the following code? (Consider $n$ to be the length of the input list. Assume that mergesort is the merge sort function defined in class.)

```
def f(ls):
    mergesort(ls)
    max = 0
    for a in ls:
        if a > max:
            max = a
    return max
```


## Question 6

What is the $\mathrm{P}=\mathrm{NP}$ question? (It is ok to not give full formal details. Explain it the way you would explain it to a friend if asked.)

## Question 7

What are some ways that computer graphics are used outside of the realms of movies, video games, and other entertainment/art?

## Question 8

Information is sent over the internet by means of packets. What is a packet?

