# DSC 40B - Discussion 01

#### Problem 1.

What is the time complexity of the following functions? State your answer using  $\Theta$  notation.

```
a) def foo(n):
    for i in range(n**2 - 2*n + 100):
        j = 0
        while j < n:
        j += 1

b) def foo(n):
    while n > 1:
        n /= 10
        print(n)

c) def foo(n):
    for i in range(n):
        for j in range(i**2): # <-- notice the bound!
        print(i + j)</pre>
```

#### Problem 2.

Consider the code below:

```
def foo(n):
    i = 1
    while i * i < n:
        i += 1
    return i</pre>
```

- a) What does foo(n) compute, roughly speaking?
- b) What is the asymptotic time complexity of foo?

### Problem 3.

```
Let f(n) = \sum_{p=0}^{n} 3^{p}. What is f in \Theta notation?
```

## Problem 4.

Consider the code below where heights is an array of n elements:

```
for i in range(n):
    for j in range(2*i):
        height = heights[i] + heights[j]
```

What is the time complexity of the code?