DSC 40B - Discussion 01

Problem 1.

What is the time complexity of the following functions? State your answer using Θ 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)
```

Problem 2.

Consider the code below:

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

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 Θ 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?