Homework 6

Due 09/13/16

September 8, 2016

1. Analyze the *worst-case* time complexity of the algorithm below. Please show all work. The $\lfloor\ \rfloor$ symbols represent the *floor* ("round down") function. You may assume that this function takes $\Theta(1)$ time for any input. You may also assume it takes a constant amount of time to determine whether an integer is odd.

   Note that figuring out what problem this algorithm solves is *irrelevant* to analyzing its complexity.

```
   Input: n: nonnegative integer
 1 Algorithm: LoopMystery
 2 sum = 0
 3 t = 1
 4 d = 1
 5 k = n
 6 while k > 1 do
 7 |   for i = 1 to k do
 8 |   |   t = t + d
 9 |   |   sum = sum + t
10 |   end
11 |   if k is odd then
12 |   |   d = −d
13 |   end
14 |   k = ⌊k/2⌋
15 end
16 return sum
```