Homework 2

Due 08/31/16

August 25, 2016

1. Prove that $sum = i^2$ after every iteration of the for loop below:

```
   Input: n: nonnegative integer
   Output: n^2
1  sum = 0
2  for i = 1 to n do
3  |  sum = sum + 2i − 1
4  end
5  return sum
```

2. Use strong induction on n to prove that the algorithm below computes 2^n for all $n \geq 0$.

```
   Input: n: nonnegative integer
   Output: 2^n
1  Algorithm: QuickPow
2  if n = 0 then
3  |  return 1
4  else if n is even then
5  |  t = QuickPow(n/2)
6  |  return t^2
7  else
8  |  t = QuickPow((n − 1)/2)
9  |  return 2t^2
10 end
```