**Lab 7 – Ben Joye**

**10/9/18**

1. **Recursive Fibonacci**
   1. *Pseudocode:*

Base case: if the x is 0 or 1, return x

Return the sum of Fibonacci of x-2 and Fibonacci of x-1

* 1. *Runtime:* O(2n)

1. **Memoized Fibonacci**
   1. *Pseudocode:*

Create a size-2 array that holds 0 and 1

Loop from 1 to the number passed {

Set total to the sum of both values in the array

Move the second element to the first spot in the array

Set the second element in the array to the total

}

return the total

* 1. *Runtime:* O(n)

1. **Comparison**

Memoized Fibonacci is significantly faster than the recursive Fibonacci because it takes linear time and the recursive function takes exponential time. This is because the recursive Fibonacci has to calculate all the values every time, while the memorized function just remembers the values it needs. Although you give up some space, this increase in speed is definitely worth it.