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Comp 352 assignment 1 Part 2

Code Segment

b)

The first function is exponential, because the function makes 4 recursive calls at the end to get the 4 needed numbers. Yet each one of these calls needs to make their own calls, quickly taking all the available memory, especially when calculating higher fibonacci numbers. The new linear algorithm solves this by making only one recursive call, which stores the numbers in an array. So when we try and calculate a higher fibonacci number it already has access to it and does not need to recalculate it like with the exponential function.

c)

No none of these algorithms use tail recursion, the linear function does not, because it is a multiple recursive function, and the exponential one returns an array and not a recursive function.

ii) No we cannot implement a tail recursive method, because of the arrays we are using to store the information. If tail recursion would be implemented, it would call itself for every number thus creating a similar memory killing function as in the exponential function discussed earlier.