COMP20010

Data Structures and Algorithms I

06 - Tutorial: Recursion

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Recursion

- Write an iterative function to count the number of files which end in ".java" in your home directory.
- Write this function in a recursive form?
- Are the counts the same?

You may need the following java api calls:

```
// a file object
String name = new String("/Users/username");
File f = new File(name);

// list of all files/directories
String [] subs = f.list();

// type of File:
f.isFile(); // true if f is a simple file
f.isDirectory(); // true if f is a directory
```

Recursion

- In this session we will look at some iterative functions and re-write them as recursive functions

1. Fibonacci Sequence

$$0,1,1,2,3,5,8,13,21,34,55,89,\ldots$$

2.write an iterative function to produce Fibonacci sequence. What is the largest Fibonacci number you can compute? What is the time complexity of this function?

$$F_n = F_{n-1} + F_{n-2}$$

$$F_0 = 0,\ F_1 = 1$$

3.Write a recursive function to compute Fibonacci? What is the largest number it

Recursion

- Write an iterative solution to print the contents of a linked list
- Write this function in a recursive form
- Write a recursive function to print the list in reverse order