

CSC 202
Project 8

Due Date: Wednesday, March 27, 2013 by 11AM

DO NOT SUBMIT THIS TO D2L!!!!
SUBMIT THIS THROUGH THE LINUX SYSTEM!

Objective: Gain an introductory experience into recursion. The only way to understand recursion is to implement it.

Instructions:

Implement the Fibonacci number method in the following ways:

- Recursively
- Iteratively
- Closed form

In addition, do the following:

- Print out your name.
- Time each function. (e.g. with “System.currentTimeMillis();” or “System.nanoTime()”)
- Time each function for the first 50 numbers.
- Make sure that each function returns the correct output.
- Produce a written report that has the following:
 - Line charts that show the time it took for each function to perform.
 - Your conclusion about the pros and cons of each function.

Here are the first 15 Fibonacci numbers (you have to print out all 45!):

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th
1	1	2	3	5	8	13	21	34	55	89	144	233	377	610

Closed-form equation:

$\text{sqrtOfFive} = \sqrt{5}$

$X = (1 + \text{sqrtOfFive}) / 2$

$Y = (1 - \text{sqrtOfFive}) / 2$

$\text{Answer} = (|X|^n - |Y|^n) / \text{sqrtOfFive}$

Note: Fibonacci numbers are only integers

How and what to turn in:

1. Java code: turn this in through the Linux system.
2. Written report: turn this in to Dr. Ball at the beginning of class on the due date.

Rubric:

NOTE: If your Java code does not compile and run, then you get a zero.

Points	Item
	Java code:
1	Your name is printed when the program runs
1 or -5	Recursive method (grader will check code to make sure it is done recursively), if not -5
1 or -5	Iterative method (grader will check code to make sure it is done iteratively) , if not -5
1 or -5	Closed-form method (grader will check code to make sure it is done closed form) , if not -5
3	Methods give correct answers (1 point per method)
	Written report:
3	Line charts look correct and are easy to read (1 point per correct line chart)
3	Conclusions – pros (at least 1 pro per method – i.e. recursion, iteration, closed form) – 1 point for each method type
3	Conclusions – cons (at least 1 pro per method – i.e. recursion, iteration, closed form) – 1 point for each method type