

CSC 383, Sections 401 and 410
Fall, 2011
Assignment 5 (version 2)
Due 11:59pm CT, Thursday, October 6th

Note: I have updated the requirements. The original assignment went out on Saturday, the 1st. Follow this one.

Requirements. You are going to determine empirically the running time of various List methods. I claim that it is time-consuming to use the `get` method on linked lists and the two-parameter `add` method on array lists. You are going to determine whether that's the case.

Write a program that:

1. Creates an array list and fills it with fifty thousand randomly generated integers in the range 1 to 1000 using the single-parameter `add` method.
2. Creates a linked list and fills it with fifty thousand randomly generated integers in the range 1 to 1000 again using the single-parameter `add` method.
3. Times how many nanoseconds it takes to execute a for-loop with an index and the `get` method to sum the values in the array list and then prints the sum and the time elapsed.
4. Times how many nanoseconds it takes to execute a for-loop with an index and the `get` method to sum the values in the linked list and then prints the sum and the time elapsed.
5. Times how many nanoseconds it takes to execute a for-loop with an index to insert fifty thousand randomly chosen new values into the array list at position 25,000 using the two-parameter `add` method (`add(index, element)`) and then prints the time elapsed.
6. Times how many nanoseconds it takes to execute a for-loop with an index to insert fifty thousand randomly chosen new values into the linked list at position 25,000 using the two-parameter `add` method (`add(index, element)`) and then prints the time elapsed.
7. Times how many nanoseconds it takes to sort the array list using the `Collections.sort` static method and prints the time elapsed.
8. Times how many nanoseconds it takes to sort the linked list using the `Collections.sort` static method and prints the time elapsed.

To time a piece of code, use the `System.nanoTime()` static method. Do I need to remind you to look at the documentation for various methods?

The program must at least have a main method, of course. Other methods, if necessary, are up to you.

CSC 383, Fall 2011, Assignment 5

Submit a source file called `EfficiencyTest.java`.

Grading rubric: This assignment is worth 30 points, with points assigned as follows:

- Variable and method names descriptive and mnemonic (4 points)
- Comment block with information specified (4 points)
- The program runs correctly to completion and prints correct output (20 points)
- Code is properly indented (2 points)

Beyond the above rubric, 2 points will be deducted for each missed requirement. If I say to do something a certain way, do it that way.