# Lab 1 Looking at Java’s ArrayList and LinkedList classes

# Week beginning 10/Sept/2018

### The following table is from Thinking In Java 3 by Bruce Eckel (<https://archive.org/details/ThinkingInJava3rdEdition>) in Choosing between Lists in Chapter 11. It gives the time in milliseconds for multiple runs of various methods.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type** | **Get** | **Iteration** | **Insert** | **Remove** |
| array | 172 | 516 | na | na |
| **ArrayList** | 281 | 1375 | 328 | 30484 |
| **LinkedList** | 5828 | 1047 | 109 | 16 |
| **Vector** | 422 | 1890 | 360 | 30781 |

# It is comparing get, iteration, insert, remove for ArrayList, LinkedList and Vector.

(Note: Example of application: using ArrayList/LinkedList to store a dictionary in spelling check)

Try to do this yourself for just ArrayList and LinkedList.

In your code, populate an ArrayList and a LinkedList with data from a large dataset.

There are datasets available to download from github (and elsewhere) e.g. <https://github.com/dwyl/english-words/blob/master/words_alpha.zip>

Download this file – Choose View Raw. Extract the file to the desktop.

Put the file in the root folder of your project in IntelliJ.

Sample code for reading from a file is given in filehandlingcode.txt.

So your main() method should be:

public static void main(String[] args) {

//declare an ArrayList instance

//declare a LinkedList instance

//populate both lists with contents of a data file

// call testGetForArrayList, testGetForLinkedList, testInsertForArrayList etc to test get, insert and remove for ArrayList and LinkedList.

To test get, use code like:

public static void testGetForList(List list) {

for(int i = 0; i < reps; i++) {

// reps is the number of repetitions

// declare reps as something large e.g. 10000

for(int j = 0; j < quantity; j++)

// declare quantity reps/10

// depends on your list size

list.get(j); // list is your list

// (ArrayList or LinkedList)

}

}

Write a method for each list type e.g. testGetForArrayList and testGetForLinkedList – each of these method calls testGetForList with the relevant list as argument.

To test iteration, use code like:

public static void testIterateForList(List list) {

for(int i = 0; i < reps; i++) {

Iterator it = list.iterator();

while(it.hasNext())

it.next();

}

}

To test insert, use code like:

public static void testInsertForList(List list) {

int half = list.size()/2;

String s = "test";

ListIterator it = list.listIterator(half);

for(int i = 0; i < reps \* 10; i++)

it.add(s);

}

To test remove, use code like:

public static void testRemoveForList(List list) {

ListIterator it = list.listIterator(3);

while(it.hasNext()) {

it.next();

it.remove();

}

}

Time the tests on the two types of list. Look at System class for a method that gives you the current time.

Check if your results are comparable to Eckels.

Fill in the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | get | iterate | insert | remove |
| ArrayList | 18 | 11008 | 5835 | 23813 |
| LinkedList | 5735 | 87215 | 16 | 31 |