**CMPSC 412 – Lab-1** (25 points)

**Due date: 9/6/2022**

**Lab Exercises:**

Design a program to generate a specified quantity of integers (minimum 1000 integers). Use rand function to generate integers between 1 and 10000. Note that these random numbers can contain duplicates. Store this collection of integers in a) Lists and b) Dictionaries. Perform the following for the List and the Dictionary:

1. Print all the elements. Perform this operation 3 times for each data structure. Measure empirically the time it takes to print all the elements each time. Tabulate your results – Table-1.

#sample of results – screenshots and Table-1 as shown below

|  |  |  |
| --- | --- | --- |
| Print operation | List | Dictionary |
| Trail-1 |  |  |
| Trail-2 |  |  |
| Trail-3 |  |  |

1. A series of retrievals of random values (use rand function) in the collection and measure empirically the time it takes to do the retrievals. Note: use the same value generated from rand function in list and dictionary. You should run this program 3 times for each data structure. Tabulate your results – Table-2.

#sample of results – screenshots and Table-2 as shown below

|  |  |  |
| --- | --- | --- |
| Find operation | List | Dictionary |
| Trail-1 |  |  |
| Trail-2 |  |  |
| Trail-3 |  |  |

1. Generate a random number, perform insertion operation and print all the elements. You should run this program 3 times for each data structure. Tabulate your results – Table-3.

#sample of results – screenshots and Table-3 as shown below

|  |  |  |
| --- | --- | --- |
| Insert operation | List | Dictionary |
| Trail-1 |  |  |
| Trail-2 |  |  |
| Trail-3 |  |  |

1. Generate a random number and perform deletion operation on the list and dictionary data structures. You should run this program 3 times for each data structure. Tabulate your results – Table-4.

#sample of results – screenshots and Table-4 as shown below

|  |  |  |
| --- | --- | --- |
| Delete operation | List | Dictionary |
| Trail-1 |  |  |
| Trail-2 |  |  |
| Trail-3 |  |  |

**Conclusion:**

What do you understand from this exercise? Explain in detail.

Deliverables:

Report and the program file.

A sample method to get time measurement:

long startTime;

long stopTime;  
...

startTime = System.currentTimeMillis();

//do whatever you want to measure

stopTime = System.currentTimeMillis();

System.out.println("Elapsed time = "+(stopTime-startTime)+" msecs.");