**CMPSC 412 – Lab-9** (50 points)

**Which Data Structure works better?**

**Due date: 9/18/2022**

**Lab Exercises:**

Design a program to generate a specified quantity of integers (minimum 25000 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 the various data structures (List, Dictionaries, Binary tree, Binary search tree, Linked List) then perform the following:

1. Print all the elements. Measure empirically the time it takes to print all the elements for all the data structures. Tabulate your results – Table-1.

#sample of results – screenshots and Table-1

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 in each of the structures. You should run this program 5 times. Tabulate your results – Table-2.

#sample of results – screenshots and Table-2

1. Generate a random number and perform insertion operation on all the data structures. You should run this program 5 times. Tabulate your results – Table-3.

#sample of results – screenshots and Table-3

1. Generate a random number and perform deletion operation on all the data structures. You should run this program 5 times. Tabulate your results – Table-4.

#sample of results – screenshots and Table-4

**Conclusion:**

What do you understand from this exercise? Which data structure works better? Explain in detail.

Deliverables:

Report and the program file.

Video demonstration - around 3 minutes: run the program and explain exercise-3 and 4.