Lab-1

DS5300: Data Structures for Data Science

March 2024

1 Dynamic List Using Array

1. Create dynamic arrays for *int, char, float, double* types.

2. Measure the size of memory of the arrays created.

3. Find out the address of the memory location allocated.

4. Measure the average time for appending elements to the list.

5. Whenever there is an overflow, instead of doubling (i.e., factor $c = 2$), increase the array capacity by factors $c = 3, 4, 5$ and compare the average time for adding elements. Does this change across *int,char,float,double*.

2 Linked Lists

1. Implement a singly linked list with functions

   (a) to add an element in the beginning
   (b) to add an element in the end
   (c) to add only unique elements
   (d) to delete the first occurrence of an element
   (e) to delete all the occurrences of an element
   (f) to add a node after a given node
   (g) to add a node before a given node
   (h) to delete a node after a given node
   (i) to delete a node before a given node

2. Implement a doubled linked list with the above functions.

3 References

- **ctypes:** https://docs.python.org/3/library/ctypes.html

- **Source Code:** https://github.com/mjwestcott/Goodrich