Linked List Report.

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Fall 2022

Introduction

The purpose of this assignment is to gain a better understanding of pointers and references and how they can be used to create more complicated data structures. In particular we will gain a deeper understanding of how linked lists functions.

Task

Implement a linked list class from the ground up that utilizes a stack structure. Also create a method that allows one to append another linked list to said created linked list. Having done that benchmark the run time of the append operation. Vary the size of the first linked list **a** and append it to a fixed size linked list **b** and examine how the run time changes with the size of list **a**.

Lastly implement the equivalent append operation using arrays and benchmark this operation. How does this compare to the append operation for the linked list class?

Method & Theory

Result

Discussion

Array size	**Select**	**Insert**	$\frac{select}{insert}$	**Merge**	$\frac{insert}{merge}$
100	3.80	1.34	2.84	2.76	0.48
200	11.0	4.11	2.68	5.21	0.79
400	43.3	14.3	3.03	9.61	1.49
800	165.1	54.8	3.01	31.7	1.73
1,600	603.3	214.9	2.81	90.6	2.37
3,200	2,439.2	855.9	2.85	243.2	3.52
6,400	9,642.7	3,375.8	2.86	513.3	6.58
12,800	45,481.7	16,778.1	2.71	1247.0	13.45

Table 1: Benchmark for the different sorting algorithm. Time in μs