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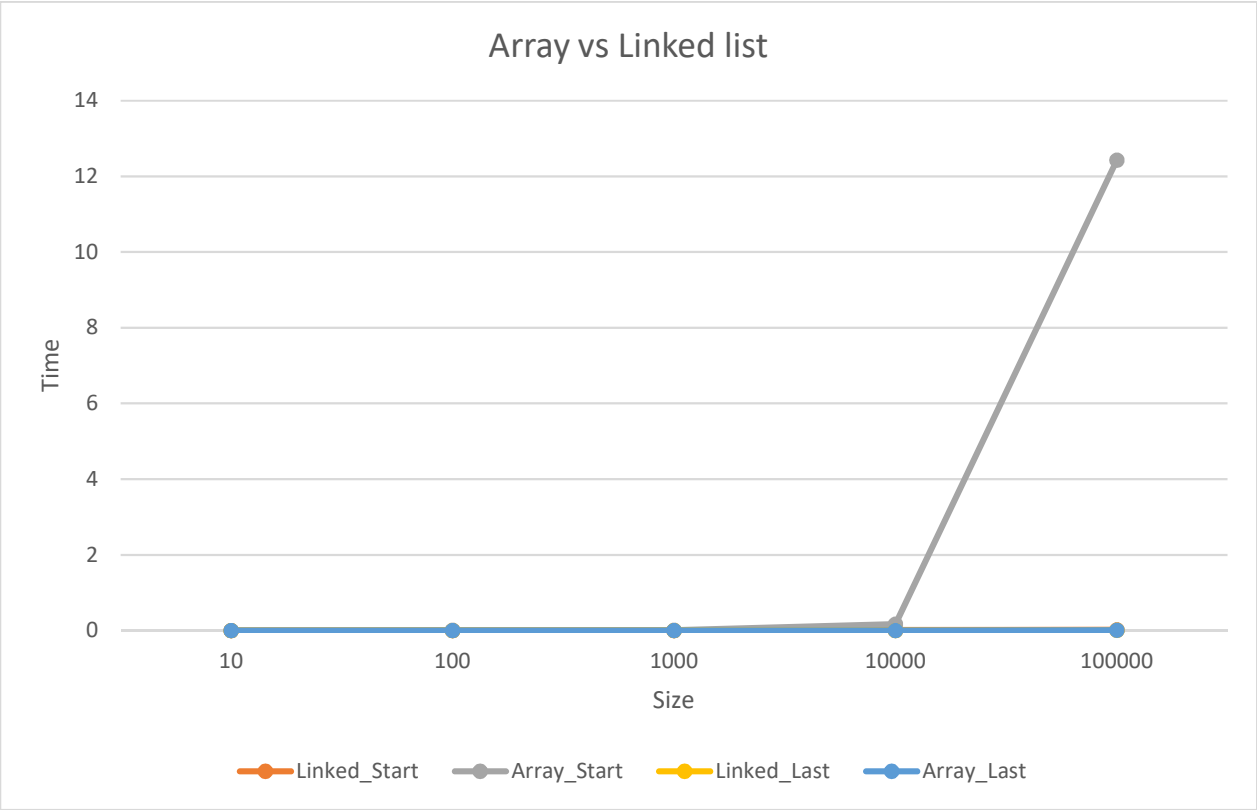
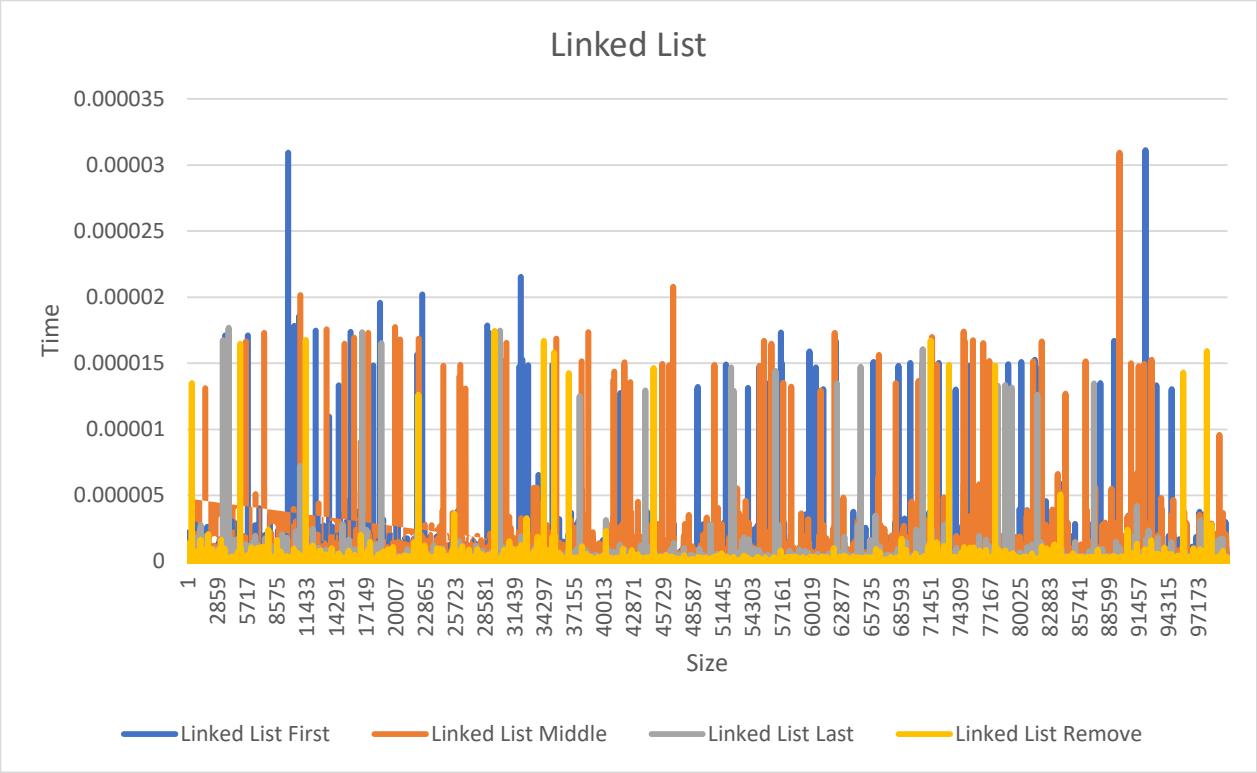
Assignment06

Analysis of Linked and Array lists

Graphs




Linked List
0.000035
0.00003
0.000025
0.00002
0.000015
0.00001
0.000005
0
Time
1
2859
5717
8575
11433
14291
17149
20007
22865
25723
28581
31439
34297
37155
40013
42871
45729
48587
51445
54303
57161
60019
62877
65735
68593
71451
74309
77167
80025
82883
85741
88599
91457
94315
97173
Size
Linked List First
Linked List Middle
Linked List Last
Linked List Remove

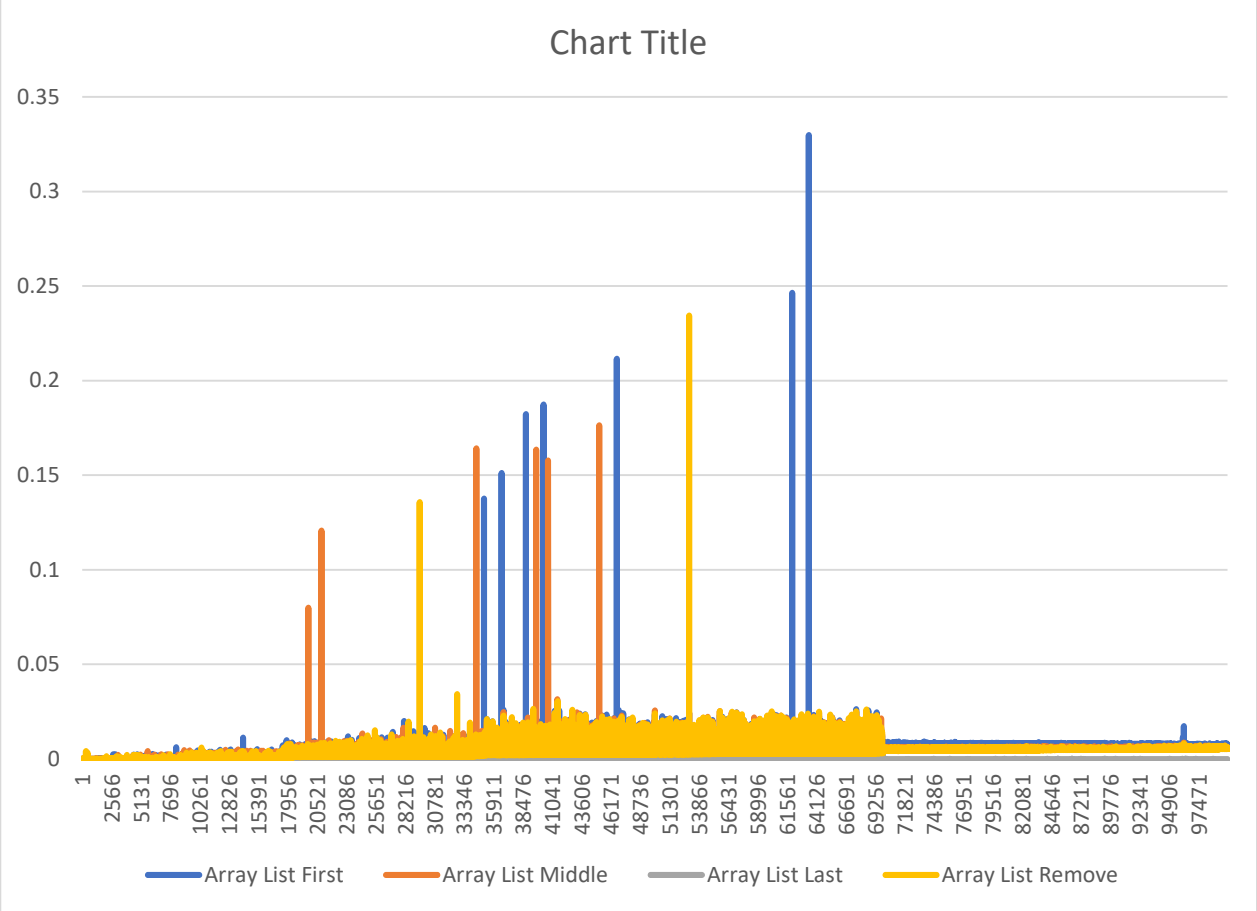


Chart Title
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1
2566
5131
7696
10261
12826
15391
17956
20521
23086
25651
28216
30781
33346
35911
38476
41041
43606
46171
48736
51301
53866
56431
58996
61561
64126
66691
69256
71821
74386
76951
79516
82081
84646
87211
89776
92341
94906
97471
Array List First
Array List Middle
Array List Last
Array List Remove

These graphs show that it is constant for adding to the beginning and the end of a linked and array list. There are a few outliers in the data, most likely because of something in the computer taking too long. The linked list took far less time to add an item then the array list though. The array list has to do many more operations than the linked list does to add anything to the beginning or middle. Adding to the last for each takes very little time however. Removing from the beginning of the list took very little time for the linked list. The array list took a little more time, as it has to shift the entire array over.

Classes

Linked_List and Array_List both implement the list interface. They don't interact otherwise. The linked list class uses a private class Node to keep track of the data. Multiple Nodes back the list. The Node class is necessary because you need an object to keep track of the data and the following Node. If you make a new linked list every time it will have the methods in linked list each time. The linked list is a list of Nodes. The linked list class modifies the Nodes as needed. It is a static inner class because it is declared inside the Linked_List_2420.java file. It is static because it always stays the same.

Recursion

The recursion in this project is doing the same thing as the iterative, simply in a different way. The recursive is simply another way of writing a while loop. It checks for certain conditions and then calls itself on a different number, doing the same checks. A for loop does the same thing, but it will stop if the checks return false. With recursion, it is possible to get an infinite loop, while a for loop is a little harder to.

Reflection

The most time consuming part of this project was this, the Analysis. Running the timing program took a while. I think I managed my time well enough. Regression testing is making sure that new code will work with old code. This is useful for making sure that a patch will work properly. Writing the tests first helped me get an idea of what I need to do to make it work correctly and to compensate for edge cases. A queue is created by adding to the end of the list and removing from the front, sorting the items by priority when they are added. The linked list simply puts the item into the list. It could be modified to check the entire list when an item is added and put it where it needs to be.

Conclusion

This project was an easier one, the coding was fairly simple. The thought process of completing this project was easy. The hardest part was making sure that it followed the assignment guidelines. The graphs took a while, but they came out well.