Report
Programming Assignment #3

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Please list all sources in the table below including web pages which you used to solve or implement the current homework. If you fail to cite sources you can get a lower number of points or even zero, read more in the Aggie Honor System Office.

Type of sources	1	2	3
People			
Web pages (provide URL)			
Printed material	Textbook		
Other Sources	Lecture Slides		

Part 1:

- Doubly Linked List is a list of Nodes, which contains object, next pointer and previous pointer.
- Complexity of different functions present in the DoublyLinkedList class.
    1. int first() – $O(1)$
    2. int last() – $O(1)$
    3. void insertFirst(int newobj) - $O(1)$
    4. void insertLast(int newobj) - $O(1)$
    5. int removeFirst() - $O(1)$
    6. int removeLast() - $O(1)$
    7. void insertBefore(DListNode &p, int newobj) - $O(1)$
    8. void insertAfter(DListNode &p, int newobj) - $O(1)$
    9. int removeBefore(DListNode &p) - $O(1)$
    10. int removeAfter(DListNode &p) - $O(1)$
- Evidence of testing part 1:

```
[Pratiks-MacBook-Pro:DoublyLinkedList pratik$ ./run-dll
Create a new list
list:


Insert 10 nodes at back with value 10,20,30,..,100
list: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100


Insert 10 nodes at front with value 10,20,30,...,100
list: 100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100


Copy to a new list
list2: 100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100


Assign to another new list
list3: 100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100


Delete the last 10 nodes
list: 100, 90, 80, 70, 60, 50, 40, 30, 20, 10


Delete the first 10 nodes
list:


Make sure the other two lists are not affected.
list2: 100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

list3: 100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

Insert after the third node(80) in list 2
list : 100, 90, 80, 55, 70, 60, 50, 40, 30, 20, 10, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100


Insert before the third node(80) in list 2
list: 100, 90, 45, 80, 55, 70, 60, 50, 40, 30, 20, 10, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100


Remove after the forth node(80) in list 2
list: 100, 90, 45, 80, 70, 60, 50, 40, 30, 20, 10, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100


Remove before the forth node(80) in list 2
list: 100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100


Length of list2
Length: 20
```

Part 2:

- MinQueue is a minimum priority queue. Hence, it removes the smallest value in the list first. It inserts a new element at the end of the queue. It can be implemented using a Doubly Linked List.
- Complexity of different functions present in the MinQueue class.
    1. void enqueue(int obj) - $O(1)$
    2. int size() - $O(1)$

3. int dequeue() - $O(n)$
4. int min() - $O(n)$

- Evidence of testing part 2:

```
The queue is right now empty.
Result of the isEmpty() function: true

The queue after inserting 6 elements looks like following
2, 5, 3, -9, 4, 1

The Length of the queue is: 6
The least number in the queue is: -9
Dequeue the least element -9.

The queue now looks like following
2, 5, 3, 4, 1
```

I certify that I have listed all the sources that I used to develop the solutions/code to the submitted work.

"On my honor as an Aggie, I have neither given nor received any unauthorized help on this academic work."

Your Name: Pratik Patel   Date: 03/05/2019