Lab work report: Lab 3

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Objectives:

The objective of this lab work is to implement queue data structure using array as well as linked list. The following methods have been included in the program:

- enqueue(element): Adds an element into the queue
- dequeue(): Removes an element from the queue
- isEmpty(): Checks if the queue is empty
- isFull(): Checks if the queue is full
- front(): Gives the element at the front
- back(): Gives the element at the rear

Implementation:

The above instructed methods have been implemented in the program displaying desired output. Additional methods have also been used to create a user friendly interface of the program. The above mentioned functions with their corresponding tasks are seen used in the program in various instances through both linked list as well as array implementation. The interface for displaying elements of the linked list as well as the array have been chosen quite orthodox to be able to differentiate between them.

Output:

Array Implementation

```
PS C:\Users\hp\Desktop\labwork\lab3> ./a.exe
Which implementation you want to see?
1)ARRAY
2)LINKEDLIST
1
```

```
Trying to dequeue in the first sequence...

The queue is empty

Cannot dequeue.The queue is empty.0
The queue is not full.

Enqueued the element in the index 0:11
 [11]
```

```
The queue is empty

Cannot dequeue.The queue is empty.0
The queue is not full.

Enqueued the element in the index 0:11
 [11]

The queue is not full.

Enqueued the element in the index 1:120
 [11]  [120]

The queue is not full.

Enqueued the element in the index 2:315
 [11]  [120]  [315]

The queue is not full.

Enqueued the element in the index 3:60
 [11]  [120]  [315]  [60]

The queue is not full.

Enqueued the element in the index 4:234
 [11]  [120]  [315]  [60]  [234]

The queue is full.

Cannot enqueue 543.The queue is full !!
The element at back is 234
 [11]  [120]  [315]  [60]  [234]
```

```
 Enqueued the element in the index 4:234
  [11]  [120]  [315]  [60]  [234]

 The queue is full.

 Cannot enqueue 543.The queue is full !!
 The element at back is 234
  [11]  [120]  [315]  [60]  [234]


 Checking whether the queue is full or not...
 The queue is full.
 1

 The queue is full.

 Cannot enqueue 30.The queue is full !!
 The element at back is 234
  [11]  [120]  [315]  [60]  [234]

 The queue is not empty


 Dequeued element is 11
  [120]  [315]  [60]  [234]

 The queue is not empty


 Dequeued element is 120
  [315]  [60]  [234]

 The element at front index is 315.
 The element at back index is 234
```

Linked list

```
The queue is empty
Cannot dequeue.The queue is empty. 0
Enqueued element 11
[11]
Enqueued element 120
[11]  next  [120]
Enqueued element 315
[11]  next  [120]  next  [315]
Enqueued element 60
[11]  next  [120]  next  [315]  next  [60]
Enqueued element 234
[11]  next  [120]  next  [315]  next  [60]  next  [234]
Cannot enqueue 543. The queue is full.The back index element is 234
[11]  next  [120]  next  [315]  next  [60]  next  [234]

Checking whether the queue is full or not... 1

Cannot enqueue 30. The queue is full.The back index element is 234
[11]  next  [120]  next  [315]  next  [60]  next  [234]
The queue is not empty

Dequeued element 11
[120]  next  [315]  next  [60]  next  [234]
The queue is not empty

Dequeued element 120
[315]  next  [60]  next  [234]
The element at front index is 315.
The element at back index is 234
```