## DATA STRUCTURE AND ALGORITHMS(Lab Exam)

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- 1. Write a Java program to
  - I] Implement circular queue using arrays

```
package com.labexam.entity;
import java.util.ArrayList;
class CircularQueue{
private int size, front, rear;
private ArrayList<Integer> queue = new ArrayList<Integer>();
CircularQueue(int size)
{
this.size = size;
this.front = this.rear = -1;
}
public void enQueue(int data)
{
if((front == 0 && rear == size - 1) | |
(rear == (front - 1) % (size - 1)))
{
System.out.print("Queue is Full");
```

```
}
else if(front == -1)
{
front = 0;
rear = 0;
queue.add(rear, data);
}
else if(rear == size - 1 && front != 0)
{
rear = 0;
queue.set(rear, data);
}
else
{
rear = (rear + 1);
if(front <= rear)</pre>
{
queue.add(rear, data);
}
else
{
queue.set(rear, data);
```

```
}
}
}
public int deQueue()
{
int temp;
if(front == -1)
{
System.out.print("Queue is Empty");
return -1;
}
temp = queue.get(front);
if(front == rear)
{
front = -1;
rear = -1;
}
else if(front == size - 1)
{
front = 0;
}
else
```

```
{
front = front + 1;
}
return temp;
}
public void displayQueue()
{
if(front == -1)
{
System.out.print("Queue is Empty");
return;
}
System.out.print("Elements in the " +
"circular queue are: ");
if(rear >= front)
{
for(int i = front; i <= rear; i++)</pre>
{
System.out.print(queue.get(i));
System.out.print(" ");
}
System.out.println();
```

```
}
else
{
for(int i = front; i < size; i++)</pre>
{
System.out.print(queue.get(i));
System.out.print(" ");
}
for(int i = 0; i <= rear; i++)
{
System.out.print(queue.get(i));
System.out.print(" ");
}
System.out.println();
}
}
public static void main(String[] args)
{
CircularQueue q = new CircularQueue(5);
q.enQueue(17);
q.enQueue(22);
q.enQueue(13);
```

```
q.enQueue(-8);
q.displayQueue();
int x = q.deQueue();
if(x != -1)
{
System.out.print("Deleted value = ");
System.out.println(x);
}
x = q.deQueue();
if(x != -1)
{
System.out.print("Deleted value = ");
System.out.println(x);
}
q.displayQueue();
q.enQueue(13);
q.enQueue(50);
q.enQueue(57);
q.displayQueue();
q.enQueue(2);
}
}
```

## **OUTPUT:**

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```

11] Perform quick sort to arrange given set of elements

```
package com.labexam.entity;
public class QuickSort {
  private int[] arr;
  public QuickSort(int[] arr) {
    this .arr=arr;
  }
  void swap(int i,int j) {
    int temp=arr[i];
    arr[i]=arr[j];
    arr[j]=temp;
  }
  int partition(int start ,int end) {
    int pivot=arr[end];
  int i=(start-1);
```

```
for(int j =start; j <=end-1;j++) {</pre>
if(arr[j]<pivot)</pre>
{
i++;
swap(i,j);
}
}
swap(i+1,end);
return(i+1);
}
void quicksort(int start,int end)
{
if(start<end)
{
int i = partition(start,end);
quicksort(start, i-1);
quicksort(i+1, end);
}
void printArray()
{
int size = arr.length;
```

```
for(int i=0;i<size;i++)</pre>
System.out.println(arr[i]+" ");
System.out.println();
}
}
Main Class:
package com.labexam.entity;
public class QuickSortMain {
public static void main(String[] args) {
int[] arr= { 9,81,68,1,6,15,93,59,54,200};
int n =arr.length;
QuickSort qs=new QuickSort(arr);
qs.quicksort(0, n-1);
System.out.println(" < Quick Sort > Sorted array : ");
qs.printArray();
}
}
OUTPUT:
```

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                                                              1 package com.labexam.entity;
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                                                              3 public class QuickSortMain {
dNumDemo
                                                                                                                                                              6
'feredReader
rencyConverterDemo
rencyForwardDemo
                                                              50 public static void main(String[] args) {
6 int[] arr= { 9,81,68,1,6,15,93,59,54,200};
                                                                                                                                                              15
                                                                                                                                                              54
                                                              7
                                                                      int n =arr.length;
JRE System Library [JavaSE-1.8]
                                                                      QuickSort qs=new QuickSort(arr);
qs.quicksort(0, n-1);
                                                                                                                                                              59
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src
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DuickSort.java
DuickSortMain.java
                                                             9
                                                                                                                                                              68
                                                                                                                                                              81
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                                                                      System.out.println(" < Quick Sort > Sorted array : ");
# com.tree.entity
# com.tree.main
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                                                            12
                                                                      qs.printArray();
                                                            13
14 }
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                                                            15
                                                            16 }
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