

BSc (Hons) in Information Technology

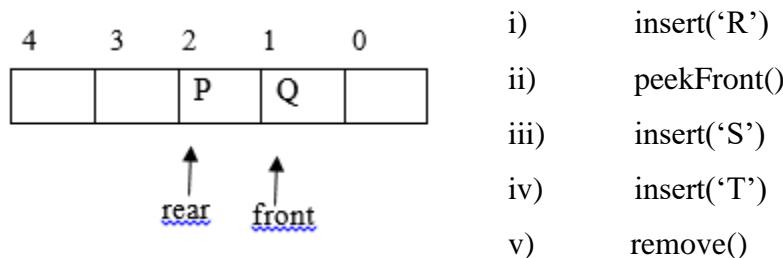
Year 2

Data Structures and Algorithms – IT2070

Worksheet 2 – Queues

Question 1

- a) Write one advantage of having a circular queue instead of a linear queue
- b) Consider the following Circular Queue and draw the queue frames after executing each statement given below.



- c) What will happen if the above queue is a linear queue?

Question 2

- a) How do you find whether a linear queue is full?
- b) How do you find whether a circular queue is full?
- c) How do you find whether a linear queue is empty?
- d) How do you find whether a circular queue is empty?

Question 3

- i) Implement isEmpty() and isFull() methods of the circular queue class.
- ii) Assume that a circular queue class has already been implemented with insert(), remove() and peekFront() methods. It is used to store characters. Write a code segment to insert the following characters to a ‘myQueue’ object created from the queue class; ‘l’ , ‘m’, ‘n’, ‘o’.
- iii) Write code segment to display all the values in a queue by removing them.

Question 4

Consider the below remove() method implemented for a circular queue. Code contains errors.

Write the line numbers with errors and correct them.

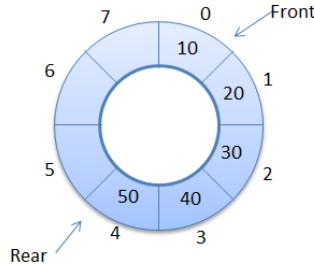
```
1. public int remove()
2. {
3.     if (rear == -1)
4.     {
5.         System.out.println("Queue is empty");
6.         return false;
7.     }
8.     else
9.     {
10.        int temp = queueArray[front++];
11.        nItems--;
12.        return temp;
13.    }
14.}
```

Question 5

Consider the following circular queue with initial values given below.

Initial values are:

- Front=0
- Rear=4
- Count=5



Show how the above parameter values (Front, Rear and Count) will change after each of the operations by completing the table given below.

- i) insert(60)
- ii) insert(70)
- iii) delete()
- iv) insert(80)
- v) insert(90)
- vi) insert(100)

Question 6

“front - rear + 1 can be used to find the no of items in a linear queue” Do you agree with the above statement? If you agree, justify your answer using a diagram. If you do not agree, write the correct answer.