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| Section # | 03 |
| Lab # | 11 |

**Task#01**

Question statement

1. Task Scheduling: Queues can be used to schedule tasks that need to be executed in a specific order. For example, in a web server application, incoming requests can be stored in a queue and processed in the order they were received.

1. Implement using array.

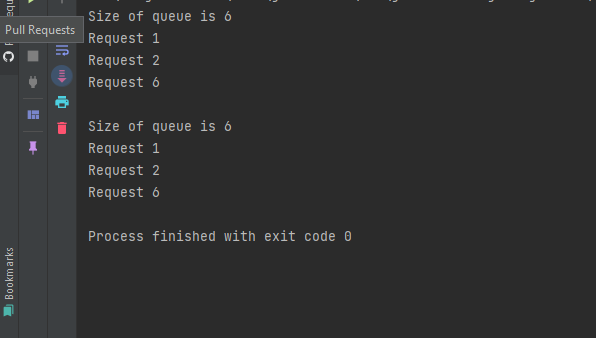
2. Implement using linked list.

# Q1.Java

**Code:**

package Lab\_11;  
  
import java.util.Arrays;  
  
class ArrayQueue {  
 private int size = 0;  
 private String[] a;  
  
 public ArrayQueue(int cap) {  
 a = new String[cap];  
 }  
 public void resize(){  
 String [] aa = a;  
 a = new String[2 \* aa.length];  
 System.*arraycopy*(aa, 0, a, 0, size);  
 }  
 public void add(String str) {  
 if (size==a.length){  
 resize();  
 }  
 a[size++] = str;  
 }  
 public String remove(){  
 for (int i=0; i<a.length-1; i++){  
 a[i] = a[i+1];  
 }  
 size--;  
 return a[0];  
 }  
 public String peek(){  
 return a[0];  
 }  
 public boolean isFull() {  
 return size == a.length;  
 }  
 public int size(){  
 return size;  
 }  
} // end of class ArrayQueue  
 // end of class Node  
  
class LinkedQueue{  
 static class Node{  
 Node prev = this, next = this;  
 private Object val;  
 public Node(Object val){  
 this.val = val;  
 }  
 public Node(Object val, Node next, Node prev){  
 this.val = val;  
 this.next = next;  
 this.prev = prev;  
 }  
 }  
 private Node head = new Node(null);  
  
 public int size = 0;  
 public int size(){  
 return size;  
 }  
 public boolean isEmpty(){  
 return (size==0);  
 }  
 public Object first(){  
 if (size==0){  
 throw new IllegalStateException();  
 }  
 return head.next.val;  
 }  
 public Object remove(){  
 Object temp = head.next.val;  
 head.next = head.next.next;  
 head.prev.next = head;  
 size--;  
 return temp;  
 }  
 public void add(Object obj){  
 head.prev.next = new Node(obj, head, head.prev);  
 head.prev = head.prev.next;  
 size++;  
 }  
} // end of LinkedQueue  
  
public class Q1 {  
  
 public static void main(String[] args) {  
  
// ArrayQueue arrayQueue = new ArrayQueue(5);  
// arrayQueue.add("Request 1");  
// arrayQueue.add("Request 2");  
// arrayQueue.add("Request 3");  
// arrayQueue.add("Request 4");  
// arrayQueue.add("Request 5");  
// arrayQueue.add("Request 6");  
// System.out.println("Size of queue is "+arrayQueue.size());  
//  
// System.out.println(arrayQueue.peek());  
// arrayQueue.remove();  
// System.out.println(arrayQueue.peek());  
// arrayQueue.remove();  
// arrayQueue.remove();  
// arrayQueue.remove();  
// arrayQueue.remove();  
// System.out.println(arrayQueue.peek());  
  
 LinkedQueue linkedQueue = new LinkedQueue();  
 linkedQueue.add("Request 1");  
 linkedQueue.add("Request 2");  
 linkedQueue.add("Request 3");  
 linkedQueue.add("Request 4");  
 linkedQueue.add("Request 5");  
 linkedQueue.add("Request 6");  
 System.*out*.println("Size of queue is "+linkedQueue.size());  
  
 System.*out*.println(linkedQueue.first());  
 linkedQueue.remove();  
 System.*out*.println(linkedQueue.first());  
 linkedQueue.remove();  
 linkedQueue.remove();  
 linkedQueue.remove();  
 linkedQueue.remove();  
 System.*out*.println(linkedQueue.first());  
  
 } // end of main() method  
} // end of program

**Output:**

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