**LAB NO:11**

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**SECTION: II**

**TASK NO:01**

Implementation of Queue using Arrays.

import java.util.Scanner;  
public class Lab\_11 {  
 Scanner input=new Scanner(System.*in*);  
 int choice;  
 int menu(){  
  
 System.*out*.println("1. EnQueue");  
 System.*out*.println("2. DeQueue");  
 System.*out*.println("3. Display");  
 System.*out*.println("4. IsEmpty");  
 System.*out*.println("5. IsFull");  
 System.*out*.println("6. Capacity of Queue");  
 System.*out*.println("7. Size of Queue");  
 System.*out*.println("8. Exit ");  
 System.*out*.println("enter your choice: ");  
 choice=input.nextInt();  
 return choice;}  
}  
  
  
  
// class Queue  
class Queue{  
 Scanner sc=new Scanner(System.*in*);  
 private int front,rear;  
 private Object[] object;  
 public Queue(int size){  
 front=-1;  
 rear=-1;  
 object=new Object[size];  
 }  
 public boolean isEmpty(){  
 return (rear==-1&&front==-1);  
 }  
 public boolean isFull(){  
 return (rear==object.length-1);  
 }  
  
 //EnQueue  
 public void enQueue(){  
 Object data=sc.next();  
 if (isFull()){  
 System.*out*.println("stack is full");  
 return;  
 } else if (isEmpty()) {  
 object[++rear] = data;  
 front++;  
 } else {  
 object[++rear] = data;  
 }}  
  
 // DEQUEUE  
 public Object deQueue(){  
 if(isEmpty())  
 return null;  
 else{  
 Object temp=object[front];  
 for(int i=front; i<=rear; i++){  
 object[i]=object[i+1];}  
 rear--;  
 return temp;  
 }  
 }  
  
 public void display(){  
 System.*out*.print("[");  
 for(int i=front; i<rear; i++){  
 System.*out*.print(object[i]+",");  
 }  
 System.*out*.print(object[rear]+"]\n");  
 }  
 public int getSize(){  
 return object.length-1;  
 }  
 public int capacity(){  
 return (object.length-1)-rear;  
 }  
}

class Main{  
 public static void main(String[] args) {  
 Lab\_11 lab11=new Lab\_11();  
 Queue queue=new Queue(10);  
 while (lab11.choice<8 ) {  
 switch (lab11.menu()) {  
 case 1: {  
 queue.enQueue();  
 break;  
 }  
 case 2: {  
 queue.deQueue();  
 break;  
 }  
 case 3: {  
 queue.display();  
 break;  
 }  
 case 4: {  
 System.*out*.println(queue.isEmpty());  
 break;  
 }  
 case 5: {  
 System.*out*.println(queue.isFull());  
 break;  
 }  
 case 6: {  
 System.*out*.println(queue.capacity());  
 break;  
 }  
 case 7: {  
 System.*out*.println(queue.getSize());  
 break;  
 }  
 case 8:{  
 System.*exit*(0);  
 }  
 default:  
 System.*out*.print("Invalid output");  
 }//switch end  
 }//while loop  
}  
}

**OUTPUT:**

"C:\Program Files\Java\jdk-17.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\lib\idea\_rt.jar=53572:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\bin" -Dfile.encoding=UTF-8 -classpath C:\Users\hp\IdeaProjects\DSA\_ALL\_LABS\out\production\DSA\_ALL\_LABS Main  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. IsFull  
 6. Capacity of Queue  
 7. Size of Queue  
 8. Exit  
 enter your choice:  
 1  
 java  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. IsFull  
 6. Capacity of Queue  
 7. Size of Queue  
 8. Exit  
 enter your choice:  
 1  
 C++  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. IsFull  
 6. Capacity of Queue  
 7. Size of Queue  
 8. Exit  
 enter your choice:  
 3  
 [java,C++]  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. IsFull  
 6. Capacity of Queue  
 7. Size of Queue  
 8. Exit  
 enter your choice:  
 2  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. IsFull  
 6. Capacity of Queue  
 7. Size of Queue  
 8. Exit  
 enter your choice:  
 3  
 [C++]  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. IsFull  
 6. Capacity of Queue  
 7. Size of Queue  
 8. Exit  
 enter your choice:  
 8  
  
 Process finished with exit code 0

**TASK NO:02**

Implementation of Queue using Linked List.

class Lab\_11B{  
 Scanner input=new Scanner(System.*in*);  
 int choice;  
 int menu() {  
 System.*out*.println("1. EnQueue");  
 System.*out*.println("2. DeQueue");  
 System.*out*.println("3. Display");  
 System.*out*.println("4. IsEmpty");  
 System.*out*.println("5. Size of Queue");  
 System.*out*.println("6. Exit ");  
 System.*out*.println("enter your choice: ");  
 choice=input.nextInt();  
 return choice;}  
 }

class QueueLinkedList{  
 Scanner sc=new Scanner(System.*in*);  
 public static class Node{  
 Object data;  
 Node next;  
 Node(Object d){  
 data=d;  
 }  
 Node(Object d,Node next){  
 data=d;  
 this.next=next;  
 }  
 }  
 private int size;  
 private Node front=null,rear=null;  
  
 public boolean isEmpty(){  
return (front==null);  
 }  
  
 //EnQueue  
 public void enQueue(){  
 System.*out*.print("enter data: ");  
 Object data=sc.next();  
 if (isEmpty()){  
 front=new Node(data);  
 rear=front;  
 }else {  
 rear.next=new Node(data);  
 rear=rear.next;  
 }  
 size++;  
 }  
  
 // DEQUEUE  
 public Object deQueue(){  
 Object temp=front.data;  
 if (isEmpty()){  
 return null;  
 }  
 else {  
 front=front.next;  
 size--;  
 }  
 return temp;  
 }  
  
 public void display(){  
 for (Node p=front;p!=null;p=p.next){  
 System.*out*.print(p.data+" ");  
 }  
 System.*out*.println();  
 }  
 public int getSize(){  
return size;  
 }  
  
  
} public static void main(String[] args)  
 { Lab\_11 lab11=new Lab\_11();  
 QueueLinkedList queue=new QueueLinkedList();  
 while (lab11.choice<6 ) {  
 switch (lab11.menu()) {  
 case 1: {  
 queue.enQueue();  
 break;  
 }  
 case 2: {  
 queue.deQueue();  
 break;  
 }  
 case 3: {  
 queue.display();  
 break;  
 }  
 case 4: {  
 System.*out*.println(queue.isEmpty());  
 break;  
 }  
 case 5: {  
 System.*out*.println("Size of Queue"+queue.getSize());  
 break;  
 }  
 case 6:{  
 System.*exit*(0);  
 }  
 default:  
 System.*out*.print("Invalid output");  
 }//switch end  
 }//while loop  
  
}}

**OUTPUT:**

"C:\Program Files\Java\jdk-17.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\lib\idea\_rt.jar=50059:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\bin" -Dfile.encoding=UTF-8 -classpath C:\Users\hp\IdeaProjects\DSA\_ALL\_LABS\out\production\DSA\_ALL\_LABS Main  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. Size of Queue  
 6. Exit  
 enter your choice:  
 1  
 enter data: java  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. Size of Queue  
 6. Exit  
 enter your choice:  
 1  
 enter data: C++  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. Size of Queue  
 6. Exit  
 enter your choice:  
 3  
 java C++  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. Size of Queue  
 6. Exit  
 enter your choice:  
 2  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. Size of Queue  
 6. Exit  
 enter your choice:  
 3  
 C++  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. Size of Queue  
 6. Exit  
 enter your choice:  
 5  
 1  
 1. EnQueue  
 2. DeQueue  
 3. Display  
 4. IsEmpty  
 5. Size of Queue  
 6. Exit  
 enter your choice:  
 6  
  
 Process finished with exit code 0