|  |
| --- |
| Queue |

**Queue**

A queue is a data structure which stores data in First In First Out(FIFO) Method. Which means the data which is inserted at first is the one which will be removed at First.

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Front

Rear

**Implementation Of Queue**

Queue can be implemented in 2 different ways

Implementation Of Queue

Using Arrays

Using Linked List

**Implementation Of Linear Queues Using Arrays**

*Queue.java*

|  |
| --- |
| public class Queue {      int[] arr;      int topOfQueue;      int beginningOfQueue;      public Queue(int *size*) {          arr = new int[*size*];          topOfQueue = -1;          beginningOfQueue = -1;          System.out.println("Queue successfully created with size " + *size*);      }      public boolean isFull() {          if (topOfQueue == arr.length - 1) {              return true;          }          return false;      }      public boolean isEmpty() {          if (topOfQueue == -1 || beginningOfQueue == arr.length) {              return true;          }          return false;      }      public void enqueue(int *value*) {          if (isFull()) {              System.out.println("The Queue Is Full. ");          } else if (isEmpty()) {              beginningOfQueue++;              topOfQueue++;              arr[topOfQueue] = *value*;          } else {              topOfQueue++;              arr[topOfQueue] = *value*;              System.out.println("Element Inserted At Position " + (topOfQueue));          }      }      public int deQueue() {          if (isEmpty()) {              System.out.println("Queue is Empty.Nothing To Return");              return -1;          } else {              int result = arr[beginningOfQueue];              beginningOfQueue++;              if (beginningOfQueue > topOfQueue) {                  topOfQueue = beginningOfQueue = -1;              }              return result;          }      }      public void showQueue() {          for (int i = beginningOfQueue; i <= topOfQueue; i++) {              System.out.print(arr[i] + " ");          }          System.out.println();      }      public int peek() {          if (!isEmpty()) {              return arr[beginningOfQueue + 1];          } else {              System.out.println("Queue is empty!");              return -1;          }      }      public void deleteQueue() {          arr = null;          System.out.println("Queue is Deleted!");      }  } |

*main.java*

|  |
| --- |
| public class main {      public static void main(String[] *args*) {          Queue q1 = new Queue(5);          q1.enqueue(5);          q1.enqueue(6);          q1.enqueue(7);          q1.enqueue(8);          q1.enqueue(9);          q1.showQueue();  *// Overflow*          q1.enqueue(1);          System.out.println(q1.topOfQueue);          q1.deQueue();          q1.showQueue();          System.out.println(q1.beginningOfQueue);          q1.deQueue();          q1.showQueue();          System.out.println(q1.beginningOfQueue);          q1.deQueue();          q1.showQueue();          System.out.println(q1.beginningOfQueue);          q1.deQueue();          q1.showQueue();          System.out.println(q1.beginningOfQueue);          System.out.println(q1.peek());      }  } |

**Implementation Of Queues Using Linked List**

A linear queue when dequeued, leaves a lot of empty cells which cannot be reused. In order to solve this, we need circular queue

*Queue.java*

|  |
| --- |
| public class Queue {      int[] arr;      int topOfQueue;      int beginningOfQueue;      public Queue(int *size*) {          arr = new int[*size*];          topOfQueue = -1;          beginningOfQueue = -1;          System.out.println("Queue successfully created with size " + *size*);      }      public boolean isFull() {          if (topOfQueue == arr.length - 1) {              return true;          }          return false;      }      public boolean isEmpty() {          if (topOfQueue == -1 || beginningOfQueue == arr.length) {              return true;          }          return false;      }      public void enqueue(int *value*) {          if (isFull()) {              System.out.println("The Queue Is Full. ");          } else {              arr[topOfQueue + 1] = *value*;              System.out.println("Element Inserted At Position " + (topOfQueue + 1));              topOfQueue++;          }      }      public int deQueue() {          if (isEmpty()) {              System.out.println("Queue is Empty.Nothing To Return");              return 0;          } else {              int result = arr[beginningOfQueue + 1];              beginningOfQueue++;              if (beginningOfQueue == topOfQueue) {                  beginningOfQueue = topOfQueue = -1;              }              return result;          }      }      public void showQueue() {          for (int i = beginningOfQueue + 1; i <= topOfQueue; i++) {              System.out.print(arr[i] + " ");          }          System.out.println();      }      public int peek() {          if (!isEmpty()) {              return arr[beginningOfQueue + 1];          } else {              System.out.println("Queue is empty!");              return -1;          }      }      public void deleteQueue() {          arr = null;          System.out.println("Queue is Deleted!");      }  } |