

Experiment No.4

Aim: Implement Linear Queue ADT using an array.

Theory:

LinearQueues

A queue is an ordered list in which items may be added only at one end called the “rear” and items may be removed only at the other end called “front”.

- Queues may be represented in the computer memory by means of linear arrays or linked list.
- There are two pointer variables namely FRONT and REAR.
- The FRONT denotes the location of the first element of the queue.
- The rear describes the location of the rear element of the queue.
- When the queue is empty, the values of front and rear are -1 and -1 respectively.
- The “max-size” represents the maximum capacity of the linear queue.
- The following is the condition to test the queue is full or not. (Rear == max size - 1)
- To insert the first element both pointers should be altered to „0“ Front = 0 rear = 0.
- Whenever an item is added to the queue, the value of REAR is incremented by 1.
$$\text{REAR} = \text{REAR} + 1;$$
- The following is the condition to test the queue is empty or not. Front == -1
- Whenever an “Item” is deleted from the queue, the value if the front is incremented by 1 $\text{Front} = \text{Front} + 1;$
- To delete the last element, both pointers should be altered.

Algorithm:

```
Step 1: IF REAR = MAX-1
        Write OVERFLOW
        Goto step 4
    [END OF IF]
Step 2: IF FRONT = -1 and REAR = -1
        SET FRONT = REAR = 0
    ELSE
        SET REAR = REAR + 1
    [END OF IF]
Step 3: SET QUEUE[REAR] = NUM
Step 4: EXIT
```

Algorithm to insert an element in
a queue

```
Step 1: IF FRONT = -1 OR FRONT > REAR
        Write UNDERFLOW
    ELSE
        SET VAL = QUEUE[FRONT]
        SET FRONT = FRONT + 1
    [END OF IF]
Step 2: EXIT
```

Algorithm to delete an element from
a queue

Conclusion:(Students write conclusion in your own words. U have to describe what u you understood from the experiment and the concept of the experiment. **Conclusion carry 4 marks out of 10**)