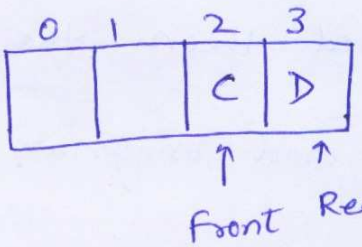
iii) Circular queue:—

In a linear queue, we have seen that the overflow can occur even when the queue is empty and space is available for inserting a new element. The following figure recalls that how the condition of overflow can occur even when space is available in the queue.



We can see that the element T has to be inserted in the queue but since the free space is available on the other end the queue is felt like overflow.

In such a situation, a new strategy is used to insert the element and that is circular queue.

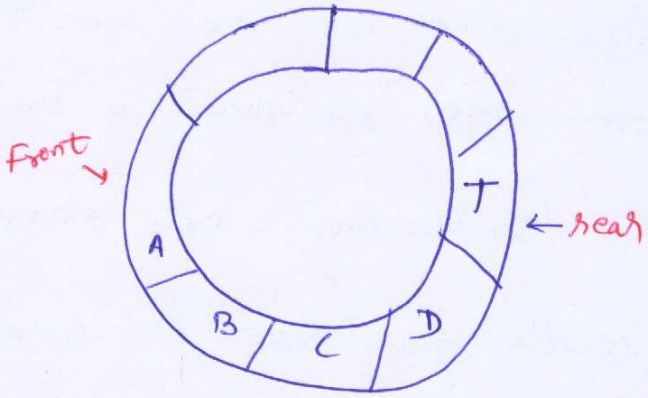


fig: Circular queue

If two of the ends of the linear queue are adjoined then the free space will become available and imaginary overflow situation will be disappeared.

Algorithms for Insertion:—

QIN (Q, maxsize, F, R, item)

Step I if F=0 and R = Maxsize - 1 then
write overflow and return
{End of If}

Step-II if F = -1 then
Set F = R = 0
Else if R = maxsize - 1 then
Set R=0

Else

Set R = R+1

{End of If}

Step-(iii) set Q[R] = item

(iv) Exit

Algorithms for deletion :—

Qde (Q, maxsize, F, R)

Step-1 if F = -1 then {check for empty queue}

write underflow and return

{End of if}

Step-2 set item = Q[f]

Step-3 if F = R then {check for single element in Q}

Set F = R = -1

Else if f = maxsize-1 then SET F = 0

Else set f = f+1

{End of if}

Step-4 Exit.

Application of Queue:—

i) Round Robin technique for processes scheduling is implemented using queue.

ii) ticket reservation system like bus reservation, railway reservation softwares are designed using queue.

iii) Printer server routines are designed using queue.

Similarities and diff. b/w stack and queue—

Similarities:— i) Insertion and deletion operation can be performed at only end point.

ii) Both can be implemented using array & link list.

iii) Both uses temporary memory location.

iv) Both have standard functions for insert and deletion elements.

Difference:—

Stack	Queue
i) Addition & deletion is done at one end only	i) Addition and deletion is done at diffent ends
ii) In stack, two operation are possible i.e. PUSH & POP	ii) In queue, the operations can be insertion, deletion serach and traverse.
iii) location where addition & deletion take place is known as Top of the stack	iii) Addition take place at the point known as rear and deletion end is known as front
iv) stack are used to postponed some decision when something is under process.	iv) In queue the operations can be insertion, deletions iv) Q is used for scheduling eg. when many jobs are waiting for execution.

RTU Based Question

Q.1 Define stack? Explain its basic expression and implementation.
[B.E. CS/IT 2006]

Q.2 Write short note on Tower of Hanoi problem [BE. CS/IT 2006]

Q.3 Write an algo for converting infix to postfix expression:
[BE 2005, 2006, CS/IT]

Q.4 Convert infix to postfix
X: A+ (B*C - (D/E -F) *G) *H [BE 05, 06, CS/IT]

Q.5 What is stack? Explain various operation on it.

Q.6 Write an algo for PUSH & POP

Q.7 Convert the following expression from infix to postfix
a) (5+4)/(8-2*6) b) 7 ^ (4*2) - 5/2
c) (P*Q) / (S*T) +U

Q.8 Explain following term
i) PUSH ii) POP iii) overflow iv) underflow
v) Front vi) Rear vii) TOP

Q.9. Write similar & diff. b/w stack and queue. [BE-2003, 10]

Q.10 Explain insert and delete an element in the queue

Q.11 How to what is circular queue. explain in details.

Q12 Write down the Application of queue and stack. [BTech 09]

Q.13 What is dequeue, explain with example.

Q.14 What is Priority queue. [B.Tech 09]

~~Q.15~~