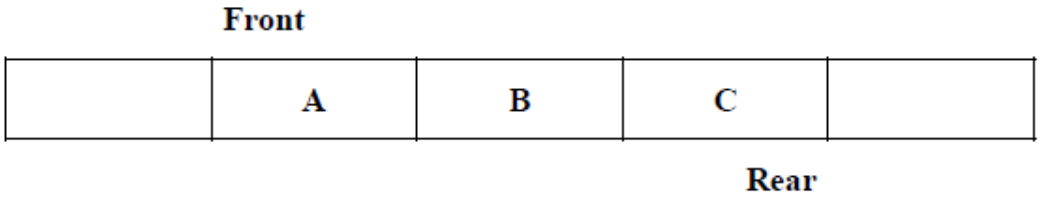
Queueالطابور

A queue is a data structure in which insertion is done at one end and deletion is done from the other end.

• A queue is a linear list of elements in which deletions can place only at one end, called the **front**, and insertions can take place only at the other end, called the **rear**. The terms **"front" and "rear"** are used in describing a linear list only when it is implemented as a queue.

• The elements are added and deleted in a **FIFO** (First In First Out) manner.

The figure illustrates a queue containing there elements **A, B and C**. **A** is at the front of the queue and **C** is at the rear.



Basic Operations on Queue:-

The two basic operations on queue are:-

1. Insert or Enqueue.
2. Delete or Dequeue.

1. Insert Operation on Queue:-

In a queue, insert operation takes place at **rear** end. An "Enqueue" operation adds an item to the "rear" of the queue.

Steps for inserting an Element in a Queue:-

1. Initialize both the **front** and **rear** as -1, which means that the queue is empty.
2. When the first element will be inserted then the **rear** will be incremented by **1**.
3. If the **rear** reaches to **size**, then display a message that "The queue is full or Queue overflow".

2. Delete Operation on Queue:-

• In a queue, delete operation takes place at **front** end. The "Dequeue" operation removes the item at the "**front**" of the queue and returns it.

Steps for deleting an Element in a Queue:-

1. When an element will be deleted from the queue the value of **front** will be incremented by **1**.
2. If the **front** reaches to **rear** value, then display a message that "The queue is empty or Queue underflow".

The program to insert and delete an element from the queue:

```
#include<iostream>
using namespace std;

const  int size=10;
int   queue[size];
int   rear=-1,front=-1;

void insert()
{
 int item;
 if ((rear==size)&&(front==0))
  cout<<"Queue is Full:\n";
 else
  {
   cout<<"Enter Item: \n";
   cin>>item;
   rear++;
   queue[rear]=item;
  }
}

void delet()
{
 int d;
 if (front==rear)
  cout<<" Queue is Empty: \n";
 else
 {
  front++;
  d=queue[front];
  cout<<"Item "<<d<<" is removed\n";
 }
}


void display()
{
 if (front==rear)
   cout<<"Queue is Empty \n";
 else
   for(int i=front+1;i<=rear;i++)
   {
    cout<<"Queue[ "<<i<<"] --> ";
    cout<<queue[i]<<endl;
   }
}
```

```
int main()
{
 int n;


 cout<<"The Menue of Queue: \n";
 while (1)
  {
   cout<<"1- Add element: \n";
   cout<<"2- Remove element: \n";
   cout<<"3- Display elements: \n";
   cout<<"4- Exit element: \n";
   cin>>n;

   switch (n)
    {
     case 1: insert();
           break;
     case 2: delet();
           break;
     case 3: display();
           break;
     case 4: exit(0);
     default:cout<<"invalid choice\n" ;
    }
  }

  return 0;
}
```