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Q.1) Write a program to simulate the working of the queue of integers using an array. Provide the following operations:
Insert, delete, display.
The program should print appropriate message for overflow and underflow condition.

Ans ⇒

```
#include <stdio.h>
#define n 2
int q[n], rear=-1, front=-1;
void add(int);
void del();
void display();
void main()
{
    int choice=0;   int num;
    while(choice!=4)
    {
        switch(choice)
        printf("Enter choice:");
        scanf("%d", &choice);
        switch(choice)
        {
            case 1:
                printf("Add numbers:");
                scanf("%d", &num);
                add(num);
                break;
            case 2:
                printf("Delete");
                del();
                break;
```

```
            case 3:
                    printf("Display");
                    display();
                    break;

            case 4:
                    printf("Exit");
                    break;
        }
    }
}
void add(int p)
{
    if(front==-1 && rear==-1)
    {
        rear++;
        q[rear]=p;
    }
    else if(rear==n)
    {
        printf("Queue is full");
    }
    else
    {
        rear++;
        q[rear]=p;
    }
}
void del()
{
    if(rear==-1 && front==-1)
    {
        printf("Queue is empty");
    }
    else if((front+1)==(rear+1))
    {
        printf("Queue is empty now");
```

```
            front=-1, rear=-1;
        }
        else
        {       front++;        int k;
                k = q[front];
                printf("%d is removed", k);
        }
}
void display()
{       int i;
        if(rear==-1 && front==-1)
        {
                printf("Queue is empty");
        }
        else
        {
                for(i=front+1; i<=rear; i++)
                {
                        printf("%d ", q[i]);
                }
                printf("\n");
        }
}
```

Output :-

Enter choice : 1
Add number : 25
Enter choice : 1
Add number : 24
Enter choice : 3
display
25 24
Enter choice : 2
Delete
Enter choice : 2
Delete

Enter choice : 2
Queue is empty now

Enter choice : 4
Exit

Q-2.) Write a program to simulate the working of a circular queue using an array. Provide the following operations : Insert, delete & display. The program should print appropriate message for queue empty and queue overflow conditions.

Ans →

```
#include <stdio.h>
#define n 3
void enqueue (int);   int q[n];
void dequeue ();
void display ();
int rear=-1, front=-1;
void main ()
{
    enqueue (25);
    enqueue (34);
    enqueue (45);
    enqueue (24);
    display ();
    dequeue ();
    dequeue ();
    enqueue (44);
    display ();
```

```
void enqueue (int p)
{
    int t;
    if (rear == -1 && front == -1)
    {
        rear++;
        q[rear] = p;
    }
    else if (rear == front)
    {
        printf("Queue is full");
    }
    else
    {
        rear = (rear + 1) % n;
        q[rear] = p;
    }
}

void dequeue()
{
    int t;
    if (rear == -1 && front == -1)
    {
        printf("Empty Queue");
    }
    else if ((front + 1) % n == (rear + 1))
    {
        printf("Queue is empty now");
        rear = -1, front = -1;
    }
    else
    {
        front = (front + 1) % n;
        t = q[front];
        printf("%d removed", t);
    }
}
```

```
void display ()
{   int i, j;
    if (rear == -1 && front == -1)
    {   printf ("Queue is empty");
    }
    else if (rear == front)
    {
        i = front + 1;
        while (i != rear)
        {
            printf ("%d ", q[i]);
            i = (i+1) % n;
        }
        printf ("%d ", q[i]);
        printf ("\n");
    }
    else
    {
        j = front + 1;
        while (j != rear)
        {
            printf ("%d ", q[j]);
            j = (j+1) % n;
        }
        printf ("%d ", q[j]);
        printf ("\n");
    }
```

Output :

Queue is full