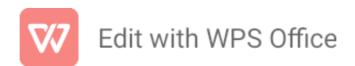
## #A PROGRAM TO IMPLEMENT DOUBLE ENDED QUEUE USING ARRAY.

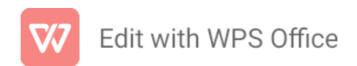
```
#include <stdio.h>
#include <stdlib.h>
#define SIZE 5
int deque[SIZE];
int front = -1, rear = -1;
int isFull() {
  return (front == (rear + 1) % SIZE);
}
int isEmpty() {
  return (front == -1);
}
void insertRear(int element) {
  if (isFull()) {
     printf("\nDeque is full. Cannot insert %d at rear.\n", element);
  } else {
     if (isEmpty()) {
       front = rear = 0;
    } else {
       rear = (rear + 1) % SIZE;
     deque[rear] = element;
     printf("%d inserted at rear.\n", element);
  }
}
void insertFront(int element) {
  if (isFull()) {
```



```
printf("\nDeque is full. Cannot insert %d at front.\n", element);
  } else {
    if (isEmpty()) { // If the deque is empty, initialize front and rear to 0
       front = rear = 0;
    } else {
       // Update front in a circular manner
       front = (front - 1 + SIZE) % SIZE;
    }
    deque[front] = element;
    printf("%d inserted at front.\n", element);
  }
}
int deleteRear() {
  if (isEmpty()) {
    printf("\nDeque is empty. Cannot delete from rear.\n");
    return -1;
  } else {
    int deleted = deque[rear];
    if (front == rear) {
       front = rear = -1;
    } else {
       rear = (rear - 1 + SIZE) % SIZE;
    printf("\nThe element deleted from rear is %d\n", deleted);
    return deleted;
  }
}
int deleteFront() {
  if (isEmpty()) {
    printf("\nDeque is empty. Cannot delete from front.\n");
```

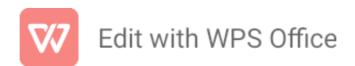


```
return -1;
  } else {
     int deleted = deque[front];
     if (front == rear) {
       front = rear = -1;
    } else {
       front = (front + 1) % SIZE;
     }
     printf("\nThe element deleted from front is %d\n", deleted);
     return deleted;
  }
}
void display() {
  if (isEmpty()) {
     printf("\nDeque is empty.\n");
  } else {
     printf("\nElements in the deque are: ");
     int i = front;
     while (i != rear) {
       printf("%d ", deque[i]);
       i = (i + 1) \% SIZE;
     printf("%d\n", deque[rear]);
  }
}
int main() {
  int choice = 1, x;
  while (choice < 7 && choice != 0) {
     printf("\nPress 1: Insert an element at the rear");
```



```
printf("\nPress 2: Insert an element at the front");
  printf("\nPress 3: Delete an element from the rear");
  printf("\nPress 4: Delete an element from the front");
  printf("\nPress 5: Display the elements");
  printf("\nEnter your choice: ");
  scanf("%d", &choice);
  switch (choice) {
     case 1:
       printf("Enter the element to be inserted at rear: ");
       scanf("%d", &x);
       insertRear(x);
       break;
     case 2:
       printf("Enter the element to be inserted at front: ");
       scanf("%d", &x);
       insertFront(x);
       break;
     case 3:
       deleteRear();
       break;
     case 4:
       deleteFront();
       break;
     case 5:
       display();
       break;
     default:
       printf("\nInvalid choice\n");
  }
return 0;
```

}



}

## o/p=

Press 1: Insert an element at the rear

Press 2: Insert an element at the front

Press 3: Delete an element from the rear

Press 4: Delete an element from the front

Press 5: Display the elements

Enter your choice: 1

Enter the element to be inserted at rear: 12

12 inserted at rear.

Press 1: Insert an element at the rear

Press 2: Insert an element at the front

Press 3: Delete an element from the rear

Press 4: Delete an element from the front

Press 5: Display the elements

Enter your choice: 2

Enter the element to be inserted at front: 12

12 inserted at front.

Press 1: Insert an element at the rear

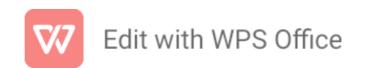
Press 2: Insert an element at the front

Press 3: Delete an element from the rear

Press 4: Delete an element from the front

Press 5: Display the elements

Enter your choice: 5



## Elements in the deque are: 12 12

Press 1: Insert an element at the rear

Press 2: Insert an element at the front

Press 3: Delete an element from the rear

Press 4: Delete an element from the front

Press 5: Display the elements

Enter your choice: 1

Enter the element to be inserted at rear: 13

13 inserted at rear.

Press 1: Insert an element at the rear

Press 2: Insert an element at the front

Press 3: Delete an element from the rear

Press 4: Delete an element from the front

Press 5: Display the elements

Enter your choice: 5

Elements in the deque are: 12 12 13

Press 1: Insert an element at the rear

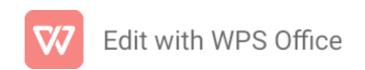
Press 2: Insert an element at the front

Press 3: Delete an element from the rear

Press 4: Delete an element from the front

Press 5: Display the elements

Enter your choice: 4



## The element deleted from front is 12

Press 1: Insert an element at the rear

Press 2: Insert an element at the front

Press 3: Delete an element from the rear

Press 4: Delete an element from the front

Press 5: Display the elements

Enter your choice: 3

The element deleted from rear is 13

Press 1: Insert an element at the rear

Press 2: Insert an element at the front

Press 3: Delete an element from the rear

Press 4: Delete an element from the front

Press 5: Display the elements

Enter your choice:

