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Roll number - 52
Sy it

```c
code-#include <stdio.h>
#define MAX 10

int deque[MAX];
int left = -1, right = -1;

void input_deque(void);
void output_deque(void);
void insert_left(void);
void insert_right(void);
void delete_left(void);
void delete_right(void);
void display(void);

int main() {
        int option;
        printf("\n *****MAIN MENU*****");
        printf("\n 1.Input restricted deque");
        printf("\n 2.Output restricted deque");
        printf("\n Enter your option : ");
        scanf("%d", &option);

        switch (option) {
        case 1:
        input_deque();
        break;
        case 2:
        output_deque();
        break;
        }
        return 0;
}

void input_deque() {
        int option;
        do {
        printf("\n INPUT RESTRICTED DEQUE");
        printf("\n 1.Insert at right");
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        printf("\n 2.Delete from left");
        printf("\n 3.Delete from right");
        printf("\n 4.Display");
        printf("\n 5.Quit");
        printf("\n Enter your option : ");
        scanf("%d", &option);

        switch (option) {
        case 1:
                insert_right();
                break;
        case 2:
                delete_left();
                break;
        case 3:
                delete_right();
                break;
        case 4:
                display();
                break;
        }
        } while (option != 5);
}

void output_deque() {
        int option;
        do {
        printf("OUTPUT RESTRICTED DEQUE");
        printf("\n 1.Insert at right");
        printf("\n 2.Insert at left");
        printf("\n 3.Delete from left");
        printf("\n 4.Display");
        printf("\n 5.Quit");
        printf("\n Enter your option : ");
        scanf("%d", &option);

        switch (option) {
        case 1:
                insert_right();
                break;
        case 2:
                insert_left();
                break;
        case 3:
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                delete_left();
                break;
        case 4:
                display();
                break;
        }
        } while (option != 5);
}

void insert_right() {
        int val;
        printf("\n Enter the value to be added: ");
        scanf("%d", &val);
        if ((left == 0 && right == MAX - 1) || (left == right + 1)) {
        printf("\n OVERFLOW");
        return;
        }
        if (left == -1) {
        /* If queue is initially empty */
        left = 0;
        right = 0;
        } else {
        if (right == MAX - 1) /* right is at the last position of queue */
        right = 0;
        else
        right = right + 1;
        }
        deque[right] = val;
}

void insert_left() {
        int val;
        printf("\n Enter the value to be added: ");
        scanf("%d", &val);
        if ((left == 0 && right == MAX - 1) || (left == right + 1)) {
        printf("\n Overflow");
        return;
        }

        if (left == -1) {
        /* If queue is initially empty */
        left = 0;
        right = 0;
        } else {
```

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        if (left == 0)
        left = MAX - 1;
        else
        left = left - 1;
        }
        deque[left] = val;
}

void delete_left() {
        if (left == -1) {
        printf("\n UNDERFLOW");
        return;
        }
        printf("\n The deleted element is: %d", deque[left]);
        if (left == right) /* Queue has only one element */
        {
        left = -1;
        right = -1;
        } else {
        if (left == MAX - 1)
        left = 0;
        else
        left = left + 1;
        }
}

void delete_right() {
        if (left == -1) {
        printf("\n UNDERFLOW");
        return;
        }
        printf("\n The element deleted is: %d", deque[right]);
        if (left == right) /* Queue has only one element */
        {
        left = -1;
        right = -1;
        } else {
        if (right == 0)
        right = MAX - 1;
        else
        right = right - 1;
        }
}
```

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void display() {
        int front = left, rear = right;
        if (front == -1) {
        printf("\n QUEUE IS EMPTY");
        return;
        }
        printf("\n The elements of the queue are: ");

        if (front <= rear) {
        while (front <= rear) {
        printf("%d ", deque[front]);
        front++;
        }
        } else {
        while (front <= MAX - 1) {
        printf("%d ", deque[front]);
        front++;
        }
        front = 0;
        while (front <= rear) {
        printf("%d ", deque[front]);
        front++;
        }
        }
        printf("\n");
}
```

Output

```
itl4@22DL407: ~                                           ×

tl4@22DL407:~$ ./a.out

*****MAIN MENU*****
1.Input restricted deque
2.Output restricted deque
Enter your option : 1

INPUT RESTRICTED DEQUE
1.Insert at right
2.Delete from left
3.Delete from right
4.Display
5.Quit
Enter your option : 1

Enter the value to be added: 52

INPUT RESTRICTED DEQUE
1.Insert at right
2.Delete from left
3.Delete from right
4.Display
5.Quit
Enter your option : 3

The element deleted is: 52
INPUT RESTRICTED DEQUE
1.Insert at right
2.Delete from left
3.Delete from right
4.Display
5.Quit
Enter your option : 4

QUEUE IS EMPTY
INPUT RESTRICTED DEQUE
1.Insert at right
2.Delete from left
3.Delete from right
4.Display
5.Quit
Enter your option : █
```