Input:

```c
#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("Enter your option : ");
 scanf("%d",&option);
 switch(option)
 {
  case 1:
  input_deque();
  break;

  case 2:printf("\n");
  output_deque();
  break;

 }
 return 0;
}
```

```c
void input_deque()
{
 int option;
 do
 {
  printf("\n INPUT RESTRICTED DEQUE");
  printf("\n 1.Insert at right");
  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);
}
```

```c
void output_deque()
{
 int option;
 do
 {
  printf("\n 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:
   delete_left();
   break;

   case 4:
   display();
   break;printf("\n");
  }
 }while(option!=5);
}
```

```c
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)
 {
  left = 0;
  right = 0;
 }

 else
 {
  if(right==MAX-1)
  {
   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)
 {
  left = 0;
  right = 0;
 }

 else
 {
  if(left==0)
  {
   left=MAX-1;
  }

  else
  {
   left=left-1;
  }
 }
 deque[left]=val;
}
```

output:

```c
void delete_left()
{
 if (left == -1)
 {
  printf("\n UNDERFLOW");
  return ;
 }

 printf("\n The deleted element is : %d", deque[left]);
 if(left == right)
 {
  left = -1;
  right = -1;
 }

 else
 {
  if(left==MAX-1)
  {
   left=0;
  }
  else
  {
   left=left+1;
  }
 }
}
```

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

```c
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");
}
```

```
student@dl405-HP-ProDesk-400-G7-Microtower-PC:~$ gedit Exp6.c
student@dl405-HP-ProDesk-400-G7-Microtower-PC:~$ gcc Exp6.c
student@dl405-HP-ProDesk-400-G7-Microtower-PC:~$ ./a.out

 *****MAIN MENU*****
 1.Input restricted deque
 2.Output restricted dequeEnter 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 : 2

 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 : 7

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

 The elements of the queue are : 27
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 : 7
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 : 2
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 : 2

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

```
student@dl405-HP-ProDesk-400-G7-Microtower-PC:~$ ./a.out

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


OUTPUT RESTRICTED DEQUE
1. INSERT AT RIGHT
2. INSERT AT LEFT
3. DELETE FROM LEFT
4. DISPLAY
5. QUIT
ENTER YOUR OPTION : 1

Enter the value to be added : 3

OUTPUT RESTRICTED DEQUE
1. INSERT AT RIGHT
2. INSERT AT LEFT
3. DELETE FROM LEFT
4. DISPLAY
5. QUIT
ENTER YOUR OPTION : 1

Enter the value to be added : 6

OUTPUT RESTRICTED DEQUE
1. INSERT AT RIGHT
2. INSERT AT LEFT
3. DELETE FROM LEFT
4. DISPLAY
5. QUIT
ENTER YOUR OPTION : 4

The elements of the queue are : 36

OUTPUT RESTRICTED DEQUE
1. INSERT AT RIGHT
2. INSERT AT LEFT
3. DELETE FROM LEFT
4. DISPLAY
5. QUIT
ENTER YOUR OPTION : 2

Enter the value to be added:1

OUTPUT RESTRICTED DEQUE
1. INSERT AT RIGHT
2. INSERT AT LEFT
3. DELETE FROM LEFT
4. DISPLAY
5. QUIT
ENTER YOUR OPTION : 2

Enter the value to be added:9

OUTPUT RESTRICTED DEQUE
1. INSERT AT RIGHT
2. INSERT AT LEFT
3. DELETE FROM LEFT
4. DISPLAY
5. QUIT
ENTER YOUR OPTION : 4

The elements of the queue are : 9136

OUTPUT RESTRICTED DEQUE
1. INSERT AT RIGHT
2. INSERT AT LEFT
3. DELETE FROM LEFT
4. DISPLAY
5. QUIT
ENTER YOUR OPTION : 4

The elements of the queue are : 9136


OUTPUT RESTRICTED DEQUE
1. INSERT AT RIGHT
2. INSERT AT LEFT
3. DELETE FROM LEFT
4. DISPLAY
5. QUIT
ENTER YOUR OPTION : 5
student@dl405-HP-ProDesk-400-G7-Microtower-PC:~$ gedit Exp6.c
student@dl405-HP-ProDesk-400-G7-Microtower-PC:~$
```