

LINKED LIST INSERTION OPERATIONS

PROGRAM:

```
Start here X Double ended queue.c X
1  #include <stdio.h>
2  #include <stdlib.h>
3
4  #define MAX 5
5
6  int dequeue[MAX];
7  int front = -1, rear = -1;
8
9  // Insert at the front end
10 void insertFront(int value) {
11     if ((front == 0 && rear == MAX - 1) || (front == rear + 1)) {
12         printf("Deque is full! Cannot insert.");
13         return;
14     }
15     if (front == -1) { // First element insertion
16         front = rear = 0;
17     } else if (front == 0) {
18         front = MAX - 1;
19     } else {
20         front -= 1;
21     }
22     dequeue[front] = value;
23     printf("%d inserted at front.", value);
24 }
25
26 // Insert at the rear end
27 void insertRear(int value) {
28     if ((front == 0 && rear == MAX - 1) || (front == rear + 1)) {
29         printf("Deque is full! Cannot insert.");
30         return;
31     }
32     if (front == -1) { // First element insertion
33         front = rear = 0;
34     } else if (rear == MAX - 1) {
35         rear = 0;
36     } else {
```

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Start here X Double ended queue.c X
36     } else {
37         rear += 1;
38     }
39     dequeue[rear] = value;
40     printf("%d inserted at rear.", value);
41 }
42
43 // Delete from the front end
44 void deleteFront() {
45     if (front == -1) {
46         printf("Dequeue is empty! Cannot delete.");
47         return;
48     }
49     printf("%d deleted from front.", dequeue[front]);
50     if (front == rear) { // Only one element
51         front = rear = -1;
52     } else if (front == MAX - 1) {
53         front = 0;
54     } else {
55         front++;
56     }
57 }
58
59 // Delete from the rear end
60 void deleteRear() {
61     if (front == -1) {
62         printf("Dequeue is empty! Cannot delete.");
63         return;
64     }
65     printf("%d deleted from rear.", dequeue[rear]);
66     if (front == rear) { // Only one element
67         front = rear = -1;
68     } else if (rear == 0) {
69         rear = MAX - 1;
70     } else {
71         rear--;
```

```

71         rear--;
72     }
73 }
74
75 // Display the dequeue
76 void display() {
77     if (front == -1) {
78         printf("Dequeue is empty!");
79         return;
80     }
81     printf("Dequeue elements are: ");
82     int i = front;
83     while (1) {
84         printf("%d ", dequeue[i]);
85         if (i == rear)
86             break;
87         i = (i + 1) % MAX;
88     }
89     printf(" ");
90 }
91
92 int main() {
93     int choice, value;
94
95     while (1) {
96         printf("--- DOUBLE ENDED QUEUE (DEQUEUE) ---");
97         printf("1. Insert at front");
98         printf("2. Insert at rear");
99         printf("3. Delete front");
100        printf("4. Delete rear");
101        printf("5. Display queue");
102        printf("6. Exit");
103        printf("Enter your choice: ");
104        scanf("%d", &choice);
105
106        switch (choice) {

```

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100     printf("4. Delete rear");
101     printf("5. Display queue");
102     printf("6. Exit");
103     printf("Enter your choice: ");
104     scanf("%d", &choice);
105
106     switch (choice) {
107     case 1:
108         printf("Enter value to insert at front: ");
109         scanf("%d", &value);
110         insertFront(value);
111         break;
112     case 2:
113         printf("Enter value to insert at rear: ");
114         scanf("%d", &value);
115         insertRear(value);
116         break;
117     case 3:
118         deleteFront();
119         break;
120     case 4:
121         deleteRear();
122         break;
123     case 5:
124         display();
125         break;
126     case 6:
127         exit(0);
128     default:
129         printf("Invalid choice! Try again.");
130     }
131 }
132 return 0;
133 }
134
```

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--- Singly Linked List Operations ---1. Insert at Beginning2. Insert at End3. Insert at Position4. Display5. ExitEnter your choice: 1
Enter data to insert: 10
Node inserted at beginning.--- Singly Linked List Operations ---1. Insert at Beginning2. Insert at End3. Insert at Position4. Display5. ExitEnter your choice: 2
Enter data to insert: 20
Node inserted at end.--- Singly Linked List Operations ---1. Insert at Beginning2. Insert at End3. Insert at Position4. Display5. ExitEnter your choice: 2
Enter data to insert: 30
Node inserted at end.--- Singly Linked List Operations ---1. Insert at Beginning2. Insert at End3. Insert at Position4. Display5. ExitEnter your choice: 3
Enter data to insert: 25
Enter position: 3
Node inserted at position 3.--- Singly Linked List Operations ---1. Insert at Beginning2. Insert at End3. Insert at Position4. Display5. ExitEnter your choice: 4
Linked List elements: 10 -> 20 -> 25 -> 30 -> NULL--- Singly Linked List Operations ---1. Insert at Beginning2. Insert at End3. Insert at Position4. Display
5. ExitEnter your choice: 1
Enter data to insert: 5
Node inserted at beginning.--- Singly Linked List Operations ---1. Insert at Beginning2. Insert at End3. Insert at Position4. Display5. ExitEnter your choice: 4
Linked List elements: 5 -> 10 -> 20 -> 25 -> 30 -> NULL--- Singly Linked List Operations ---1. Insert at Beginning2. Insert at End3. Insert at Position4. Display5. ExitEnter your choice: 5
Exiting...
Process returned 0 (0x0)   execution time : 99.988 s
Press any key to continue.

```