

**3b) WAP to simulate the working of a circular queue of integers using an array. Provide the following operations: Insert, Delete & Display
The program should print appropriate messages for queue empty and queue overflow conditions**

```

1 #include <stdio.h>
2 #include <stdlib.h>
3
4 #define MAX 5
5
6 int queue [ MAX ];
7 int front = -1, rear = -1;
8
9 void insert (int x) {
10    if ((front == 0 && rear == MAX - 1) || (rear + 1 == front)) {
11        printf ("Queue Overflow\n");
12    } else {
13        if (front == -1) {
14            front = rear = 0;
15        } else {
16            rear = (rear + 1) % MAX;
17        }
18        queue [ rear ] = x;
19        printf ("Added inserted\n", x);
20    }
21}
22
23 void del () {
24    if (front == -1) {
25        printf ("Queue Underflow\n");
26    } else {
27        printf ("Deleted element: %d\n", queue [ front ]);
28        if (front == rear) {
29            front = rear = -1;
30        } else {
31            front = (front + 1) % MAX;
32        }
33    }
34}
35
36 void display () {
37    if (front == -1) {
38        printf ("Queue is empty\n");
39    } else {
40        int i = front;
41        while (1) {
42            printf ("%d ", queue [ i ]);
43            if (i == rear) break;
44            i = (i + 1) % MAX;
45        }
46        printf ("\n");
47    }
48}
49
50 int main () {
51    int choice, value;
52    while (1) {
53        printf ("1. Insert\n2. Delete\n3. Display\n4. Exit\nEnter your choice: ");
54    }
55}

```

The code implements a circular queue using an array of size MAX (5). It includes functions for insertion, deletion, and display. The main loop allows the user to choose between these operations or exit.

Compilation results...

- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\apurv\Documents\c_programs\p32.exe
- Output Size: 130.5703125 KiB
- Compilation Time: 0.34s

Line: 23 Col: 13 Sel: 0 Lines: 82 Length: 1699 Insert Done parsing in 0 seconds

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The screenshot shows the Dev-C++ IDE interface. The code editor displays a C++ program (p32.cpp) with syntax highlighting. The compiler log shows successful compilation with 0 errors and 0 warnings. The terminal window below shows the execution of the program, which is a menu-driven application for a queue. It handles insertions, deletions, and displays the queue's state. The desktop taskbar at the bottom shows various application icons and system status.

```
C:\Users\apurv\Documents\c_programs\p32.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
| (globals) | TDM-GCC 4.9.2 64-bit Release |
Project Classes Debug p32.cpp
33 while ( 1 ) {
34     printf ("1. Insert\n2. Delete\n3. Display\n4. Exit\nEnter your choice: ");
35     scanf ("%d", &choice );
36
37     switch ( choice ) {
38         case 1:
39             printf ("Enter value to insert: ");
40             scanf ("%d", &value );
41             insert ( value );
42             break;
43
44         case 2:
45             del ();
46             break;
47
48         case 3:
49             display ();
50             break;
51
52         case 4:
53             exit ( 0 );
54
55         default:
56             printf ("Invalid choice\n");
57
58     }
59
60
61 }
62
63 return 0;
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82

Compiler Resources Compile Log Debug Find Results Close
Abort Compilation Compilation results...
---  
- Errors: 0  
- Warnings: 0  
- Output Filename: C:\Users\apurv\Documents\c_programs\p32.exe  
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Line: 23 Col: 13 Sel: 0 Lines: 82 Length: 1699 Insert Done parsing in 0 seconds
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C:\Users\apurv\Documents\c_programs\p32.exe
4. Exit
Enter your choice: 34
Invalid choice

1. Insert
2. Delete
3. Display
4. Exit
Enter your choice: 56
Invalid choice

1. Insert
2. Delete
3. Display
4. Exit
Enter your choice: 2
Deleted element: 23

1. Insert
2. Delete
3. Display
4. Exit
Enter your choice: 3
Queue is empty

1. Insert
2. Delete
3. Display
4. Exit
Enter your choice:

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```