

LAB-4

DOUBLE ENDED QUEUE

include < stdio.h >

~~# define q size 5~~

include < stdlib.h >

define q size 5

int f = 0, r = -1, ch;

int item, q[10];

int is full()

{

return (r == q size - 1) ? 1 : 0;

}

int is empty()

{

return (f > r) ? 1 : 0;

}

void insert - rear()

{

if (is full())

{

printf ("queue overflow\n");

return;

}

```
r = r + 1;  
q[r] = item;  
}
```

```
void delete-front()  
{
```

```
    if (is empty())  
    {
```

```
        printf ("queue empty \n");  
        return;  
    }
```

```
    printf ("item deleted is %d \n", q[f]++);  
    if (f > r)
```

```
    {  
        f = 0;  
        r = -1;  
    }
```

```
    }  
void insert-front()  
{
```

```
    if (f != 0)
```

```
    {  
        f = f - 1;  
        q[f] = item;  
        return;  
    }
```



```
else if (f == 0) && (r == -1)
```

```
{  
    q[++r] = item;  
    return;  
}
```

```
else
```

```
    printf("insertion not possible\n");  
}
```

```
void delete_rear()
```

```
{  
    if (is_empty())  
    {
```

```
        printf("queue is empty\n");  
        return;  
    }
```

```
    printf("item deleted is %d\n", q[r--]);  
    if (f > r)
```

```
    {  
        f = 0;  
        r = -1;  
    }
```

```
}
```

```
void display()
```

```
{  
    int i;
```

```
if (is empty())
```

```
{  
    printf("queue empty \n");  
    return;  
}
```

```
for (i = 1; i <= n; i++)
```

```
    printf("%d", q[i]);
```

```
}
```

```
void main()
```

```
{  
    for(;;)
```

```
        printf("1.insert-rear \n 2. insert-front \n 3.  
        delete-rear \n 4. delete-front \n 5. display  
        6. exit \n");
```

```
        printf("enter choice \n");
```

```
        scanf("%d", &ch);
```

```
        switch (ch)
```

```
{
```

```
    case 1: printf("enter the item \n");
```

```
            scanf("%d", &item);
```

```
            insert-rear();
```

```
            break;
```



```
case 2: printf("enter the item\n"),
scanf("%d", &item),
insert_front();
break;
```

```
case 3: delete_rear();
break;
```

```
case 4: delete_front();
break;
```

```
case 5: display();
break;
```

```
default: exit(0);
```

```
}
```

```
}
```

```
}
```

```
C:\Users\Ganesh\Downloads\Fan\Wetricks.exe
1
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice
1
enter the item
2
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice
1
enter the item
3
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice
1
enter the item
4
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice
3
Item deleted is 4
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice
5
1
2
3
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice
6
Process returned 0 (0x0)   execution time : 130.711 s
Press any key to continue.
```

```
SVA_DQA (4) - Notepad
File Edit Format View Help

#include<stdio.h>
#include<conio.h>
#include<process.h>
#define qsize 5
int f=0,r=-1,ch;
int item,q[10];

int isfull()
{
    return(r==qsize-1)?1:0;
}
int isempty()
{
    return(f>r)?1:0;
}
void insert_rear()
{
    if(isfull())
    {
        printf("queue overflow\n");
        return;
    }
    r=r+1;
    q[r]=item;
}
void delete_front()
{
    if(isempty())
    {
        printf("queue empty\n");
        return;
    }
    printf("item deleted is %d\n",q[(f)++]);
    if(f>r)
    {
        f=0;
    }
}
```

```
SVA_DQA (4) - Notepad
File Edit Format View Help

if(f>r)
{
    f=0;
    r=-1;
}
}
void insert_front()
{
    if(f!=0)
    {
        f=f-1;
        q[f]=item;
        return;
    }
    else if((f==0)&&(r==1))
    {
        q[++(r)]=item;
        return;
    }
    else
        printf("insertion not possible\n");
}
void delete_rear()
{
    if(isempty())
    {
        printf("queue is empty\n");
        return;
    }
    printf("item deleted is %d\n",q[(r)--]);
    if(f>r)
    {
        f=0;
        r=-1;
    }
}
```

09:18 PM
08-11-2020


```
SVA_DQA (4) - Notepad
File Edit Format View Help

    r=-1;
    }
}
void display()
{
    int i;
    if(isempty())
    {
        printf("queue empty\n");
        return;
    }
    for(i=f;i<=r;i++)
        printf("%d\n",q[i]);
}
void main()
{
    clrscr();
    for(;;)
    {
        printf("1.insert_rear\n2.insert_front\n3.delete_rear\n4.delete_front\n5.display\n6.exit\n");
        printf("enter choice\n");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1:printf("enter the item\n");
                    scanf("%d",&item);
                    insert_rear();
                    break;
            case 2:printf("enter the item\n");
                    scanf("%d",&item);
                    insert_front();
                    break;
            case 3:delete_rear();
                    break;
            case 4:delete_front();
        }
    }
}
```

Windows taskbar and system tray are visible at the bottom of the window. The system tray shows the date and time as 08:18 PM, 08-11-2020.

```
SVA_DQA (4) - Notepad
File Edit Format View Help

    return;
}
for(i=f;i<=r;i++)
    printf("%d\n",q[i]);
}
void main()
{
    clrscr();
    for(;;)
    {
        printf("1.insert_rear\n2.insert_front\n3.delete_rear\n4.delete_front\n5.display\n6.exit\n");
        printf("enter choice\n");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1:printf("enter the item\n");
                    scanf("%d",&item);
                    insert_rear();
                    break;
            case 2:printf("enter the item\n");
                    scanf("%d",&item);
                    insert_front();
                    break;
            case 3:delete_rear();
                    break;
            case 4:delete_front();
                    break;
            case 5:display();
                    break;
            default:exit(0);
        }
    }
    getch();
}
```

Windows taskbar icons: File Explorer, Google Chrome, Microsoft Excel, Microsoft Word, Notepad. System tray: 08:19 PM, 08-11-2020.

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```
1 #include<stdio.h>
2 #include<stdlib.h>
3 #define qsize 3
4 int f=0,r=-1,ch;
5 int item,q[10];
6 int isfull()
7 {
8     return(r==qsize-1)?1:0;
9 }
10 int isempty()
11 {
12     return(f>r)?1:0;
13 }
14 void insert_rear()
15 {
16     if(isfull())
17     {
18         printf("queue overflow\n");
19         return;
20     }
21     r=r+1;
22     q[r]=item;
23 }
24 void delete_front()
25 {
26     if(isempty())
27     {
28         printf("queue empty\n");
29         return;
30     }
31     f=f+1;
32 }
```

```
> clang-7 -pthread -lm -o main main.c
> ./main
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 1
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 2
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 3
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 4
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 4
1
2
3
4
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 2
item deleted is 4
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 2
item deleted is 3
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 1
```

Windows Taskbar: File Explorer, Google Chrome, Microsoft Word, 09:24 PM 08-11-2020

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C C Run Share

```
22 q[r]=item;
23 }
24 void delete_front()
25 {
26     if(isempty())
27     {
28         printf("queue empty\n");
29         return;
30     }
31     printf("item deleted is %d\n",q[(f++)]);
32     if(f>r)
33     {
34         f=0;
35         r=-1;
36     }
37 }
38 void delete_rear()
39 {
40     if(isempty())
41     {
42         printf("queue is empty\n");
43         return;
44     }
45     printf("item deleted is %d\n",q[(r--)]);
46     if(f>r)
47     {
48         f=0;
49         r=-1;
50     }
51 }
```

```
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 4
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 4
1
2
3
4
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 2
item deleted is 4
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 2
item deleted is 3
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 1
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 2
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 2
queue is empty
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 4
queue empty
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 5
```

Windows Taskbar: 09:24 PM 08-11-2020

The screenshot shows a web browser window with the Repl.it online compiler. The browser's address bar shows the URL `repl.it/languages/c`. The Repl.it interface includes a top navigation bar with links for Features, Jobs, Blog, Pricing, and Jam, along with Log in and Sign up buttons. The main workspace is divided into two panes. The left pane contains C code for a queue implementation, and the right pane shows the output of the program.

```
47 - {
48 -   f=0;
49 -   r=-1;
50 - }
51 -
52 - void display()
53 - {
54 -   int i;
55 -   if(isempty())
56 -   {
57 -     printf("queue empty\n");
58 -     return;
59 -   }
60 -   for(i=f;i<=r;i++)
61 -     printf("%d\n",q[i]);
62 - }
63 - int main()
64 - {
65 -   for(;;)
66 -   {
67 -     printf("1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit\n");
68 -     printf("enter choice : ");
69 -     scanf("%d",&ch);
70 -     switch(ch)
71 -     {
72 -     case 1:printf("enter the item : ");
```

The output pane displays the program's execution, showing the menu and the results of various operations:

```
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 4
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 4
1
2
3
4
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 2
item deleted is 4
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 2
item deleted is 3
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 1
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 2
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 2
queue is empty
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 4
queue empty
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 5
```

The screenshot shows a web browser window with the Repl.it online compiler. The browser's address bar displays `repl.it/languages/c`. The page header includes the Repl.it logo and navigation links: Features, Jobs, Blog, Pricing, and Jam. On the right side of the header are 'Log in' and 'Sign up' buttons. The main interface has a dark theme. At the top left, there's a dropdown menu set to 'C' and a green 'Run' button. Below these, the code editor on the left contains a C program for a linked list. The code defines a `Node` structure with `data` and `next` pointers, and implements functions for inserting, deleting, and displaying nodes. The `main` function uses a `switch` statement to handle user choices for these operations. The output window on the right shows the program's execution, displaying the menu and the results of several operations: inserting 4, deleting 4, deleting 3, deleting 1, deleting 2, and checking for an empty queue. The Windows taskbar at the bottom shows icons for various applications and the system clock indicating 09:24 PM on 08-11-2020.

```
65 for(;;)
66 {
67     printf("1.insert_rear 2.delete_rear 3.delete_front 4.display
        5.exit\n");
68     printf("enter choice : ");
69     scanf("%d",&ch);
70     switch(ch)
71     {
72     case 1:printf("enter the item : ");
73             scanf("%d",&item);
74             insert_rear();
75             break;
76     case 2:delete_rear();
77             break;
78     case 3:delete_front();
79             break;
80     case 4:display();
81             break;
82     default:exit(0);
83     }
84 }
85 }
86 }
```

1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 4
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 4
1
2
3
4
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 2
item deleted is 4
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 2
item deleted is 3
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 1
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 2
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 2
queue is empty
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 4
queue empty
1.insert_rear 2.delete_rear 3.delete_front 4.display 5.exit
enter choice : 5

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```
1 #include<stdio.h>
2 #include<stdlib.h>
3 #define qsize 3
4 int f=0,r=-1,ch;
5 int item,q[10];
6 int isfull()
7 {
8     return(r==qsize-1)?1:0;
9 }
10 int isempty()
11 {
12     return(f>r)?1:0;
13 }
14 void insert_rear()
15 {
16     if(isfull())
17     {
18         printf("queue overflow\n");
19         return;
20     }
21     r=r+1;
22     q[r]=item;
23 }
24 void delete_front()
25 {
26     if(isempty())
27     {
28         printf("queue empty\n");
29         return;
30     }
31     f=f+1;
32 }
```

```
> clang-7 -pthread -lm -o main main.c
> ./main
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 1
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 2
enter the item : 2
insertion not possible
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 2
enter the item : 4
insertion not possible
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 4
1
3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 1
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
queue empty
```

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```
--
26 if(isempty())
27 {
28     printf("queue empty\n");
29     return;
30 }
31 printf("item deleted is %d\n",q[(f++)]);
32 if(f>r)
33 {
34     f=0;
35     r=-1;
36 }
37 }
38 void insert_front()
39 {
40     if(f!=0)
41     {
42         f=f-1;
43         q[f]=item;
44         return;
45     }
46     else if((f==0)&&(r==1))
47     {
48         q[++(r)]=item;
49         return;
50     }
51     else
52     printf("insertion not possible\n");
```

```
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 1
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 2
enter the item : 2
insertion not possible
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 2
enter the item : 4
insertion not possible
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 4
1
3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 1
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
queue empty
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 5
```

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Run

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```
50 }
51 else
52     printf("insertion not possible\n");
53 }
54 void display()
55 {
56     int i;
57     if(isempty())
58     {
59         printf("queue empty\n");
60         return;
61     }
62     for(i=f;i<=r;i++)
63         printf("%d\n",q[i]);
64 }
65 int main()
66 {
67     for(;;)
68     {
69         printf("1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit\n");
70         printf("enter choice : ");
71         scanf("%d",&ch);
72         switch(ch)
73         {
74             case 1:printf("enter the item : ");
75                     scanf("%d",&item);
76                     insert_rear();
```

```
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 1
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 2
enter the item : 2
insertion not possible
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 2
enter the item : 4
insertion not possible
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 4
1
3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 1
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
queue empty
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 5
```

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```
68 {
69 printf("1.insert_rear 2.insert_front 3.delete_front 4.display
5.exit\n");
70 printf("enter choice : ");
71 scanf("%d",&ch);
72 switch(ch)
73 {
74 case 1:printf("enter the item : ");
75 scanf("%d",&item);
76 insert_rear();
77 break;
78 case 2:printf("enter the item : ");
79 scanf("%d",&item);
80 insert_front();
81 break;
82 case 3:delete_front();
83 break;
84 case 4:display();
85 break;
86 default:exit(0);
87 }
88 }
89 }
90 }
91 }
```

```
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 1
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 2
enter the item : 2
insertion not possible
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 1
enter the item : 3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 2
enter the item : 4
insertion not possible
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 4
1
3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 1
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
item deleted is 3
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 3
queue empty
1.insert_rear 2.insert_front 3.delete_front 4.display 5.exit
enter choice : 5
```

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