

Double Circular Queue

จัดทำโดย

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ไฟล์ทั้งหมดในการทำโปรแกรม

app2.c -> ใช้ในการ run app เป็นการเรียกใช้ 2 ไฟล์ข้างล่าง

DoubleCircularQueue.c -> เป็น function กระบวนการทั้งหมด ของ DCQ

System.c -> ใช้ในการแสดงผล และ ดัก input ต่างๆ

ช่องทางเพิ่มเติม หากต้องการนำไปใช้งาน

Github : [NutNaphop/Circular_Array_C: Using for Project \(github.com\)](https://github.com/NutNaphop/Circular_Array_C_Using_for_Project)

app2.c

```
1  #include <stdio.h>
2  #include <string.h>
3  #include <stdlib.h>
4  #include <ctype.h>
5  #include "DoubleCircularQueue.c"
6  #include "System.c"
7
8  int isRunning = 1;
9  int val;
10 char input[2];
11
12 int main() {
13     while (isRunning) {
14         clear() ;
15         displayMenu();
16         printf("Enter your choice: ");
17         scanf("%s", input);
18         while (getchar() != '\n') ;
19         // Using for get input only one word , with out whitespace
20         clear() ;
21         if (isInt(input)) {
22             switch (atoi(input)) {
23                 case 1 :
24                     displayEF() ;
25                     printf("Enter the number you want to enqueue at the front: ");
26                     scanf("%s", input);
27                     while (getchar() != '\n') ;
28                     // Using for get input only one word , with out whitespace
29                     if (isInt(input)) {
30                         val = atoi(input);
31                         enqueueFront(val);
32                     }
33                     else {
34                         printf("Invalid input. Please enter a valid integer.\n");
35                     }
36                     break;
37                 case 2:
38                     displayER() ;
39                     printf("Enter the number you want to enqueue at the rear: ");
40                     scanf("%s", input);
41                     while (getchar() != '\n') ;
42                     // Using for get input only one word , with out whitespace
43                     if (isInt(input)){
44                         val = atoi(input);
45                         enqueueRear(val);
46                     }
47                     else {
48                         printf("Invalid input. Please enter a valid integer.\n");
49                     }
50                     break;
51                 case 3:
52                     displayDF() ;
53                     dequeueFront();
54                     break;
55                 case 4:
56                     displayDR() ;
57                     dequeueRear();
58                     break;
59                 case 5:
60                     displayItem() ;
61                     showItem() ;
62                     break;
63                 case 6:
64                     displayEXIT() ;
65                     isRunning = 0;
66                     printf("Exiting the program.\n");
67                     break;
68                 default:
69                     printf("Invalid choice. Please try again.\n");
70                     break;
71             }
72             wait() ;
73         }
74         else {
75             displayMenu() ;
76             printf("Invalid input. Please enter a valid integer.\n");
77             wait() ;
78         }
79     }
80 }
```

DoubleCircularQueue.c

```
1  #include <stdio.h>
2  #include <stdlib.h>
3
4  #define SIZE 5
5  int items[SIZE];
6  int front = -1, rear = -1;
7
8  // Function
9  int enqueueFront(int data);
10 int enqueueRear(int data);
11 int dequeueFront();
12 int dequeueRear();
13 void showItem();
14 int isFull();
15 int isEmpty();
16
17
18 int enqueueFront(int data) {
19     if (isFull()) {
20         printf("Queue is full. Cannot enqueue at the front.\n");
21         return 0;
22     }
23     if (isEmpty()) {
24         front = 0;
25         rear = 0;
26     }
27     else {
28         front = (front - 1 + SIZE) % SIZE;
29     }
30     items[front] = data;
31     printf("Enqueued %d at the front. Enqueue Front Complete.\n", items[front]);
32     showItem() ;
33 }
34
35 int enqueueRear(int data) {
36     if (isFull()) {
37         printf("Queue is full. Cannot enqueue at the rear.\n");
38         return 0;
39     }
40     if (isEmpty()) {
41         front = 0;
42         rear = 0;
43     }
44     else {
45         rear = (rear + 1) % SIZE;
46     }
47     items[rear] = data;
48     printf("Enqueued %d at the rear. Enqueue Complete.\n", items[rear]);
49     showItem() ;
50 }
51
52 int dequeueFront() {
53     if (isEmpty()) {
54         printf("Queue is empty. Cannot dequeue from the front.\n");
55         return 0;
56     }
57     printf("Dequeued item: %d. Dequeue Complete!\n", items[front]);
58     if (front == rear) {
59         front = -1;
60         rear = -1;
61     }
62     else {
63         front = (front + 1) % SIZE;
64     }
65     showItem() ;
66 }
```

```

1  int deQueueRear() {
2      if (isEmpty()) {
3          printf("Queue is empty. Cannot dequeue from the rear.\n");
4          return 0;
5      }
6      printf("Dequeued item: %d. Dequeue Complete!\n", items[rear]);
7      if (front == rear) {
8          front = -1;
9          rear = -1;
10     }
11     else {
12         rear = (rear - 1 + SIZE) % SIZE;
13     }
14     showItem() ;
15 }
16
17 void showItem() {
18     printf("*****\n");
19     printf("Front -> %d\n", front);
20
21     if (isEmpty()) {
22         printf("Queue is empty. Nothing to display.\n");
23     }
24
25     else {
26         printf("\n") ;
27         for (int i = front; i != rear; i = (i + 1) % SIZE) {
28             printf("%d ->", items[i]);
29         }
30         printf("%d" , items[rear]) ;
31     }
32     printf("\n\nRear -> %d\n", rear);
33     printf("*****\n");
34 }
35
36 int isFull() {
37     if ((rear + 1) % SIZE == front) {
38         return 1;
39     }
40     return 0;
41 }
42
43 int isEmpty() {
44     if (front == -1 && rear == -1) {
45         return 1;
46     }
47     return 0;
48 }
49

```

System.c

```
1 #include <stdio.h>
2 #include <stdlib.h>
3 #include <ctype.h>
4
5 void clear();
6 void wait();
7 int isInt(char *str);
8 void clear();
9 void wait();
10
11 void displayMenu() {
12     printf("\n");
13     printf("***** Double Circular Queue *****\n");
14     printf("[1] Enqueue at Front\n");
15     printf("[2] Enqueue at Rear\n");
16     printf("[3] Dequeue from Front\n");
17     printf("[4] Dequeue from Rear\n");
18     printf("[5] Display Queue\n");
19     printf("[6] Exit\n");
20     printf("*****\n");
21 }
22
23 void displayEF() {
24     printf("\n");
25     printf("***** Double Circular Queue *****\n");
26     printf("[1] Enqueue at Front\n");
27     printf("\n");
28     printf("\n");
29     printf("\n");
30     printf("\n");
31     printf("\n");
32     printf("*****\n");
33 }
34
35 void displayER() {
36     printf("\n");
37     printf("***** Double Circular Queue *****\n");
38     printf("\n");
39     printf("[2] Enqueue at Rear\n");
40     printf("\n");
41     printf("\n");
42     printf("\n");
43     printf("\n");
44     printf("*****\n");
45 }
46
47 void displayOF() {
48     printf("\n");
49     printf("***** Double Circular Queue *****\n");
50     printf("\n");
51     printf("\n");
52     printf("[3] Dequeue from Front\n");
53     printf("\n");
54     printf("\n");
55     printf("\n");
56     printf("*****\n");
57 }
58
59 void displayOR() {
60     printf("\n");
61     printf("***** Double Circular Queue *****\n");
62     printf("\n");
63     printf("\n");
64     printf("\n");
65     printf("[4] Dequeue from Rear\n");
66     printf("\n");
67     printf("\n");
68     printf("*****\n");
69 }
70
71 void displayItem() {
72     printf("\n");
73     printf("***** Double Circular Queue *****\n");
74     printf("\n");
75     printf("\n");
76     printf("\n");
77     printf("\n");
78     printf("[5] Display Queue\n");
79     printf("\n");
80     printf("*****\n");
81 }
82
83 void displayEXIT() {
84     printf("\n");
85     printf("***** Double Circular Queue *****\n");
86     printf("\n");
87     printf("\n");
88     printf("\n");
89     printf("\n");
90     printf("\n");
91     printf("[6] Exit\n");
92     printf("*****\n");
93 }
94
95 int isInt(char *str) {
96     while (*str) {
97         if (!isdigit(*str)) {
98             return 0;
99         }
100         str++;
101     }
102     return 1;
103 }
104
105 void clear() {
106     system("cls");
107 }
108
109 void wait() {
110     system("pause");
111 }
112
```

Example of program display

#การแสดงผลทางหน้าจอเมื่อเปิดโปรแกรม

```
***** Double Circular Queue *****
* [1] Enqueue at Front                      *
* [2] Enqueue at Rear                      *
* [3] Dequeue from Front                  *
* [4] Dequeue from Rear                  *
* [5] Display Queue                      *
* [6] Exit                              *
*****
Enter your choice:
```

#เมื่อเลือก [1] Enqueue at Front

```
***** Double Circular Queue *****
* [1] Enqueue at front                      *
*                                           *
*                                           *
*                                           *
*                                           *
*                                           *
*                                           *
*****
Enter the number you want to enqueue at the front: 5
Enqueued 5 at the front. Enqueue Front Complete.
*****
Front -> 0

5

Rear -> 0
*****
Press any key to continue . . .
```


#เมื่อเลือก [2] Enqueue at Rear

```
***** Double Circular Queue *****
*
* [2] Enqueue at Rear
*
*
*
*
*
*****
Enter the number you want to enqueue at the rear: 7
Enqueued 7 at the rear. Enqueue Complete.
*****
Front -> 0

5 ->7

Rear -> 1
*****
Press any key to continue . . . █
```

#เมื่อเลือก [3] Dequeue at Front

```
***** Double Circular Queue *****
*
*
* [3] Dequeue from Front
*
*
*
*
*****
Dequeued item: 1. Dequeue Complete!
*****
Front -> 0

5 ->7

Rear -> 1
*****
Press any key to continue . . .
```


#เมื่อเลือก [4] Dequeue at Rear

```
***** Double Circular Queue *****
*                                                                           *
*                                                                           *
*                                                                           *
* [4] Dequeue from Rear                                                  *
*                                                                           *
*                                                                           *
*****
Dequeued item: 7. Dequeue Complete!
*****
Front -> 0

5

Rear -> 0
*****
Press any key to continue . . .
```

#เมื่อเลือก [5] Display Queue

```
***** Double Circular Queue *****
*                                                                           *
*                                                                           *
*                                                                           *
* [5] Display Queue                                                    *
*                                                                           *
*****
Front -> 3

99 ->1 ->5 ->41 ->74

Rear -> 2
*****
Press any key to continue . . . █
```

#เมื่อ Input ค่าที่ไม่ใช่ Integer

```
***** Double Circular Queue *****
* [1] Enqueue at Front *
* [2] Enqueue at Rear *
* [3] Dequeue from Front *
* [4] Dequeue from Rear *
* [5] Display Queue *
* [6] Exit *
*****
Invalid input. Please enter a valid integer.
Press any key to continue . . .
```

```
***** Double Circular Queue *****
* [1] Enqueue at front *
* * *
* * *
* * *
* * *
* * *
* * *
*****
Enter the number you want to enqueue at the front: 1.1
Invalid input. Please enter a valid integer.
Press any key to continue . . .
```

```
***** Double Circular Queue *****
* * *
* [2] Enqueue at Rear *
* * *
* * *
* * *
* * *
* * *
*****
Enter the number you want to enqueue at the rear: 1af
Invalid input. Please enter a valid integer.
Press any key to continue . . .
```