

```
Stack_Queue.c - CodeBlocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools- Plugins Doc/Books Settings Help
Start here X "Sort_Reverse_Concate" X Stack_Queue.c X
1 #include <stdio.h>
2 #include <stdlib.h>
3
4
5 struct Node {
6     int data;
7     struct Node *next;
8 };
9
10 struct Node *top = NULL;
11 struct Node *front = NULL;
12 struct Node *rear = NULL;
13
14
15 void push(int value) {
16     struct Node *newNode;
17
18     newNode = (struct Node*)malloc(sizeof(struct Node));
19     if (newNode == NULL) {
20         printf("Memory allocation failed.\n");
21         return;
22     }
23
24     newNode->data = value;
25     newNode->next = top;
26     top = newNode;
27
28     printf("kd pushed into stack.\n", value);
29 }
30
31
32 void pop() {
33     struct Node *temp;
34
35     if (top == NULL) {
36         printf("Stack is empty.\n");
37         return;
38     }
39
40     temp = top;
41     printf("kd popped from stack.\n", temp->data);
42     top = top->next;
43     free(temp);
44 }
45
46
47 void displayStack() {
48     struct Node *temp;
49
50     if (top == NULL) {
51         printf("Stack is empty.\n");
52         return;
53     }
54 }
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```

```
Stack_Queue.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools- Plugins DocyBlocks Settings Help
Start here X Sort_Reverse_Concat X Stack_Queue X
103
104     free(temp);
105 }
106
107
108 void displayQueue() {
109     struct Node *temp;
110
111     if (front == NULL) {
112         printf("Queue is empty.\n");
113         return;
114     }
115
116     temp = front;
117     printf("Queue: ");
118     while (temp != NULL) {
119         printf("%d -> ", temp->data);
120         temp = temp->next;
121     }
122     printf("\n");
123 }
124
125
126 int main() {
127     int choice, value;
128
129     while (1) {
130         printf("\n--- Linked List Stack & Queue ---\n");
131         printf("1. Push (Stack)\n");
132         printf("2. Pop (Stack)\n");
133         printf("3. Display Stack\n");
134         printf("4. Enqueue (Queue)\n");
135         printf("5. Dequeue (Queue)\n");
136         printf("6. Display Queue\n");
137         printf("7. Exit\n");
138
139         printf("Enter your choice: ");
140         scanf("%d", &choice);
141
142         switch (choice) {
143             case 1:
144                 printf("Enter value to push: ");
145                 scanf("%d", &value);
146                 push(value);
147                 break;
148             case 2:
149                 pop();
150                 break;
151             case 3:
152                 displayStack();
153                 break;
154             case 4:
155                 enqueue(value);
156                 break;
157             case 5:
158                 dequeue();
159                 break;
160             case 6:
161                 displayQueue();
162                 break;
163             case 7:
164                 exit(0);
165             default:
166                 printf("Invalid choice\n");
167         }
168     }
169     return 0;
170 }
```

```
Stack_Queue.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools- Plugins DocyBlocks Settings Help
Start here X Sort_Reverse_Concat X Stack_Queue X
130     printf("\n--- Linked List Stack & Queue ---\n");
131     printf("1. Push (Stack)\n");
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135     printf("5. Dequeue (Queue)\n");
136     printf("6. Display Queue\n");
137     printf("7. Exit\n");
138
139     printf("Enter your choice: ");
140     scanf("%d", &choice);
141
142     switch (choice) {
143         case 1:
144             printf("Enter value to push: ");
145             scanf("%d", &value);
146             push(value);
147             break;
148         case 2:
149             pop();
150             break;
151         case 3:
152             displayStack();
153             break;
154         case 4:
155             enqueue(value);
156             break;
157         case 5:
158             dequeue();
159             break;
160         case 6:
161             displayQueue();
162             break;
163         case 7:
164             exit(0);
165         default:
166             printf("Invalid choice\n");
167     }
168     return 0;
169 }
```

```
D:\chehan\DP\Stack_Queue.exe
3. Display Stack
4. Enqueue (Queue)
5. Dequeue (Queue)
6. Display Queue
7. Exit
Enter your choice: 1
Enter value to push: 23
23 pushed into stack.

--- Linked List Stack & Queue ---
1. Push (Stack)
2. Pop (Stack)
3. Display Stack
4. Enqueue (Queue)
5. Dequeue (Queue)
6. Display Queue
7. Exit
Enter your choice: 3
Stack: 23 -> NULL

--- Linked List Stack & Queue ---
1. Push (Stack)
2. Pop (Stack)
3. Display Stack
4. Enqueue (Queue)
5. Dequeue (Queue)
6. Display Queue
7. Exit
Enter your choice: 4
Enter value to enqueue: 666
666 enqueued into queue.

--- Linked List Stack & Queue ---
1. Push (Stack)
2. Pop (Stack)
3. Display Stack
4. Enqueue (Queue)
5. Dequeue (Queue)
6. Display Queue
7. Exit
Enter your choice: 6
Queue: 666 -> NULL

--- Linked List Stack & Queue ---
1. Push (Stack)
2. Pop (Stack)
3. Display Stack
4. Enqueue (Queue)
5. Dequeue (Queue)
6. Display Queue
7. Exit
Enter your choice: 9
666 dequeued from queue.

--- Linked List Stack & Queue ---
1. Push (Stack)
2. Pop (Stack)
3. Display Stack
4. Enqueue (Queue)
5. Dequeue (Queue)
6. Display Queue
7. Exit
Enter your choice:
```

b) Implement single linked list to simulate stack and queue operation.

```
#include <stdio.h>
```

```
#include <stdlib.h>
```

```
struct Node {
```

```
    int data;
```

```
    struct Node * next;
```

```
};
```

```
struct Node * top = NULL;
```

```
struct Node * front = NULL;
```

```
struct Node * rear = NULL;
```

```
void push(int value) {
```

```
    struct Node * newNode;
```

```
    newNode = (struct Node *) malloc (sizeof (struct Node));
```

```
    if (newNode == NULL) {
```

```
        printf("Memory allocation failed\n");
```

```
        return;
```

```
    }
```

```
    newNode->data = value;
```

```
    newNode->next = top;
```

```
    top = newNode;
```

```
    printf("id pushed into stack\n", value);
```

```
}
```

```
void pop() {
```

```
    struct Node * temp;
```

```
    if (top == NULL) {
```

```
        printf("stack is empty\n");
```

```
        return;
```

```
    }
```

```
    temp = top;
```



DATE: _____ PAGE: _____
printf("%d popped from stack\n", top->data);
top = top->next;
free(temp);

```
void displaystack() {  
    struct Node * temp;  
    if (top == NULL) {  
        printf("stack is empty\n");  
        return;  
    }  
    temp = top;  
    printf("Stack:");  
    while (temp != NULL) {  
        printf("%d -> ", temp->data);  
        temp = temp->next;  
    }  
    printf("\n\n");  
}
```

```
void enqueue(int value) {  
    struct Node * newNode;  
    newNode = (struct Node *) malloc (sizeof (struct node));  
    if (newNode == NULL) {  
        printf("memory allocation failed\n");  
        return;  
    }
```

```
    newNode->data = value;  
    newNode->next = NULL;
```

```
    if (front == NULL) {  
        front = newNode;  
        rear = newNode;  
    } else {
```



```

    rear->next = new Node;
    rear = new Node;
}
printf("%d enqueued into queue\n");

void dequeue() {
    struct Node * temp;
    if (front == NULL) {
        printf("Queue is empty\n");
        return;
    }
    temp = front;
    printf("%d dequeued from queue\n", front->data);
    front = front->next;
    if (front == NULL)
        rear = NULL;
    free(temp);
}

```

```

void displayqueue() {
    struct Node * temp;
    if (front == NULL) {
        printf("Queue is empty\n");
        return;
    }
    temp = front;
    printf("Queue:");
    while (temp != NULL) {
        printf("%d->", temp->data);
        temp = temp->next;
    }
    printf("\n");
}

```



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```

int main() {
    int choice, value;
    while (1) {
        printf("1. push");
        printf("2. pop");
        printf("3. display");
        printf("4. enqueue");
        printf("5. dequeue");
        printf("6. display queue");
        printf("7. Exit");
        printf("Enter your choice:");
        scanf("%d", &choice);
        switch (choice) {
            case 1:
                printf("Enter value to push");
                scanf("%d", &value);
                push(value);
                break;
            case 2:
                pop();
                break;
            case 3:
                displaystack();
            case 4:
                printf("Enter value of enqueue");
                scanf("%d", &value);
                enqueue(value);
                break;
            case 5:
                dequeue();
                break;
        }
    }
}

```



Case 6:

```
displayQueue();  
break;
```

Case 7:

```
exit(0);
```

```
}
```

```
}
```

output

Linked list stack queue:-

1. push 2. pop 3. stack display 4. Enqueue 5. dequeue

6. Queue display 7. Exit

Enter your choice: 1

10 push to stack

1. push 2. pop 3. stack display 4. Enqueue 5. dequeue

6. Queue display 7. Exit

Enter your choice: 3

Stack: 10 → NULL

Enter your choice: 2

10 popped from stack

1. push 2. pop 3. display 4. enqueue 5. dequeue 6. display
7. Exit

Enter your choice: 4

Enter value to enqueue: 20

20 Enqueued into queue

1. push 2. pop 3. display 4. Enqueue 5. dequeue
6. display 7. Exit

Enter your choice: 6

Queue → 20 from queue



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1. push 2. pop 3. display 4. enqueue 5. dequeue
6. display queue 7. Exit

Enter your choice:

20 digits from queue.

~~Ans~~
See

