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Section: **3D**

```

6
7 class Stack {
8     int top;
9
10 public:
11     int a[MAX]; // Maximum size of an stack
12
13     Stack() {
14         top = -1;
15     }
16
17     bool push (int x) {
18         if (top==(MAX-1)) {
19             cout<<"Stack Overflow";
20             return false;
21         }
22         else {
23             a[++top] = x;
24             // cout<<x<<" pushed into the stack";
25             return true;
26         }
27     }
28
29
30     int pop() {
31         if(top<0) {
32             cout<<"Stack underflow";
33             return 0;
34         }
35
36         else {
37             // cout<<"Hey! Value popped successfully"<<endl;
38             int x = a[top--];
39             return x;
40         }
41     }
42
43
44     int peek() {
45         if (top<0) {
46             cout<<"Stack is Empty";
47             return 0;
48         }
49
50         else {
51             int x = a[top];
52             return x;
53         }
54     }
55
56     bool isEmpty() // here
57     {
58         if(top<0) {
59             return false;
60         }
61         else
62             return true;
63     }
64 }

```

Task 1 code

```

67 int main()
68 {
69     Stack s1;
70     s1.push(4);
71     s1.push(5);
72     s1.push(6);
73     s1.push(7);
74     s1.push(8);
75     s1.push(9);
76     s1.push(10);
77     s1.push(11);
78     s1.push(12);
79     s1.push(13);
80
81     // s1.push(1);
82
83
84     cout<<endl;
85
86     // Display Elements using for loop
87
88     // for(int i=0; i<MAX; i++) {
89     //     cout<<s1.peek()<<" ";
90     //     s1.pop();
91     // }
92
93
94     // Display Elements using while loop
95
96     while (s1.isEmpty()) {
97         cout<<s1.peek()<<" ";
98         s1.pop();
99     }
100     return 0;
101 }
102

```

Task 1 output

```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
kashiii@kashiii:~/DSL7$ cd "/home/kashiii/DSL7"
kashiii@kashiii:~/DSL7$ ./"stack with array"

13 12 11 10 9 8 7 6 5 4 kashiii@kashiii:~/DSL7$ cd "/home/kashiii/DSL7"
kashiii@kashiii:~/DSL7$ ./"stack with array"
Stack Overflow
13 12 11 10 9 8 7 6 5 4 kashiii@kashiii:~/DSL7$

```

```

3
4 class node{
5     int top;
6     public:
7
8     node *next;
9     int data;
10    node(){
11        top=0;
12        next=NULL;
13        data=0;
14    }
15
16 };
17 class linked{
18     public:
19     node *top;
20     linked(){
21         top=NULL;
22     }
23     bool push(int n){
24         node *tmp;
25         tmp=new node;
26         tmp->data=n;
27         if(top==NULL){
28             top=tmp;
29         }
30         else{
31             tmp->next=top;
32             top=tmp;
33         }
34     }
35
36
37 }
38 int pop(){
39     node *tmp;
40     tmp=top;
41     if(top==NULL){
42         cout<<"stack is empty ";
43     }
44     else{
45         top=top->next;
46         delete tmp;
47     }
48 }
49 int peek(){
50     node *tmp;
51     tmp=top;
52     if(top==NULL){
53         cout<<"Stack is empty ";
54     }
55     else{
56         cout<<"top element is "<<tmp->data<<" ";
57     }
58 }
59

```

Task 2 code part 1

```

stack with array.cpp  stack with linked list.cpp  X
stack with linked list.cpp > main()
60     void display(){
61         node *tmp;
62         tmp=top;
63         while(tmp!=NULL){
64             cout<<tmp->data<<" ";
65             tmp=tmp->next;
66         }
67     }
68
69     void reverse()
70     {
71
72         node* current = top;
73         node *prev = NULL, *next = NULL;
74
75         while (current != NULL) {
76             next = current->next;
77
78             current->next = prev;
79
80             prev = current;
81             current = next;
82         }
83         top = prev;
84     }
85
86 };
87 int main(){
88     linked l;
89     l.push(12);
90     l.push(1);
91     l.push(2);
92     l.push(11);
93     l.push(3);
94     l.push(15);
95     l.push(155);
96     l.push(17);
97     l.push(162);
98     l.push(113);
99
100
101     cout<<"before reversing the elements are "<<endl;
102
103     l.display();
104     cout<<endl;
105     cout<<"after reversing the elements are "<<endl;
106     l.reverse();
107     l.display();
108     cout<<endl;
109     cout<<endl;
110     // cout<<"after deleting all elements from stack "<<endl;
111     // l.peak();
112     l.pop();
113     //l.peak();
114     cout<<endl;
115     // l.peak();
116     l.pop();
117     //l.pop():l.pop():l.pop():l.pop():l.pop():l.pop():l.pop():l.pop():

```

Task 2 code part 2

Task 2 output

```
120 }  
121
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
12 1 2 11 3 15 155 17 162 113
```

```
top element is 0 top element is 0 kashiii@kashiii:~/DSLAB7$ cd "/home/kashiii/DSLAB7"  
kashiii@kashiii:~/DSLAB7$ ./"stack with linked list"  
before reversing the elements are  
113 162 17 155 15 3 11 2 1 12  
after reversing the elements are  
12 1 2 11 3 15 155 17 162 113
```

```
kashiii@kashiii:~/DSLAB7$
```

```

3 using namespace std;
4
5 int prec(char c) {
6     if(c == '^')
7         return 3;
8     else if(c == '/' || c == '*')
9         return 2;
10    else if(c == '+' || c == '-')
11        return 1;
12    else
13        return -1;
14 }
15
16 void infixToPostfix(string s) {
17     stack<char> st;
18     string result;
19
20     for(int i = 0; i < s.length(); i++) {
21         char c = s[i];
22
23         if((c >= 'a' && c <= 'z') || (c >= 'A' && c <= 'Z') || (c >= '0' && c <= '9'))
24             result += c;
25
26         else if(c == '(')
27             st.push('(');
28
29         else if(c == ')') {
30             while(st.top() != '(')
31             {
32                 result += st.top();
33                 st.pop();
34             }
35             st.pop();
36
37         else {
38             while(!st.empty() && prec(s[i]) <= prec(st.top())) {
39                 result += st.top();
40                 st.pop();
41             }
42             st.push(c);
43         }
44     }
45
46     while(!st.empty()) {
47         result += st.top();
48         st.pop();
49     }
50
51     cout << result << endl;
52 }

```

Task 3 code


Task 3 output

```
63 int main() {  
64     string exp ;  
65     cout<<"enter the string that you want to convert it from infix to postfix "<<endl;  
66     cin>>exp;  
67     infixToPostfix(exp);  
68     return 0;  
69 }  
70  
71
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
top element is 0 top element is 0 kashiii@kashiii:~/DSLAB7$ cd "/home/kashiii/DSLAB7"  
kashiii@kashiii:~/DSLAB7$ ./"stack with linked list"
```

```
kashiii@kashiii:~/DSLAB7$ cd "/home/kashiii/DSLAB7"  
kashiii@kashiii:~/DSLAB7$ ./"infix to Postfix"  
enter the string that you want to convert it from infix to postfix  
2+3-(1-4)  
23+14--  
kashiii@kashiii:~/DSLAB7$
```




```

5  class Queue {
6
7  int front, rear, size;
8  public:
9      int arr[n];
10     Queue(){
11         front=-1;
12         rear=-1;
13     }
14     bool enqueue(int data){
15         if(rear==n-1){
16             cout<<"Overflow ";
17             return 0;
18         }
19
20         else{
21             rear++;
22             arr[rear]=data;
23             // cout<<arr[rear];
24             return true;
25         }
26     }
27     int dequeue(){
28         if(front==rear){
29             cout<<"empty ";
30         }
31         else{
32             // front++;
33             // front++;
34
35             cout<<"deleted element is "<<arr[front]<<endl;
36             // front++;
37
38             front++;
39             int s=arr[front];
40             cout<<"Now front is Pointing to "<<s<<endl;
41
42             return s;
43         }
44     }
45     int peek(){
46         if(rear<0){
47             cout<<"underflow ";
48         }
49         else{
50             //cout<<arr[rear];
51             int p=arr[rear];
52             cout<<"Top element is "<<p<<endl;
53         }
54     }
55     bool isfull(){
56         if(rear==n){
57             cout<<"oops Queue is Full ";
58             return true;
59         }
60         else{
61             return false;
62         }

```

Task 4 code

```

67  int main(){
68      Queue q;
69      q.enqueue(2);
70      q.enqueue(23);
71      q.enqueue(245);
72      q.isfull();
73      q.enqueue(237);
74      q.isfull();
75
76      q.peek();
77      q.dequeue();
78
79      //q.peek();
80  }
81
82

```

Task 4 output

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```

kashiii@kashiii:~/DSLAB7$ cd "/home/kashiii/DSLAB7"
kashiii@kashiii:~/DSLAB7$ ./"Queue with array"
Top element is 237
deleted element is 237
Now front is Pointing to 245
kashiii@kashiii:~/DSLAB7$ █

```

```

1 Queue.cpp > main()
2 using namespace std;
3 class node{
4     public:
5         node *next;
6         int data;
7         node(){
8             this->next=NULL;
9             data=0;
10
11         }
12
13
14
15 };
16 class Queue{
17     public:
18         node *front;
19         node *rear;
20         Queue(){
21
22             front=0;
23             rear=0;
24
25         }
26         void enqueue(int n){
27             node *tmp;
28             tmp=new node;
29             tmp->data=n;
30             if(front==0 && rear==0){
31                 front=tmp;
32                 rear=tmp;
33             }
34             else{
35                 rear->next=tmp;
36                 rear=tmp;
37             }
38         }
39
40         void display(){
41             node *tmp;
42             if(front==0&&rear==0){
43                 cout<<"Queue is empty ";
44             }
45             else{
46                 tmp=front;
47                 while(tmp!=NULL){
48                     cout<<tmp->data<<" ";
49                     tmp=tmp->next;
50

```

Task 5 code

```
56  int main(){
57      Queue Q;
58      Q.enqueue(2);
59      Q.enqueue(3);
60      Q.enqueue(4);
61      Q.enqueue(5);
62      Q.display();
63      cout<<endl;
64      return 0;
65  }
66
```

Task 5 output

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
kashiii@kashiii:~/DSLAB7$ cd "/home/kashiii/DSLAB7"
kashiii@kashiii:~/DSLAB7$ ./"Queue"
2 3 4 5
kashiii@kashiii:~/DSLAB7$
```

Thank You

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