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Section: **3D**

stack with array.cpp

```cpp
class Stack {
    int top;

    public:
        int a[MAX];  // Maximum size of an stack

        Stack() {
            top = -1;
        }

        bool push (int x) {
            if (top>=(MAX-1)) {
                cout<<"Stack Overflow";
                return false;
            }
            else {
                a[++top] = x;
                // cout<<x<<" pushed into the stack";
                return true;
            }
        }


        int pop() {
            if(top<0) {
                cout<<"Stack underflow";
                return 0;
            }

            else {
//                cout<<"Hey! Value poped succussfully"<<endl;
                int x = a[top--];
                return x;
            }
        }


        int peek() {
            if (top<0) {
                cout<<"Stack is Empty";
                return 0;
            }

            else {
                int x = a[top];
                return x;
            }
        }

        bool isEmpty()   // here
        {
          if(top<0) {
            return false;
        }
        else
          return true;
        }
```

Task 1 code

```
int main()
{
    Stack s1;
    s1.push(4);
    s1.push(5);
    s1.push(6);
    s1.push(7);
    s1.push(8);
    s1.push(9);
    s1.push(10);
    s1.push(11);
    s1.push(12);
    s1.push(13);

    //  s1.push(1);


    cout<<endl;

// Display Elements using for loop

    // for(int i=0; i<MAX; i++) {
    //     cout<<s1.peek()<<" ";
    //     s1.pop();
    // }


//  Display Elements using while loop

   while (s1.isEmpty()) {
      cout<<s1.peek()<<" ";
      s1.pop();
   }
    return 0;
}
```

```
PROBLEMS  OUTPUT  TERMINAL  DEBUG CONSOLE
kashiii@kashiii:~/DSLAB7$ cd "/home/kashiii/DSLAB7"
kashiii@kashiii:~/DSLAB7$ ./"stack with array"

13 12 11 10 9 8 7 6 5 4 kashiii@kashiii:~/DSLAB7$ cd "/home/kashiii/DSLAB7"
kashiii@kashiii:~/DSLAB7$ ./"stack with array"
Stack Overflow
13 12 11 10 9 8 7 6 5 4 kashiii@kashiii:~/DSLAB7$
```

Task 1 output

stack with linked list.cpp > main()

```cpp

class node{
    int top;
    public:

        node *next;
        int data;
        node(){
            top=0;
            next=NULL;
            data=0;
        }

};
class linked{
    public:
        node *top;
        linked(){
            top=NULL;
        }
        bool push(int n){
            node *tmp;
            tmp=new node;
            tmp->data=n;
            if(top==NULL){
                top=tmp;


            }
            else{
                tmp->next=top;
                top=tmp;



            }
        }
        int pop(){
            node *tmp;
            tmp=top;
            if(top==NULL){
                cout<<"stack is empty ";
            }
            else{
                top=top->next;
                delete top;
            }
        }
        int peek(){
            node *tmp;
            tmp=top;
            if(top==NULL){
                cout<<"Stack is empty ";
            }
            else{
                cout<<"top element is  "<<top->data<<" ";


            }
        }
```

Task 2 code part 1

stack with array.cpp ● | stack with linked list.cpp ×

stack with linked list.cpp > main()

```
        void dislay(){
            node *tmp;
            tmp=top;
            while(tmp!=NULL){
                cout<<tmp->data<<" ";
                tmp=tmp->next;
            }
        }

    void reverse()
    {

        node* current = top;
        node *prev = NULL, *next = NULL;

        while (current != NULL) {
            next = current->next;

            current->next = prev;

            prev = current;
            current = next;
        }
        top = prev;
    }

};
int main(){
    linked l;
    l.push(12);
    l.push(1);
    l.push(2);
    l.push(11);
    l.push(3);
    l.push(15);
    l.push(155);
    l.push(17);
    l.push(162);
    l.push(113);


    cout<<"before reversing the elements are "<<endl;

    l.dislay();
    cout<<endl;
    cout<<"after reversing the elements are "<<endl;
    l.reverse();
    l.dislay();
    cout<<endl;
    cout<<endl;
//  cout<<"after deleting all elements from stack "<<endl;
//  l.peek();
    l.pop();
    //l.peek();
    cout<<endl;
//  l.peek();
    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$
```

stack with array.cpp ● | stack with linked list.cpp | infix to Postfix.cpp ●

infix to Postfix.cpp > ...

```cpp
using namespace std;

int prec(char c) {
    if(c == '^')
        return 3;
    else if(c == '/' || c=='*')
        return 2;
    else if(c == '+' || c == '-')
        return 1;
    else
        return -1;
}


void infixToPostfix(string s) {

    stack<char> st;
    string result;

    for(int i = 0; i < s.length(); i++) {
        char c = s[i];


        if((c >= 'a' && c <= 'z') || (c >= 'A' && c <= 'Z') || (c >= '0' && c <= '9'))
            result += c;


        else if(c == '(')
            st.push('(');


        else if(c == ')') {
            while(st.top() != '(')
            {
                result += st.top();
                st.pop();
            }
            st.pop();
        }


        else {
            while(!st.empty() && prec(s[i]) <= prec(st.top())) {
                result += st.top();
                st.pop();
            }
            st.push(c);
        }
    }


    while(!st.empty()) {
        result += st.top();
        st.pop();
    }

    cout << result << endl;
}
```

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"
[redacted]


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$
```

Queue with array.cpp > Queue > dequeue()

```cpp
class Queue {

int front, rear, size;
public:
    int arr[n];
    Queue(){
        front=-1;
        rear=-1;
    }
    bool enqueue(int data){
        if(rear==n-1){
            cout<<"Overflow ";
            return 0;
        }

        else{
            rear++;
            arr[rear]=data;
        //  cout<<arr[rear];
            return true;
        }
    }
    int dequeue(){
        if(front==rear){
            cout<<"empty  ";
        }
        else{
//                      front++;
                            //      front++;
//
            cout<<"deleted element is "<<arr[front]<<endl;
                                    //  front++;

            front++;
            int s=arr[front];
            cout<<"Now front is Pointing to "<<s<<endl;

            return s;
        }
    }
    int peek(){
        if(rear<0){
            cout<<"underflow ";
        }
        else{
            //cout<<arr[rear];
            int p=arr[rear];
            cout<<"Top element is "<<p<<endl;
        }
    }
    bool isfull(){
        if(rear==n){
            cout<<"oops Queue is Full ";
            return true;
        }
        else{
            return false;
        }
```

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
```

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$
```

Task 4 output

Queue.cpp > main()

```cpp
using namespace std;
class node{
    public:
        node *next;
        int data;
        node(){
            this->next=NULL;
            data=0;


        }


};
class Queue{
    public:
        node *front;
        node *rear;
        Queue(){

        front=0;
        rear=0;

        }
        void enqueue(int n){
            node *tmp;
            tmp=new node;
            tmp->data=n;
            if(front==0 && rear==0){
                front=tmp;
                rear=tmp;
            }
            else{
                rear->next=tmp;
                rear=tmp;

            }
        }

        void display(){
            node *tmp;
            if(front==0&&rear==0){
                cout<<"Queue is empty ";
            }
            else{
                tmp=front;
                while(tmp!=NULL){
                    cout<<tmp->data<<" ";
```

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
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

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

Task 5 output

Thank You

...