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Question 1 A) Program on Linear search using array

CODE

```
#include<iostream>
using namespace std;
int main()
{
   int n;
   cout<<"21BCE0777 Enter the size of the array:";
   cin>>n;
   int arr[n],location[n],count=0,x;
   for(int i=0;i<n;i++)
   {
      cout<<"21BCE0777 Enter the element of the array:";
      cin>>arr[i];
   }
   cout<<"\n21BCE0777 Displaying the array: ";
   for(int i=0;i<n;i++)
   {
      cout<<arr[i]<<" ";
   }
   cout<<"\n\n21BCE0777 Enter the element to be searched:";
   cin>>x;
```

```
    for(int i=0;i<n;i++)
    {
        if(x==arr[i])
        {
            location[count]=i;
            count++;
        }
    }
    if(count>0)
    {
        cout<<"21BCE0777 The entered element was found "<<count<<" times";
        cout<<"\n21BCE0777 The index it was found were:";
        for(int i=0;i<count;i++)
        {
            cout<<location[i]<<" ";
        }
    }
    else
    {
        cout<<"21BCE0777 The entered element was not found";
    }
    return 0;
}
```

OUTPUT

When element to be searched is Present

```
21BCE0777 Enter the size of the array:6
21BCE0777 Enter the element of the array:10
21BCE0777 Enter the element of the array:20
21BCE0777 Enter the element of the array:30
21BCE0777 Enter the element of the array:40
21BCE0777 Enter the element of the array:50
21BCE0777 Enter the element of the array:60

21BCE0777 Displaying the array: 10 20 30 40 50 60

21BCE0777 Enter the element to be searched:20
21BCE0777 The entered element was found 1 times
21BCE0777 The index it was found were:1
```

When element to be searched is absent

```
21BCE0777 Enter the size of the array:5
21BCE0777 Enter the element of the array:10
21BCE0777 Enter the element of the array:20
21BCE0777 Enter the element of the array:30
21BCE0777 Enter the element of the array:40
21BCE0777 Enter the element of the array:50

21BCE0777 Displaying the array: 10 20 30 40 50

21BCE0777 Enter the element to be searched:5
21BCE0777 The entered element was not found
```

Ques 1 B) Stack using array

CODE

```
#include<iostream>
#include<conio.h>
#include<stdlib.h>
using namespace std;
int top=-1;
void push(int arr[])
{
   int x;
   cout<<"\n21BCE0777 Enter the element to be pushed:";
   cin>>x;
   top++;
   arr[top]=x;
   cout<<"\n21BCE0777 The pushed element is: "<<arr[top];
}
void pop(int arr[])
{
   if(top==-1)
   cout<<"\n21BCE0777 Stack is empty";
   else
   {
      int x=arr[top];
```

```
        top--;
        cout<<"\n21BCE0777 The poped element is "<<x;
    }

}
void display(int arr[])
{
    if(top==-1)
    cout<<"\n21BCE0777 Stack is empty";
    else
    {
        cout<<"\n21BCE0777 Displaying the Stack: ";
        for(int i=top;i>-1;i--)
        {
            cout<<arr[i]<<" ";
        }
    }

}
void viewTop(int arr[])
{
    if(top==-1)
    cout<<"\n21BCE0777 Stack is empty";
    else
```

```
    {
        cout<<"\n21BCE0777 The top of the element is "<<arr[top];
    }


}
int main()
{
    int n,ch;
    cout<<"21BCE0777 Enter the maximum size of Stack it can be: ";
    cin>>n;
    int arr[n];
    do
    {
        cout<<"\n\n1 for push\n2 for pop\n3 for display whole stack\n4 to display the top element\n5 to exit\nEnter your choice:";
        cin>>ch;
        switch(ch)
        {
        case 1:
            push(arr);
            break;
        case 2:
            pop(arr);
            break;
```

```
        case 3:
            display(arr);
            break;
        case 4:
            viewTop(arr);
            break;
        case 5:
            exit(0);
        default:
            cout<<"\n21BCE0777 Invalid choice";
        }
    }while(1);

}
```

OUTPUT

```
21BCE0777 Enter the maximum size of Stack it can be: 9


1 for push
2 for pop
3 for display whole stack
4 to display the top element
5 to exit
Enter your choice:1

21BCE0777 Enter the element to be pushed:10

21BCE0777 The pushed element is: 10

1 for push
2 for pop
3 for display whole stack
4 to display the top element
5 to exit
Enter your choice:1

21BCE0777 Enter the element to be pushed:20

21BCE0777 The pushed element is: 20

1 for push
```

```
21BCE0777 The pushed element is: 20

1 for push
2 for pop
3 for display whole stack
4 to display the top element
5 to exit
Enter your choice:1

21BCE0777 Enter the element to be pushed:30

21BCE0777 The pushed element is: 30

1 for push
2 for pop
3 for display whole stack
4 to display the top element
5 to exit
Enter your choice:1

21BCE0777 Enter the element to be pushed:40

21BCE0777 The pushed element is: 40

1 for push
2 for pop
3 for display whole stack
4 to display the top element
5 to exit
Enter your choice:1
```

```
5 to exit
Enter your choice:1

21BCE0777 Enter the element to be pushed:50

21BCE0777 The pushed element is: 50

1 for push
2 for pop
3 for display whole stack
4 to display the top element
5 to exit
Enter your choice:3

21BCE0777 Displaying the Stack: 50 40 30 20 10

1 for push
2 for pop
3 for display whole stack
4 to display the top element
5 to exit
Enter your choice:2

21BCE0777 The poped element is 50

1 for push
2 for pop
3 for display whole stack
4 to display the top element
5 to exit
Enter your choice:2
```

```
4 to display the top element
5 to exit
Enter your choice:2

21BCE0777 The poped element is 50

1 for push
2 for pop
3 for display whole stack
4 to display the top element
5 to exit
Enter your choice:2

21BCE0777 The poped element is 40

1 for push
2 for pop
3 for display whole stack
4 to display the top element
5 to exit
Enter your choice:3

21BCE0777 Displaying the Stack: 30 20 10

1 for push
2 for pop
3 for display whole stack
4 to display the top element
5 to exit
Enter your choice:
```

Q 1C) Infix to postfix

CODE

```
#include<iostream>

using namespace std;

int top=-1;

char exps[100];

char s[100];

void push(char c)

{

   if (top==sizeof(s))

   cout<<"21BCE0777 stack is full";

   else

   {

      top=top+1;

      s[top]=c;

   }

}

void pop()

{

   if(top==-1)

   {

      cout<<"21BCE0777 the stack is empty";

   }
```

```
    else
    {
        cout<<s[top];
        top=top-1;
    }

}
int prior(char t)
{
    if(t=='('
    return 0;
    else if(t=='+'||t=='-')
    return 1;
    else if(t=='*'||t=='/')
    return 2;
    else if(t=='^')
    return 3;
}

int main()
{

    cout<<"21BCE0777 enter the expression:";
    cin>>exps;
```

```
char *t;
t=exps;
while(*t!='\0')
{
   if(isalnum(*t))
   {
      cout<<*t;
   }
   else if(*t=='(')
   {
      push(*t);
   }
   else if(*t==')')
   {
      while(s[top]!='('
         pop();
      top--;
   }
   else
   {
      while(prior(*t)<=prior(s[top]))
      {
         pop();
      }
```

```
        push(*t);
      }

      t++;
   }
   while(top!=-1)
   {
      pop();
   }
   return 0;
}
```

OUTPUT