Assignment#1 - Check Validity of an Arithmetic Expression using Stack Data Structure in any of your preferred Programming Language (C/C++/Java)

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Code:

```
#include <bits/stdc++.h>
#include <iostream>

using namespace std;

#define size 50
char stacks[size];
int top = -1;

bool isempty()
{
   if(top==-1)
      return true;
   else
      return false;
}
void push(char arr[],int j)
```

```
{
   if (top==size-1)
   {
      cout<<"stack is full\n";
   }
   else
   {
      top++;
      stacks[top]= arr[j];
   }
}

void pop()
{
   if(isempty())
   {
      cout<<"stack is empty\n";
   }
   else
   {
      top--;
   }
}

void showtop()
{
```

```
    if (isempty())
    {
        cout<<"array is empty and top = "<<top;
    }
    else
    {
        cout<<"\ntop position is = "<<top<<"\nelement in top is = "<<stacks[top];
        cout<<endl;
    }
}



void showstack()
{
    if(isempty())
    {
        cout<<endl<<"stack is empty because in first we find a closing bracket";
    }
    else
    {
        cout<<"stack is = ";
        for(int i=0;i<=top;i++)
        {
            cout<<stacks[i];
        }
    }
    cout<<endl;
```

```
}


void check(char arr[], int n)
{
   for(int j=0;j<n;j++)
   {
      if(arr[j]=='(' || arr[j]=='{' || arr[j]=='['
      {
          push(arr, j);
          showtop();
          showstack();
      }
      else if(arr[j]==')' || arr[j]=='}' || arr[j]==']')
      {
          if (isempty())
          {
             goto L;
          }
          else
          {
             if(stacks[top]=='('&&arr[j]==')')
             {
                pop();
             }
             else if(stacks[top]=='{'&&arr[j]=='}')
             {
                pop();
```

```
            }
            else if(stacks[top]=='['&&arr[j]==']')
            {
               pop();
            }
            else
            {
               cout<<"\nopening parenthesis is missing! for = "<<arr[j]<<endl;
               showtop();
               showstack();
               goto L;
            }
         }
      }
   }
L:   if (top==-1)
   {
      cout<<endl<<"Arithmetic Expression is valid"<<endl;
   }
   else
   {
       cout<<endl<<"Arithmetic Expression is not valid"<<endl;
       showstack();
   }
}

int main()
```

```
{
   int n;
   cout <<"size of your array is = ";
   cin>>n;
   cout<<endl;
   char arr[n];
   cout<<"input your Arithmetic Expression = ";
   for (int i=0;i<n;i++)
   {
      cin>>arr[i];
   }
   check(arr,n);
   return 0;
}
```

Output :