# 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 :

