Practical No. 10

Title :-
Write a C++ program using stack whether given expression is well parenthesized or not.

Objective :-
1) To check the given expression is parenthesized or not by using stack.

Problem Statement :-
In any language program mostly syntax error occurs due to unbalancing delimiter such as ( ).
C++ program using stack to check whether given expression is well parenthesized or not.

Theory :-
Stack :
Stack is a LIFO (last in First out) structure. It is an ordered list of the same type of elements
A stack is a linear list where all insertions and deletions are permitted at only one end of list.
When elements are added to stack it grows at one end. Similarly when elements are deleted From shrinks at the same end.

Stack using array :-
1. Stack is a LIFO structure. Stack can be represented using array
2. A one dimensional array can be used to hold elements of stack
3. Another variable "top" is used to keep track of the index of the top most elements.

4. The following operations can be done on the stack by using array.

1) Initialization
2) Is empty condition
3) Is Full condition
4) Push condition
5) Pop condition

Parenthesized :-
In the assignment created by us the meaning of parenthesized can be defined as in which statement in completed by using opening and closing brackets
For eg. 1. (a+b)
2. {a+b}
3. [a+b]
4. {q[h+K(a+v)]}

Operation :-
We used a stack to complete the operation using parenthesize When we give a opening bracket in the statement we push the bracket in stack and in the case of closing bracket we pop the top most opening brackete and compare with the closing bracket
1. if the brackets are equal to each other the case of valid statement gets printed in the test case.
2. if the brackets are unequal to each other the case of invalid statement gets printed in the case
3. if the stack is not empty & a series of closing brackets has been exhausted then also the statement is not well parenthesized
4. if the stack is empty and series of closing brackets hasn't been

exhausted then also the statement is not well parenthesized and invalid statement message occurs.

| | |
|---|---|
| } | - closing brackets |
| ] | In the case given in fig the topmost element in stack is compared with closing bracket. If they match each other then valid statement message occurs. |
| ( | |

Algorithms :-

Step 1 :- Start
Step 2 :- Declare character Array Data [MAX]
Step 3 :- Declare integer top, I, character ch, Found = 0
Step 4 :- Accept char data and other data From user.
Step 5 :- Call Function push
Step 6 :- call Function pop
Step 7 :- Stop