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1 // Question_1.cpp : This file contains the 'main' function. Program execution begins and ends there.
2 //
3 //
4 // /
5 //-----
6 //Name Sai Chaitanya Kilambi
7 //Course CPSC 131 Data Structures, Fall, 2022
8 //Assignment No.6b question:1
9 //Due date 10/12/2022
10 // Purpose:
11 // This program performs postfix arithmetic
12 //-----
13 // list of libraries
14 //
15 //importing the required libraries
16
17 #include <iostream>
18 #include<string>
19 #include "STACKPAC.h"
20 using namespace std;
21
22 bool isNum(string str)
23 {
24     for (int i = 0; i < str.length(); i++)
25         if (isdigit(str[i]) == false)
26             return false;
27     return true;
28 }
29 int main(){
30
31     Stack<int, 100> s1;
32     s1.clearStack();
33     // s is string for taking in input
34     string s;
35     // s2 is string array to store split words
36     string s2[100];
37     cout<<"Enter a postfix expression:";
38     // getline is used to take input string which have spaces
39     getline(cin,s);
40     // ind is index for s2 to store words
41     int i,ind=0;
42     string word="";
43     // we access each character in s if we get space then store that word
44     // in s2
45     // else add each character to word
46     for(i=0;i<s.length();i++){
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46     if(s[i]==' ')
47     {
48         s2[ind]=word;
49         ind++;
50         // making word empty to use it for another word
51         word="";
52     }
53     else
54         word=word+s[i];
55 }
56 // str have the postfix expression
57 string str="";
58 // t is used to ask inputs
59 string t;
60 // accessing each word in s2
61 // check whether it is number using isNum or + or - or * or / if true ➤
62 // then add them to str
63 // else ask user to enter int value of that variable
64 for(i=0;i<ind;i++){
65     if(isNum(s2[i]) || s2[i]=="+" || s2[i]=="*" || s2[i]=="-" || s2[i] ➤
66         =="/" )
67     {
68         str = str + s2[i]+" ";
69     }
70     else{
71         //do while loop because if again user enters string value ➤
72         // rather than int
73         do{
74             cout << "Enter value of "<<s2[i]<<":";
75             cin >> t;
76         }
77         while(isNum(t)!=true);
78         // adding newly entered value to str
79         str = str + t + " ";
80     }
81 }
82 // num stores the number which is in string form
83 int num=0;
84 // accessing each element in the str i.e postfix expression
85 for(i=0;i<str.length();i++){
86     // space or num is not zero then num is pushed to stack and making ➤
87     // num to 0 for next number
88     if(str[i]==' ' && num!=0){
89         s1.pushStack(num);
90         num=0;
91     }
92     // if we encounterd number then we convert that char to number
93     else if(isdigit(str[i])){
94         num = num * 10 + int(str[i]-'0');
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91     }
92     // if we encountered +,/,*,- then we pop top 2 elements of stack  ➤
93     // and do respective operation and push them again into stack
94     else if(str[i]=='+' || str[i]=='*' || str[i]=='-' || str[i]=='/'){ ➤
95
96         int a,b;
97         a=s1.popStack();
98         b= s1.popStack();
99         switch(str[i]){
100             case '+':s1.pushStack(b+a);break;
101             case '-':s1.pushStack(b-a);break;
102             case '*':s1.pushStack(b*a);break;
103             case '/':s1.pushStack(b/a);break;
104         }
105     }
106     // after doing all operations there will be only 1 element in stack  ➤
107     // which is the value of postfix expression
108     cout<<"\tValue of postfix expression is "<<s1.popStack();
109     return 0;
110 }
111
```