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1  /*
2  Convert ((A - (B + C)) * D) @ (E + F) infix expression to postfix form:
3  Answer is    A B C + - D * E F + @
4
5  Convert a + b * c + (d * e + f) * g the infix expression into postfix form.
6  Answer is    a b c * + d e * f + g * +
7
8  Convert the following infix expression A + B * C - D / E * H into its equivalent postfix
9  expression.
10 Answer is    A B C * + D E / H * -
11
12 Convert the following infix expression A + (B * C - (D / E @ F) * G) * H into its
13 equivalent postfix expression.
14 Answer is    A B C * D E F @ / G * - H * +
15 */
16 #include<stdio.h>
17 #define SIZE 50          /* Size of Stack */
18 #include <ctype.h>
19 char stack[SIZE];
20 int top=-1;              /* Global declarations */
21
22 void push(char token)
23 {                        /* Function for PUSH operation */
24     stack[++top]=token;
25 }
26
27 char pop()
28 {                        /* Function for POP operation */
29     return(stack[top--]);
30 }
31
32 /* Function for precedence */
33 int precedence(char token) // Higher the return value, higher is the precedence
34 {
35     switch(token)
36     {
37         case '#': return 0;
38         case '(': return 1;
39         case '+': return 2;
40         case '-': return 2;
41         case '*': return 3;
42         case '/': return 3;
43         case '%': return 3;
44         case '@': return 4; // '@' is being used for exponential operator
45     }
46 }
47
48 int main()
49 {                        /* Main Program */
50     char infix[50],postfix[50],ch,token;
51     int i=0,k=0;
52     printf("\n Input the Infix Expression with spaces in between: ");
53     //scanf("%s",infix); //Input the infix expression without spaces
54     gets(infix); //Input the infix expression with spaces in between
55
56     push('#'); // # is being inserted in the stack to mark the end of the stack
57     while( (ch=infix[i++]) != '\0')
58     {
59         if (ch==' ') continue;
60         else if( ch == '(' ) push(ch); // add ( to stack
61         else if(isalnum(ch)) postfix[k++]=ch; // add operand to postfix expression
62         /* if ) bracket is encountered, repeatedly pop the stack and add it to postfix
63         until ( bracket is found. Finally, remove the ( bracket from the stack by
64         popping it.
65         */
66         else if( ch == ')' )
67         {
68             while( stack[top] != '(')
69             {

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69         postfix[k++]=pop(); // repeatedly pop and add to postfix
70     }
71     token=pop(); /* Remove ( from the stack*/
72 }
73 else
74 {
75     /* if the incoming symbol is an Operator:-
76     if the precedence of incoming operator is greater than the precedence of
77     the operator at the top of the stack, simply add it to the stack.
78     But, if the precedence of incoming operator is less than or equal to the
79     precedence of the operator at the top of the stack, repeatedly pop the
80     operators from the stack and add to postfix expression until the precedence
81     of the incoming operator becomes greater than the operator at the top of
82     the stack or left bracket ( is found at the top of the stack.
83     After that, simply add the incoming operator to the stack.
84     */
85     while( precedence(ch)<=precedence(stack[top]) )
86     {
87         postfix[k++]=pop();
88     }
89     push(ch); // Incoming operator is anyway pushed to the stack
90 }
91
92 while( stack[top] != '#') /* Pop from stack till stack is empty */
93 {
94     postfix[k++]=pop();
95 }
96
97 postfix[k]='\0'; /* Make postfix as valid string by inserting '\0' at its end */
98 printf("\n\nGiven Infix Expn: %s \n\nPostfix Expn: %s\n",infix,postfix);
99 return 0;
100 }

```