#include<stdio.h>

#include<stdlib.h>

#include<ctype.h>

#include<string.h>

#define SIZE 100

char stack[SIZE];

int top = -1;

/\* == push operation == \*/

void push(char item)

{

if(top >= SIZE-1)

{

printf("\n Stack Overflow.");

}

else

{

top = top+1;

stack[top] = item;

}

}

/\* == pop operation == \*/

char pop()

{

char item ;

if(top <0)

{

printf("stack under flow: invalid infix expression");

getchar();

/\* underflow may occur for invalid expression \*/

/\* where ( and ) are not matched \*/

exit(1);

}

else

{

item = stack[top];

top = top-1;

return(item);

}

}

/\* === define function that is used to determine whether any symbol is operator or not \*/

int is\_operator(char symbol)

{

if(symbol == '^' || symbol == '\*' || symbol == '/' || symbol == '+' || symbol =='-')

{

return 1;

}

else

{

return 0;

}

}

/\* === define fucntion that is used to assign precendence to operator. \*/

int precedence(char symbol)

{

if(symbol == '^')

{

return(3);

}

else if(symbol == '\*' || symbol == '/')

{

return(2);

}

else if(symbol == '+' || symbol == '-')

{

return(1);

}

else

{

return(0);

}

}

void InfixToPostfix(char infix\_exp[], char postfix\_exp[])

{

int i, j;

char item;

char x;

push('('); /\* push '(' onto stack \*/

strcat(infix\_exp,")"); /\* add ')' to infix expression \*/

i=0;

j=0;

item=infix\_exp[i];

while(item != '\0')

{

if(item == '(')

{

push(item);

}

else if( isdigit(item) || isalpha(item))

{

postfix\_exp[j] = item; /\* add operand symbol to postfix expr \*/

j++;

}

else if(is\_operator(item) == 1) /\* means symbol is operator \*/

{

x=pop();

while(is\_operator(x) == 1 && precedence(x)>= precedence(item))

{

postfix\_exp[j] = x; /\* so pop all higher precendence operator and \*/

j++;

x = pop(); /\* add them to postfix expresion \*/

}

push(x);

push(item); /\* push current oprerator symbol onto stack \*/

}

else if(item == ')') /\* if current symbol is ')' then \*/

{

x = pop(); /\* pop and keep popping until \*/

while(x != '(') /\* '(' encounterd \*/

{

postfix\_exp[j] = x;

j++;

x = pop();

}

}

else

{ /\* if current symbol is neither operand not '(' nor ')' and nor operator \*/

printf("\nInvalid infix Expression.\n");

getchar();

exit(1);

}

i++;

item = infix\_exp[i];

}

if(top>0)

{

printf("\nInvalid infix Expression.\n");

getchar();

exit(1);

}

postfix\_exp[j] = '\0'; /\* add sentinel else puts() fucntion \*/

}

/\* === main function begins === \*/

int main()

{

char infix[SIZE], postfix[SIZE];

printf("\n Enter Infix expression : ");

gets (infix);

InfixToPostfix(infix,postfix);

printf(" Postfix Expression: ");

puts(postfix);

return 0;

}

