PRACTICAL – 4

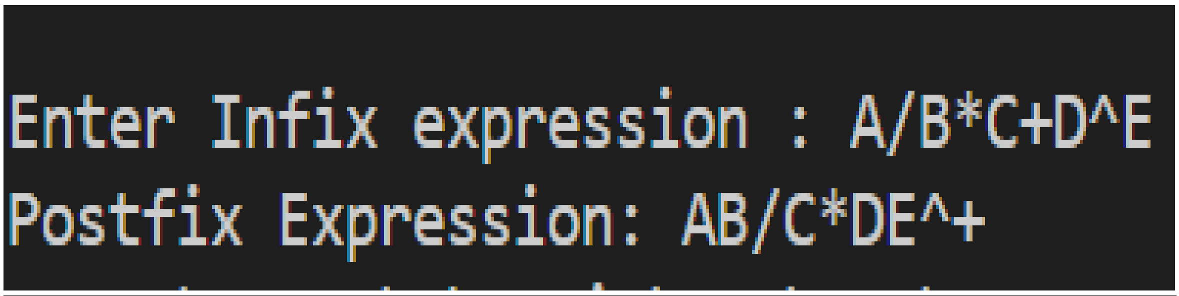
Implement a program to convert infix notation to postfix notation using stack.

SOURCE CODE:

```
#include<stdio.h>

#include<stdlib.h>

#include<ctype.h>

#include<string.h>

#define SIZE 100

char stack[SIZE];

int top = -1;

void push(char item)

{

 if(top >= SIZE-1)

 {

 printf("\nStack Overflow.");

 }

 else

 {

 top = top+1;

 stack[top] = item;

 }

}

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);
 }
}
int is_operator(char symbol)
{
 if(symbol == '^' || symbol == '*' || symbol == '/' || symbol == '+' || symbol =='-')
 {
 return 1;
 }
 else
 {
 return 0;
 }
}
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('(');

 strcat(infix_exp,")");

 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;
j++;
}
else if(is_operator(item) == 1)
{
x=pop();
while(is_operator(x) == 1 && precedence(x)>= precedence(item))
{
postfix_exp[j] = x;
j++;
x = pop();
}
push(x);
push(item);
}
else if(item == ')')
{
x = pop();
while(x != '(')
{
postfix_exp[j] = x;
j++;
x = pop();
}
}
else
{
 printf("\nInvalid infix Expression.\n");
 getchar();
 exit(1);
 }
 i++;
 item = infix_exp[i];
 }
 if(top>0)
 {
 printf("\nInvalid infix Expression.\n");
 getchar();
 exit(1);
 }
 if(top>0)
{
 printf("\nInvalid infix Expression.\n");
 getchar();
 exit(1);
 }
 postfix_exp[j] = '\0';


}
int main()
{
 char infix[SIZE], postfix[SIZE];
 printf("ASSUMPTION: The infix expression contains single letter variables and single digit
constants only \n");
 printf("\nEnter Infix expression : ");
 gets(infix);
 InfixToPostfix(infix,postfix);
 printf("Postfix Expression: ");
 puts(postfix);
 return 0;
}
```

OUTPUT:



```
Enter Infix expression : A/B*C+D^E
Postfix Expression: AB/C*DE^+
```