EXPERIMENT NUMBER: – 6

STUDENT'S NAME: - Vaibhav Ahuja	**STUDENT'S UID: -** 19BCS1065
BRANCH: - CSE	**SECTION AND GROUP**: - 1/B
SUBJECT NAME: - Data Structure Lab	**DATE OF PERFOMANCE: -** 13/9/2020
SEMESTER: - 3	**SUBJECT CODE: -** CSP-231

AIM/OVERVIEW OF PRACTICAL–

Write a program to find infix to postfix notation of **a+b*c+(d*e).**

TASK TO BE DONE—

Making a program using stack to find postfix notation of infix notation: - **a+b*c+(d*e).**

ALGORITHM/FLOWCHART—

Step 1: - Scan expression left to right**.**
Step 2: - for all the character in expression left to right repeat step 3 to step 11
Step 3: - if char is equal to operand(any alphabet) print it.
Step 4: - If operator ('+' ; '-' ; '*' ; '/' ; '^') arrives and stack is empty push operator onto stack.
Step 5: - If incoming operator has higher precedence than the operator present at the top of the stack, push it onto the stack. (precedence of '(' is set to -1)
Step 6: - If the incoming operator has lower precedence than the top of the stack, then POP and print the top element of the stack and repeat from step-3 again.
Step 7: - If incoming operator has equal precedence with top of stack do step 8 and step 9 else go to step 10.
Step 8: - If operator is power operator (' ^ ') push incoming operator onto stack.
Step 9: - else POP and print the top of the stack and then push the incoming operator.
Step 10: - If incoming symbol is '(' PUSH it onto the stack
Step 11: - if incoming symbol is ')' POP and print the elements in the stack until '(' is found, and the POP '(' from the stack without printing.
Step 12: - At the end of the expression POP and print all the elements from the stack.

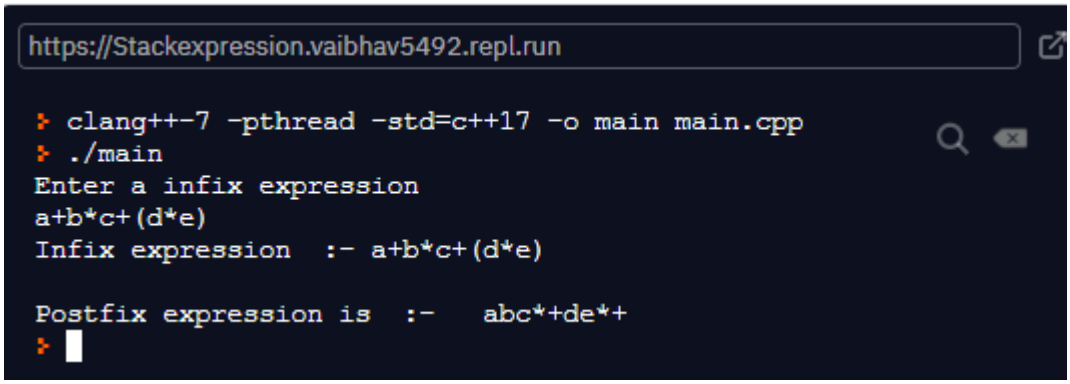
CODE: -

```
#include<iostream>
#include<stack>
using namespace std;
int precedence(char pre)
{
```

```
    if(pre == '^')
    return 3;
    else if(pre == '*' || pre == '/')
    return 2;
    else if(pre == '+' || pre == '-')
    return 1;
    else
    return -1;
}
string infix_to_postfix(string infix)
{
  string postfix;
  stack <char> s;
  for(int i=0;i<infix.length();i++)
  {
    if((infix[i] >= 'a' && infix[i] <= 'z')||(infix[i] >= 'A' && infix[i] <=
'Z'))
    {
      postfix+=infix[i];
    }
    else if(infix[i]=='(')
    {
      s.push('(');
    }
    else if(infix[i]==')')
    {
      while((s.top()!='(') && (!s.empty()))
      {
        char temp=s.top();
        postfix+=temp;
        s.pop();
      }
      if(s.top()=='(')
      {
        s.pop();
      }
    }
    else if(infix[i]=='+' || infix[i]=='-' || infix[i]=='*' || infix[i]=='/'
|| infix[i]=='^')
    {
      if(s.empty())
      {
        s.push(infix[i]);
      }
      else
      {
        if(precedence(infix[i])>precedence(s.top()))
        {
```

```
            s.push(infix[i]);
          }
          else if((precedence(infix[i])==precedence(s.top()))&&(infix[i]=='^'))
          {
            s.push(infix[i]);
          }
          else
          {
            while((!s.empty())&&( precedence(infix[i])<=precedence(s.top())))
            {
              postfix+=s.top();
              s.pop();
            }
            s.push(infix[i]);
          }
        }
      }
    }
    while(!s.empty())
    {
      postfix+=s.top();
      s.pop();
    }
    return postfix;
}
int main()
{
    string infix_1,postfix_1;
    cout<<"Enter a infix expression"<<endl;
    cin>>infix_1;//a+b*c+(d*e)
    cout<<"Infix expression  :- "<<infix_1<<endl;
    postfix_1=infix_to_postfix(infix_1);
    cout<<endl<<"Postfix expression is  :-   "<<postfix_1<<endl;
    return 0;
}
```

Result/Output: -



Learning outcomes (What I have learnt): -

1. Algorithm to convert infix to postfix expression.

2. How to use stack library.

3. How to implement the algorithm to convert infix to postfix.