**DATA STRUCTURES**

**EXPERIMENT – 4**

**AIM: Evaluate Postfix Expression using Stack ADT**

**PROBLEM STATEMENT: Write a program to input a postfix expression and perform evaluation.**

**Sample: Enter a postfix expression: ab+c\*pq+-**

**Enter value of a: 2**

**Enter value of b: 3**

**Enter value of c: 4**

**Enter value of p: 5**

**Enter value of q: 7**

**Result of evaluation: 8**

**Code**:(Paste your code below)

#include <stdio.h>

#include <string.h>

#define size 50

float stack[size]; //declare the stack array to store 50 integers//

int top = -1;

void push(float val);

float pop();

float peep();

void display();

float evaluate(char \*);

int main()

{

float ans;

char postfix[50];

int len = 0;

printf("Enter the postfix expression:\n");

gets(postfix);

printf("\nThe postfix expression is: %s",postfix);

ans=evaluate(postfix);

printf("\nAnswer after evaluation = %0.2f",ans);

}

float evaluate(char postfix[50])

{

int i=0;

float val;

float a,b;

while(postfix[i]!='\0')

{

if(isalpha(postfix[i]))

{

printf("\nEnter the value of %c: ",postfix[i]);

scanf("%f",&val);

push(val);

}

else

{

b=pop();

a=pop();

/\*printf("a=%f , b=%f",a,b);\*/

switch(postfix[i])

{

case '+': val= (a+b);

break;

case '-': val= (a-b);

break;

case '\*': val= (a\*b);

break;

case '/': val= (a/b);

break;

}

/\*printf("val=%f:",val);\*/

push(val);

}

i++;

}

return pop();

}

//floatstack.h contents//

void push(float val)

{

if(top == size -1)

{

printf("\nStack Full!!\n");

}

else

{

top++;

stack[top] = val;

}

}

float pop()

{

if(top == -1)

{

printf("\nStack Empty!!\n");

return -1;

}

else

{

return(stack[top--]);

}

}

float peep()

{

if(top == -1)

{

/\*printf("\nStack Empty!!\n");\*/

return -1;

}

else

{

/\*printf("Element at the top = %d\n",stack[top]);\*/

return stack[top];

}

}

void display()

{

int i;

if(top == -1)

{

printf("\nStack Empty!!\n");

}

else

{

printf("\nStack elements are:\n");

for(i=top;i>=0;i--)

{

printf("%0.2f\n",stack[i]);

}

}

}

**Output**:(Evaluate the following postfix expression : **ab-cd+/ef+\***

Give following values: **a=12, b=3, c=2,d=1, e=7, f=5**)