Exp. No. 15

Write a C Program to implement the operator precedence parsing.

Program:

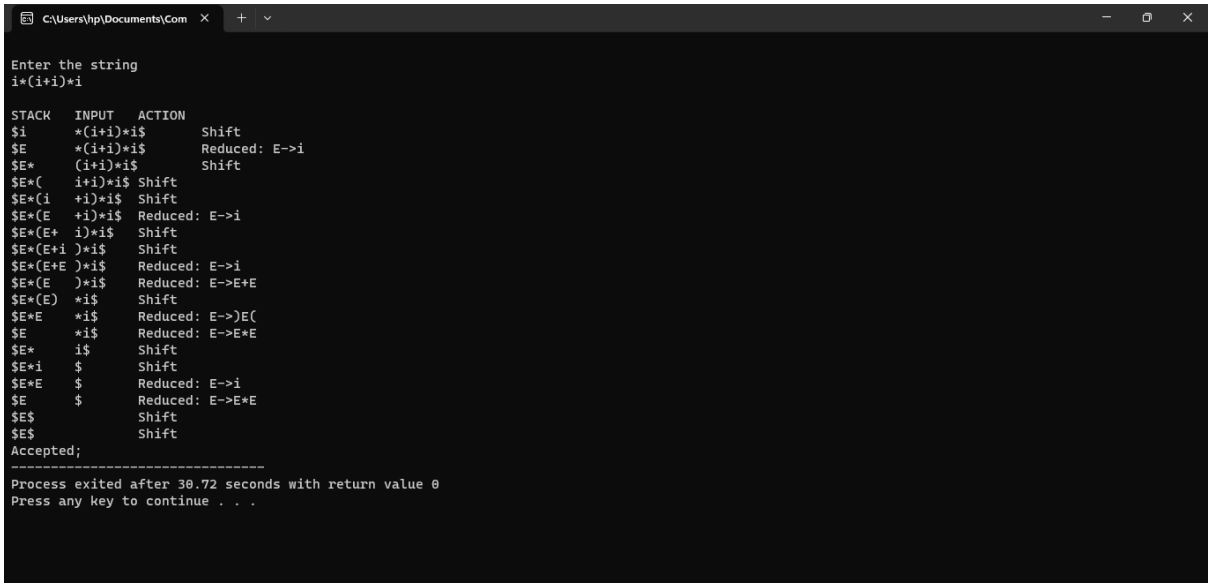
```
#include<stdio.h>
#include<string.h>

char *input;
int i=0;
char lasthandle[6],stack[50],handles[][5]={")E(","E*E","E+E","i","E^E"};
//(E) becomes )E( when pushed to stack

int top=0,l;
char prec[9][9]={

                /*input*/

        /*stack   +   -   *   /   ^   i   (   )   $  */

        /*  + */  '>', '>','<','<','<','<','<','>','>',

        /*  - */  '>', '>','<','<','<','<','<','>','>',

        /*  * */  '>', '>','>','>','<','<','<','>','>',

        /*  / */  '>', '>','>','>','<','<','<','>','>',

        /*  ^ */  '>', '>','>','>','<','<','<','>','>',

        /*  i */  '>', '>','>','>','>','e','e','>','>',

        /*  ( */  '<', '<','<','<','<','<','<','>','e',

        /*  ) */  '>', '>','>','>','>','e','e','>','>',

        /*  $ */  '<', '<','<','<','<','<','<','<','>',

           };
```

```
int getindex(char c)
{
switch(c)
   {
   case '+':return 0;
   case '-':return 1;
   case '*':return 2;
   case '/':return 3;
   case '^':return 4;
   case 'i':return 5;
   case '(':return 6;
   case ')':return 7;
   case '$':return 8;
   }
}

int shift()
{
stack[++top]=*(input+i++);
stack[top+1]='\0';
}


int reduce()
{
int i,len,found,t;
for(i=0;i<5;i++)//selecting handles
   {
   len=strlen(handles[i]);
   if(stack[top]==handles[i][0]&&top+1>=len)
      {
      found=1;
      for(t=0;t<len;t++)
         {
         if(stack[top-t]!=handles[i][t])
            {
            found=0;
```

```
            break;
            }
          }
       if(found==1)
          {
          stack[top-t+1]='E';
          top=top-t+1;
          strcpy(lasthandle,handles[i]);
          stack[top+1]='\0';
          return 1;//successful reduction
          }
       }
  }
return 0;
}

void dispstack()
{
int j;
for(j=0;j<=top;j++)
   printf("%c",stack[j]);
}

void dispinput()
{
int j;
for(j=i;j<l;j++)
   printf("%c",*(input+j));
}



void main()
{
int j;

input=(char*)malloc(50*sizeof(char));
printf("\nEnter the string\n");
```

```
scanf("%s",input);
input=strcat(input,"$");
l=strlen(input);
strcpy(stack,"$");
printf("\nSTACK\tINPUT\tACTION");
while(i<=l)
        {
        shift();
        printf("\n");
        dispstack();
        printf("\t");
        dispinput();
        printf("\tShift");
        if(prec[getindex(stack[top])][getindex(input[i])]=='>')
                {
                while(reduce())
                        {
                        printf("\n");
                        dispstack();
                        printf("\t");
                        dispinput();
                        printf("\tReduced: E->%s",lasthandle);
                        }
                }
        }

if(strcmp(stack,"$E$")==0)
   printf("\nAccepted;");
else
   printf("\nNot Accepted;");
}
```

OUTPUT:


C:\Users\hp\Documents\Com
Enter the string
i*(i+i)*i
STACK INPUT ACTION
$i *(i+i)*i$ Shift
$E *(i+i)*i$ Reduced: E->i
$E* (i+i)*i$ Shift
$E*(i+i)*i$ Shift
$E*(i +i)*i$ Shift
$E*(E +i)*i$ Reduced: E->i
$E*(E+ i)*i$ Shift
$E*(E+i)*i$ Shift
$E*(E+E)*i$ Reduced: E->i
$E*(E)*i$ Reduced: E->E+E
$E*(E) *i$ Shift
$E*E *i$ Reduced: E->)E(
$E *i$ Reduced: E->E*E
$E* i$ Shift
$E*i $ Shift
$E*E $ Reduced: E->i
$E $ Reduced: E->E*E
E Shift
E Shift
Accepted;
Process exited after 30.72 seconds with return value 0
Press any key to continue . . .