#include<stdio.h>

#include<string.h>

#include<ctype.h>

#include<math.h>

char a[100],stack[100],b[100];

int top=-1,i=0,j=0;

float stack1[100];

char \*strrev(char \*str)

{

int j=0;

int i=strlen(str)-1;

char ch;

while(i>j)

{

ch=str[i];

str[i]=str[j];

str[j]=ch;

i--;

j++;

}

return str;

}

void push(char inp)

{

if(top>=99)

{

printf("STACK OVERFLOW\n");

}

else

{

top++;

stack[top]=inp;

}

}

void pushev(float item)

{

if(top>=99)

{

printf("STACK OVERFLOW\n");

}

else

{

top+=1;

stack1[top]=item;

}

}

char pop()

{

char ch;

if(top<0)

{

printf("STACK UNDERFLOW\n");

}

else

{

ch=stack[top];

top--;

}

return ch;

}

float popev()

{

float item;

if(top<0)

printf("STACK OVERFLOW");

else

{

item=stack1[top];

top-=1;

return(item);

}

}

char read\_symbol()

{

char ch=a[i];

i++;

return(ch);

}

void output(char item)

{

b[j]=item;

j++;

}

int isp(char ch)

{

switch(ch)

{

case '^':return 4;

break;

case '\*':return 2;

break;

case '/':return 2;

break;

case '+':return 1;

break;

case '-':return 1;

break;

case ')':return 0;

break;

default:printf("FOUND INVALID CHARECTER FOR ISP\n");

}

}

int icp(char ch)

{

switch(ch)

{

case '^':return 3;

break;

case '\*':return 2;

break;

case '/':return 2;

break;

case '+':return 1;

break;

case '-':return 1;

break;

case ')':return 4;

break;

default:printf("FOUND INVALID CHARECTER FOR ICP\n");

}

}

char readsymbol()

{

char ch;

ch=b[j];

j++;

return(ch);

}

void main()

{

printf("ENTER THE INFIX EXPRESSION: ");

gets(a);

char x,item;

int len;

float value;

strrev(a);

len=strlen(a);

a[len]='(';

push(')');

while(top>-1)

{

item = read\_symbol();

x = pop();

if(isalpha(item))

{

push(x);

output(item);

}

else if (item == '(')

{

while(x!=')')

{

output(x);

x=pop();

}

}

else if(isp(x)>icp(item))

{

while(isp(x)>icp(item))

{

output(x);

x=pop();

}

push(x);

push(item);

}

else if(isp(x)<=icp(item))

{

push(x);

push(item);

}

else

printf("INVALID EXPRESSION\n");

}

printf("PREFIX EXPRESSION: %s\n",strrev(b));

for(i=0;b[i]!='\0';i++)

{

if(isalpha(b[i]))

{

printf("ENTER THE VALUE OF %c: ",b[i]);

scanf(" %c",&b[i]);

}

}

strrev(b);

float z,y,t;

char op;

b[i]='#';

j=0;

item=readsymbol();

while(item!='#')

{

if(isdigit(item))

pushev(item - '0');

else

{

op=item;

z=popev();

y=popev();

switch(item)

{

case '^':t=pow(z,y);

break;

case '\*':t=z\*y;

break;

case '/':t=z/y;

break;

case '+':t=z+y;

break;

case '-':t=z-y;

break;

}

pushev(t);

}

item=readsymbol();

}

value = popev();

printf("THE VALUE OF EXPRESSION IS %f\n",value);

}