**算法训练 阿尔法乘积**

时间限制：1.0s   内存限制：512.0MB

问题描述

　　计算一个整数的阿尔法乘积。对于一个整数x来说，它的阿尔法乘积是这样来计算的：如果x是一个个位数，那么它的阿尔法乘积就是它本身；否则的话，x的阿尔法乘积就等于它的各位非0的数字相乘所得到的那个整数的阿尔法乘积。例如：4018224312的阿尔法乘积等于8，它是按照以下的步骤来计算的：  
　　4018224312 → 4\*1\*8\*2\*2\*4\*3\*1\*2 → 3072 → 3\*7\*2 → 42 → 4\*2 → 8  
　　编写一个程序，输入一个正整数（该整数不会超过6,000,000），输出它的阿尔法乘积。  
　　输入格式：输入只有一行，即一个正整数。  
　　输出格式：输出相应的阿尔法乘积。  
　　输入输出样例

样例输入

4018224312

样例输出

8

本题的C++参考代码如下：

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*Powered by Graphene Richards\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

//{

#define OUTPUT\_PRECISION "%.2f"

#define LF\_PRECISION 10

#define INT\_64\_MOD "%lld"

#define UNSIGNED\_64\_MOD "%llu"

#define CONTEST\_EXIST 1

#define CONTEST\_START\_HOUR 13

#define CONTEST\_START\_MIN 0

#define CONTEST\_DUR\_HOUR 3

#define CONTEST\_DUR\_MIN 40

//#pragma comment(linker,"/STACK:102400000,102400000")

#include<cmath>

#include<cstdio>

#include<cstdlib>

#include<cstring>

#include<algorithm>

#include<bitset>

#include<complex>

#include<vector>

#include<iomanip>

#include<iostream>

#include<list>

#include<map>

#include<queue>

#include<set>

#include<stack>

#include<string>

#include<typeinfo>

#define FAST\_RW ios\_base::sync\_with\_stdio(0),cin.tie(0);

#define IT(x) \_\_typeof((x).begin())

#define FS(i,a) for(ll i=0;a[i];i++)

#define FE(x,ctn) for(IT(ctn)x=(ctn).begin(),CluhxSchFuDeugk=(ctn).end();x!=CluhxSchFuDeugk;x++)

#define FR(i,en) for(ll i=0,pJNwFPtlXiwFoIv=(en);i<pJNwFPtlXiwFoIv;i++)

#define FOR(i,en) for(ll i=1,SbKCIcakJTeYVqs=(en);i<=SbKCIcakJTeYVqs;i++)

#define FFR(i,x,y) for(ll i=(x),alVDbhLBoMEGSwA=(y);i<=alVDbhLBoMEGSwA;i++)

#define DFFR(i,x,y) for(ll i=(x),NWYfecAcmGBMJuU=(y);i>=NWYfecAcmGBMJuU;i--)

#define ll long long

#define lf long double

#define pc putchar

#define mp make\_pair

#define pb push\_back

#define pq priority\_queue

#define fi first

#define se second

#define lb(x) (x&(-x))

#define sqr(x) (x)\*(x)

#define all(x) (x).begin(),(x).end()

#define clr(x) memset((x),0,sizeof(x))

#define inf(x) memset((x),0x7F,sizeof(x))

#define \_inf(x) memset((x),0x80,sizeof(x))

#define NL puts("");

using namespace std;

template<class T1,class T2,class T3>

bool \_IN(T1 x,T2 y,T3 z){

return x<=y&&x>=z||x<=z&&x>=y;

}

ll gcd(ll a,ll b){

if(!b)

return a;

while(b^=a^=b^=a%=b);

return a;

}

#ifdef wmx16835

#include<ctime>

#include<conio.h>

#include<windows.h>

#define GREEN 10

#define BLUE 11

#define RED 12

#define PINK 13

#define YELLOW 14

#define WHITE 15

struct TM{

int t;

TM(int a,int b,int c):t(a\*3600+b\*60+c){}

TM(int x):t(x){}

TM(){}

operator int(){return t;}

void print(){

printf("%02d:%02d:%02d",t/3600%24,t/60%60,t%60);

}

};

void OVZmetNNpAqAVZx(){

time\_t t=time(0);

srand(t);

tm\*p=localtime(&t);

TM day(24,0,0),cur(p->tm\_hour,p->tm\_min,p->tm\_sec),beg(CONTEST\_START\_HOUR,CONTEST\_START\_MIN,0),len(CONTEST\_DUR\_HOUR,CONTEST\_DUR\_MIN,0),en(beg+len),fen(beg+en+day>>1),seg;

if(beg>cur)

cur.t+=day;

puts(" +--------------------------+");

if(\_IN(cur,beg,en)&&CONTEST\_EXIST){

puts(" | Status: Running |");

printf(" | Progress: %5.1f %% |\n",(double)(cur-beg)/len\*100);

seg.t=en-cur;

printf(" | Remaining time: ");

seg.print();

puts(" |");

}

else{

printf(" | Current time: ");

cur.print();

puts(" | ");

if(cur<=fen||!CONTEST\_EXIST)

puts(" | Status: Ended |");

else{

puts(" | Status: Scheduled |");

cur.t-=day;

seg.t=beg-cur;

printf(" | Remaining time: ");

seg.print();

puts(" |");

}

}

puts(" +--------------------------+");

puts("................................\n");

}

const HANDLE hout=GetStdHandle(STD\_OUTPUT\_HANDLE);

void \_COLOR(unsigned x=BLUE){

SetConsoleTextAttribute(hout,x);

}

void pCJUYxWEXKaDOIC(){

int num=1;

FILE\*p=fopen("FILE\_NAME","r");

if(p){

fscanf(p,"%d",&num);

fclose(p);

}

char f\_name[1024];

sprintf(f\_name,"%d.out",num++);

\_COLOR(PINK);

printf("[NOTICE] Standard output has been redirected to \"%s\".\n",f\_name);

\_COLOR();

freopen(f\_name,"w",stdout);

if(!stdout)

exit(1);

else

p=fopen("FILE\_NAME","w");

if(p){

fprintf(p,"%d",num);

fclose(p);

}

}

int bXMXqqguPAUDCia;

void FrKZgXsfpPVkeNv(){

char x[1000];

sprintf(x,"[Paused: %d]",++bXMXqqguPAUDCia);

int len=strlen(x);

printf(x);

getch();

FR(i,len)pc('\b');

FR(i,len)pc(' ');

FR(i,len)pc('\b');

}

#define LOG {\_COLOR(RED);unsigned ijqQjAZZNYpJYBe=clock();puts("\n----------------------");\_COLOR();

#define TEL \_COLOR(RED),printf("\n----------------------\nExecution time: %ums\n----------------------\n",clock()-ijqQjAZZNYpJYBe);\_COLOR();}

#define SHOW\_TIME \_COLOR(GREEN);OVZmetNNpAqAVZx();\_COLOR();

#define test(...) \_COLOR(YELLOW),printf(\_\_VA\_ARGS\_\_),\_COLOR()

#define TEST(x) \_COLOR(YELLOW),printf("%s = ",#x),\_P(x),puts(""),\_COLOR()

#define TRY(...) \_\_VA\_ARGS\_\_

#define PF pCJUYxWEXKaDOIC();

#define PP \_COLOR(RED);FrKZgXsfpPVkeNv();\_COLOR();

#else

#define LOG

#define TEL

#define SHOW\_TIME

#define test(...)

#define TEST(...)

#define TRY(...)

#define PF

#define PP

#endif

int S(char\*a){

return scanf("%s",a)==1;

}

template<class T>

int S(T&a){

const char\*x=typeid(a).name();

if(!strcmp(x,"i")||!strcmp(x,"b"))return scanf("%d",&a)==1;

else if(!strcmp(x,"j"))return scanf("%u",&a)==1;

else if(!strcmp(x,"c"))return scanf("%c",&a)==1;

else if(!strcmp(x,"Pc")||\*x=='A')return scanf("%s",a)==1;

else if(!strcmp(x,"f"))return scanf("%f",&a)==1;

else if(!strcmp(x,"d"))return scanf("%lf",&a)==1;

else if(!strcmp(x,"x"))return scanf(INT\_64\_MOD,&a)==1;

else if(!strcmp(x,"y"))return scanf(UNSIGNED\_64\_MOD,&a)==1;

else if(!strcmp(x,"e"))return (cin>>a)!=0;

else test("Input format error!\n");

}

template<class T>

void \_P(T a){

const char\*x=typeid(a).name();

if(!strcmp(x,"i")||!strcmp(x,"b"))printf("%d",a);

else if(!strcmp(x,"j"))printf("%u",a);

else if(!strcmp(x,"c"))printf("%c",a);

else if(!strcmp(x,"Pc")||!strcmp(x,"PKc")||\*x=='A')printf("%s",a);

else if(!strcmp(x,"d")||!strcmp(x,"f"))printf(OUTPUT\_PRECISION,a);

else if(!strcmp(x,"x"))printf(INT\_64\_MOD,a);

else if(!strcmp(x,"y"))printf(UNSIGNED\_64\_MOD,a);

else if(!strcmp(x,"e"))cout<<setprecision(LF\_PRECISION)<<a;

else test("Output format error!\n");

}

template<class T1,class T2>

int S(T1&a,T2&b){

return S(a)+S(b)==2;

}

template<class T1,class T2,class T3>

int S(T1&a,T2&b,T3&c){

return S(a)+S(b)+S(c)==3;

}

template<class T1,class T2,class T3,class T4>

int S(T1&a,T2&b,T3&c,T4&d){

return S(a)+S(b)+S(c)+S(d)==4;

}

template<class T1,class T2,class T3,class T4,class T5>

int S(T1&a,T2&b,T3&c,T4&d,T5&e){

return S(a)+S(b)+S(c)+S(d)+S(e)==5;

}

template<class T>

void P(T a){

\_P(a);

pc(' ');

}

template<class T1,class T2>

void P(T1 a,T2 b){

\_P(a);pc(' ');

\_P(b);pc(' ');

}

template<class T>

void PN(T a){

\_P(a);

NL

}

template<class T1,class T2>

void PN(T1 a,T2 b){

\_P(a);pc(' ');

\_P(b);NL

}

template<class T1,class T2,class T3>

void PN(T1 a,T2 b,T3 c){

\_P(a);pc(' ');

\_P(b);pc(' ');

\_P(c);NL

}

template<class T1,class T2,class T3,class T4>

void PN(T1 a,T2 b,T3 c,T4 d){

\_P(a);pc(' ');

\_P(b);pc(' ');

\_P(c);pc(' ');

\_P(d);NL

}

template<class T1,class T2,class T3,class T4,class T5>

void PN(T1 a,T2 b,T3 c,T4 d,T5 e){

\_P(a);pc(' ');

\_P(b);pc(' ');

\_P(c);pc(' ');

\_P(d);pc(' ');

\_P(e);NL

}

int kase;

const double pi=4\*atan(1);

const double ep=1e-9;

//}

int fun(int x){

if(x/10==0)return x;

int r=1;

while(x){

if(x%10)r\*=x%10;

x/=10;

}

return fun(r);

}

int main(){

SHOW\_TIME

int x;

S(x);

P(fun(x));

}

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/\*\*\*\*\*\*\*\*\*\*\*\*\*\*Template V1.36 build 20150119\*\*\*\*\*\*\*\*\*\*\*\*\*/

本题的C参考代码如下：

#include<stdio.h>

int main()

{

unsigned int t,n; scanf("%d",&n); if(n<=6000000)

{

while(n>=10)

{

t=1; while(n>0)

{

if(n%10!=0) t\*=(n%10); n/=10;

} n=t;

}

} printf("%d",n); return 0;

}

本题的Java参考代码如下：

import java.io.BufferedReader;

import java.io.InputStreamReader;

public class Main{

public static void main(String[] args) throws Exception {

BufferedReader br = new BufferedReader(new InputStreamReader(System.in));

String number = br.readLine();

if (number.equals("0"))

System.out.println(number);

else {

while (number.length() > 1) {

int sum = 1;

char[] temp = number.toCharArray();

for (int i = 0; i < temp.length; i++) {

if (temp[i] == '0')

continue;

sum \*= temp[i] - 48;

}

number = sum + "";

}

System.out.println(number);

}

}

}