**身份证号码升级**

问题描述

　　从1999年10月1日开始，公民身份证号码由15位数字增至18位。(18位身份证号码简介)。升级方法为：  
　　1、把15位身份证号码中的年份由2位(7,8位)改为四位。  
　　2、最后添加一位验证码。验证码的计算方案：  
　　将前 17 位分别乘以对应系数 (7 9 10 5 8 4 2 1 6 3 7 9 10 5 8 4 2) 并相加，然后除以 11 取余数，0-10 分别对应 1 0 x 9 8 7 6 5 4 3 2。  
　　请编写一个程序，用户输入15位身份证号码，程序生成18位身份证号码。假设所有要升级的身份证的四位年份都是19××年

输入格式

　　一个15位的数字串，作为身份证号码

输出格式

　　一个18位的字符串，作为升级后的身份证号码

样例输入

110105491231002

样例输出

11010519491231002x

数据规模和约定

　　不用判断输入的15位字符串是否合理

C++代码：

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

extern"C++"{

#define FLOAT\_PRECISION 2

#ifdef \_MSC\_VER

#define \_SECURE\_SCL 0

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

#else

#pragma GCC optimize("O3")

#pragma GCC target("sse,sse2,sse3,ssse3,sse4,popcnt,abm,mmx")

#endif

#if defined(\_MSC\_VER)||\_\_cplusplus>199711L

#define IT(x) auto

#define DIT(x) auto

#else

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

#define DIT(x) \_\_typeof((x).rbegin())

#endif

# inc\

lude<cmath>

# inc\

lude<cstdio>

# inc\

lude<cstdlib>

# inc\

lude<cstring>

# inc\

lude<algorithm>

# inc\

lude<bitset>

# inc\

lude<complex>

# inc\

lude<vector>

# inc\

lude<iomanip>

# inc\

lude<iostream>

# inc\

lude<list>

# inc\

lude<map>

# inc\

lude<queue>

# inc\

lude<set>

# inc\

lude<stack>

# inc\

lude<string>

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

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

#define FE(it,x) for(IT(x) it=(x).begin(),\_en=(x).end();it!=\_en;it++)

#define EF(it,x) for(DIT(x) it=(x).rbegin(),\_en=(x).rend();it!=\_en;it++)

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

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

#define RF(i,en) for(ll i=(en)-1;i>=0;i--)

#define ROF(i,en) for(ll i=(en);i>0;i--)

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

#define RFF(i,x,y) for(ll i=(x),\_en=(y);i>=\_en;i--)

#define pc putchar

#define pb push\_back

#define ppb pop\_back

#define pq priority\_queue

#define fi first

#define se second

#define mp make\_pair

#define pii pair<int,int>

#define pll pair<ll,ll>

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

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

#define rall(x) (x).rbegin(),(x).rend()

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

#define ms(x,v) memset((x),(v),sizeof(x))

#define mc(x,y) memcpy((x),(y),sizeof(y))

#define NL puts("");

#define LB lower\_bound

#define UB upper\_bound

#define rand() ((rand()<<16)^(rand()<<15)^(rand()))

#ifdef \_WIN32

#define \_i64\_ "%I\

64d"

#define \_u64\_ "%I\

64u"

#else

#define \_i64\_ "%l\

ld"

#define \_u64\_ "%l\

lu"

#endif

typedef unsigned ui;

typedef long long ll;

typedef unsigned long long ull;

typedef long double lf;

using namespace std;

ull gcd(ull a,ull b){if(!b)return a;while(b^=a^=b^=a%=b);return a;}

extern const ll MOD;

ll ksm(ll a,ll b){

ll res=1;a%=MOD;

for(;b;b>>=1){if(b&1)res=res\*a%MOD;a=a\*a%MOD;}

return res;

}

#ifdef wmx16835

#include"wmx16835.h"

#else

#define LOG

#define TEL

#define test(...) 0

#define TEST(...) 0

#define TRY(...)

#define SF(...)

#define SC

#define PF

#define PC

#define PP

#define SHOW\_TIME

#define BR

#endif

int main(){SHOW\_TIME int \_\_MAIN();\_\_MAIN();}

#define main \_\_MAIN

#define y0 NKwKGuBI

#define y1 KFJssmlK

#define yn XypGISMR

#define j1 kQDCYYWX

#define tm BdKIQNcs

#define lr UsCPcJvt

template<class T1,class T2,class T3>bool In(T1 x,T2 y,T3 z){return x<=y&&x>=z||x<=z&&x>=y;}

template<class T1,class T2>T1 max(const T1&a,const T2&b){return a<b?b:a;}

template<class T1,class T2,class T3>T1 max3(const T1&a,const T2&b,const T3&c){return a<b?(b<c?c:b):(a<c?c:a);}

template<class T1,class T2>T1 min(const T1&a,const T2&b){return a<b?a:b;}

template<class T1,class T2,class T3>T1 min3(const T1&a,const T2&b,const T3&c){return a<b?(a<c?a:c):(b<c?b:c);}

bool S(char\*a){return scanf("%s",a)==1;}

bool S(int&a){return scanf("%d",&a)==1;}

bool S(bool&a){return scanf("%d",&a)==1;}

bool S(ui&a){return scanf("%u",&a)==1;}

bool S(float&a){return scanf("%f",&a)==1;}

bool S(double&a){return scanf("%lf",&a)==1;}

bool S(ll&a){return scanf(\_i64\_,&a)==1;}

bool S(ull&a){return scanf(\_u64\_,&a)==1;}

bool S(lf&a){double b;if(scanf("%lf",&b)==-1)return 0;a=b;return 1;}

bool S(char&a){char b[2];if(scanf("%1s",b)==-1)return 0;a=\*b;return 1;}

bool SL(char\*a){a[0]=0;while(gets(a)&&!a[0]);return a[0];}

template<class T1,class T2>bool S(pair<T1,T2>&a){S(a.fi),S(a.se);}

template<class T>bool S(T&a){a.in();}

void \_P(const int&x){printf("%d",x);}

void \_P(const bool&x){printf("%d",x);}

void \_P(const ui&x){printf("%u",x);}

void \_P(const char&x){printf("%c",x);}

void \_P(const char\*x){printf("%s",x);}

void \_P(const string&x){printf("%s",x.c\_str());}

void \_P(const ll&x){printf(\_i64\_,x);}

void \_P(const ull&x){printf(\_u64\_,x);}

void \_P(const float&x){printf("%.\*f",FLOAT\_PRECISION,x);}

void \_P(const double&x){printf("%.\*f",FLOAT\_PRECISION,x);}

void \_P(const lf&x){printf("%.\*f",FLOAT\_PRECISION,(double)x);}

template<class T1,class T2>void \_P(const pair<T1,T2>&x){\_P(x.fi);pc(' ');\_P(x.se);}

template<class T>void \_P(const T&a){a.out();}

template<class T1,class T2>bool S(T1&a,T2&b){return S(a)+S(b)==2;}

template<class T1,class T2,class T3>bool S(T1&a,T2&b,T3&c){return S(a)+S(b)+S(c)==3;}

template<class T1,class T2,class T3,class T4>bool 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>bool 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 T1>void P(const T1&a){\_P(a);pc(' ');}

template<class T1,class T2>void P(const T1&a,const T2&b){\_P(a);pc(' ');\_P(b);pc(' ');}

template<class T1>void PN(const T1&a){\_P(a);NL}

template<class T1,class T2>void PN(const T1&a,const T2&b){\_P(a);pc(' ');\_P(b);NL}

template<class T1,class T2,class T3>void PN(const T1&a,const T2&b,const T3&c){\_P(a);pc(' ');\_P(b);pc(' ');\_P(c);NL}

template<class T1,class T2,class T3,class T4>void PN(const T1&a,const T2&b,const T3&c,const 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(const T1&a,const T2&b,const T3&c,const T4&d,const T5&e){\_P(a);pc(' ');\_P(b);pc(' ');\_P(c);pc(' ');\_P(d);pc(' ');\_P(e);NL}

void PS(int a){printf("%\*s",a,"");}

template<class T>void SA(T\*a,int n){FR(i,n)S(a[i]);}

template<class T>void PA(T\*a,int n){FR(i,n){if(i)pc(' ');\_P(a[i]);}NL}

template<class T>void PA(const T&x){FE(it,x){if(it!=x.begin())pc(' ');\_P(\*it);}NL}

int kase;

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

const double ep=1e-9;

const int INF=0x3f3f3f3f;

const ll INFL=0x3f3f3f3f3f3f3f3fll;

const ll MOD=1000000007;

}

char bf[25], res[25];

int x[] = {7, 9, 10, 5, 8, 4, 2, 1, 6, 3, 7, 9, 10, 5, 8, 4, 2};

const char \*xx = "10x98765432";

int main() {

S(bf);

FR(i, 6) res[i] = bf[i];

res[6] = '1';

res[7] = '9';

FFR(i, 8, 16) res[i] = bf[i - 2];

int r = 0;

FR(i, 17) {

r = (r + (res[i] - '0') \* x[i]) % 11;

}

res[17] = xx[r];

PN(res);

}

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C代码：

#include<stdlib.h>

#include<stdio.h>

int main(){

int i,j,sum=0;

int base[]={7,9,10,5,8,4,2,1,6,3,7,9,10,5,8,4,2};

char end[]={'1','0','x','9','8','7','6','5','4','3','2'};

char id[19];

gets(id);

for(i=14;i>=6;i--){

id[i+2]=id[i];

}

id[6]='1';id[7]='9';

for(i=0;i<17;i++){

sum+=base[i]\*(id[i]-'0');

}

id[17]=end[sum%11];

id[18]='\0';

puts(id);

system("pause");

return 0;

}

JAVA代码：

import java.io.BufferedReader;

import java.io.BufferedWriter;

import java.io.InputStreamReader;

import java.io.OutputStreamWriter;

import java.io.PrintWriter;

public class Main {

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

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

PrintWriter out = new PrintWriter(new BufferedWriter(new OutputStreamWriter(System.out)));

char[] sign = new char[]{

'1', '0', 'x', '9', '8', '7', '6', '5', '4', '3', '2'

};

int[] nums = new int[] {

7, 9, 10, 5, 8, 4, 2, 1, 6, 3, 7, 9, 10, 5, 8, 4, 2

};

StringBuilder sb = new StringBuilder();

String str;

int total;

while((str = in.readLine()) != null) {

sb.append(str);

sb.insert(6, "19");

total = 0;

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

total += (sb.charAt(i) - 48) \* nums[i];

}

sb.append(sign[total % 11]);

System.out.println(sb.toString());

}

}

}