#include<bits/stdc++.h>

using namespace std;

#define fRead(x) freopen(x,"r",stdin)

#define fWrite(x) freopen (x,"w",stdout)

#define LL long long

#define ULL unsigned long long

#define ff first

#define ss second

#define pb push\_back

#define INF 2e16

#define PI acos(-1.0)

#define mk make\_pair

#define pii pair<int,int>

#define pll pair<LL,LL>

#define min3(a,b,c) min(a,min(b,c))

#define max3(a,b,c) max(a,max(b,c))

#define min4(a,b,c,d) min(a,min(b,min(c,d)))

#define max4(a,b,c,d) max(a,max(b,max(c,d)))

#define SQR(a) ((a)\*(a))

#define FOR(i,a,b) for(int i=a;i<=b;i++)

#define ROF(i,a,b) for(int i=a;i>=b;i--)

#define REP(i,b) for(int i=0;i<b;i++)

#define MEM(a,x) memset(a,x,sizeof(a))

#define ABS(x) ((x)<0?-(x):(x))

#define scanI(a) scanf("%d",&a)

#define scanI2(a,b) scanI(a) , scanI(b)

#define scanI3(a,b,c) scanI(a), scanI(b), scanI(c)

#define scanI4(a,b,c,d) scanI(a), scanI(b), scanI(c), scanI(d)

#define scanL(a) scanf("%I64d",&a)

#define scanL2(a,b) scanL(a) , scanL(b)

#define scanL3(a,b,c) scanL(a), scanL(b), scanL(c)

#define scanL4(a,b,c,d) scanL(a), scanL(b), scanL(c), scanL(d)

#define SORT(v) sort(v.begin(),v.end())

#define REV(v) reverse(v.begin(),v.end())

#define FastRead ios\_base::sync\_with\_stdio(0);cin.tie(nullptr);

#ifdef MATRIX

const int N=3;

const LL mod = 10007;

void MatMul(int A[N][N], int B[N][N])

{

int R[N][N];

memset(R, 0, sizeof(R));

REP(i, 3) REP(j, 3) REP(k, 3) R[i][j] = (R[i][j] + A[i][k] \* B[k][j]) % mod;

REP(i, 3) REP(j, 3) B[i][j] = R[i][j];

}

int R[N][N] = {{2,0,0},{1,0,0},{1,0,0}};

int M[N][N] = {{1,1,2},{1,0,0},{0,1,0}};

void MatPow(int B)

{

while(B)

{

if(B & 1) MatMul(M, R);

MatMul(M, M);

B = B >> 1;

}

}

#endif

bool Check(int N,int pos) { return (bool)(N&(1<<pos)); }

int Set(int N,int pos) { return (N|(1<<pos)); }

int fx[ ] = {-1,0,1,0};

int fy[ ] = {0,1,0,-1};

inline LL BigMod(LL B,LL P,LL M){LL R=1;while(P>0){if(P%2==1){R=(R\*B)%M;}P/=2;B=(B\*B)%M;}return R;}

#ifdef FAC

LL fac[200005];void FacGen(){fac[0]=1;FOR(i,1,200000)fac[i]=(fac[i-1]\*i)%mod;}

LL COM(LL a,LL b){return ((fac[a]\*BigMod((fac[b]\*fac[a-b])%mod,mod-2,mod))%mod+mod)%mod;}

#endif

#ifdef SIEVE

const int N = 100000;

bool stat[N+5];

void siv()

{

int sq = sqrt(N);for(int i =4;i<=N;i+=2)stat[i]=1;

for(int i=3;i<=sq;i+=2)if(!stat[i])for(int j=i\*i;j<=N;j+=2\*i)stat[j]=1;

}

#endif