# China

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#include<cstdio>

#include<cstring>

#include<algorithm>

#include<iostream>

using namespace std;

const int Mod=23\*28\*33;

long long extend\_gcd(long long a,long long b,long long &x,long long &y){

if(b==0){

x=1,y=1;

return a;

}

extend\_gcd(b,a%b,x,y);

long long tmp=x;x=y;y=tmp-a/b\*y;

return a;

}

long long gcd(long long a,long long b){

return b==0?a:gcd(b,a%b);

}

long long A,B,C,D,ans;

int get\_phi(int num){

int p=0;

for(int i=1;i<=num;i++){

if(gcd(i,num)==1) p++;

}

return p-1;

}

long long quick\_pow(long long num,long long mod,int ct){

long long ans=1;

while(ct){

if(ct%2==1) {

ans=ans\*num;

ans=ans%mod;

}

num=num\*num;

num=num%mod;

ct=ct/2;

}

return ans;

}

long long sum;

int main(){

int phi23=get\_phi(23);

int phi28=get\_phi(28);

int phi33=get\_phi(33);

// printf("%d %d %d\n",phi23,phi28,phi33);

int time=1;

while(1){

sum=0;

cin>>A>>B>>C>>D;

if(A+B+C==0){

cout<<"Case "<<time++<<": the next triple peak occurs in "<<Mod-D<<" days."<<endl;

continue;

}

if(A==-1) break;

long long ans1=23\*28;

sum=sum+ans1\*quick\_pow(ans1,33,phi33)\*C;

sum=sum%Mod;

long long ans2=23\*33;

sum=sum+ans2\*quick\_pow(ans2,28,phi28)\*B;

sum=sum%Mod;

long long ans3=33\*28;

sum=sum+ans3\*quick\_pow(ans3,23,phi23)\*A;

sum=sum%Mod;

if(((sum-D)%Mod+Mod)%Mod==0)cout<<"Case "<<time++<<": the next triple peak occurs in "<<Mod<<" days."<<endl;

else cout<<"Case "<<time++<<": the next triple peak occurs in "<<((sum-D)%Mod+Mod)%Mod<<" days."<<endl;

}

return 0;

}