**ccu13a03: Cycle length in decimal expansion**

**time limit: 1 sec**

**Problem Description**

Given integers p<=q in which p>=0 and q>0, find the cycle length in the decimal expansion of p/q. For example, 1/7=0.142857142857…, the cycle length is six; and 1/3=0.333…, so the cycle length is one. Note that 1/2=0.5 which can also be expressed as 0.500…, and we assume the length is one.

**Input**

The input consists of several cases. Each case contains two integers p and q in one line. We assume that 0<=p<=q<=1000100.

The case with q=0 ends the input, and you don’t need to compute this case.

**Output**

For each case, print the cycle length in one line.

**Sample Input**

1 7

2 3

1 1

2 0

**Sample Output**

6

1

1

Solution

如果會做請先不要看次頁解答

Solution

題意: 求有理數化小數十的循環節長度

題型: simulation:

模擬的題目通常是要你以程式模擬某個動作, 大多數的題目並不難, 在模擬過程中必須記錄某些值, 常運用到陣列

本題你可以模擬人在做除法運算時的動作

每次將餘數乘以10在求餘數

何時循環? 當餘數重複時就表示循環了

如何記錄餘數

直覺方法一: 以一個陣列book[i]記錄下第i次的餘數

缺點: 要每次掃描book[1]到book[i], 當循環節很大時會花很多時間 O(n^2)

方法二: 以一個陣列book[i]記錄下i這個餘數在第幾次出現

因為餘數必定0~n-1

Initial set book[i]=0 for all i

檢查餘數只要檢查book[i]是否等於0

for (i=0;i<m;i++) book[i]=0;

for (i=1;;i++) {

if (book[n]>0) break;

book[n]=i;

n=(n\*10)%m;

}

這種轉換紀錄對象的手法經常使用, 請大家多多了解。

記憶體問題：

宣告int book[1000100];

可能會有陣列太大的問題，有兩個方法可以獲得更大記憶體

(1)用malloc

int \*book;

book=malloc(sizeof(int)\*1000100);

(2) global variable.