## 2710 Max Factor

### 一、题目

#### 问题描述

To improve the organization of his farm, Farmer John labels each of his N (1 <= N <= 5,000) cows with a distinct serial number in the range 1..20,000. Unfortunately, he is unaware that the cows interpret some serial numbers as better than others. In particular, a cow whose serial number has the highest prime factor enjoys the highest social standing among all the other cows.

(Recall that a prime number is just a number that has no divisors except for 1 and itself. The number 7 is prime while the number 6, being divisible by 2 and 3, is not).

Given a set of N (1 <= N <= 5,000) serial numbers in the range 1..20,000, determine the one that has the largest prime factor.

#### 输入数据

\* Line 1: A single integer, N

\* Lines 2..N+1: The serial numbers to be tested, one per line

#### 输出数据

\* Line 1: The integer with the largest prime factor. If there are more than one, output the one that appears earliest in the input file.

#### 输入样例

4 36 38 40 42

#### 输出样例

38

#### 题目来源

HDU 2710http://acm.hdu.edu.cn/showproblem.php?pid=2710

### 二、题解

#### 解题思路

题目大意是给定n个整数，求得质因数最大的那个整数。当输入为0时停止程序。

质因数的定义是：满足自身为质数，且是给定整数的因子的数。

注意在这题1也算作素数。

大致思路是先搞个素数表，根据题意是20000内。然后根据素数表对数据进行遍历，找到比当前质因数大的就替换，直到遍历完整个数组。

可以速构素数表，也可以直接打表法，这里给出第一种代码。

#### 参考程序

#include <stdio.h>  
#define TRUE 1  
#define FALSE 0  
#define SIZE 20010  
int main()  
{  
 int i;   
 int j;   
 int k;  
 int a[SIZE];  
 int \*p;  
 for(p=a;p<a+SIZE;++p)   
 {  
 \*p=TRUE;  
 }  
  
 int n,temp,max,out;  
 a[0]=a[1]=FALSE;  
 i=2;  
 while(i<SIZE)   
 {   
 while(a[i++]==TRUE)   
 {  
 j = i-1;  
 break;  
 }  
 for(k = 2; j\*k < SIZE && i < SIZE; ++k)   
 { /\*处理质数的倍数\*/  
 a[j\*k] = FALSE;  
 }   
 } //素数打表，凡是true都是素数  
 while(scanf("%d",&n)!=EOF)  
 {  
 max=-1;  
 a[1]=TRUE;  
 while(n--)  
 {  
 scanf("%d",&temp);  
 for(i=temp;i>=1;i--)  
 {  
 if(temp%i==0)  
 {  
 if(i>max&&a[i]==TRUE)  
 {  
 max=i;  
 out=temp;  
 break;  
 }  
 }  
 }   
 }  
 printf("%d\n",out);  
 }  
 return 0;  
}

#### 复杂度分析

无

#### 编程技巧

无