重要公告

一、109 年 3 月 31 日起，修習進階程式課程同學，可以在任何地方撰寫老師所出的程式作業，為了防疫及個人健康，不一定要擠到通風不怎麼理想之電腦教室(一)寫程式。由於教育部全面禁用 ZOOM 視訊教學軟體，因而改用 Webex 視訊軟體，請同學練習並熟稔一下該軟體使用環境，109/04/22 起 ZOOM 停用改成 Webex 視訊會議軟體

二、為了老師能完全掌握修課同學於上課時段是否確實認真的在寫程式，請無法到電腦教室(一)上課的同學，務必登入老師的 WebEX 個人會議室（網址 ：https://moe-tw.webex.com/meet/hsiaojy)，以方便同學可以問問題或老師可以隨時瞭解同學的學習狀況

三、在電腦教室(一)寫程式的同學，依然可以舉手驗收完成的程式，遠距學習的同學則可用 WebEX 或雲端學院課程討論版的功能通知助教驗收你完成的程式

四、無故不到電腦教室(一)上課且又不登入老師的 WebEX 個人會議室與老師保持聯繫，視為翹課，視情節嚴重程度扣減平常成績，若累計 4 次無法聯絡到人，直接當掉

進階程式設計課程作業#11

（請使用 C 或 C++語言撰寫解決下列問題之程式）

SBN Prime Number

To find out a suitable prime number is very important for many algorithms, for example, RSA or hash table. Given a positive integer *P*, we name another positive integer *Q* as the SBN prime number of *P*. If the following conditions are true: (1) The number of 1's digit in binary form of *P* and *Q* is the same. (2) *Q* is less or equal than *P*. (3) *Q* is a prime number. (4) *Q* is the largest number in accordance with the above conditions.

For example: If *P*=10, we can transfer *P* into binary form as 00001010_2. We can find that *Q* (the SBN prime number) of *P* is 5 (00000101_2). 7 (00000111_2) is a prime number but the number of 1's digit in binary form is not matched. 3 (00000011_2) is a prime number and the number of 1's digit in binary form is also matched but it is not the largest number.

Input Format

The input of this problem is a sequence of unsigned integers (decimal form) as *P*. Each line represents a *P*. The last *P* of input is 0, it means your program will terminate when you see 0. The range of *P* is the same with the range of a 32-bits unsigned integer (**0** ~ **4294967295**).

Output Format

You need to output the SBN prime number of each *P* in decimal form and exactly in a line. If you cannot find out any SBN prime number of *P*, please output 0 in a line.

Sample Input:

```
10
3
1024
5998
0
```

Sample Output:

```
5
3
2
5981
```