

Problem 1. Caesar Shift 字母往前移

(Time Limit: 2 seconds)

問題描述：

George and Mary make a lovely couple. They have a habit exchanging diaries to kill time. In order to protect the content from being peeked by classmates or being confiscated by teachers, they use a way that shifts characters a certain number of positions in the alphabet and this certain number is written in the next line of the content. Mary feels that it is not convenient to translate diary content into an "encrypted" format every time it is done. Please help Mary write a program that can translate diary content into an "encrypted" form. The result of the encryption does not affect the case of the original letter, and the digital part is processed in the same way. The symbols and special characters and Chinese are not processed.

志明跟春嬌是班上的一對情侶，他們有寫交換日記來打發時間的習慣，為了防止他們寫的內容被幫忙傳的同學偷看，或者是不小心被老師沒收，而曝光了裡面寫的東西，他們想到了一個辦法，就是把內容的所有字母都往後數幾次的字母替代，而往後數幾次的數目就寫在內容的下一行。但是，問題來了，春嬌覺得每次寫完都要再數來數去的轉化成「加密」格式，實在是太麻煩了。但又礙於不想被輕易的看到內容，於是她拜託你寫個程式幫忙她可以直接把寫好的內容轉化成「加密」的狀態。加密結果不會影響原字母的大小寫，且數字部分亦作相同處理，但不處理符號及特殊字元及中文。

輸入說明：

The first line of the input is the content. It is not greater than 100 characters.

The second line of the input is the number of position by which each character is shifted.

第一行為想輸入的內容，不超過 100 個字元。

第二行為打完你想輸入的內容之後，換行輸入你想要往後替代的數目。

輸出說明：

Output the sentence that is translated and add a "newline" in the end of output.

印出轉換後的句子，最後必須有換行字元。

範例：

Sample Input:	Sample Output:
How are you? 123 2	Jqy ctg aqw? 345

Problem 2. Higher Score 我要九十九

(Time Limit: 2 seconds)

問題描述：

When you are a student, you should hear about the score adjusting rule of the square root times 10. If the teacher promises to apply this rule, all students will become happy, because you will get 60 if your original score is 36. However, those students whose scores are below 36 still feel stressed. One of these students dreams that the teacher says this adjusting rule can be applied several times until the score reaches to 99. If you are good at mathematics, how many times do you know if we want to adjust a score to be 99? Please write a program to answer this question. The program stops when the input score is -1. Please round off each square root number to the 1st decimal place (e.g., square root(2) = 1.4).

只要當過學生，一定很多人在算分數的時候，聽過老師跟大家說開根號乘以十。通常大家這樣都會很開心，因為只要 36 分就可以及格了！但是，36 分以下的同學就很頭痛了。在壓力太大的情況下，有些學生就作夢，夢到老師跟他們說，要讓他們開更號乘以十很多次，可是最後出來的分數要到 99 分才讓他們過。數學好的你，可以告訴他們到底最少需要做多少次開根號乘以十，才能夠讓分數等於 99 嗎？當輸入為 -1 時結束程式。（開根號之後都四捨五入到小數第一位）

輸入說明：

Input several positive integer numbers line-by-line with the last line to be -1. Each integer number N has the limit, $0 < N < 36$.

輸入若干筆正整數 N ， $0 < N < 36$ ，直到輸入 -1 時停止。

輸出說明：

The number of rounds that are necessary to adjust an input number to be 99. Please print a carriage return at the end of each output line.

一個正整數（共做了幾次開根號乘以十），最後必須有換行字元。

範例：

Sample Input:	Sample Output:
20	8
35	7
-1	

Problem 3. Fake Coins!! 偽造的金幣!!

(Time Limit: 2 seconds)

問題描述：

Among n bags of gold coins, one of them is counterfeit. We do not know which one is counterfeit, but we know counterfeit gold coins are lighter than real gold coins. Now we have a scale without scales that you can put more than one bags of gold coins on it. You need to weigh for a few times, then you can find out which bag of gold coins is counterfeit.

在 n 袋金幣中，有一袋金幣是偽造的，但我們不知道哪一袋金幣是偽造的金幣，我們知道偽造的金幣比真的金幣還輕，而手邊又正好只有沒有刻度的天秤，天秤的一端可放多袋金幣，聰明的你最多需要使用天秤幾次，保證一定能找出哪一袋是偽造的金幣。

輸入說明：

The first line of the input contains an integer $N(0 < N \leq 20)$ indicating the number of test cases. For each test case, there is a line with one integer numbers $n(2 \leq n \leq 1000000)$ representing how many bags of gold coins.

第一行為一個整數 $N(0 < N \leq 20)$ 代表有 N 組測試資料，之後會有 N 行數字，每一行數字代表 $n(2 \leq n \leq 1000000)$ 袋金幣。

輸出說明：

For each test case, the output is the maximum number of times you use the scale. Add a "newline" in the end of the output.

輸出 N 組測試資料可使用天秤的最多次數，最後必須有換行字元。

範例：

Sample Input:	Sample Output:
3	2
8	3
17	5
100	

Problem 4. Merge Sort 合併排序

(Time Limit: 2 seconds)

問題描述：

Merge sort is a sorting algorithm. It divides numbers into two groups first, then sorts the numbers in these two groups respectively, and finally merges them. For example, A and B represent two groups of sorted numbers. A is (2, 4, 5) and B is (1, 6). Two pointers which point to the first number of A and B respectively can be used when doing merge process. Then output the smaller number pointed by these two pointers. In this case, the first output number is 1. The pointer for B points to next number. Output the smaller number pointed by these two pointers again. Now the second output number is 2. The pointer for A points to next number. Please write a program that can sort two groups of numbers according to merge sort algorithm described above.

合併排序是一種將一組數字拆成兩組，待這兩組數字分別排序後進行合併的動作。例如 A 與 B 分別表示兩組已經排序好的數字，A 為 (2, 4, 5) 且 B 為 (1, 6)。合併的方式可以透過兩個指標，分別指向 A 與 B 的第一個數字，接著輸出這兩個指標所指較小的數字，因此第一個輸出數字為 1。緊接移動 B 的指標至下一個數字，再輸出這兩個指標所指較小的數字，因此第二個輸出數字為 2。接著移動 A 的指標至下一個數字，以此類推。請寫一個程式，完成兩組數字的合併排序。

輸入說明：

For each test case, the input should consist of two lines with a sorted number list. For example, enter N numbers in the first line and M numbers in the second line, where $N, M \leq 10$.

If numbers in the first line of a test case are all 0, then program ends;

每一測試資料需要輸入兩行以單一空白區隔並由小至大排列的整數數字，其中第一行輸入 N 個數字，第二行輸入 M 個數字。 $N, M \leq 10$ 。

如果測試資料的第一行全部輸入數字 0 則結束程式執行。

輸出說明：

Output sorted numbers separated by one space and add a "newline" in the end of output.

輸出排序後的數字，數字間以一個空格隔開，最後必須有換行字元。

範例：

Sample Input:	Sample Output:
2 5 6 8 12	1 2 4 5 6 8 12 15
1 4 15	1 2 4 5 8 9 10 11 13
1 8 9 11	
2 4 5 10 13	
0 0 0 0 0	

Problem 5. Binary Conversion 二進制轉換

(Time Limit: 2 seconds)

問題描述：

Convert two binary numbers into two decimal numbers and compute their sum. Your program has to convert two binary numbers b_1 , b_2 of 8 bits into two decimal numbers d_1 , d_2 respectively. Then compute the result of (d_1+d_2) .

將兩個二進制數轉換為兩個十進制數並計算它們的總和。您的程式必須將兩個二進制數 b_1 、 b_2 的 8 個位元轉換為兩個十進制數 d_1 、 d_2 。然後計算 $(d_1 + d_2)$ 的結果。

輸入說明：

The input consists of N cases. The first line of the input contains only one positive integer N indicating the number of test cases, followed by N following cases. Each case is exactly in one line with two binary numbers b_1 , b_2 (at most 8 digits, and each digit is either 0 or 1) separated by one space. Note that $1 \leq N \leq 5$.

輸入由 N 個案例組成。輸入的第一行只包含一個表示測試案例數量的正整數 N ，後面跟著 N 個情況。每個案例恰好在一行中，包含兩個二進制數 b_1 、 b_2 （最多 8 位，每個數字為 0 或 1）由一個空格分隔。注意 $1 \leq N \leq 5$ 。

輸出說明：

For each case, print the result in one line.

對於每種情況，將結果輸出在一行中。

範例：

Sample Input:	Sample Output:
2	81
01010000 00000001	368
11110000 10000000	

Problem 6. Broken Numbers 破碎的數字

(Time Limit: 2 seconds)

問題描述：

Judy wants to write a secret number to Peter. The method she used to keep her secret is to insert some non-digit characters in any positions. You are asked to find the original number for Peter.

Judy 想給 Peter 寫一個秘密號碼。她用來保密的方法是在任意的位置插入一些非數字字元。你被要求找出給 Peter 的原始號碼。

輸入說明：

The input consists of several lines, and each line is a string for one test case. The number is a positive integer no larger than 100000000. The length of each string is no more than 80.

輸入由幾行組成，每行是一個測試用例的字串。該數字是一個不大於 100000000 的正整數。每個字串的長度不超過 80。

輸出說明：

For each case, find the number and print it in one line. If there is no number, output -1.

對於每種情況，找到數字並將其輸出在一行中。如果沒有數字，則輸出-1。

範例：

Sample Input:	Sample Output:
teyg2j dj3dd4*+	234
-1.3 ww+5-	135
Judy love Peter	-1