

### 第一題

Problem Detail

C112MID01Q01

# Print an Hourglass Pattern

C112MID01Q01

標題

基本

Write a program to display an hourglass pattern.

輸入說明

The only input is an integer  $L$  ( $2 < L < 50$ ) that indicates how many top layers (half of the hourglass) there are.

數字輸入

5

輸出說明

With the given number of top layers, print the top and bottom parts to complete a full hourglass with '\*' symbols. Note that no additional spaces should be added after the last '\*' symbol.

程序輸出

```
* * * * *  
* * * * *  
* * * * *  
* * * * *  
* * * * *  
* * * * *  
* * * * *  
* * * * *  
* * * * *  
* * * * *
```

提示

錯誤清單

輸出

Problem Detail

## 第二題

Problem Detail

题目 C112MID01Q02

# Power of Two

## C112MID01Q02

练习

提交

Given an integer, write a program to determine if it is a power of two.

输入说明

The only input is an integer  $n$  ( $0 <= n < 2^{*31} - 1$ ).

输出说明

With the given integer  $n$ , print `true` if it is a power of two. Otherwise, print `false`.

输入输入

4

程序输出

true

提示

返回顶端

练习

Problem Detail

第三題

Problem Detail

編號 C112MD01Q03

Properties of Two Vectors

C112MD01Q03

描述基本

Given two 3-dimensional (3D) vectors, write a program to read the input and calculate the (1) **Addition**, (2) **Subtraction** and (3) **Dot product** results of the two vectors.

輸入說明

輸出說明

輸入範例

輸出範例

提示

問題清單 輸出 Problem Detail

第四題

Problem Detail

編號 C112MD01Q04

Fibonacci Number

C112MD01Q04

描述基本

The **Fibonacci numbers**, commonly denoted  $F_n$  form a sequence, called the **Fibonacci sequence**, such that each number is the sum of the two preceding ones, starting from 0 and 1. That is

$$F_0 = 0, F_1 = 1, F_n = F_{n-1} + F_{n-2}, \text{ for } n \geq 2$$

輸入說明

輸出說明

輸入範例

輸出範例

提示

問題清單 輸出 Problem Detail

第五題

Problem Detail

編號 C112MID01Q05

# Digit Counting

C112MID01Q05

[傳紙](#) [基本](#)

Trung is bored with his mathematics homeworks. He takes a piece of chalk and starts writing a sequence of consecutive integers starting with  $1$  to  $n$ . After that, he counts the number of times each digit  $0$  to  $9$  appears in the sequence. For example, with  $n = 13$  the sequence is:

0 1 2 3 4 5 6 7 8 9 1 0 1 1 2

In this sequence,  $0$  appears once,  $1$  appears 6 times,  $2$  appears 2 times,  $3$  appears 2 times, and each digit from  $4$  to  $9$  appears once. After playing for a while, Trung gets bored again. He now wants to

輸入說明

The input file consists of several data sets. The first line of the input file contains the number of data sets which is a positive integer and is not bigger than 20. The following lines describe the data sets. For each test case, there is one single line containing the number  $n$ .

輸出說明

For each test case, write sequentially in one line the number of digit  $0$ ,  $1$ , ...,  $9$  separated by a space.

樣例輸入

2  
3  
13

樣例輸出

0 1 1 0 0 0 0 0 0  
1 2 2 1 1 1 1 1 1

提示

問題清單

輸出

Problem Detail

第六題

Problem Detail

編號 C112MID01Q06

# Encoding

C112MID01Q06

[傳紙](#) [基本](#)

Encoding is the process of transforming information from one format into another. There exist several different types of encoding scheme. In this problem we will talk about a very simple encoding technique: *Run-Length Encoding*. Run-length encoding is a very simple and easy form of data compression in which consecutive occurrences of the same characters are replaced by a single character followed by its frequency. As an example, the string 'AABBBBDAA' would be encoded to 'A2B4D1A2', quotes for clarity. In this problem, we are interested in encoding strings using the above procedure.

輸入說明

The first line of input is an integer  $T$  ( $1 \leq T \leq 50$ ) that indicates the number of test cases. Each case is a line consisting of a decoded string. The string will contain only letters [A-Z]. Every inputted string will be valid. That is, every letter will be followed by another same or different letter. You may assume the decoded string won't have a length greater than 200 and it will only consist of upper-case alphabets.

輸出說明

For each case, output the case number followed by the encoded string. In each encoded string, every letter will be followed by 1 or more digits as the number of repeated letters. Adhere to the sample for exact format.

樣例輸入

3  
AABBBBDAA  
AAAAAAAAAAAA  
ABCD

樣例輸出

Case 1: A2B4D1A2  
Case 2: A12  
Case 3: A1B1C1D1

提示

問題清單

輸出

Problem Detail