Problem A

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 Format

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 Format

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

Example

Sample Input	Sample Output
1 7	6
2 3	1
1 1	1
2 0	

Problem B

Power and exponential functions

Time limit: 1 sec

Problem Description

Given positive integers x, n and a prime P, you are asked to compute the n-th power of x modulo P, that is, x^n (mod P).

- The number of test cases is at most 10.
- The numbers of digits of n and x are at most 200.
- P is a positive 31-bit integer.

Input Format

The test file contains several test cases. Each line is a test case and contains three integers x, n and P in this order, separated by a space.

Output Format

For each test case, output the result in one line.

Example

Sample Input	Sample Output
10 2 7	2
20 1 23	20

Problem C

Binary Conversion

Time limit: 3 sec

Problem Description

Convert binary numbers into decimal numbers and compute their sum.

Input Format

The input consists of several cases. The first line of each case contains only one positive integer N indicating the number of binary strings in this case, followed by N binary strings, each in one line.

Each binary string has at most 16 digits, and each digit is either 0 or 1. The case

of N=0 signs the end of input, and you don't need to compute this case.

Output Format

For each case, print the result in one line. The result is at most 232-1.

Example

Sample Input	Sample Output
2 1010000 000001 3 11110000 10000000 00000 0	81 368

Problem D

Carrying items

Time limit: 1 sec

Problem Description

A teacher with his students will go picnicking to a mountain pack. There are N objects to be carried by the M students. Each item has a weight and must be carried by one student since it cannot be partitioned into pieces. Also for the sake of safety, a student can carry at most one item. For each student, there is a power-value which is the maximum weight he/she can carry. A student should be paid for reward if he/she carry an item, and the reward is a number of his/her power-value. Write a program to compute the minimum reward the teacher must pay.

Input Format

The input consists of a number of test cases. The first line is an integer T which is the number of test cases, and the test cases follow one by one. The input of a test case consists of three lines. The first line contains two integers N and M, which are the numbers of items and students, respectively. The second line consists of N integers, which are the weights of the N items. The third line consists of M integers which are the power-values of the students. Any two consecutive numbers in the same line are separated by a space. All the input and output numbers in this problem are 32-bit integers. You can assume that 0<N<=M<10000.

Output Format

For each test case, output the minimum reward the teacher needs to pay in an individual line. If there is no way to carry all the items, then output -1.

Example

Sample Input	Sample Output
2	17
5 7	-1
2 3 1 5 4	
1 2 1 3 9 7 4	
3 2	
1 2 3	
1 1	

Problem E

Delivery problem

Time limit: 3 sec.

Problem Description

A deliveryman has to send N boxes to N different customers. Each box belongs to one customer. All the boxes are now in the warehouse. Each time he can carry one box to its owner, go back to the warehouse, and then deliveries another box. The travelling time from the warehouse to the i-th customer is $t(i)$, and it takes the same time to go back. Also we assume that there is no other time to be considered. The deliveryman wants to determine the delivery sequence such that the total waiting time of all the customers is minimized, where the waiting time of a customer is the time from now to the time he receives his box.

For example, if there are three boxes and the travelling times are $t(0)=20$, $t(1)=10$, $t(2)=30$. The best sequence of the box indexes is (1,0,2). The waiting times 10, 40, and 90, respectively, which gives a total waiting time 140. Write a program to compute the minimum total waiting time.

Input Format

The input consists of a number of test cases. The first line is an integer T which is the number of test cases, and the test cases follow one by one. The input of a test case consists of two lines. The first line contains an integer N, $0<N<=1000$, which is the numbers of boxes to be delivered. The second line consists of N integers, which are $t(0)$, $t(1)$,…,$t(N-1)$. Two consecutive numbers are separated by one space. All the input and output numbers in this problem are 32-bit integers.

Output Format

Output the total waiting time in one line.

Example

Sample Input	Sample Output
1 3 20 10 30	140

Problem F

Decreasing-Digit number

Time limit: 2 sec

Problem Description

一個正整數如果從左到右它的每一位數都是下降或相等，我們稱它為 decreasing-digit number，例如 1, 55, 1110, 98765 都是，反之 12, 101, 8792 都不是。輸入一個正整數 N，請計算有多少小於或等於 N 的 different-digit number。

Input Format

輸入第一行是測資筆數，以下每一行是一筆測資。一筆測資是一個不超過 1000000 的正整數。

Output Format

每筆測資單獨一行輸出答案。

Example

Sample Input	Sample Output
2	10
10	64
100	