



Greetings From Globussoft

- ❖ Given below are 5 Programming questions, you have to solve any 3 out of 5 questions.
- ❖ These 5 questions you can attempt in any technology like C/C++, java, .Net, PHP
- ❖ To solve these 3 questions you've max. 3 hours.
- ❖ While Solving these questions you are not allowed to use any Search Engine like Google, Yahoo, Bing ...

All the best for your test

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QUESTION - 1

Scientists at the TIFR, Mumbai, are doing some cutting edge research on the Propagation of Signals. A young researcher comes up with a method of progressively amplifying signals, as they progress along a path. The method involves the placing of Amplifiers at regular distances along the line. Each amplifier is loaded with a number $a(i)$, which is called its amplification factor. The method of amplification is simple: an amplifier which receives a signal of strength X , and has Y loaded in it, results in a signal of strength Y^X [Y to the power X]. In course of his research, the young scientist tries to find out, that given a set of n amplifiers loaded with $a(0)$, $a(1)$, $a(2)$, ..., $a(n-1)$, which particular permutation of these amplifiers, when placed at successive nodes, with the initial node given a signal of strength 1, produces the strongest output signal.

this is better illustrated by the following example : 5 6 4

$4^{(5^{(6^1)})}$ is the strength of the strongest signal, which is generated by putting amplifier loaded with 6 in first place, 5 in second place and 4 in third place.

Given a list of integers specifying the set of amplifiers at hand, you must find out the order in which they must be placed, to get the highest signal strength. In case there exist multiple permutations with same output, you should print the one which has bigger amplifiers first.

Input

First line of input contains T , the number of test cases. For each test case first line contains a number n_i , which is equal to the number of amplifiers available. Next line contains n integers, separated by spaces which denote the values with which the amplifiers are loaded.

Output

Output contains T lines, one for each test case. Each line contains n_i integers, denoting the order in which the amplifiers should be kept such that the result is strongest.

Example

Input :

```
2
3
5 6 4
2
2 3
```

Output :

```
6 5 4
2 3
```

QUESTION – 2

In a small Village near the Himalayas, there is a rich Land-Owner, in Possession of a vast, rectangular tract of land. Unknown to him, a Major Oil Corporation has verified the existence of a vast Oil Resource beneath the land owned by him.

The Oil Company sends a Man to negotiate the purchase of a rectangular field from within the landowner's land, with sides parallel to those of his area. The Landowner, valuing his land according to the trees growing in it and the area to be purchased, gives the company man a Map of his Land, marking the location of trees of different types, and a list of the worth of each type of tree.

To ensure the most economic purchase of land with the required dimensions, the Company Man provides you with the data in his possession, and alongwith that, a list of the land areas that he considers good by his judgement.

You must provide, for each land area that he has listed, the Sum Total of the values of the Trees that lie Within or On the Boundary of that land area.

Input

The first line of the input contains an integer T, which is the number of test cases. For each test case, the first line contains an integer n, equal to the number of trees in the area. This line is followed by n lines each containing 3 integers separated by spaces which are coordinate of the tree (x, y) and value of that tree. Following this is an integer R, equal to the number of proposals of land areas given by the Company Man. Next R lines contain 4 integers each (x1, y1, x2, y2) which are the coordinates of lower left (x1,y1) and upper right (x2, y2) corner of the rectangular area.

Output

For each test case, your program should output R lines containing the sum of values of the Trees which lie inside or on the corresponding rectangular plot. There should NOT BE any blank lines between output of different test cases.

Example

Input :

```
1
3
1 1 2
2 2 3
3 3 4
2
1 1 1 2
0 0 5 5
```

Output :

2
9

QUESTION – 3

Given a string, count the number of distinct subsequences of it (including empty subsequence). For the uninformed, A subsequence of a string is a new string which is formed from the original string by deleting some of the characters without disturbing the relative positions of the remaining characters.

For example, "AGH" is a subsequence of "ABCDEFGH" while "AHG" is not.

Input

First line of input contains an integer T which is equal to the number of test cases. You are required to process all test cases. Each of next T lines contains a string s.

Output

Output consists of T lines. Ith line in the output corresponds to the number of distinct subsequences of ith input string. Since, this number could be very large, you need to output $\text{ans} \% 1000000007$ where ans is the number of distinct subsequences.

Example

Input :

3
AAA
ABCDEFG
CODECRAFT

Output :

4
128
496

QUESTION – 4

Rabbits are incredible animals. One of their more interesting characteristics is related with their reproduction. If we keep a couple of adult rabbits in optimal conditions of life, it is scientifically proved that, each month, that couple is capable of procreating a new couple of young rabbits. You should know that only the adult couples may procreate and that the time taken by a young couple of rabbits to grow (that is, to become adult) is of 1 month. For the convenience of this task, we will be dealing with immortal rabbits.

Farmer Luis (FL) is a great admirer of rabbits. FL bought in the market 1 couple of adult rabbits (alive, of course) and now wants to raise as many rabbits as he can. Unfortunately, there is a little problem, FL has boxes where he can only put exactly 2^M ($1 \leq M \leq 20$) couples of rabbits (neither more nor less). FL can use as many boxes as he wishes as long as he fulfils the condition above. FL would like to know how many couples of rabbits he will not be able to put inside boxes if he raises rabbits for N ($1 \leq N \leq 2147483647$) months and then tries to 'box' them (put them inside boxes). You should help FL with these calculations. You must consider that FL starts with 1 adult couple of rabbits the 1st month, and that couples of rabbits reproduce and grow as stated in the 1st paragraph.

Input

Line 1: C ($1 \leq C \leq 100$), the number of calculations your program will be requested to do

Lines 2- $C+1$: two integers N and M (in that order)

Output

Lines 1- C : on each line print S , which is the number of rabbits FL will not be able to 'box' for calculation # i

Example

Input:

```
1
5 2
```

Output:

```
0
```

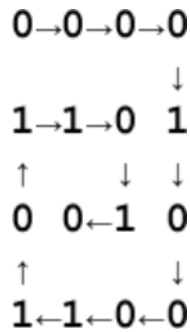
QUESTION – 5

Chip and Dale have devised an encryption method to hide their (written) text messages. They first agree secretly on two numbers that will be used as the number of rows (R) and columns (C) in a matrix. The sender encodes an intermediate format using the following rules:

1. The text is formed with uppercase letters [A-Z] and <space>.
2. Each text character will be represented by decimal values as follows:

<space> = 0, A = 1, B = 2, C = 3, ..., Y = 25, Z = 26

The sender enters the 5 digit binary representation of the characters' values in a spiral pattern along the matrix as shown below. The matrix is padded out with zeroes (0) to fill the matrix completely. For example, if the text to encode is: "ACM" and $R=4$ and $C=4$, the matrix would be filled in as follows:



A = 00001, C = 00011, M = 01101
(one extra 0)

The bits in the matrix are then concatenated together in row major order and sent to the receiver. The example above would be encoded as: 0000110100101100

Input

The first line of input contains a single integer N , ($1 \leq N \leq 1000$) which is the number of datasets that follow.

Each dataset consists of a single line of input containing R ($1 \leq R \leq 20$), a space, C ($1 \leq C \leq 20$), a space, and a text string consisting of uppercase letters [A-Z] and <space>. The length of the text string is guaranteed to be $\leq (R \cdot C) / 5$.

Output

For each dataset, you should generate one line of output with the following values: The dataset number as a decimal integer (start counting at one), a space, and a string of binary digits ($R \cdot C$) long describing the encoded text. The binary string represents the values used to fill in the matrix in row-major order. You may have to fill out the matrix with zeroes (0) to complete the matrix.

Example

Input :

```
4
4 4 ACM
5 2 HI
2 6 HI
5 5 HI HO
```

Output :

```
1 0000110100101100
2 0110000010
3 010000001001
4 0100001000011010110000010
```

