

## Problem A. A Perfect Gift

Program:            `aperfect.(cpp|java)`  
Input:             `aperfect.in`  
Balloon Color:    `Yellow`

Rasha Al-Shalabi wants to do something special for her friend coach Fegla on his birthday. She decided to make him a program that generates a smart calendar. You can input how many days there are in the month and what day the month starts on, and it outputs the calendar of that month.

Rasha wants to generate a bunch of testcases, and print them out as a gift. She wants them to be printed as a grid. Can you help her?

### Input

The first line contains a single integer **T** denoting the number of test-cases in the input.

Each test case contains 2 space separated integers on one line, **M** and **N**.

**M** is the number of days in the month ( $28 \leq M \leq 31$ ).

**N** is the first day of the month (between **1** and **7**, 1 is Sunday, 2 is Monday, etc...).

### Output

For every test case output a matrix of between 5 and 7 rows, 7 columns each, where the first row contains days of the week in the format (Sun Mon Tue Wed Thr Fri Sat) as displayed in the output section.

Each cell in the rest of the rows is either a number (number of the day of the month), or an '\*' in case the day is in the previous or later month. Note that each cell in the matrix consists of 3 characters left aligned (if the number is less than three characters, fill the remaining with spaces).

### Example

<code>aperfect.in</code>	Standard Output
2	Sun Mon Tue Wed Thr Fri Sat
30 3	* * 1 2 3 4 5
28 1	6 7 8 9 10 11 12
	13 14 15 16 17 18 19
	20 21 22 23 24 25 26
	27 28 29 30 * * *
	Sun Mon Tue Wed Thr Fri Sat
	1 2 3 4 5 6 7
	8 9 10 11 12 13 14
	15 16 17 18 19 20 21
	22 23 24 25 26 27 28

## Problem B. Best Score

Program: `best.(cpp|java)`  
Input: `best.in`  
Balloon Color: `Orange`

$\text{Score}(x) = 2$  (if there is  $k$  such that  $x = k^2$ )  $+ 3$  (if there is  $k$  such that  $x = k^3$ )  $+ 4$  (if there is  $k$  such that  $x = k^4$ )  $+ 5$  (if there is  $k$  such that  $x = k^5$ )  $+ 6$  (if there is  $k$  such that  $x = k^6$ ) ....

Given 2 numbers **L** and **R**, can you calculate the sum of scores of the numbers between them (including **L** and **R**)?

### Input

The first line contains a single integer **T** denoting the number of test-cases in the input. ( $1 \leq T \leq 5000$ )

Each following line represents a test-case and contains two space separated integers **L** and **R**. ( $2 \leq L \leq R \leq 10^{18}$ )

### Output

For each test-case, print one line containing the result.

### Example

<code>best.in</code>	Standard Output
1 2 100	46

## Problem C. Cute Amal

Program: `cute.(cpp|java)`  
Input: `cute.in`  
Balloon Color: `Red`

Amal Fayed was a contestant in ACPC, one day she was chatting with coach Fegla while she was at work. She told him she was bored and asked him to give her a simple problem to pass some time at work.

He was busy but he didn't want to let her down, so he asked her to solve this problem: Coach Fegla gives her a letter, if the letter was a vowel, print **Vowel**, else, print **Consonant**.

### Input

The first line contains a single integer **T** denoting the number of test-cases.

Each test-case is a single English letter on a single line.

### Output

For each test-case, print either **Vowel** or **Consonant** on a single line each.

### Example

<code>cute.in</code>	Standard Output
2	Vowel
a	Consonant
z	

### Note

The vowels are 'A', 'E', 'I', 'O', 'U'

## Problem D. Distinguished Game

Program: distinguished.(cpp|java)  
Input: distinguished.in  
Balloon Color: Green

Coach Fegla and Rasha's favorite game is a weird one. It is called "69". In this game coach Fegla gives Rasha 2 numbers **N** and **M**, and Rasha counts the numbers between **N** and **M** (inclusive) with this special feature: the number remains the same if you look at it rotated 180 degrees around its center. For example: 69, 88. Can you help Rasha?

### Input

You are given **T** ( $T \leq 100$ ), the number of test cases. For each test case, you will be given 2 numbers **N** and **M**. ( $0 < N \leq M \leq 100000$ )

### Output

Print **T** lines each containing the required count for the corresponding test case.

### Example

distinguished.in	Standard Output
3	1
1 20	3
50 100	0
1 7	

## Problem E. Efficient Coach

Program: `efficient.(cpp|java)`  
Input: `efficient.in`  
Balloon Color: `Silver`

Amal Fayed drives her car to work everyday, but she sometimes have problems finding gas and she needs to save money. Coach Fegla wants to prove to her that any life problem can be solved using problem solving.

Coach Fegla got the map of Amal's town, and simplified it by drawing it as an  $N \times M$  grid, where her house is on cell  $(1,1)$  (top-left-most cell) and her work is located at  $(N,M)$ . The car can move in the 4 main directions on the grid (up-down-right-left).

Given  $F$  which is the car tank's maximum capacity,  $K$  gas stations located in  $K$  different cells, and the price of gas in each station. And given that the car consumes 1 liter of gas in every move on the grid (in any direction).

Can you find out the minimum cost to go from her house to work?

### Input

The first line contains  $T$  denoting the number of test-cases in the input.

Each test case consists of  $K+1$  lines. The first line contains four integers  $N$ ,  $M$ ,  $F$  and  $K$  respectively.

The following  $K$  lines each describes a gas station and each begins with 2 space separated integers  $X$ ,  $Y$  which are the row and column indices of the station position on the grid followed by a real number  $C$  representing the price for 1 liter of gas at this station.

### Output

For each test case output a single real number that is the minimum cost for Amal to reach her workplace. Results should be rounded to three decimal places.

### Example

<code>efficient.in</code>	Standard Output
1 3 3 2 1 2 2 1.5	3.000

### Note

Amal always leaves the house with a full tank.

$$1 \leq T \leq 50$$

$$1 \leq N, M \leq 100$$

$$1 \leq X \leq N, 1 \leq Y \leq M$$

$$0 \leq C \leq 50$$

## Problem F. Ferrari and Elon Musk

Program:            `ferrari.(cpp|java)`  
Input:             `ferrari.in`  
Balloon Color:    `Gold`

Ferrari is an Italian car company, that specializes in sports cars and it is based in Maranello, it is well known for the expensive and very high quality cars that is also very fast and powerful. It was founded by Enzo Ferrari, and was officially started in 1947 when the first Ferrari emerged which was the 125 S. 125 S provided a horsepower of 118, and they have improved much since then where currently LeFerrari (a powerful Ferrari car model) provides a horsepower of 963 which is produced using a V12 petrol engine producing a horsepower of 800, and an electric motor producing the rest.

Not everyone though loves petrol engines, for example Elon Musk. Musk is someone with high hopes for a future without the need for petrol, a much cleaner and sustainable future. Musk has been working on electric cars for quite sometime now, and he seems to be getting very good at it. His most challenging task is to provide powerful cars in order to be competitive, so he needs to know what is the equivalent of horsepower in watts. To calculate the watts, you will have to multiply the horsepower by 746.

### Input

An integer **T** representing the number of test cases. Then it will be followed by **T** lines each contains an integer **H** representing the horsepower.

$$0 < \mathbf{T} \leq 100$$

$$0 < \mathbf{H} \leq 2000$$

### Output

Print **T** lines, each contains the corresponding watts.

### Example

<code>ferrari.in</code>	Standard Output
5	746
1	7460
10	74600
100	3730
5	11190
15	

## Problem G. Game of Circles

Program: `game.(cpp|java)`  
Input: `game.in`  
Balloon Color: `Black`

Amal and Rasha were planning the excursion time for **KCPC-2016**, and they wanted to plan something different this year that combines fun and the students' love of mathematics. They couldn't find someone better than coach Fegla to give them inspiration.

Coach Fegla suggested the following game:

An even number (**N**) of contestants are chosen and asked to stand in a circle, where each contestant is given an **ID**. There is a number of ropes. The contestants need to be matched in pairs where each pair carry a rope without any two ropes intersecting. The cost of matching 2 people **i** and **j** is  $(ID[i] + ID[j])^2$ , where **ID[i]** is the **ID** of the student standing in position **i** in the circle. And the cost of the entire circle is the sum of the costs of all pairs.

What is the minimum circle cost to match them in **N/2** pairs so that no 2 ropes intersect?

### Input

The input starts with a single integer **T** on the first line, denoting how many test-cases are in the input.

Each test-case is given on 2 lines, the first one has a single integer **N** denoting the number of students in this test-case. The second line consists of **N** space separated integers, representing the **IDs** of the students in a clockwise order of their position in the circle.

### Output

For each test-case print one line that has an integer that is the minimum circle match cost for that test-case.

### Example

game.in	Standard Output
2	9
2	18
1 2	
4	
1 2 1 2	

### Note

$$1 \leq T \leq 200$$

$$1 \leq N \leq 200$$

$$-1000000 \leq ID[i] \leq 1000000$$

Any **ID** can be negative or positive.

## Problem H. Help Me Win

Program:            help.(cpp|java)  
Input:              help.in  
Balloon Color:      Pink

While waiting for the system to install on **KCPC-2016** computers, Amal and Rasha got bored, so coach Fegla gave them this game to pass the time:

They start with a list of **N** numbers, and a counter that starts at 0. On each turn, the current player picks a number from the list, removes it from the list and adds its value to the counter.

When the value displayed on the counter is a multiple of three the player that played the last move loses.

Assuming that Amal plays the first turn and they both play optimally. Print either First (if Amal wins), Second (if Rasha wins) or Draw (if the list is finished and neither of them wins).

### Input

The first line contains a single integer **T** that represents the number of test-cases in the input. Each test-case consists of two lines, the first contains a single integer **N** representing the length of the number list they start with.

The second line consists of **N** space separated integers that are the numbers in the list.

### Output

For each test-case print one line that has either, First, Second or Draw.

### Example

help.in	Standard Output
3	First
4	Second
1 4 2 5	Draw
5	
1 4 2 3 5	
2	
1 4	

### Note

Don't forget the capitalization of the first letter in the answer in your output.

$$1 \leq T \leq 100$$

$$1 \leq N \leq 10^5$$

$$1 \leq \text{Each number in the list} \leq 10^9$$



## Problem I. Interesting Game

Program:            `interestng.(cpp|java)`  
Input:             `interestng.in`  
Balloon Color:    `Purple`

Coach Fegla and Rasha Al-Shalaby are close friends. Since they are both smart, they share the hobby of solving crosswords.

Coach Fegla likes to make things more interesting, and spice up any game he plays. He gave Rasha a crossword of **N** rows and **M** columns, and asked her to find the lexicographically smallest word in the game.

The words are written vertically (up to down) or horizontally (left to right) and each word is at least 2 characters long. Blank spaces in the game are marked with the character '\*' and separate words (so a word ends before them and a new word starts after them).

### Input

The first line has a single integer **T** that denotes the number of test-cases in the input.

Each test-case starts with a line containing two space separated integers **N** and **M**, where **N** is the number of rows in the test-case and **M** is the number of columns.

**N** lines follow, each containing **M** characters representing the game in this test-case.

### Output

For each test-case, print one a single line containing the lexicographically smallest word in the game.

### Example

<code>interestng.in</code>	Standard Output
<code>1</code> <code>4 4</code> <code>dqs*</code> <code>naza</code> <code>q*o*</code> <code>*a*a</code>	<code>dnq</code>

### Note

$N, M \leq 30$

Every game will consist of only English letters or '\*'

Each game has at least one word.

## Problem J. Jewelry for sale

Program: jewelry.(cpp|java)  
Input: jewelry.in  
Balloon Color: White

You have  $N$  pieces of gold, each of them weighs  $G_i$  grams, every day (of  $M$  given days) the price per gram ( $P_j$ ) is given. You can only sell one piece per day, can you find out the maximum amount of money you can get by selling these pieces?

### Input

You are given  $T$ , where  $T$  is the number of test cases.

Each test case consists of 3 lines. The first line contains  $N$  and  $M$ , where  $N$  is the number of gold pieces, and  $M$  is the number of days.

The second line contains  $N$  integers, each representing the weight of a piece of gold.

The third line contains  $M$  integers, each representing the price per gram for a single day.

$$1 \leq T \leq 10$$

$$1 \leq N, M, G_i, P_j \leq 1000$$

### Output

Print  $T$  lines, where each line contains the answer for the corresponding test case.

### Example

jewelry.in	Standard Output
1 6 4 11 5 3 1 4 7 50 200 100 1000	13100

## Problem K. Kotsh Academy

Program:           kotsh.(cpp|java)  
Input:             kotsh.in  
Balloon Color:     Blue

Coach Academy, which is a training center for both problem solving and robotics, and a training partner for the ACPC, its headquarters and Cairo branch is located in Smart Village.

Coach Fegla wanted the students to feel that Coach Academy is their second home. He wanted them to feel as comfortable as they can be, so he figured that the best way to do that is to let the students paint their training rooms in the headquarter.

The students wanted to give the place a mathematical style, so first they drew on each wall a  $N \times N$  Square grid.

Initially all the cells are colored white, one of the students shouts some indices of rows and columns, and the team would brush the entire row or entire column in blue. Coach Fegla challenged the students to figure out the number of cells that remain white in the end, are you fast enough to win this challenge?

### Input

You are given  $T$ , which is the number of test cases. Each test case consists of 3 lines. The first line contains 3 integers  $N$ ,  $R$ ,  $C$ , where  $N$  is the length of the square grid, and  $R$ ,  $C$  represent the number of rows, columns correspondingly that will be painted. The second line contains  $R$  integers, each integer  $r_i$  represents a row index. The third line contains  $C$  integers, each integer  $c_j$  represents a column index.

$1 \leq T \leq 30$   
 $1 \leq N \leq 100$   
 $1 \leq R, C \leq 100$   
 $1 \leq r_i, c_j \leq N$  (row indices and column indices start at 1)

### Output

Print  $T$  lines, each line contains the answer for the corresponding test case.

### Example

kotsh.in	Standard Output
1 3 1 1 1 2	4