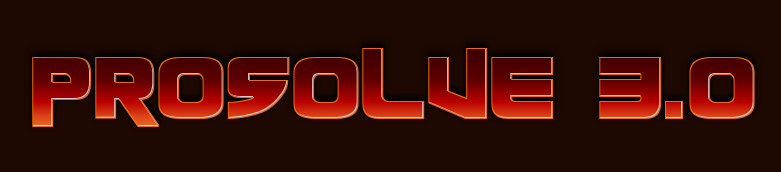
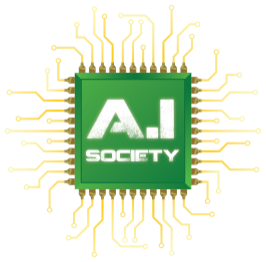
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**PROGRAMMING CONTEST PROBLEM SET 2017**

**This problem set contains 8 problems (A-H).**

**25th March 2017**

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**Hosted by**

**Artificial Intelligence Society**

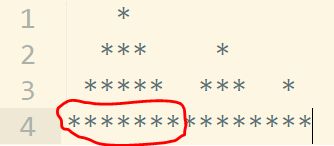
**Faculty of Computer and Mathematical Sciences**

**Universiti Teknologi MARA Shah Alam**

|  |  |  |
| --- | --- | --- |
| A | Pyramid Loop to Loop | |
| Input | Standard Input |
| Output | Standard Output |

**PROBLEM DESCRIPTIONS**

This problem is the easiest for you all. Just print the pyramid with descending order. The input must be odd number. For example the input is 7,



The red color shows the base of the pyramid is 7 ‘\*’ characters and then followed by pyramid with 5 ‘\*’ characters and lastly with 3 ‘\*’ characters.

**INPUT**

First line is the number of test cases, N, 1 <= N <= 20, then the following line is the base number of pyramid, B, 3 <= B < 50.

**OUTPUT**

Output the pyramid.

|  |  |
| --- | --- |
| Sample input | Sample output |
| 3  5  7  11 |  |

|  |  |  |
| --- | --- | --- |
| B | Tiger Mom | |
| Input | Standard Input |
| Output | Standard Output |

**PROBLEM DESCRIPTIONS**

Bella has a tiger mom with an extremely difficult schedule. Everyday she has to wake p at 5am and workout followed by studying for her mathematics competition. 8am to 4pm during weekdays she goes to school otherwise has different practices such as chess, piano and so on. This strict schedule continues until 11pm. Bella feels so exhausted during the day but she is scared to ask for break. Therefore she decided to take naps in her study hours, as her mother would leave her alone to study. But shedoesn’t have a clock in her room because her mother doesn’t want her to concentrate on time and only focuse on her study and practice. What she doesn’t know is that by using mirror she can see the reflect of living room’s wall clock. As you know reflect of clock in the mirror is not the correct clock. That’s why she asks you to write a program that can convert the mirror clock time to the real clock time.

**INPUT**

The first line of the input containts an integer T *(T ≤ 1000),* number of test cases. Each of the following T liens will contain the time Onuvob reads from the clock in the mirror. The time will be in the following format:

HH:MM

Hours and minutes both are integer and the time is always valid.

**OUTPUT**

For each line of Input you have to produce one line of output which will contain the real time, in the same format, namely:

HH:MM

See sample input and output for more clarification.

|  |  |
| --- | --- |
| Sample input | Sample output |
| 2  12:00  10:09 | 12:00  01:51 |

|  |  |  |
| --- | --- | --- |
| C | FABONACCI | |
| Input | Standard Input |
| Output | Standard Output |

**PROBLEM DESCRIPTIONS**

Depicted below is the Fibonacci sequence:

1, 1, 2, 3, 5, 8, 13, 21, 34, ...

As you can see, each value from 2 onwards is the sum of the previous two values. Given P, Q and n, find the nth fibonacci number modulus Q.

**Input**

The first line of the input gives an integer T, which is the number of test cases. Each test case consists of two integers P and Q. P is between 1 and 2,000,000,000 inclusive. Q is between 1 and 10,000 inclusive.

**Output**

For each test case, the output contains a line in the format Case #x: ***M***, where x is the case number (starting from 1) and ***M*** is the ***P***’th fibonacci number modulus ***Q***.

|  |  |
| --- | --- |
| **Sample Input** | **Sample Output** |
| 10  5 10  6 25  10 21  32 43  100 100  50 50  25 25  45 67  109 32  128 128 | Case #1: 5  Case #2: 8  Case #3: 13  Case #4: 15  Case #5: 75  Case #6: 25  Case #7: 0  Case #8: 19  Case #9: 9  Case #10: 69 |

|  |  |  |
| --- | --- | --- |
| D | BOWLING | |
| Input | Standard Input |
| Output | Standard Output |

**PROBLEM DESCRIPTIONS**

A bowling match consists of ten frames. Each frame except for the tenth consists of one or two balls, or attempts to knock down the ten pins at the end of the alley. Doing so on the first ball of the frame is called a strike, and the second ball of the frame is not rolled. Knocking down all ten pins with both balls (having left some up with the firt ball) is called a spare. If both attempts to knock down the pins leave some standing, the frame is called an open frame. A spare in the tenth frame gives the bowler one extra ball; a strike in the tenth give him or her two extra baalls. A bowling score is computed as follows. A strike counts as 10 points pluse the next ball. Any other balls merely count as themselves, as do any bonus balls rolled as a result of a strike or a spare in the tenth frame. Suppose for example that the sequence of balls was

9 1 0 10 10 10 6 2 7 3 8 2 10 9 0 9 1 10

The score for the ten frames would be

Frame Score

1. 10
2. 30
3. 56
4. 74
5. 82
6. 100
7. 120
8. 139
9. 148
10. 168

Write a program to accept from standard input the scores for a sequence of balls and output the scores for the ten frames. There may be multiple lines of input, where each input line will be the scores for one player. The scores will be separated by one or more blanks. You may assume that the number of scores on the line is valid.

|  |  |  |
| --- | --- | --- |
| E | CIPHER | |
| Input | Standard Input |
| Output | Standard Output |

**PROBLEM DESCRIPTIONS**

A substitution is one of the technique used in encryption. A substitution cipher is probably the simplest cipher to implement and, at the same time, it is also the easiest cipher to break. Write a program that shifting each letter a few position ahead based on user input.

For instance, if the offset number is 2 then the letter “a” becomes “” (since “c” is the 2nd letter of “a”), “b” becomes “d”, “c” becomes “e”, or “z” becomes “b”, etc.

|  |  |
| --- | --- |
| **Sample Input** | **Sample Output** |
| 4  SAYA BERJAYA | WECE FIVNECE |

|  |  |  |
| --- | --- | --- |
| F | Integer Frequencies | |
| Input | Standard Input |
| Output | Standard Output |

**PROBLEM DESCRIPTIONS**

**General Statement:** For an input integer, determine how many times an integer occurs in that string.

**Input:** There are 4 lines of data. The first line is an integer input that the program should receive from users. The second line is the integers input, the number of the input should be equal to the first input.

The third line contains an integer input that the user would like count the occurrences. The fourth line contains the integers to be determined their occurrences, total of this number should be equal to the third input.

**Output:** Output the letter, followed by an equal sign (=) and then the count for that integer. The output is to be formatted exactly like that for the sample output given below.

**Assumptions:** Input integers are any numbers.

**Sample Input:**

10

11 3 4 61 100 2 34 8 22 3

3

3 4 22

**Sample Output:**

3 = 2

4 = 1

22 = 1

|  |  |  |
| --- | --- | --- |
| G | Zrog’s the Judge | |
| Input | Standard Input |
| Output | Standard Output |

**PROBLEM DESCRIPTIONS**

Representative of Zrog’s country didn’t do too well in this Olympics, the Olympics Committee of the respective country was very unhappy about it. They decided to do a very thorough talent search in the country for the next Olympics and train them further, every willing participant had to submit their height, weight and the length they can go in one jump. As all these parameters included numbers and only Zrog was known to be good with numbers, they gave him the responsibility to order the list of participants based on these numbers. Zrog decided, height takes precedence over weight and weight takes precedence over the length of one jump. Also, more height, less weight and longer jump distances are the priority factor. In case all of these are identical for two participants, they will be chosen in the order entered in the list, first come first serve. Now, as the number of participants is very large, Zrog wants you to help him by writing a program which will order the list according to the above rules.

**Input**

The first input is an integer n (1 ≤ n ≤ 100000). The following n lines each contains three doubles h (0 < h ≤ 100), w (0 < w ≤ 100) and l (0 < l ≤ 100) denoting the height, weight and jump length respectively

**Output**

Print out all the n lines in the correct order according to the rules, the numbers should be until 2 decimal points. Check sample output for correct output format.

|  |  |
| --- | --- |
| Sample Input | Sample Output |
| 4  4.20 4.20 2.10  9.11 11.90 1.19  4.20 4.20 2.00  9.11 91.10 0.19 | ID:2 H:9.11 W:11.90 L:1.19  ID:4 H:9.11 W:91.10 L:0.19  ID:1 H:4.20 W:4.20 L:2.10  ID:3 H:4.20 W:4.20 L:2.00 |

|  |  |  |
| --- | --- | --- |
| H | BIG INTEGER | |
| Input | Standard Input |
| Output | Standard Output |

**PROBLEM DESCRIPTIONS**

Big Integer is one of Computer Science’s fields, where we’re dealing with a calculation that involving a very larger number than a computer can hold. By convention, size of integers that are available for general purpose computer is limited by size of processor registers.

Big integer is one of very important subject in computer science. One of application that are dealing with a very large number is in cryptography field. First practical public-key cryptosystem, RSA, is one of the example that’s involved with a very large prime number in order to generate resultant calculated integer which are hard to factories.

In this problem, you need to compute a sum of two numbers, let’s say *A* and *B.* You need to find a sum of *A + B = C*, where C is the answer that you need to calculate. Note that A and B can be a very large integer number.

**INPUT**

The first line of the input contains an integer T (1 ≤ T ≤ 5), the number of test cases. Following the first line are the test cases. Each test case contains two, where first is strings A, followed by string B after newline. Both A and B is strings with natural integer presentation [0, inf), such example is “0”, “123” and “999”. Length of string A, B is in range of 0 ≤ A, B ≤ 1000.

The input must be read from standard input.

**OUTPUT**

The output of the program should print the number resulted from sum of A and B followed by a new line for each answer.

The output must be written to standard output.

|  |  |
| --- | --- |
| Sample Input | Sample Output |
| 3  0  0  999  7775  999999999999999999999999999999999999  999999999999999999999999999999999999 | 0  8774  1999999999999999999999999999999999998 |