

Day 7: Temperature Predictions

Objective

In this challenge, we practice predicting values. Check out the [Resources](#) tab for some tips on approaching this problem.

Task

Given a record containing the maximum and minimum monthly temperatures at a particular station. The record shows the temperature information for each month in a data range from **January 1908** to **March 2012**; however, some of the temperature values have been blanked out! Estimate and print the missing values.

Input Format

The first line contains an integer, N , denoting the number of rows of data in the input file.

The second line contains the header for the tab-separated file; this line can be ignored, and is simply there to make the test case easier to read.

The N subsequent lines each describe the respective *year*, *month*, *maximum temperature*, and *minimum temperature* data as a row of tab-separated values. In some of the rows, The *minimum* or *maximum* temperature field has been blanked out and replaced by: *Missing_1*, *Missing_2*, etc.

Constraints

- $1 \leq N \leq 1500$
- $1908 \leq Year \leq 2013$
- $-75 \leq Maximum/Minimum\ Temperature \leq 75$
- The *month* field will always contain a fully spelled out month (January - December).
- Data is provided for each month in chronological order.
- Data may be missing for certain months or years.

Scoring

The score seen upon hitting **Run Code** is the score against the sample test case (of **444** rows) only. It is normalized and will always lie between **0** and **1**.

Upon hitting **Submit Code**, the score seen is determined *solely on the basis of the hidden test case*.

Details on the Scoring Formula

We compute the average of the magnitude of difference between your predicted value and the actual recorded value for each of the missing terms. If this average exceeds **5.0** degrees, you will be assigned a score of zero.

For each of the values predicted by you (p), we will compute an *error*. The *error* is the difference of the predicted value (p) and the actual temperature at that location. Hence,

$error = |p - actualTemperatureRecording|$
 $M = \text{total missing values in the test case}$

We will compute the *average* of all these error terms over all rows of data in the input file, and record it as $avg = \frac{\sum errors}{M}$

Your score for this challenge will be $(1 - \frac{avg}{5.0}) \times (MaxScore)$
Here, $MaxScore = \text{Total number of points assigned to this challenge.}$

Output Format

Print each missing value on a new line.

Sample Input

```
20
yyyy month   tmax   tmin
1908 January 5.0 -1.4
1908 February 7.3 1.9
1908 March 6.2 0.3
1908 April Missing_1 2.1
1908 May Missing_2 7.7
1908 June 17.7 8.7
1908 July Missing_3 11.0
1908 August 17.5 9.7
1908 September 16.3 8.4
1908 October 14.6 8.0
1908 November 9.6 3.4
1908 December 5.8 Missing_4
1909 January 5.0 0.1
1909 February 5.5 -0.3
1909 March 5.6 -0.3
1909 April 12.2 3.3
1909 May 14.7 4.8
1909 June 15.0 7.5
1909 July 17.3 10.8
1909 August 18.8 10.7
```

The above test case is for explanatory purposes only, which is why we included only **20** lines.
The sample test case, which is run upon hitting **Run Code**, has **444** rows of data.
The hidden test case, which is used at the time of submission, has over **1.2k** rows of data. The sample test case rows are a subset of it.

Sample Output

The four missing values (*Missing_1*, *Missing_2*, *Missing_3*, and *Missing_4*) are:

```
8.6
15.8
18.9
0.0
```

Your task is to predict values as close as possible to these.