# Predict the Google Search Trends

Problem Statement

You are given the worldwide search trends data (via Google Trends) for certain search terms. The numbers are available on a weekly basis, for each week from January 2004 till May 2015. A number indicating the search interest score has been given for each of the 595 weeks in this period. The data for the last 50 weeks is missing. Your task is to estimate (as close as possible, to the original) these missing numbers.

For example here is the search trend chart for **"perfumes"**. The chart on Google Trends may be viewed here.
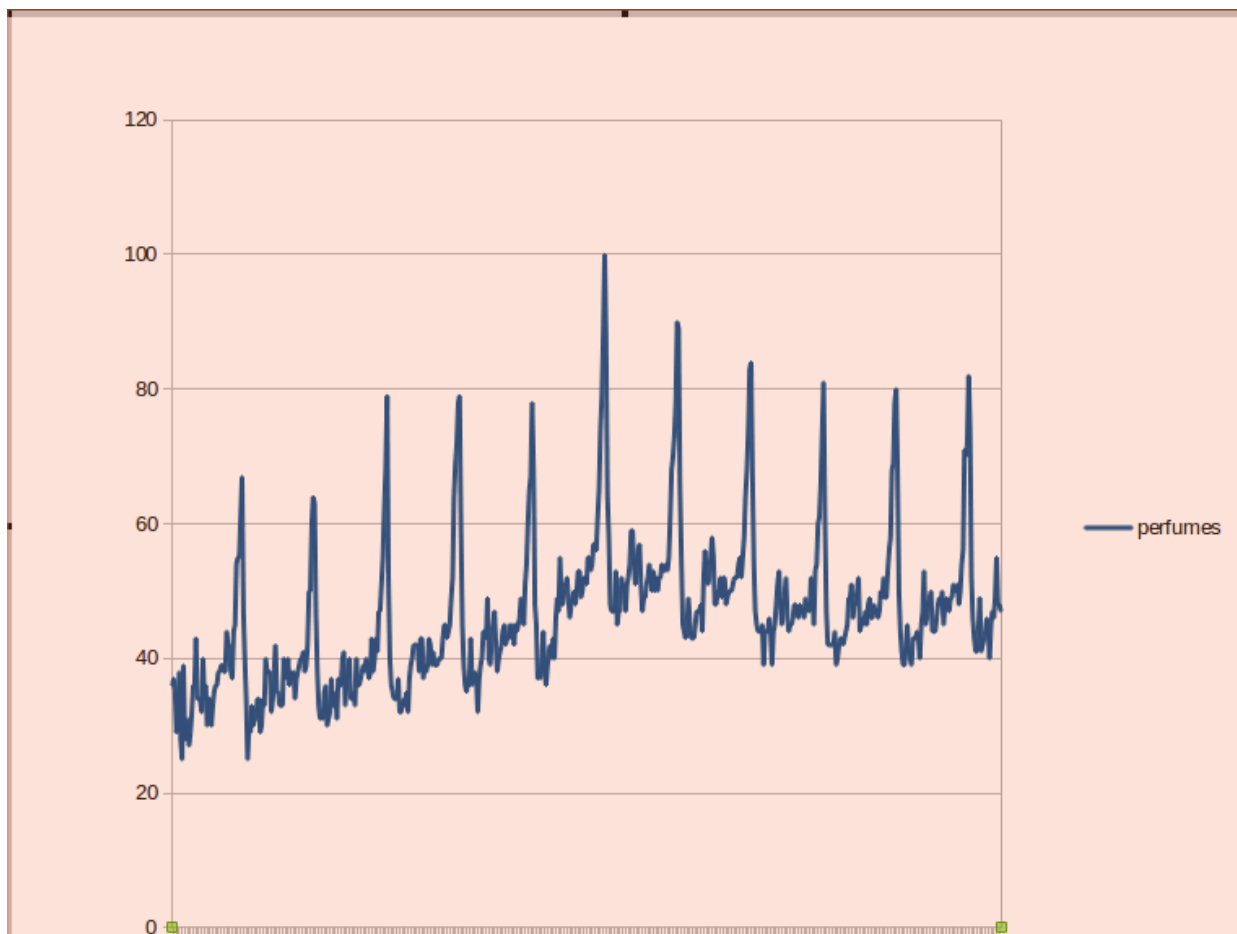
On a week to week basis, here is how the data looks.

```
Week            InterestLevel
2004-01-04 - 2004-01-10 34
2004-01-11 - 2004-01-17 37
2004-01-18 - 2004-01-24 32
2004-01-25 - 2004-01-31 31
2004-02-01 - 2004-02-07 32
2004-02-08 - 2004-02-14 37
2004-02-15 - 2004-02-21 27
2004-02-22 - 2004-02-28 24
2004-02-29 - 2004-03-06 35
2004-03-07 - 2004-03-13 25
2004-03-14 - 2004-03-20 25
.....
.....
.....
2015-02-15 - 2015-02-21 39
2015-02-22 - 2015-02-28 42
2015-03-01 - 2015-03-07 43
2015-03-08 - 2015-03-14 44
```

```
2015-03-15 - 2015-03-21 46
2015-03-22 - 2015-03-28 44
2015-03-29 - 2015-04-04 40
2015-04-05 - 2015-04-11 45
2015-04-12 - 2015-04-18 47
2015-04-19 - 2015-04-25 46
2015-04-26 - 2015-05-02 50
2015-05-03 - 2015-05-09 54
2015-05-10 - 2015-05-16 48
2015-05-17 - 2015-05-23 49
2015-05-24 - 2015-05-30 46
```

There are 595 weeks of data between January 2004 and May 2015.

Given the data for search interest levels, for a particular keyword, for each of the first 454 weeks, your task is fill the missing data in the table for the last 50 weeks of data.

Scoring

The score seen on hitting 'Compile and Test' is the score against the sample test case (of 444 rows) only. It is normalized, and will always lie between 0 and 1.
The score seen on making the submission is awarded **only on the basis of the hidden test case**.

Details of the scoring formula

We compute, the average of the magnitude of the percentage difference **err** between your pedicted value and the actual recorded value, for each of the missing terms. If this average exceeds 10.0, you will be assigned a zero score.

For each of the values predicted by you (p), we will compute a relative percentage "error" i.e. **err**. "error" is the difference of the predicted value (p) and the actual value on that particular date. Hence,
err = 100*abs(p - actualRecording)/actualRecording
M = total missing values in the test case=50
We will compute the **average** of all these error terms, over all the rows of data in the input file, and record it as **Av= (summation of percentage errors for each of the M terms)/M**

Your score for each test case this challenge, will be **(1-Av/15.0) * (Max Score)** Where, **Max Score =** Total number of points assigned to this challenge.

Your total score for the challenge will be the **average** of the **non-zero** scores obtained for each of these test cases.

Input Format

There will be 595 rows in the input file, each with two tab separated columns. The first column will be the week. The second column contains an integer indicating the search interest level. In the last 50 rows, the data for the search interest level(s) is missing, and has been replaced by Missing_1, Missing_2, Missing_3 .... Missing_50.

Output Format

Output the table as it was, except that the values marked Missing_1 ... Missing_50 should be filled up with integers, as estimated by you.

Sample Input

```
2004-01-04 - 2004-01-10 34
2004-01-11 - 2004-01-17 37
2004-01-18 - 2004-01-24 32
2004-01-25 - 2004-01-31 31
2004-02-01 - 2004-02-07 32
```

```
2004-02-08 - 2004-02-14 37
2004-02-15 - 2004-02-21 27
2004-02-22 - 2004-02-28 24
2004-02-29 - 2004-03-06 35
....
....
....
....
2014-06-15 - 2014-06-21 Missing_1
2014-06-22 - 2014-06-28 Missing_2
2014-06-29 - 2014-07-05 Missing_3
2014-07-06 - 2014-07-12 Missing_4
2014-07-13 - 2014-07-19 Missing_5
2014-07-20 - 2014-07-26 Missing_6
2014-07-27 - 2014-08-02 Missing_7
2014-08-03 - 2014-08-09 Missing_8
2014-08-10 - 2014-08-16 Missing_9
2014-08-17 - 2014-08-23 Missing_10
2014-08-24 - 2014-08-30 Missing_11
2014-08-31 - 2014-09-06 Missing_12
2014-09-07 - 2014-09-13 Missing_13
2014-09-14 - 2014-09-20 Missing_14
2014-09-21 - 2014-09-27 Missing_15
2014-09-28 - 2014-10-04 Missing_16
2014-10-05 - 2014-10-11 Missing_17
2014-10-12 - 2014-10-18 Missing_18
2014-10-19 - 2014-10-25 Missing_19
2014-10-26 - 2014-11-01 Missing_20
2014-11-02 - 2014-11-08 Missing_21
2014-11-09 - 2014-11-15 Missing_22
2014-11-16 - 2014-11-22 Missing_23
2014-11-23 - 2014-11-29 Missing_24
2014-11-30 - 2014-12-06 Missing_25
2014-12-07 - 2014-12-13 Missing_26
2014-12-14 - 2014-12-20 Missing_27
2014-12-21 - 2014-12-27 Missing_28
2014-12-28 - 2015-01-03 Missing_29
2015-01-04 - 2015-01-10 Missing_30
2015-01-11 - 2015-01-17 Missing_31
2015-01-18 - 2015-01-24 Missing_32
2015-01-25 - 2015-01-31 Missing_33
2015-02-01 - 2015-02-07 Missing_34
2015-02-08 - 2015-02-14 Missing_35
2015-02-15 - 2015-02-21 Missing_36
2015-02-22 - 2015-02-28 Missing_37
2015-03-01 - 2015-03-07 Missing_38
2015-03-08 - 2015-03-14 Missing_39
2015-03-15 - 2015-03-21 Missing_40
2015-03-22 - 2015-03-28 Missing_41
2015-03-29 - 2015-04-04 Missing_42
2015-04-05 - 2015-04-11 Missing_43
2015-04-12 - 2015-04-18 Missing_44
2015-04-19 - 2015-04-25 Missing_45
2015-04-26 - 2015-05-02 Missing_46
2015-05-03 - 2015-05-09 Missing_47
2015-05-10 - 2015-05-16 Missing_48
2015-05-17 - 2015-05-23 Missing_49
2015-05-24 - 2015-05-30 Missing_50
```

Sample Output

```
59
67
69
73
67
66
76
65
....
....
....


42
33
```

```
40
42
43
48
```

Explanation

The last fifty rows have been filled up with estimated numbers. The objective is to be as close as possible to the actual values, as gathered from the original Google Trends data for the last 50 weeks(rows).
Here's how the actual data for the last 50 weeks looks:

```
2014-06-15 - 2014-06-21 54
2014-06-22 - 2014-06-28 58
2014-06-29 - 2014-07-05 56
2014-07-06 - 2014-07-12 62
2014-07-13 - 2014-07-19 64
2014-07-20 - 2014-07-26 62
2014-07-27 - 2014-08-02 58
2014-08-03 - 2014-08-09 58
2014-08-10 - 2014-08-16 53
2014-08-17 - 2014-08-23 49
2014-08-24 - 2014-08-30 47
2014-08-31 - 2014-09-06 42
2014-09-07 - 2014-09-13 39
2014-09-14 - 2014-09-20 40
2014-09-21 - 2014-09-27 38
2014-09-28 - 2014-10-04 38
2014-10-05 - 2014-10-11 35
2014-10-12 - 2014-10-18 34
2014-10-19 - 2014-10-25 34
2014-10-26 - 2014-11-01 32
2014-11-02 - 2014-11-08 36
2014-11-09 - 2014-11-15 36
2014-11-16 - 2014-11-22 36
2014-11-23 - 2014-11-29 31
2014-11-30 - 2014-12-06 37
2014-12-07 - 2014-12-13 36
2014-12-14 - 2014-12-20 36
2014-12-21 - 2014-12-27 30
2014-12-28 - 2015-01-03 33
2015-01-04 - 2015-01-10 34
2015-01-11 - 2015-01-17 36
2015-01-18 - 2015-01-24 40
2015-01-25 - 2015-01-31 36
2015-02-01 - 2015-02-07 37
2015-02-08 - 2015-02-14 39
2015-02-15 - 2015-02-21 38
2015-02-22 - 2015-02-28 39
2015-03-01 - 2015-03-07 41
2015-03-08 - 2015-03-14 41
2015-03-15 - 2015-03-21 40
2015-03-22 - 2015-03-28 40
2015-03-29 - 2015-04-04 40
2015-04-05 - 2015-04-11 39
2015-04-12 - 2015-04-18 42
2015-04-19 - 2015-04-25 42
2015-04-26 - 2015-05-02 39
2015-05-03 - 2015-05-09 40
2015-05-10 - 2015-05-16 42
2015-05-17 - 2015-05-23 43
2015-05-24 - 2015-05-30 48
```