
Income inequality**X56838_en**

Reducing inequality within and among countries is the tenth target in the United Nations Sustainable Development Goals list. Write a program that given a list of countries, sorts the countries from the best (minimum inequality) to the worst.

Use the Gini coefficient as inequality indicator, see https://en.wikipedia.org/wiki/Gini_coefficient

The Gini coefficient comes out from the wealth distribution by population groups. Let us see how to compute the coefficient value with an example. The following table shows the quintile wealth distribution in Spain in 2014:

Q ₁	Q ₂	Q ₃	Q ₄	Q ₅
5.7	11.8	17	23.6	41.9

Note that the poorest 20% population (i.e., Q₁ quintile) shares 5.7% of the country wealth. In contrast, the richest 20% (i.e., Q₅ quintile) shares 41.9%.

The value of the Gini coefficient is

$$\frac{\sum_{i=1}^4 S_i}{500}$$

where each S_i is:

$$S_i = \sum_{j=i+1}^5 (Q_j - Q_i)$$

that, for the Spain 2014 data above, results in 0.3368 because:

$$S_1 = (Q_2 - Q_1) + (Q_3 - Q_1) + (Q_4 - Q_1) + (Q_5 - Q_1) = 71.5$$

$$S_2 = (Q_3 - Q_2) + (Q_4 - Q_2) + (Q_5 - Q_2) = 47.1$$

$$S_3 = (Q_4 - Q_3) + (Q_5 - Q_3) = 31.5$$

$$S_4 = (Q_5 - Q_4) = 18.3$$

Note that Gini coefficient is zero under income equality and the more inequality a country has the greater its value is.

The program **MUST** use the following `struct` and **MUST** implement and use the following function:

```
struct Info {
    string country_name;
    double gini;
};

//pre: quintile_data represents a country income by quintile info
//post: returns the gini coef corresponding to quintile_data
double gini_coef(const vector<double>& quintile_data) {
    ...
}
```

Exam score: 3.7 **Automatic part:** 40%

Input

The input consists on an integer n greater than zero followed by a list of n tuples. Each tuple is formed by a country name (string) and the income share by quintiles (five doubles representing income percentages).

Output

Countries sorted by income inequality, from the best (lowest Gini) to the worst (highest one). Write each country in a line. Write the Gini value besides the country name using four decimal places. Use the lexicographical order for tie cases. See the examples below.

Sample input 1

```
15
Argentina 4.8 9.6 14.9 22.9 47.8
France 8 12.7 16.8 22 40.5
Germany 8.1 12.9 16.9 22.4 39.8
Greece 5.9 11.9 17 23.3 41.8
Hungary 7.6 13.2 17.6 22.9 38.7
Italy 6.2 12.3 17.2 23.3 41
Mexico 5.1 8.8 12.7 18.9 54.5
Norway 9.1 14.2 18 22.8 35.9
Poland 8 12.5 16.8 22.5 40.2
Portugal 6.5 12.2 16.4 22.3 42.6
Spain 5.7 11.8 17 23.6 41.9
Sweden 9 14.1 17.7 22.9 36.3
Turkey 5.8 10.2 14.7 21.6 47.7
United_Kingdom 7.3 12 16.6 22.9 41.3
United_States 5.1 10.3 15.4 22.7 46.4
```

Sample output 1

```
Norway 0.2488
Sweden 0.2536
Hungary 0.2876
Germany 0.2916
France 0.2972
Poland 0.2976
United_Kingdom 0.3156
Italy 0.3224
Portugal 0.3292
Greece 0.3328
Spain 0.3368
United_States 0.3800
Turkey 0.3808
Argentina 0.3972
Mexico 0.4356
```

Sample input 2

```
4
Z 15 20 20 20 25
Y 15 20 20 20 25
X 19 20 20 20 21
V 19 19 20 21 21
```

Sample output 2

```
X 0.0160
V 0.0240
Y 0.0800
Z 0.0800
```

Observation

Data of first example below is from <https://ourworldindata.org/>. If you program in C++, use the double data type and put these two lines at the beginning of your `main()`:

```
cout.setf(ios::fixed);
cout.precision(4);
```

Problem information

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Generation : 2022-06-14 09:53:39

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