Measurement

You have just been hired as a PE (Physical Education) teacher in Southern Orchard College (SOC). In your first day at work, you are tasked with collecting the data of the height and weight of all students in SOC. The principal (the one who gave you this task) is interested in finding out who is the shortest and tallest student in SOC, as well as their BMI[1] (Body Mass Index).

You took out your notes and found out this magic formula on how to compute BMI:

$$BMI = \frac{weight(kg)}{height(m)^2}$$

After gathering all the data necessary, you realized that it is tedious to manually compile the data by hand, not to mention calculating the BMI itself. Fortunately, you are an experienced programmer, having taken a programming course in school. Your job is simple: write a program that takes in the name, height, and weight of all students in SOC and prints the shortest and tallest student's name as well as his or her BMI.

Input

The input consists of a single number **N** (1 <= N <= 100). **N** rows follow. Each row consists of a student's name, his or her height in centimetres (cm), followed by his or her weight in kilograms (kg), separated by a single space (0 < height, weight < 1000). It is guaranteed that no two students have the same name nor height. All student names are guaranteed to be single words with each name not exceeding 50 characters and the height and weight of all students are able to be stored in a 32-bit integer.

Output

Print two lines with the following format:

```
A is the shortest with BMI equals to B.
C is the tallest with BMI equals to D.
```

with A being the shortest student's name and B is the student's BMI (and C is the tallest student's name with BMI of D).

All BMI values should be rounded to two decimal places (i.e. 0.055 becomes 0.06 and 0.044 becomes 0.04).

Sample Input

```
4
Diamond 178 55
Jarod 160 80
Douglas 180 60
Rod 151 48
```

Sample Output

```
Rod is the shortest with BMI equals to 21.05.
Douglas is the tallest with BMI equals to 18.52.
```

Explanation

Rod is the shortest student with height of 151 cm, while Douglas is the tallest student with height of 180 cm. Rod's BMI is 21.05 while Douglas' BMI is 18.52 (both rounded to two decimal places).

Rod's BMI $= \frac{48}{1.51^2} = 21.0517$ Douglas' BMI $= \frac{60}{1.8^2} = 18.5185$

[1] BMI, or Body Mass Index, is the ratio of one's weight (in kilograms) with one's height (in metres) squared.