Scaling Recipes

Problem ID: recipes

Time limit: 8 seconds

A recipe is a list of ingredients and a set of instructions to prepare a dish. It is often written for a particular number of portions. If you have a recipe for 4 portions and you want to make 6 portions, it turns out that simply multiplying the amounts for each ingredient by 1.5 is often wrong! The reason is that the original recipe may have been rounded to the nearest teaspoon, gram, etc., and the rounding errors magnify when a recipe is scaled.

Some recipes are specifically written to ease the task of scaling. These recipes are developed using "Baker's percentages." Each ingredient is listed not only by weight (in grams), but also as a percentage relative to the "main ingredient." The main ingredient will always have a 100% Baker's percentage. Note that the sum of the Baker's percentages from all ingredients is greater than 100%, and that the Baker's percentages of some ingredients may exceed 100%.

Simple Cake Recipe

225g (8 oz) self-raising flour.
225g (8 oz) soft butter (i.e. room temperature).
225g (8 oz) caster sugar.
4 eggs.
1 teaspoon baking powder.

Mix the ingredients well in a large bowl using an electric whisk.
Halve the mixture and pour into 2 non-stick 18cm (7 inch) cake tins.
Cook till golden brown (15-25 minutes) in a preheated oven at 180 degrees C (gas mark 4).
Cool on a wire rack before serving, add jam between the two halves and optionally top with butter cream.

Table 1: Example Recipe

Ingredient	Weight (g)	Percentage (%)
Olive Oil	50.9	11.2
Garlic	12.0	2.7
Beef	453.6	100.0
Onions	1134.0	250.0
Raisins	82.5	18.2
Bouillon	10.0	2.2

To scale a recipe:

1. determine the scaling factor by dividing the number of desired portions by the number of portions for which the recipe is written;

2. multiply the weight of the main ingredient with a 100% Baker's percentage by the scaling factor. This is the scaled weight of the main ingredient;

3. calculate the scaled weight of every other ingredient by multiplying its Baker's percentage by the scaled weight of the main ingredient.

Input

The first line of input specifies a positive integer $T \leq 1000$, consisting of the cases to follow. Each case starts with a line with three integers R, P, and D: $1 \leq R \leq 20$ is the number of ingredients, $1 \leq P \leq 12$ is the number of portions for which the recipe is written, and $1 \leq D \leq 1000$ is the number of desired portions. Each of the next R lines is of the form

```
<name>    <weight>    <percentage>
```

where `<name>` is the name of the ingredient (an alphabetic string of up to 20 characters with no embedded spaces), `<weight>` is the weight in grams for that ingredient, and `<percentage>` is its Baker's percentage. Both `<weight>` and `<percentage>` are floating-point numbers with exactly one digit after the decimal point. Each recipe will only have one ingredient with a Baker's percentage of 100%.

Output

For each case, print `Recipe #` followed by a space and the appropriate case number (see sample output below). This is followed by the list of ingredients and their scaled weights in grams. The name of the ingredient and its weight should be separated by a single space. Each ingredient is listed on its own line, in the same order as in the input. After each case, print a line of 40 dashes ('-'). Answers within 0.1g of the correct result are acceptable.

Sample Input 1	Sample Output 1
2 6 4 20 oliveoil 50.9 11.2 garlic 12.0 2.7 beef 453.6 100.0 onions 1134.0 250.0 raisins 82.5 18.2 bouillon 10.0 2.2 4 5 8 Milk 265.0 93.0 SodiumCitrate 11.0 4.0 WhiteCheddar 285.0 100.0 DryMacaroni 240.0 84.0	Recipe # 1 oliveoil 254.0 garlic 61.2 beef 2268.0 onions 5670.0 raisins 412.8 bouillon 49.9 -- Recipe # 2 Milk 424.1 SodiumCitrate 18.2 WhiteCheddar 456.0 DryMacaroni 383.0 --