Programming I — Laboratory Sessions

Week 12: Inheritance II

Geometric Shape Sorting

Task description

Write a program that reads the data about different geometric shapes (in the same way as in the 11th week's exercise), executes the given command, and prints its result. This time, the commands are as follows:

- 1: Sort the shapes by increasing **type** (first rectangles, then squares, and finally circles).
- 2: Sort the shapes by increasing **area**. All areas should be rounded to the nearest integer.
- 3: Sort the shapes by increasing **circumference**. All circumferences should be rounded to the nearest integer.
- 4: The shapes have to be sorted by increasing **type**, and those having the same type have to be sorted by increasing **area**.
- 5: The shapes have to be sorted by increasing **area**, and those having the same area have to be sorted by increasing **type**.
- 6: The shapes have to be sorted by increasing **area**. Those having the same area have to be sorted by increasing **circumference**, and those having the same area and circumference have to be sorted by increasing **type**.

In all cases, sorting has to be *stable*. This means that if two shapes don't differ according to the sorting criteria, your sorting algorithm should not swap them.

Input

The input data are specified in the same way as in the 11th week's exercise. Therefore, the first line contains the number of shapes. The following lines contain the data about individual shapes, and the last line contains the command. The data about rectangles are specified as `1` a b, those about squares are given as `2` a, and the data about circles are presented as `3` r.

Output

Print the sequence of shapes in the expected order. The data about individual shapes should be printed as in the 11th week's exercise.

Test case 1

Test input:

```
10
2 5
3 4
2 7
1 5 10
2 6
1 18 2
3 5
1 4 9
1 6 6
3 3
1
```

Expected output:

```
pravokotnik [a = 5, b = 10] | p = 50, o = 30
pravokotnik [a = 18, b = 2] | p = 36, o = 40
pravokotnik [a = 4, b = 9] | p = 36, o = 26
pravokotnik [a = 6, b = 6] | p = 36, o = 24
kvadrat [a = 5] | p = 25, o = 20
kvadrat [a = 7] | p = 49, o = 28
kvadrat [a = 6] | p = 36, o = 24
krog [r = 4] | p = 50, o = 25
krog [r = 5] | p = 79, o = 31
krog [r = 3] | p = 28, o = 19
```

Test case 6

Test input:

```
10
2 5
3 4
2 7
1 5 10
2 6
1 18 2
3 5
1 4 9
1 6 6
3 3
6
```

Expected output:

```
kvadrat [a = 5] | p = 25, o = 20
krog [r = 3] | p = 28, o = 19
pravokotnik [a = 6, b = 6] | p = 36, o = 24
kvadrat [a = 6] | p = 36, o = 24
```

```
pravokotnik [a = 4, b = 9] | p = 36, o = 26
pravokotnik [a = 18, b = 2] | p = 36, o = 40
kvadrat [a = 7] | p = 49, o = 28
krog [r = 4] | p = 50, o = 25
pravokotnik [a = 5, b = 10] | p = 50, o = 30
krog [r = 5] | p = 79, o = 31
```