03 : 14 : 57 : 50
DAY HRS MIN SEC

January Circuits '17

LIVE

Jan 20, 2017, 09:00 PM IST - Jan 28, 2017, 09:00 PM IST

Lots of Circles

Max. Marks: 100

This is an approximation problem

Cat Noku arranging n circles for a party.

The i-th circle has radius r_i and weight w_i.

Cat Noku must arrange the circles in the plane such that no two overlap.

Let (x_i, y_i) be the final position of the center of the i-th circle in the arrangement. The coordinates must be at integer positions.

Then, his score will equal $\frac{\sum_{i=1}^{n} w_i}{\sum_{i=1}^{n} w_i \sqrt{x_i^2+y_i^2}} \cdot 10^9$. His score will be zero if any two circles are overlapping. It is ok for two circles to touch.

Find any such arrangement that maximizes the score. Note, this is an approximation problem, so you do not need to find an optimal answer.

Input Format

The first line of input will contain a single integer n. The next n lines of input will each contain two integers r_i, w_i.

Output Format

Print n lines with two integers each. The i-th line denotes the center of the i-th circle in the arrangement.

The absolute values of the output coordinates must be at most 10^9.

Test case generation

n will be chosen uniformly at random between 3 and 1,000.

r_i, w_i will be chosen uniformly at random between 1 and 1,000.

During the contest, 100 tests will be provided. After the contest ends, 100 additional cases will be generated, and the combined results will be used to determine your final score.

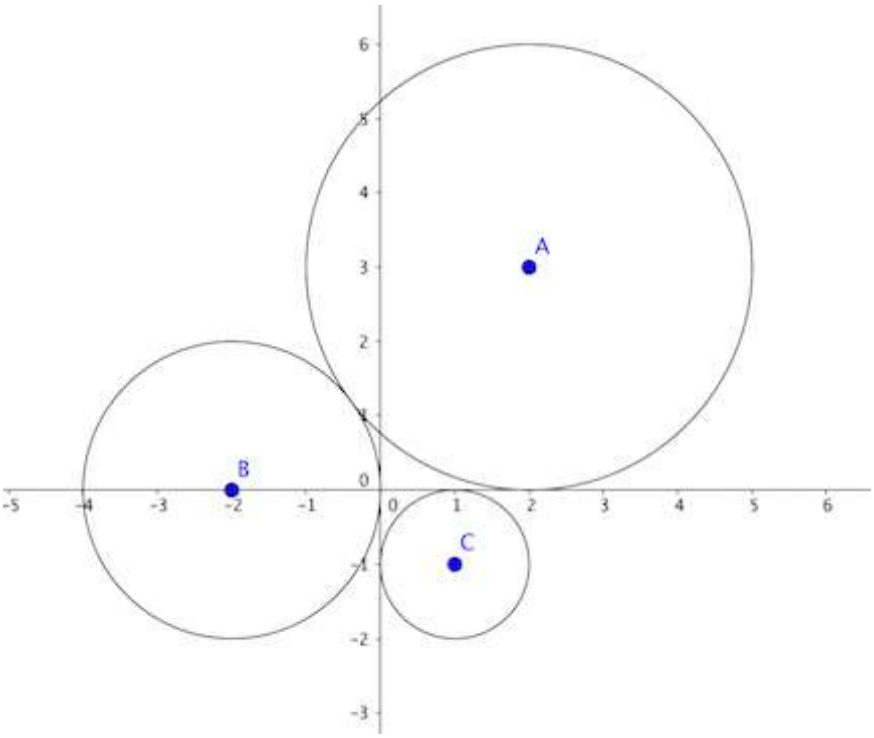
SAMPLE INPUT

```
3
3 5
2 3
1 4
```

SAMPLE OUTPUT

```
2 3
-2 0
1 -1
```


Explanation



Time Limit:	5.0 sec(s) for each input file.
Memory Limit:	256 MB
Source Limit:	1024 KB
Marking Scheme:	Marks are awarded if any testcase passes.

Allowed Languages: C, C++, Clojure, C#, D, Erlang, F#, Go, Groovy, Haskell, Java, Java 8, JavaScript(Rhino), JavaScript(Node.js), Lisp, Lisp (SBCL), Lua, Objective-C, OCaml, Octave, Pascal, Perl, PHP, Python, Python 3, R(RScript), Racket, Ruby, Rust, Scala, Scala 2.11.8, Swift, Visual Basic

CODE EDITOR

Enter your code or Upload your code as file. Save C (gcc 4.8.4)

```c
#include <stdio.h>

int main()
{
    printf("Hello World!\n");
    return 0;
}

```

5 LIVE EVENTS

1:1

Provide custom input

COMPILE & TEST SUBMIT

Press Ctrl-space for autocomplete suggestions. POWERED BY code table

Tip: You can submit any number of times you want. Your best submission is considered for computing total score.

Your Rating: Like 0 Share Tweet