

Round 2 2009

[A. Crazy Rows](#)

[B. A Digging Problem](#)

[C. Stock Charts](#)

D. Watering Plants

[Contest Analysis](#)

[Questions asked](#)

Submissions

Crazy Rows

6pt	Not attempted 1837/2092 users correct (88%)
10pt	Not attempted 1605/1744 users correct (92%)

A Digging Problem

9pt	Not attempted 193/388 users correct (50%)
17pt	Not attempted 70/152 users correct (46%)

Stock Charts

7pt	Not attempted 741/1384 users correct (54%)
21pt	Not attempted 355/537 users correct (66%)

Watering Plants

5pt	Not attempted 1251/1420 users correct (88%)
25pt	Not attempted 64/226 users correct (28%)

Top Scores

ACRush	100
winger	100
iwi	100
wata	100
bwps	100
natalia	100
Burunduk1	100
AS1	100
Khuc.Anh.Tuan	100
Nerevar	100

Problem D. Watering Plants

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the [Quick-Start Guide](#) to get started.

Small input
5 points

Solve D-small

Large input
25 points

Solve D-large

Problem

In your greenhouse you have a number of plants which you need to water.

Each of the plants takes up an area which is a circle. No two of the plants overlap or touch each other.

You are going to buy two sprinklers. Each of the sprinklers will spray everything within a circle of radius **R** with water.

One of the sprinklers will run in the morning, and one will run at night. For you to be satisfied that a plant will get enough water, either the whole area of the plant must be watered in the morning, or the the whole area of the plant must be watered at night. So each of the circles representing a plant must be completely in one or both of the two circles representing the area the sprinklers can water.

Given the location and radius of each of the plants, find the minimum radius **R** so that it is possible to place the two sprinklers to water all the plants. The sprinklers will be installed on the ceiling, so a sprinkler's position can be inside the area of a plant.

Input

- One line containing an integer **C**, the number of test cases in the input file.

For each test case, there will be:

- One line containing **N**, where **N** is the number of plants you have.
- N** lines, one for each plant, containing three integers "**X Y R**", where (**X**, **Y**) are the coordinates of the center of the plant, and **R** is the radius of the plant.

Output

For each test case:

- One line containing the string "Case #x: R" where *x* is the number of the test case, starting from 1, and **R** is the minimum radius of the sprinklers.

Any answer with absolute or relative error of at most 10^{-5} will be accepted.

Limits

All numbers in the input file are integers.

$$1 \leq X \leq 1000$$
$$1 \leq Y \leq 1000$$
$$1 \leq R \leq 100$$

Small Input

$$1 \leq C \leq 10$$
$$1 \leq N \leq 3$$

Large Input

$$1 \leq C \leq 30$$
$$1 \leq N \leq 40$$

Sample

Input	Output
5	Case #1: 7.000000
3	Case #2: 8.000000
20 10 2	Case #3: 26.000000
20 20 2	Case #4: 8.071067
40 10 3	Case #5: 51
3	
20 10 3	
30 10 3	
40 10 3	

```
5
100 100 1
140 100 1
100 130 1
100 500 1
150 500 1
8
100 100 1
110 100 1
100 110 1
110 110 1
200 200 1
210 200 1
200 210 1
210 210 1
4
100 100 1
200 100 1
200 103 1
300 103 1
```

In the first case, a sprinkler of radius at least 7 centered at (20,15) will water the first two plants. A sprinkler of radius at least 3 will water the plant at (40,10).

In the second case, one of the two sprinklers will need a radius of at least 8. Note that the plant at (30,10) must be covered entirely by one of the two sprinklers.

All problem statements, input data and contest analyses are licensed under the [Creative Commons Attribution License](#).

© 2008-2017 Google [Google Home](#) - [Terms and Conditions](#) - [Privacy Policies and Principles](#)

Powered by



Google Cloud Platform