Green Balloon

Description

As a GRE lover, tmt514 often get GREen "AC" in programming contest, solve problem by GREedy. Now he obtain a GREen balloon after GREen "AC", and place that balloon on the ground at $(0, 0)$. The balloon is connected to n fans with ribbons, and the i-th fans are standing at (x_i, y_i), holding the ribbon with length l_i. He then free that balloon, thus the balloon goes up, and it may be pulled to other directions by ribbons. You want to know how high the green balloon can go up. You may assume that the ribbons are very light, so they can move freely within range. You may assume that the height of fans, and size of balloons are negligible.

Input

The first line contains a integer T indicating the total number of test cases. Each test case starts with a line containing an integer n, and each of following n lines contains three integers x_i, y_i, l_i.

- $1 \leq T \leq 2000$
- $1 \leq n \leq 10$
- $-100 \leq x_i, y_i \leq 100$
- $1 \leq l_i \leq 300$
- (x_i, y_i) are distinct
- $x_i^2 + y_i^2 \leq (l_i - 1)^2$

Output

For each test case, output the height that balloon will go up. The error within 10^{-5} would be accepted.

Sample Input

```
5
1
10 10 16
2
10 10 20
10 -10 20
3
10 10 20
10 -10 20
-10 10 120
4
90 -100 160
-80 -80 150
90 80 150
80 80 245
5
0 0 4
3 0 5
-3 0 5
0 3 5
0 -3 5
```

Sample Output

```
16.000000
17.320508
17.320508
94.187909
4.000000
```