

Problem C

Laser Beam

Input file: *testdata.in*

Time limit: 3 seconds

Problem Description

William, a college student, is working on a simulation project. The project is modeled on a 2-dimensional plane as follows. There are a number of trees, where each is represented by a line segment with an integer x -coordinate and the tree height is equal to its y -coordinate. Consider the example in Figure ???. There are five trees, whose x -coordinates are 2, 5, 6, 9, and 10, respectively. The tree with x -coordinate 2 has height 3, and the tree with x -coordinate 6 has height 2, and so on.

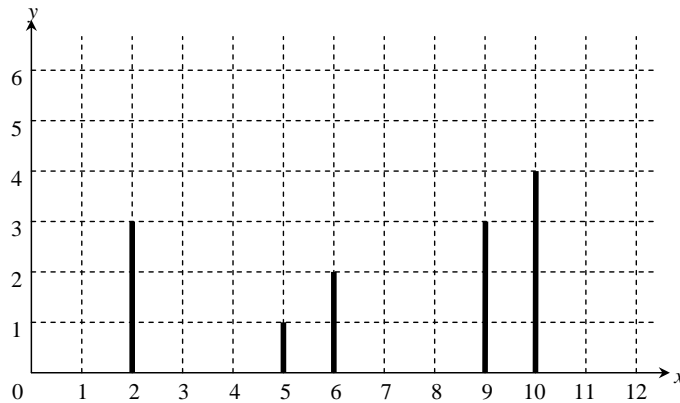


Figure 1: An example.

Given a set of trees on the screen, the players can setup a laser gun and give one shot toward the trees. The laser gun can be placed under the following two restrictions.

1. The x -coordinate of the laser gun can only be 0.
2. The y -coordinate of the laser gun is a positive integer.

While the position of the laser gun could be different, its firing direction is fixed. Precisely, the angle between its firing direction and the y -axis is $\pi/2 + \arctan(1/2)$ radians, which is about 116.565051 degrees, counted clockwise from the y -axis. (See Figure ?? as an illustration.)

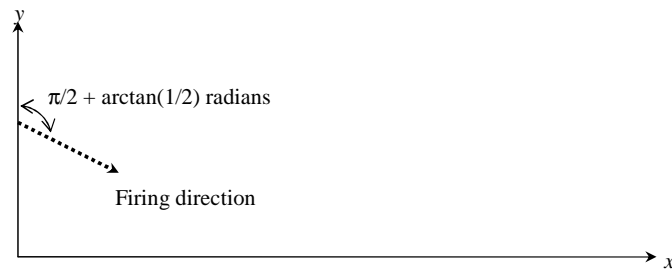


Figure 2: An illustration of the firing direction.

Since William is not a computer science student, he asks for your help. Given a set of trees and a laser gun, please determine which tree will be shot. Note that the laser emitted from the laser gun vanishes after hitting a tree or hitting the ground (the x -axis itself). Consider the example in Figure ??. The laser gun is placed at (0, 6). According to the firing direction, the tree with x -coordinate 9 will be shot.

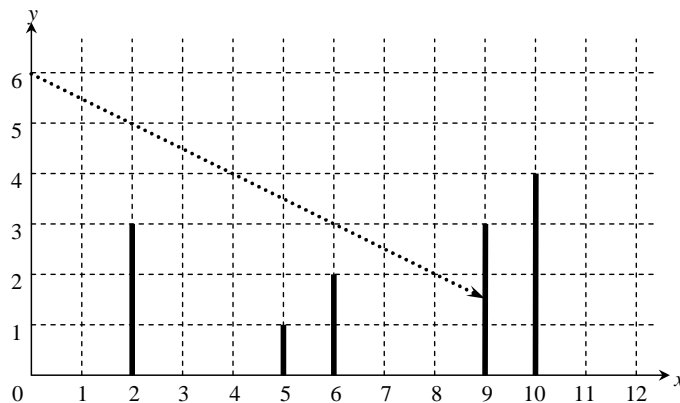


Figure 3: An example.

Note that if the laser touches either the top or the bottom of a tree, it is considered as a hit on that tree.

Technical Specification

1. There are n trees, $3 \leq n \leq 60000$, each having a distinct integer x -coordinate.
2. A tree with of height h is represented by a line segment $(x, 0) - (x, h)$, where x denotes the x -coordinate of the tree. We have $1 \leq x \leq 60000$ and $1 \leq h \leq 62000$.
3. The angle between the firing direction of the laser gun and the y -axis is $\pi/2 + \arctan(1/2)$, measured in radians, counted clockwise from the y -axis.
4. The y -coordinate of a laser gun is a positive integer less than or equal to 100000.

Input Format

The first line of input gives the number of cases, T ($T \leq 10$). T test cases follow. The first line of each test case contains a positive integer n , $3 \leq n \leq 60000$, indicating the number of trees. Then, n lines follow, where each line contains two positive integers x and h , $1 \leq x \leq 60000$ and $1 \leq h \leq 62000$, representing a tree of height h at x -coordinate equal to x . Next, a line containing a positive integer m follows, $1 \leq m \leq 60000$, indicating there are m queries. Each of the following m lines contains a positive integer y , $1 \leq y \leq 100000$, indicating the existence of a laser gun at $(0, y)$.

Output Format

For each query of each test case, print "NOTHING" in a single line if the laser cannot hit any of the trees. Otherwise, print the x -coordinate of the tree that is shot.

Sample Input

2

5
2 3
5 1
10 4
9 3
6 2
2
6
5
5
2 3
5 1
10 4
9 3
6 2
3
1
15
13

Sample Output

9
6
2
NOTHING
NOTHING