E — Hybrid Salientia

Input: Standard Input
Output: Standard Output

It's believed that frogs jump due to lack of natural physical defense against predators. However, there are some types of frogs that do not leap. In this problem, we will consider a hybrid version of a frog that can both leap and walk.

Consider a magical creek with **N** stones. The shape of each stone is either a circle or a square. Our frog is currently standing on stone 1 and it is going to make (**N-1**) leaps so that it can land on every stone. It is believed that after making **N-1** jumps, the frog will grow wings and fly away. After every jump, it loses 10% of its 'leaping energy'. That means in the K^{th} leap it can jump to a maximum distance of $L*0.9^{k-1}$, where **L** is the initial *maximum jump distance*. The frog, however, can walk from any point to any other point within a stone without loss of any energy.

In this problem, you have to find the minimum value of **L** that will enable the frog to visit all the stones starting from stone 1. Obviously, the visiting order of the stones will be such that the value of **L** is minimized. When calculating the distances, assume the frog is a point and the stones are circles and squares on a 2D Cartesian coordinate.

Input

The first line of input is an integer **T (≤ 200)** that indicates the number of test cases. Each case starts with a line containing an integer **N (2 ≤ N ≤ 15)** that represents the number of stones. The next **N** lines contain the descriptions of the stones starting from stone **1**. Each stone will be given in the format **type X Y R. type** can be ***'C'*** or ***'S'*** and represents circle and square respectively. If **type** is equal to ***'C'***, then (**X**, **Y**) will give you the center of the circle and **R** will give you the radius. If **type** is ***'S'***, then (**X**, **Y**) will give you the lower left corner of the square and **R** will give the length of the sides. The sides of the squares are axis parallel. **0 ≤ X, Y ≤ 1000000, 0 < R ≤ 1000** and stones will be non-overlapping.

Output

For each case, output the minimum value of **L**. Errors less than 10^{-6} will be ignored.

Sample Input	Output for Sample Input
2 2 C 0 0 5 C 10 0 2 3 C 0 0 2 S 10 1 4 S 3 1 2	3.000000 5.555556

Note

For the second sample we have the picture on the right. Initial value of L is 5.555556. First, the frog makes a leap to stone 3. It loses 10% of energy and that means the next leap distance can be at most 5.555556 * 0.9 = 5.000000. Since the shortest distance between stone 3 and stone 2 is 5.000000, the next leap will enable the frog to land safely on stone 2.