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% ot 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.

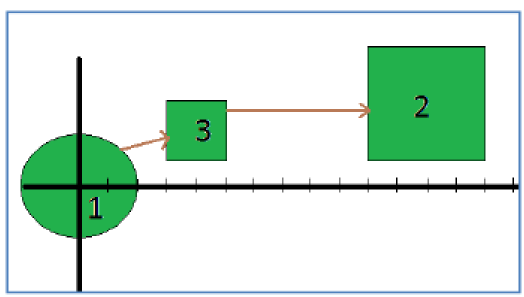
Input

The first line of input is an integer T ($T \leq 200$) that indicates the number of test cases. Each case starts with a line containing an integer N ($2 \leq N \leq 15$) 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. $0 \leq X, Y \leq 1000000$, $0 < R \leq 1000$ and stones will be non-overlapping.

Output

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

Note:
For the second sample we have the picture below. 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.



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
```

Sample Output

```
3.000000
5.555556
```