Problem H. Spacecraft

The $10 billion Quapler spacecraft, which launched in October 2016, in Dalian, is staring continuously at a patch of sky containing about 12 rare stars in the WF18 constellation. We are careful to set up the universe as a three dimensional space (x, y, z). The exact location of our planet is (a, b, c) and the centre of WF18 constellation is (u, v, w). The ground detector recorded the initial state of Quapler. It faces the x direction and the y direction is on the left side.

The flight recorder captured its all orbit transformations with a total of n in a timed sequence. Each record as a triple $< d, s, t >$ describes a rectilinear motion along the current direction of length d and ending with a directional rotation.

The string s is one of "R", "L", "D", "U" indicating a rotation with t radian to the right, the left, the down and the up side respectively. The recorded information is based on relative direction. That is say, the exact meaning of "R", "L", "D" and "U" should be discussed in the current direction of Quapler spacecraft itself.

To emphasize the importance of the studying, the scientists need to analyze the shortest distance between Quapler and the target constellation WF18.

Input

The first line consisting a number T ($T \leq 30000$) indicating the number of test cases.

For each test case, the first line contains three float numbers a, b and c where $0 \leq a, b, c \leq 100$. The second line contains three float numbers u, v and w where $0 \leq u, v, w \leq 100$. The third line is the total number of orbit transformation n ($1 \leq n \leq 30$). Each of the following n lines consists a float number d ($0 \leq d \leq 100$), a string s and a float number t ($0 \leq t \leq \pi$) described as above.

Output

For each test case, the shortest distance as a float number with the precision of 2 digits.

Sample

1 0 0 0 1 1 1 7 2 U 1.5708 2 U 1.5708 2 L 1.5708 2 L 1.5708 2 U 1.5708 2 U 1.5708 2 L 1.5708	1.41