2010 Canadian Computing Competition
Day 2, Question 2

Space Miner

Input: from standard input
Output: to standard output
Source file: `space.c`

There are M ($1 \leq M \leq 1,000$) planets each with v_i ($1 \leq v_i \leq 10,000$) units of resources and radius r_i ($1 \leq r_i \leq 100$).

Starting from $(0, 0, 0)$, you travel in straight lines through N ($1 \leq N \leq 1,000$) waypoints in a specific order.

Whenever you travel within $D + r_i$ ($1 \leq D \leq 50$) units from a planet's center, you can mine the planet using your tractor beam retrieving v_i units of resources. Note that if you are exactly D units from the surface of the planet, you can mine the planet. If your path takes you through a planet, do not worry, since your spaceship can drill through planets, which makes mining even easier. Also note that you cannot mine the same planet on a subsequent visit.

Give the number of minerals that can be mined on your journey.

Hint: you should do all calculations with 64-bit integers.

Input Specification

On the first line of input is the number M, the number of planets. On the next M lines are five integers describing each of the M planets. These integers are $x_i y_i z_i v_i r_i$, where the planet i is at position (x_i, y_i, z_i), (where $-1,000 \leq x_i, y_i, z_i \leq 1,000$) and this planet has v_i resources and radius r_i. On the next line is the number N, the number of waypoints to pass through. Each of the next N lines contains the position of these waypoints, as three integers $x_i y_i z_i$ ($-1,000 \leq x_i, y_i, z_i \leq 1,000$). The last line of input is the number D, the maximum distance from a planet's surface that your ship can be and still mine a planet.

Output Specification

On one line, output the amount of minerals that you can mine on your journey.

Sample Input

```
3
10 0 0 1 1
0 10 0 2 1
0 0 10 4 1
3
8 0 0
0 7 0
0 0 9
1
```

Output for Sample Input

```
5
```