

Problem C - Quick Response

The terrorist organization has moved one step ahead of you! The MDD's have been deployed!

As you have been the main ACM staff in charge of this tunnel incident, you are now tasked with disarming these terrible devices, but you must move quickly before they explode!

You have been provided with the Mobile MDD Sweeper (MMS), which is capable of disarming all MDDs it passes over, even those buried deep underground. Unfortunately, the MDDs have been enchanted to continuously teleport randomly every millisecond, rendering it effectively invincible to the MMS. To nullify the enchantment, we need to use a high-powered detector.

We model the problem on a 2D plane with integer coordinates for simplicity. Here is the *modus operandi*:

1. You place your MMS on some integer coordinate at $t = 0$.
2. At the start the t -th minute ($1 \leq t \leq 10$), the detector makes a scan that instantly reveals and immobilizes some MDDs to integer coordinates; this effect on MDDs lasts for < 1 minute.
3. During the t -th minute, before the detector's effect wears off, you move your MMS in a straight line to another integer coordinate **no more than d units away** in Euclidean distance ($1 \leq d \leq 5$ is given), disarming all the MDDs you directly pass over; you do not always have to move.

The detector has limited range; in particular, the coordinates of all detected MDDs satisfy $0 \leq x, y < n$ (where $1 \leq n \leq 20$ is given), but of course you are free to place or move your MMS outside of this square.

Another complication is that the terrorists have attached an anti-detection charm onto the MDDs, making it nearly impossible to detect the same MDD twice in the same day. In other words, we can assume that every MDD is detected at most once, so **all detected MDDs are distinct across all scans**.

Hypothetically, given perfect knowledge of all detection events, how many MDDs can you disarm?

Input

The input starts with a line containing T , the number of test cases.

Each test case starts with a line containing three integers, n, d, m ($1 \leq n \leq 20, 1 \leq d \leq 5, 1 \leq m \leq 1000$), where n and d are as described above, and m is the total number of MDDs that are detected.

Then, m lines follow, each containing three integers x, y, t ($0 \leq x, y < n, 1 \leq t \leq 10$) denoting that at the start of the t -th minute, a MDD was detected and fixed at coordinate (x, y) .

No two MDDs will be detected in the same place at the same time.

Output

For each test case output a single line with a single integer – the maximum number of MDDs you can disarm.

Sample Input

```
2
8 5 5
0 0 1
2 2 2
3 7 1
3 6 3
1 1 5
20 5 20
0 17 3
4 6 8
17 12 3
13 14 5
0 4 5
4 6 3
12 7 2
4 9 10
6 10 10
5 3 5
1 1 9
9 2 9
16 6 1
9 5 7
3 4 1
3 9 9
12 9 9
14 18 6
6 12 5
3 12 10
```

Sample Output

```
4
9
```

Sample Input Explanation

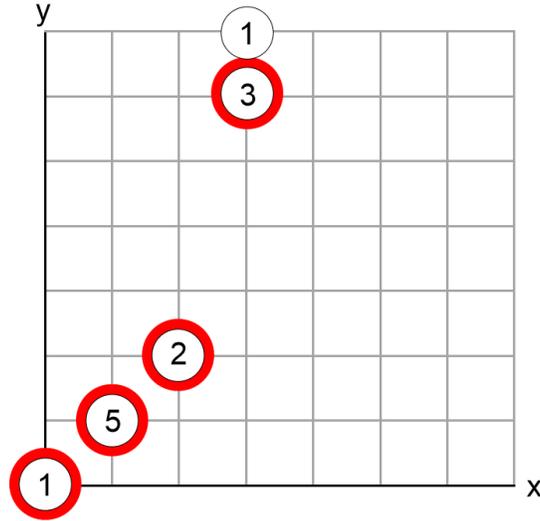


Figure 1: A visual representation of the sample input and its optimal solution

The above figure depicts the sample input, each circle denotes a detection event at that location, with the number inside each circle marking the time when that MDD is detected. The red circles denote the MDDs that are disarmed in the optimal procedure described below.

Note that while in this test case all MDDs detected have different coordinates, in general it is possible for two detection events to occur at the same location at two *different* times.

For the sample input, we can disarm four MDDs by the following procedure:

- At $t = 0$, position the MMS at $(0, 0)$
- At $t = 1$, move from $(0, 0) \rightarrow (2, 2)$, disarming the MDD detected at $(0, 0)$
- At $t = 2$, move from $(2, 2) \rightarrow (3, 6)$, disarming the MDD detected at $(2, 2)$
- At $t = 3$, move from $(3, 6) \rightarrow (2, 2)$ – note we cannot move any further as we must travel in a straight line between integer coordinates and we cannot move more than $d = 5$ units away in this test case.
- At $t = 4$, do not move.
- At $t = 5$, move from $(2, 2) \rightarrow (0, 0)$, disarming the MDD detected at $(1, 1)$ – notice that simply “passing through” the coordinate of a detected MDD is enough to disarm it. We could also have simply moved to $(1, 1)$ – if an MDD detected at the start of the t -th minute is under the start point or the end point of your movement during the t -th minute, then it is also disarmed.

We cannot disarm all five MDDs because the two MDDs detected at $t = 1$ are too far apart.

Thus, the maximum number of MDDs we can disarm is 4.