Data Scientist Technical Test (A)

Congratulations on getting to this stage and thank you for taking the time to solve the following exercise. This should not take you more than 3 hours to complete. Please remember to commit your code frequently using a version control system of your choice. Once you successfully complete this task please share your repository with us.

Only Questions 1 through 3 are required. However, if you want to showcase your skills you can complete questions 4 and 5 as well.

You should include in your repository:

- A text file with your thought process (question 1 and 3)
- The source code to solve the exercise
- A README file with all the instructions that you think will be useful for us to test your solution

Best of luck.

NOTE: Keep in mind that you should keep you repository private. You can use https://github.com to create an account with free private repos. Once you are done you can share your repo with hiring-novafutur (hiring@novafutur.com) on GitHub.

Exercise

After a long deferment, the mayor of Z-city has allowed pizzerias to be opened in town. Pizzerias used to be unlawful because of health reasons (according to the mayor). The city is big, and suddenly there are pizzerias everywhere.
We can imagine the city like a matrix with **N**x**N** squares, where every square represents one block of the city. Every pizzeria only delivers pizza to the nearby blocks. Specifically, every pizzeria delivers pizza to every block that is at most **K** blocks away from the pizzeria's block. Distance is determined by the minimum number of blocks that the delivery guy must take if he is going East/West or North/South (moving diagonally is forbidden in Z-city). For example, let's say that **N**=5 and a pizzeria is located at the block (3, 3). It can deliver to a 2 block distance at most. The following map shows where the given pizzeria delivers pizzas.

```
00X00
0XXX0
XXXXX
0XXX0
00X00
```

Mr. Little Z loves pizza, so he wants to move to the block where he can have the greatest selection of pizzas (the block that has the maximum number of pizzerias delivering to it).

Help Mr. Little Z building an API to find that maximum. In other words, if he moves to the block with the greatest selection of pizzas, how many pizzerias will be able to deliver to his block?

INPUT:

The first line of the standard input contains the two numbers **N** and **M**, and both numbers are on the interval [1, 1000]. The number **N** represents the dimension of the city in blocks (the city has **N**x**N** blocks). **M** is the number of pizzerias in the city. The following **M** lines contain information about each pizzeria, given by the three numbers **X**, **Y**, **K**. The numbers **X** and **Y** represent the block where the pizzeria is located, (1 <= **X**, **Y** <= **N**) and the number **K** represents the maximum distance that the given pizzeria's delivery guy will travel to deliver pizza (1 <= **K** <= 1000).

OUTPUT:

Write one number to the standard output that represents the number of pizzerias that deliver pizzas to the block with the greatest selection of pizzas.

Input:

5 2

3 3 2

1 1 2

Output:

2

Explanation:

The first pizzeria delivers pizzas to the following blocks:

00X00
0XXX0
XXXXX
0XXX0
00X00

and the second one:

00000
00000
X0000
XX000
XXX00

So the number of pizzerias that deliver pizzas to each block is:

00100
01110
21111
12110
11200

So the maximum number is 2.

Please complete **all** the following questions:

1. Write down your thoughts on how you would approach this problem briefly.

2. Code down the solution with a language of your choice. Organise your code well.

3. What is the complexity of your approach? Can we do better?

Have some **spare time**? Complete these **extra** questions to showcase your skills.

4. Deploy the solution as a service into AWS or GCP and release the service endpoint

5. Release test for each method and for the application test (use one of the frameworks used for the specific language - pytest, junit, scalatest, etc