Safety Zone

Time Limit: 1 Second
Memory Limit: 512 MB

Self-propelled artilery is known for its high mobility and ability to adapt to various terains, making it into a military weapon of significant value in any army. N self-propelled artilleries have been deployed in various locations which can be represented in a 2D Cartesian coordinate system. However, due to some unknown circumtances, all these artilleries become immobile. The army's chief scientist suspect that the enemy has successfully developed an EMP (electromagnetic pulse) weapon. Apparently, those artilleries are equiped with computers (which can be destroyed by an EMP weapon) to handle its movement.

The commander calls for an emergency situation!

His first command is to pull all N artilleries to the army's safety zone. The army's safety zone is a circle centered at (X_s, Y_s) with radius of R. Each artilery can only be pulled for an **integer** distance. Note that the destination is not necessarily an integer coordinate (only the distance should be integer). Pulling an immobile artillery, of course, is very costly; the cost, however, is proportional to the distance it being pulled. So, calculating the distance is equal to calculating the cost.

The logistic officer of the army needs to calculate the minimum total distance of pulling all artilleries to the safety zone. However, as this is an emergency situation, help him!

Input

Input begins with an integer: T ($1 \leq T \leq 100$) denoting the number of cases.

Each case contains the following input block: Each case begins with three integers: X_s Y_s R ($-10^5 \leq X_s, Y_s \leq 10^5$; $1 \leq R \leq 10^5$) in a line denoting the (X, Y) coordinate of the center of the safety zone and its radius, respectively. The next line contains an integer: N ($1 \leq N \leq 1000$) denoting the number of immobile artilleries. The next N lines each contains two integers: X_i Y_i ($-10^5 \leq X_i, Y_i \leq 10^5$) denoting the position of the ith artillery.

Output

For each case, output in a line "`Case #X: Y`" where `X` is the case number (starts from 1) and `Y` is the output for the respective case.

Examples

```
2
0 0 10
3
0 13
-4 7
10 10
4 5 5
2
13 17
-10 -150
```

output

```
Case #1: 8
Case #2: 161
```

explanation

Case 1: The first artillery is at (0, 13) and can be pulled to (0, 10) for a distance of 3. The second artillery is already inside the safety zone. The third artillery is at (10, 10) can dan be pulled to (6.464, 6.464) for a distance of 5.

Case 2: The first artillery is at (13, 17) and can be pulled to (7, 9) for a distance of 10. The second artiller is at (-10, -150) and can be pulled to (3.583, 0.388) for a distance of 151.

End of Problem