

## C. "Bomb alert"

### Statement

Panic is rising in SkylineCity ! A bomb has just been discovered in the Intergalactical Congress Center !

Fortunately, the police took action early enough and managed to defuse it. They are looking for the culprit, and asked for CatWoman's help to identify the latter.

To do so, the superhero has access to **the bomb's coordinates ( $X_b, Y_b$ )**, location histories from several suspects that have been previously identified by the authorities, and were wearing **GPS devices that transmitted their coordinates once per minute**. She also knows that every suspect was walking at a speed of **at most 6 km/h or 100 m/min**, and that suspects could walk in a straight line freely and in any direction they wanted, without any obstacles slowing them down. **All coordinates are given in meters**.

Knowing all of this, help CatWoman find all of the suspects that might have placed the bomb mentioned earlier.



SkylineCity

### Input

- On the first line, two decimal numbers  $X_b$  et  $Y_b$  separated by spaces represent the **coordinates of the bomb** ( $0 \leq X_b, Y_b \leq 10^6$ );
- On the second line, two integers  $N$  and  $T$  separated by spaces represent the **number of suspects** and the **number of successive positions** recorded by every suspect's tracker every minute ( $1 \leq N \leq 500$  and  $2 \leq T \leq 1000$ );  
Then, for each of the  $N$  suspects:
  - On a first line, a character string  $S$  containing only [a-z : A-Z] letters is the **name** of the suspect;
  - On the  $T$  following lines, two decimal numbers  $X_t$  and  $Y_t$  separated by spaces represent the **suspect's coordinates** at the instant  $t$  ( $0 \leq X_t \leq 10^6$  and  $0 \leq Y_t \leq 10^6$ ).

*Note: Successive positions of each suspect are given in chronological order, starting at  $t=0$  then every minute.*

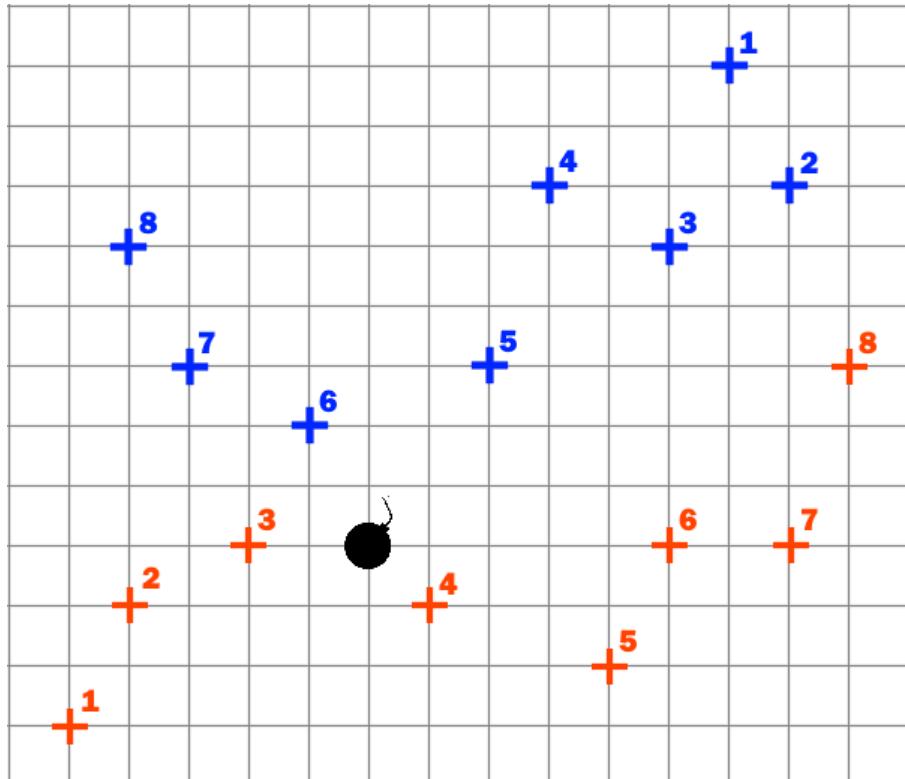
## Output

On a single line, print the list of name of suspects who might have placed the bomb, separated by spaces and given in the same order as in the input.

*Note: At least one suspect was always able to set the bomb.*

## Examples

### Example 1



Magneto is in blue, Fatalis in orange. 1 case = 25m

Figure 1:

# ShaKer 2019 Coding Battle



Input	Output
150 100 2 8 Magneto 300 300 325 250 275 225 225 250 200 175 125 150 75 175 50 225 Fatalis 25 25 50 75 100 100 175 75 250 50 275 100 325 100 350 175	Fatalis

In this first example, only Fatalis can reach the position of the bomb between  $t_3$  and  $t_4$  without exceeding the maximal speed. He is therefore the only suspect who might have set the bomb.

## Example 2

Input	Output
655634.179 386592.920 3 2 Joker 497241.048 914855.941 497186.929 914930.143 Pingouin 655648.377 386554.071 655613.507 386607.796 Sphinx 137820.061 269107.963 137785.257 269065.766	Pingouin

Here, only Pingouin had the opportunity to place the bomb.