11. Target Practice

Program Name: Target.java Input File: target.dat

Don and his fellow police officers are having target practice. They have decided to make a contest out of it, and have come up with the following rules:

- Each person fires 5 shots at a target.
- The center of a target and the position of a shot are each recorded as `(x,y)` coordinates.
- The distance of each of the 5 shots from the center of the target can be determined by using the following general formula for the distance between two points:

$$\sqrt{(x_1 - x_0)^2 + (y_1 - y_0)^2}$$

- The scoring system they have decided on is to take each officer's best 3 shots. An officer's best 3 shots are his 3 shots that are closest to the center of the target.
- The score for a given target and a given officer is determined by adding the distances for those 3 shots together and then rounding the total to the nearest integer.
- The officer with the lowest score for a target wins on that target.
- For each officer the same 5 shots will be considered for each of the different targets.

Given the `x` and `y` coordinates for each officer's 5 shots and the center of various targets determine which officer wins on a target and what their score is. The given data will never result in a tie.

Input

- The first line will contain two integers `m` and `n`. The integer `m` indicates the number of officers who have shot at the targets. The integer `n` indicates the number of different targets.
- The next `m` lines contain the data for the officers.
  - Each line of data for the officers will have the following form:
    `NAME (x1,y1) (x2,y2) (x3,y3) (x4,y4) (x5,y5)`
  - The officer's name will consist of uppercase letters only and will be followed by a single space.
  - Following the name are the locations of the 5 shots in the form `(x,y)` and separated by a single space.
  - All `x` and `y` coordinates will be integers greater than -100 and less than 100.
- The next `n` lines will be the location of the center of the targets.
  - Each line will be of the form `(x,y)` which are the coordinates for the center of that target.
  - All `x` and `y` coordinates will be integers greater than -100 and less than 100.

Output

For each target print out `TARGET <N> <NAME> <SCORE>.`

- `<N>` is the number of the target which corresponds to its order in the input data set, starting at 1.
- `<NAME>` is the name of the officer who had the lowest (best) score on that target given his shots.
- `<SCORE>` is the score for the winning officer for that target rounded to the nearest integer.

Example Input File

```
3 2
PYLE (3,4) (5,4) (0,0) (4,1) (10,11)
ANDY (1,5) (-1,-2) (3,3) (-4,4) (0,1)
DON (0,2) (-2,0) (1,0) (2,3) (-2,1)
(0,0)
(15,-10)
```

Example Output to Screen

```
TARGET 1 DON 5
TARGET 2 PYLE 51
```