# P1: Rat Attack

Baaaam! Another deadly gas bomb explodes in Manhattan's underworld. Rats have taken over the sewerage and the city council is doing everything to get the rat population under control.

As you know, Manhattan is organized in a regular fashion with streets and avenues arranged like a rectangular grid. Waste water drains run beneath the streets in the same arrangement and the rats have always set up their nests below street intersections. The only viable method to extinguish them is to use gas bombs like the one which has just exploded. However, gas bombs are not only dangerous for rats. The skyscrapers above the explosion point have to be evacuated in advance and so the point of rat attack must be chosen very carefully.

The gas bombs used are built by a company called American Catastrophe Management (ACM) and they are sold under the heading of "smart rat gas". They are smart because —when fired— the gas spreads in a rectangular fashion through the under street canals. The strength of a gas bomb is given by a number $d$ which specifies the rectangular "radius" of the gas diffusion area. For example, the figure shows what happens when a bomb with $d = 1$ explodes.

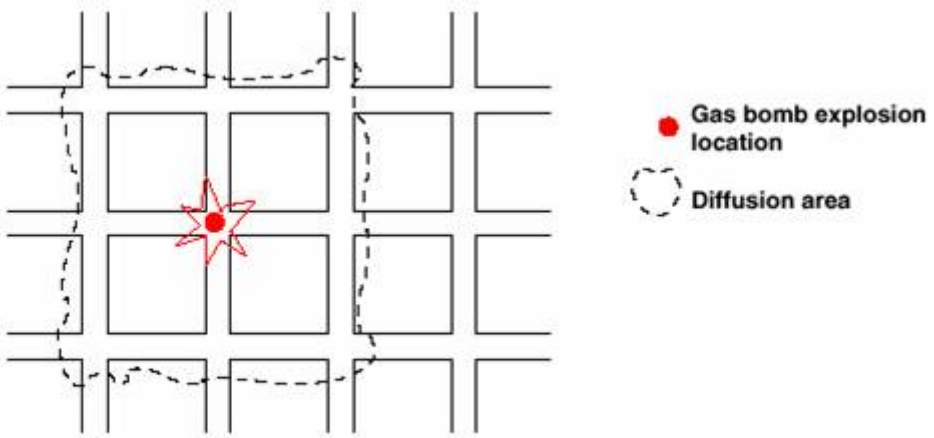


Fig: Rectangular diffusion area of gas bomb

The area of interest consists of a discrete grid of $1025 \times 1025$ fields. Rat exterminator scouts have given a detailed report on where rat populations of different sizes have built their nests. You are given a gas bomb with strength $d$ and your task is to find an explosion location for this gas bomb which extinguishes the largest number of rats.

The best position is determined by the following criteria:

- The sum of all rat population sizes within the diffusion area of the gas bomb (given by $d$) is maximal.
- If there is more than one of these best positions then the location with the "minimal" position will be chosen. Positions are ordered first by their $x$ coordinate and second by their $y$ coordinate.

Formally, given a location $(x_1, y_1)$ on the grid, a point $(x_2, y_2)$ is within the diffusion area of a gas bomb with strength $d$ if the following equation holds:

$$\max(abs(x_2 - x_1), abs(y_2 - y_1)) \leq d$$

## Input

The first line contains the number of scenarios in the input.

For each scenario the first line contains the strength $d$ of the gas bomb in the scenario ($1 \leq d \leq 50$). The second line contains the number $n$ ($1 \leq n \leq 20000$) of rat populations. Then for every rat population follows a line containing three integers separated by spaces for the position $(x, y)$ and "size" $i$ of the population ($1 \leq i \leq 255$). It is guaranteed that position coordinates are valid (i.e., in the range between 0 and 1024) and no position is given more than once.

## Output

For every problem print a line containing the $x$ and $y$ coordinate of the chosen location for the gas bomb, followed by the sum of the rat population sizes which will be extinguished. The three numbers must be separated by a space.

## Sample Input

```
1
1
2
4 4 10
6 6 20
```

## Sample Output

```
5 5 30
```

# P2: The Sultan's Successors

The Sultan of Nubia has no children, so she has decided that the country will be split into up to $k$ separate parts on her death and each part will be inherited by whoever performs best at some test. It is possible for any individual to inherit more than one or indeed all of the portions. To ensure that only highly intelligent people eventually become her successors, the Sultan has devised an ingenious test. In a large hall filled with the splash of fountains and the delicate scent of incense have been placed $k$ chessboards. Each chessboard has numbers in the range 1 to 99 written on each square and is supplied with 8 jewelled chess queens. The task facing each potential successor is to place the 8 queens on the chess board in such a way that no queen threatens another one, and so that the numbers on the squares thus selected sum to a number at least as high as one already chosen by the Sultan. (For those unfamiliar with the rules of chess, this implies that each row and column of the board contains exactly one queen, and each diagonal contains no more than one.)

Write a program that will read in the number and details of the chessboards and determine the highest scores possible for each board under these conditions. (You know that the Sultan is both a good chess player and a good mathematician and you suspect that her score is the best attainable.)

## Input

Input will consist of $k$ (the number of boards), on a line by itself, followed by $k$ sets of 64 numbers, each set consisting of eight lines of eight numbers. Each number will be a positive integer less than 100. There will never be more than 20 boards.

## Output

Output will consist of $k$ numbers consisting of your $k$ scores, each score on a line by itself and right justified in a field 5 characters wide.

## Sample Input

```
1
 1  2  3  4  5  6  7  8
 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48
48 50 51 52 53 54 55 56
57 58 59 60 61 62 63 64
```

## Sample Output

```
  260
```