"Marriage, in life, is like a duel in the midst of the battle"

`Edmond About`

Daltons (Daida, Alhar, Tara, and Reyton) love playing games. One of their favorite games is 'Battle II'. In order to play this game, first, one of them is chosen as a problem-setter. The problem-setter starts drawing some bombs on a piece of paper (each bomb is a circle: has a center and a radius). She then associates to each bomb a destruction range. There are three rules defined in this game:

1. If a bomb explodes, all the bombs in its destruction range will also explode. A bomb b_1 is in destruction range of another bomb b_2 if distance of b_2 from the perimeter of b_1 is less than the range of b_1. (i.e. $b_2.range + b_1.radius + b_2.radius \geq Distance(b_1.center, b_2.center)$)
2. A bomb may explode due to either being affected by explosion of another bomb according to the first rule or manually being fired.
3. Firing a bomb manually has a cost which is equal to the range of it.

She finally gives the configuration of the bombs to the others and asks them to find a sequence of bombs to fire which should satisfy the following conditions:

1. All the bombs should be exploded as a result of firing and explosion of the bombs in this sequence.
2. The i-th bomb in the sequence should not result explosion of the j-th bomb where $j > i$.
3. The **average** cost of firing the bombs that are in the sequence must be minimum.

You should help the players find the solution to this problem by writing a program which is able to find such a sequence given the specifications and configuration of the bombs in the paper.

Input

The first line of input gives the number of cases, N. N test cases will follow. Each one starts with a line containing the number of bombs ($0 < n \leq 300$). Each of the next n lines contains four integers X_i, Y_i, R_i, E_i, meaning that the i-th bomb is located at (X_i, Y_i), has a radius of R_i, and has a range of E_i.

There will be a blank line after each block of test case.

Output

For each test case, output the line containing '`Case #`x`:`', followed by list of bombs in the order that should be fired, seperated by a single space. Follow the output format used in sample output. If there are more than one solution, any of them is acceptable.

Sample Input

```
1
3
4 7 2 2
8 5 1 0
3 -3 1 1
```

Sample Output

```
Case #1: 1 0 2
```