Problem J. Just Mining

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1.5 seconds
Memory limit:	1024 megabytes

The dwarfs have identified multiple new gold deposits at the bottom floor of their Deep Mine. The locations of the deposits (on the floor, i.e., plane) are given by a multiset of points $P = \{p_1, \ldots, p_m\}$, and each point has a corresponding (estimated) value, given by v_i. Mining these deposits is not so easy however, as too much drilling in certain areas might cause instability and risk collapsing of the whole mine. Together, the guilds of miners, geologists, and engineers, managed to identify these hazardous areas: They form a multiset of circles (on a plane) $C = \{c_1, \ldots, c_n\}$. Each circle c_i has an associated maximal capacity f_i, which is the maximum number of deposits contained within it that may be (safely) extracted.

Your task is to choose a subset of points $A \subseteq P$ maximizing the total (estimated) value of selected points such that no capacity is exceeded. Formally, for any $i \in \{1, \ldots, n\}$, let P_i be the multiset of points from P contained in the i-th circle (i.e., lying either strictly inside c_i or on its boundary). Then A should satisfy $|A \cap P_i| \leq f_i$ for all i.

Moreover it is guaranteed that C can be divided into two disjoint *laminar families* C_1, C_2. A *laminar family* of circles is defined here as a set of circles in which each pair of circles is either disjoint or contained in one another. That means that no two circles in one laminar family have a point in common.

Input

The first line of the input contains two integers N and M, the number of circles and points, respectively.

Each of the next N lines describes one of the circles. Such description contains four integers x_i, y_i, r_i, f_i describing in order: coordinates of the center of i-th circle, its radius, and capacity.

Each of the next M lines describes one of the points. Such description contains three integers x_i, y_i, v_i describing in order: coordinates of the point and its value. Multiple points may have the same coordinates.

Limits $1 \leq N, M \leq 300$, $-10^9 \leq x_i, y_i \leq 10^9$, $1 \leq r_i, v_i \leq 10^9$, $1 \leq f_i \leq 300$.

Output

As an output print three lines.

The first line should contain one integer – the maximum possible total value of points in multiset A.

The second line also should contain one integer – the number of points in a multiset A obtaining such value.

The third and final line should contain numbers of points in such a multiset. The points are numbered according to their order in the input, starting from 1. The points can be given in any order, but each of them must appear at most once. If there are many such sets you can print any of them.

Examples

standard input	standard output
5 5 3 5 2 2 4 10 4 2 5 10 2 3 5 5 5 2 14 4 2 3 6 11 3 3 8 5 4 6 20 9 5 4 14 5 1	28 4 1 3 4 5
3 2 4 7 2 2 4 8 1 1 8 7 1 1 4 7 5 4 8 4	5 1 1