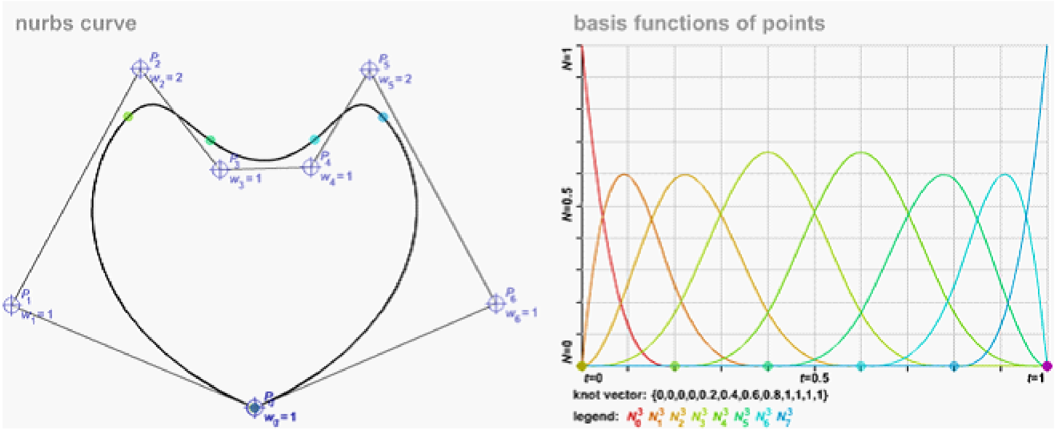
NURBS Curves are lovely and magical, because you can make a lot of interesting shapes from it:



Given two NURBS curves, your task is the find all their intersection points.

If you're not familiar with NURBS curves, here we go:
NURBS is a parametric curve which takes the following form:

$$C(u) = \frac{\sum_{i=1}^{n} w_i N_{i,k}(u) P_i}{\sum_{i=1}^{n} w_i N_{i,k}(u)}$$

Where u is the parameter, n is the number of control points, k is the degree of the curve, P_i and w_i are the location and weight of the i-th control point.

The basis function $N_{i,k}$ is defined recursively below:

$$N_{i,k}(u) = \frac{u - t_i}{t_{i+k} - t_i} N_{i,k-1}(u) + \frac{t_{i+k+1} - u}{t_{i+k+1} - t_{i+1}} N_{i+1,k-1}(u)$$

$$N_{i,0}(u) = \begin{cases} 1 & \text{if} \quad t_i \le u < t_{i+1} \\ 0 & \text{else} \end{cases}$$

Where t_i is the i-th knot value. **In the formula above, 0/0 is deemed to zero.**

To understand the formulae above, here are some brief explanations of the parameters:

Degree. The *degree* is a positive integer. NURBS lines and polylines are usually degree 1 (linear curve), NURBS circles are degree 2 (quadratic curve), and most free-form curves are degree 3 or 5.

Control Points. The control points are a list of at least *degree*+1 points. One of easiest ways to change the shape of a NURBS curve is to move its control points (You can try it out: `http://geometrie.foretnik`
Each control point has an associated number called weight. In this problem, weights are positive numbers. If you increase the weight of a control point, the curve is pulled toward that control point and away from other control points.

Knots. The knot vector is defined as $U = [t_1, t_2, \ldots, t_m]$. The relation between the number of knots m, the degree k, and the number of control points n is given by $m = n+k+1$ (In OpenNURBS/Rhinoceros website, $m = n + k - 1$. The algorithm presented here is referred as "some older algorithms". When solving this problem, please stick to this problem description).

The sequence of knots in the knot vector U is assumed to be non-decreasing, i.e. $t_i \le t_{i+1}$. Each successive pair of knots represents an interval $[t_i, t_{i+1})$ for the parameter values to calculate a segment of a shape. **Thus, the whole NURBS curve is defined within** $[t_1, t_m)$. The number of times a knot value is duplicated is called the knot's *multiplicity*, which should be no more than the *degree*. Duplicate knot values in the middle of the knot list make a NURBS curve less smooth.

If you're still puzzled after reading all the information above, suppose we're moving u from t_1 towards t_m (but never reach t_m), then the point $C(u)$ will move long the NURBS curve we define.

Input

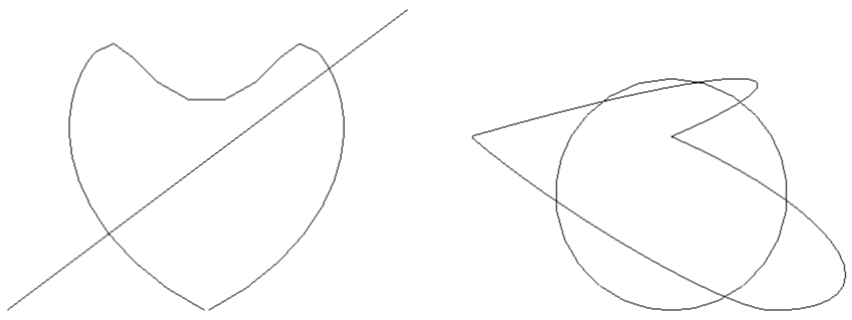
The first line contains the number of test cases T ($T \le 25$). Each test case contains two parts, one for each NURBS curve. Each curve begins with two integers n and m ($2 \le n \le 20$), the number of control points and the number of knots. Each of the next n lines contains three real numbers x, y, w ($0 \le x, y \le 10$, $0 < w \le 10$), describing a control point (x, y) with weight w. The next line contains m real numbers, describing the knot vector. The first knot value is always 0 and the last one is always 1. The degree of both NURBS curves will be 1, 2, 3 or 5.

Output

For each test case, print the number of intersection points in the first line, then each point is printed in a following line. The coordinates should be rounded to three decimal places, and points should be sorted lexicographically (i.e. points with smaller x-coordinate comes earlier). Inputs are carefully designed so that the minimal difference of x-coordinate between any two intersection points will be at least 0.005 (otherwise the sorting result might be affected by numerical stability).

Print a blank line after each test case.

Note: The pictures of the samples are shown below:



Sample Input

```
2
8 12
2   0 1
0   1 1
1   3 2
1.5 2 1
2.5 2 1
3   3 2
4   1 1
2   0 1
0 0 0 0 0.2 0.4 0.6 0.8 1 1 1 1
2 4
0 0 1
4 3 1
0 0 1 1
7 10
1 1.732 1
0 0 0.5
2 0 1
4 0 0.5
3 1.732 1
2 3.464 0.5
1 1.732 1
0 0 0 0.333 0.333 0.667 0.667 1 1 1
7 10
0 1.732 1
2 0 0.5
3 0 1
6 0 0.5
2 1.732 1
6 3.464 0.5
0 1.732 1
0 0 0 0.333 0.333 0.667 0.667 1 1 1
```

Sample Output

```
Case 1: 2
(1.029, 0.772)
(3.221, 2.416)

Case 2: 6
(0.847, 1.092)
(1.307, 2.078)
(2.283, 2.274)
(2.538, 0.133)
(2.693, 2.078)
(3.153, 1.092)
```