

Dividing the Points

Input file:	standard input
Output file:	standard output
Time limit:	2 seconds
Memory limit:	512 megabytes

In Spectral Clustering, data points are represented as vertices of an edge-weighted undirected graph G . Let n and m be the number of vertices and edges in G respectively. The vertices are numbered from 1 to n . Large edge weights mean that the adjacent vertices are very similar; small weights imply dissimilarity. Clustering can be viewed as partitioning vertices into two non-empty disjoint groups A and B such that

$$Ncut(A, B) = \frac{cut(A, B)}{\sum_{x \in A} d_x} + \frac{cut(A, B)}{\sum_{x \in B} d_x}$$

is minimized, where $cut(A, B)$ is the total edge weight of edges connecting vertices from different groups, and d_x is the total edge weight of edges adjacent to the x -th vertex.

In this problem, a graph G with n vertices and m edges will be given, where each vertex corresponds to a data point on the 2D plane. You need to find a straight line to divide these n points into two non-empty groups A and B such that $Ncut(A, B)$ is minimized. Note that the straight line shouldn't pass through any data points.

Input

The input contains multiple cases. The first line of the input contains a single integer T ($1 \leq T \leq 200$), the number of cases.

For each case, the first line of the input contains two integers n and m ($2 \leq n \leq 1\,500$, $n-1 \leq m \leq 5\,000$), denoting the number of vertices and the number of edges.

For the next n lines, the i -th line contains two integers x_i and y_i ($1 \leq i \leq n$, $0 \leq x_i, y_i \leq 10\,000$), denoting a data point at (x_i, y_i) . It is guaranteed that no two points coincide.

For the next m lines, the i -th line contains three integers u_i, v_i and w_i ($1 \leq i \leq m$, $1 \leq u_i, v_i \leq n$, $u_i \neq v_i$, $1 \leq w_i \leq 100$), denoting a bidirectional edge connecting the u_i -th vertex and the v_i -th vertex. It is guaranteed that there won't be multiple edges between the same pair of vertices, and it is also guaranteed that the graph is connected.

It is guaranteed that the sum of n over all cases does not exceed 1 500, and the sum of m over all cases does not exceed 5 000.

Output

For each case, print a single line containing a single irreducible fraction of the form $\mathbf{p/q}$, denoting the minimum value of $Ncut(A, B)$. Formally, your answer must satisfy $p, q > 0$ and $\gcd(p, q) = 1$, where $\gcd(a, b)$ denotes the greatest common divisor of a and b .

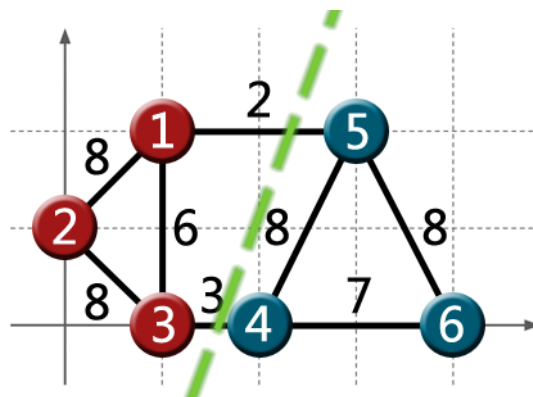
Example

standard input	standard output
1	500/2499
6 8	
1 2	
0 1	
1 0	
2 0	
3 2	
4 0	
1 2 8	
1 3 6	
2 3 8	
1 5 2	
3 4 3	
5 4 8	
5 6 8	
4 6 7	

Note

The following is an optimal solution for the sample case, which is illustrated below.

- $A = \{1, 2, 3\}$, $B = \{4, 5, 6\}$.
- $cut(A, B) = 2 + 3 = 5$.
- $\sum_{x \in A} d_x = d_1 + d_2 + d_3 = 16 + 16 + 17 = 49$.
- $\sum_{x \in B} d_x = d_4 + d_5 + d_6 = 18 + 18 + 15 = 51$.
- $Ncut(A, B) = \frac{5}{49} + \frac{5}{51} = \frac{500}{2499}$.



An illustration of the sample case.