

Dynamic Convex Hull

Input file: **standard input**
Output file: **standard output**
Time limit: 10 seconds
Memory limit: 512 megabytes

There are N points.

You will be given M queries. Each query will give you several points. You must answer the area of the convex hull of these points merged with the initial N points.

Input

This problem contains multiple test cases.

The first line contains an integer T ($1 \leq T \leq 10^5$) — the number of test cases.

For each test case:

The first line contains an integer N ($3 \leq N \leq 2 \times 10^5$) — the number of the initial points.

Then N lines follow. The i -th of them contains two integers x_i, y_i ($|x_i|, |y_i| \leq 10^9$) — the coordinate of the i -th initial point.

The next line contains an integer M ($1 \leq M \leq 2 \times 10^5$) — the number of queries.

Then M queries follow. For each query: the first line contains an integer k ($1 \leq k \leq 10$) — the number of points in this query; then k lines follow, the i -th of which contains two integers x_i, y_i ($|x_i|, |y_i| \leq 10^9$) — the coordinate of the i -th point in this query.

It is guaranteed that in all test cases, the sum of N is no more than 10^6 , and the sum of k is no more than 10^6 .

Output

For each query in each test case, output $2 \times S$ in one line. S indicates the area in this query.

It can be proved that $2 \times S$ is always an integer.

Example

standard input	standard output
1	39
8	
-1 2	
-2 1	
-2 -1	
-1 -2	
1 -2	
2 -1	
2 1	
1 2	
1	
3	
0 3	
0 4	
1 5	