Boxes

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

Given n points in three-dimensional space, the task is to partition them into some mutually disjoint subsets $S_1, S_2, \ldots, S_k$. For any $i \neq j$, the partition must satisfy at least one of the following three conditions:

1. $\text{volume}(\text{conv}(S_i) \cap \text{conv}(S_j)) = 0$,
2. $\text{conv}(S_i) \subseteq \text{conv}(S_j)$,
3. $\text{conv}(S_j) \subseteq \text{conv}(S_i)$.

Here, the convex hull $\text{conv}(S_i)$ of a subset S_i is defined as:

$$\text{conv}(S_i) = \left\{ \sum_{p \in S_i} \lambda_p p \mid \lambda_p \geq 0, \sum_{p \in S_i} \lambda_p = 1 \right\}.$$

The goal is to maximize

$$6 \sum_{i=1}^{k} \text{volume}(\text{conv}(S_i)).$$

The challenge is to find the optimal partition that achieves the maximum total volume of the convex hulls while ensuring these constraints are met.

Input

There are multiple test cases in a single test file. The first line of the input contains a single integer T ($1 \leq T \leq 3000$), indicating the number of test cases.

For each test case, the first line of the input contains one integer n ($4 \leq n \leq 3000$) — the number of points. The following n lines each contain three integers x_i, y_i, and z_i ($0 \leq x_i, y_i, z_i \leq 10^6$), representing the coordinates of point p_i in three-dimensional space.

It's guaranteed that no four points are coplanar, and the sum of n over all test cases does not exceed 3000.

Output

For each test case, output a single integer — the maximum sum of volumes of the convex hulls under the given conditions, multiplied by 6. It can be proven that this value is always an integer.

Example

standard input	standard output
2 4 0 0 1 0 0 2 0 1 1 1 1 1 10 2 6 3 2 9 0 2 1 0 3 7 3 0 5 6 10 9 2 4 4 2 8 5 2 4 6 9 6 7 5	1 943