

The Whole World

Input file: *standard input*
Output file: *standard output*
Time limit: 8 seconds
Memory limit: 512 mebibytes

We will call a polynomial with real coefficients *whole* if it takes integer values at all integer points.

You are given n pairs of integers (x_i, y_i) . You should find the minimal possible degree of a *whole* polynomial f such that $f(x_i) = y_i$ for $i = 1, 2, \dots, n$.

In this problem, consider the polynomial $f(x) = 0$ to have degree 0.

Input

The first line of the input contains an integer T ($1 \leq T \leq 100$) denoting the number of test cases.

Each test case starts with a line containing an integer n ($1 \leq n \leq 30$) denoting the number of points. Then n lines follow, each one containing a pair of integers (x_i, y_i) ($1 \leq x_i \leq 30, -10^9 \leq y_i \leq 10^9$). It is guaranteed that all x_i are pairwise distinct.

Output

For each test case, print a line with a single integer: the answer for that test case.

Example

| <i>standard input</i> | <i>standard output</i> |
|-----------------------|------------------------|
| 2 | 3 |
| 2 | 1 |
| 1 0 | |
| 4 1 | |
| 3 | |
| 1 1 | |
| 4 4 | |
| 6 6 | |