Problem I. Longest Increasing Subsequence

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

Bobo is tired of all kinds of hard LIS (Longest Increasing Subsequence) problems, so he decides to make himself some easier one.

Bobo wants to build a sequence of integers $\{x_1, x_2, \ldots, x_n\}$, where x_i lies in the range $[a_i, b_i]$ (that is, $a_i \le x_i \le b_i$).

Let LIS(X) be the length of longest increasing subsequence of $\{x_1, x_2, \ldots, x_n\}$. It's clear that $1 \le \text{LIS}(X) \le n$. Bobo would like to find g_k which is the number of sequences whose LIS(X) $= k$ for $k = 1, 2, \ldots, n$.

Note that a sequence $\{i_1, i_2, \ldots, i_k\}$ is a increasing sequence of $\{a_1, a_2, \ldots, a_n\}$ only if:

- $1 \le i_1 < i_2 < \cdots < i_k \le n$
- $a_{i_1} < a_{i_2} < \cdots < a_{i_k}$

Input

The first line contains an integer n ($1 \le n \le 5$).

The i-th of the following n lines contains 2 integers a_i, b_i ($1 \le a_i \le b_i \le 10^3$).

Output

n integers $g_1, g_2, \ldots, g_n$.

Examples

standard input	standard output
2 1 2 1 2	3 1
3 1 1 2 2 3 3	0 0 1