Star Rail

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	256 megabytes

In the far reaches of the universe, there is a special train called the Astral Express. The Astral Express, built by the renowned engineer, Aeon Akivili the Trailblazer, has the unique ability to travel throughout the galaxy using a network of star rails.

The universe is comprised of n stars, which can be conceptualized as n points on a 2D plane. The Astral Express begins its journey at a chosen star, referred to as the i-th star.

Pom-Pom, the conductor of the Astral Express, has an important task. Pom-Pom needs to draw a straight line that divides the remaining $n-1$ stars into two sets (possibly empty). This line must avoid intersecting any of the remaining $n-1$ stars, although passing through the i-th star is permissible. Pom-Pom will then choose one of these sets to visit, provided it contains exactly k stars. If there is no set that meets this condition, Pom-Pom will not select any. The number of different sets that can be selected is denoted as $A_{i,k}$.

Pom-Pom is curious about the matrix A formed by elements $A_{i,k}$. Your task is to help him determine this matrix. In other words, for each possible i ($1 \le i \le n$) and k ($1 \le k \le n-1$), you need to calculate the corresponding $A_{i,k}$, which represents the number of selectable sets when the Astral Express starts at the i-th star and the size of the set is k.

Input

The first line contains a single integer n ($2 \le n \le 2 \times 10^3$), representing the total number of stars in the universe.

Each of the next n lines contains two integers x_i, y_i ($0 \le x_i, y_i \le 10^9$), representing the coordinates of the i-th star in the universe. It is guaranteed that each star has a unique position.

Output

Output a matrix with n rows and $n-1$ columns, representing the matrix A. The element at the i-th row and the k-th column should denote $A_{i,k}$, which represents the number of selectable sets when the Astral Express starts at the i-th star and the size of set is k.

Examples

standard input	standard output
3 0 0 0 1 1 0	2 1 2 1 2 1
5 0 0 0 4 4 0 4 4 1 2	4 4 4 1 4 4 4 1 3 6 3 1 3 6 3 1 4 4 4 1
5 0 0 2 0 0 2 2 2 1 1	3 4 3 1 3 4 3 1 3 4 3 1 3 4 3 1 4 4 4 1