Gameday Restaurants (200 points)

Introduction

It's Game Day, and the places to watch the VT vs UVA game are packed! You and the rest of the Hokies are trying to figure out if there are enough restaurants for all of the Hokies' preferences.

We Hokies have come up with a ranking system for the restaurants which are showing the game: each restaurant is assigned a level R, and each Hokie has settled on a minimum level H. A Hokie will only go to a restaurant whose level R is greater than or equal to their minimum level H.

Unfortunately, there is limited space at the restaurants, so it may not be possible to satisfy everyone's preferences. We want to calculate how much additional capacity would be needed at each level to ensure that all Hokies have a great football viewing experience.

Input Specifications

The first line will contain an integer L, representing the number of distinct restaurant levels. (1 < L < 100)

The next L lines will provide information about each level in descending order of the level (the first level is higher than the second level, and so on). Each line contains two integers C and H.

C represents total current capacity at that restaurant level. (0 ≤ C ≤ 10^10).

H represents the number of Hokies who have chosen this level as their minimum level. (0 ≤ H ≤ 100)

Output Specifications

In the same line, output the additional capacity needed at each distinct restaurant level in order to satisfy all Hokies' preferences, starting with the highest restaurant level and going down to the lowest.

If there are multiple solutions, output the one which comes lexicographically first (minimize the additional capacity needed at the highest level, then the second highest level, etc.)

Sample Input/Output

Input

```
7
1 2
2 3
3 4
4 5
5 6
6 7
7 8
```

Output

```
1 1 1 1 1 1 1
```

Explanation

Line 1 indicates that there are 7 levels.

This implies that Lines 2 - 8 provide capacity and number of Hokies who have chosen this level as their minimum level.

The restaurant capacity (C) at level 1 is 1 and the number of Hokies (H) who have chosen this level as their minimum level is 2. At level 2, C is 2 and H is 3.

Since restaurant capacity at level 5 is 5, 5 students with a chosen level ≤ 5 can be served at restaurants at level 5.

Student demand at level 5 is 6. This implies this demand can be met at restaurants at level ≥ 5.

The required output is

1 1 1 1 1 1 1

An alternative solution would have been 7 0 0 0 0 0 0 since the additional capacity at level 7 also satisifies the demand at lower levels. However, the required solution minimizes additionally needed capacity at higher levels.