Problem H. Coins

Input file:	*standard input*
Output file:	*standard output*
Time limit:	5 seconds
Memory limit:	512 mebibytes

There are n groups of coins, and the i-th group contains two coins valued as a_i and b_i. Now you want to pick exactly k coins out of them. However, there is a restriction: you can not pick the second coin (the one valued as b_i) in the i-th group without picking the other one in the same group. In other words, in the i-th group, you can:

- pick none of the two coins;
- pick only the first one valued as a_i; or
- pick both of them.

Let $f(k)$ be the maximum total value if we pick exactly k coins.

Find the values $f(1), f(2), \ldots, f(2n)$.

Input

The input contains several test cases, and the first line contains a single integer T ($1 \le T \le 90$), the number of test cases.

For each test case, the first line contains an integer n ($1 \le n \le 100\,000$), indicating the number of coin groups.

Each of the following n lines contains two integers a_i and b_i ($1 \le a_i, b_i \le 10\,000$) indicating the coin values in that group.

It is guaranteed that the sum of n in all test cases does not exceed $2\,100\,000$.

Output

For each test case, just output $2n$ integers on a single line representing $f(1), f(2), \ldots, f(2n)$. Separate consecutive integers by single spaces.

Example

standard input	standard output
2 3 1 2 1 4 4 2 2 1 3 3 2	4 6 9 11 12 14 3 5 7 9