Problem D. Fibonacci Partition

Input file:	*standard input*
Output file:	*standard output*
Time limit:	10 seconds
Memory limit:	256 mebibytes

The sequence of Fibonacci numbers is defined as:

$$F_n = \begin{cases} 1 & n = 1 \\ 2 & n = 2 \\ F_{n-1} + F_{n-2} & \text{otherwise} \end{cases}$$

The first few elements of the sequence are $1, 2, 3, 5, 8, 13, 21, 34, \ldots$

For a given positive integer n, let $partition(n)$ be the maximum value of m such that n can be expressed as a sum of m distinct Fibonacci numbers. For example, $partition(1) = partition(2) = 1$, $partition(3) = partition(4) = partition(5) = partition(7) = 2$, $partition(6) = partition(8) = 3$.

Chiaki has an integer X which initially equals to 0. She will perform some operations on X: the i-th operation will add $a_i \cdot F_{b_i}$ to X.

After each operation, Chiaki would like to know the value of $partition(X)$. It is guaranteed that, after each operation, X will be a positive integer.

Input

There are multiple test cases. The first line of input contains an integer T, indicating the number of test cases. For each test case:

The first line contains an integer n ($1 \le n \le 5 \cdot 10^4$): the number of operations.

Each of the next n lines contains two integers a_i and b_i ($1 \le |a_i|, b_i \le 10^9$).

It is guaranteed that the sum of n for all test cases will not exceed $5 \cdot 10^4$.

Output

For each test case, output n integers: the i-th integer denotes the value of $partition(X)$ after the i-th operation.

Example

standard input	standard output
1 10 1 1 1 1 1 2 1 3 1 4 1 5 1 6 1 7 1 8 -2 5	1 1 2 2 3 3 4 4 5 6

Note

The value of X after each operation in the sample: $1, 2, 4, 7, 12, 20, 33, 54, 88, 72$.