



Time Limit: 1sec Memory Limit:256MB

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1000. Huffman coding

Total: 323 Accepted: 73

Description

In computer science and information theory, a Huffman code is an optimal prefix code algorithm.

In this exercise, please use Huffman coding to encode a given data.

You should output the number of bits, denoted as B(T), to encode the data:

 $B(T) = \sum f(c) d_T(c)$,

where f(c) is the frequency of character c, and $d_T(c)$ is be the depth of character c's leaf in the tree T.

Input

The first line is the number of characters *n*.

The following n lines, each line gives the character c and its frequency f(c).

Output

Output a single number B(T).

Sample Input Copy

5 0 5

1 4

2 6

3 2

4 3

Sample Output

Сору

45

Hint

0: 01

1:00

2: 11

3: 100

4: 101

Problem Source: Exercise 2

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