

# Problem F

## Lighting System Design

**Input:** Standard Input  
**Output:** Standard Output

You are given the task to design a lighting system for a huge conference hall. After doing a lot of calculation & sketching, you have figured out the requirements for an energy-efficient design that can properly illuminate the entire hall. According to your design, you need lamps of  $n$  different power ratings. For some strange current regulation method, all the lamps need to be fed with the same amount of current. So, each category of lamp has a corresponding voltage rating. Now, you know the number of lamps & cost of every single unit of lamp for each category. But the problem is, you are to buy equivalent voltage sources for all the lamp categories. You can buy a single voltage source for each category (Each source is capable of supplying to infinite number of lamps of its voltage rating.) & complete the design. But the accounts section of your company soon figures out that they might be able to reduce the total system cost by eliminating some of the voltage sources & replacing the lamps of that category with higher rating lamps. Certainly you can never replace a lamp by a lower rating lamp as some portion of the hall might not be illuminated then. You are more concerned about money-saving than energy-saving. Find the minimum possible cost to design the system.

### Input

Each case in the input begins with  $n$  ( $1 \leq n \leq 1000$ ), denoting the number of categories. Each of the following  $n$  lines describes a category. A category is described by 4 integers -  $V$  ( $1 \leq V \leq 132000$ ), the voltage rating,  $K$  ( $1 \leq K \leq 1000$ ), the cost of a voltage source of this rating,  $C$  ( $1 \leq C \leq 10$ ), the cost of a lamp of this rating &  $L$  ( $1 \leq L \leq 100$ ), the number of lamps required in this category. The input terminates with a test case where  $n = 0$ . This case should not be processed.

### Output

For each test case, print the minimum possible cost to design the system.

Sample Input	Output for Sample Input
3 100 500 10 20 120 600 8 16 220 400 7 18 0	778

---

Problemsetter: Mohammad Mahmudur Rahman  
Special Thanks to: Manzurur Rahman Khan