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Exercise Sheet ACM Week I

Algorithms Lab

Exercise 2 – *Shelves*

Description The computer science library is in the process of being moved to a new building. As an intern in the library it's your task to help the head librarian with the planning. From the floor plan it's pretty clear that some walls should be filled with as much shelf-space as possible. However, it's not entirely clear just how much of the wall you can optimally cover. The library can order two kinds of shelves which have different lengths. The larger of the two is slightly cheaper per unit of length, so you prefer them to the smaller ones. However cost is secondary and as a very first priority you wish to minimize the empty space on the wall. You think to yourself that this optimization problem should easily be solved with a clever computer program.

Input The first line of the input contains the number $N \leq 1000$ of test cases. Then N lines follow. Each line is a test-case and contains 3 strictly positive integers ℓ, m and n. The number $\ell < 2^{31}$ denotes the length of the wall, while m and n denote the length of the two shelf types, $m \leq n < 2^{31}$.

Output For each test case you should output the optimal number of shelves of length m and n such that the sum of their lengths is at most ℓ and as close to ℓ as possible. If there are multiple solutions you should prefer the one which uses the largest amount of shelves of length n.

For each test case output one line containing 3 integers separated by a single space. The first two integers are the number of shelves of length m and n, the third is the amount of wall that remains uncovered in an optimal solution.

Sample input

```
3
24 3 5
29 3 9
42 4 5
```

Sample output

```
3 3 0
0 3 2
3 6 0
```