Problem 7: Unwrapped - A CLASS-BASED PROBLEM

Overview

The Food Network TV show, “Unwrapped”, gave viewers a behind-the-scenes look at how their favorite foods were manufactured (and wrapped). One of the big lessons of this show was that the same facilities were often used for different foods even within a single day, obviously using different ingredients (or at least proportions) each time.

Problem

In this problem you will simulate such a facility for one “day”. On any given day, the factory will try to manufacture a series of products. Each product will have a list of ingredients with quantities. Assuming that the inventory has enough of each ingredient on hand, you will manufacture a batch of that product. Should a product need more ingredients than are on hand, you will place a “reorder” for the missing ingredients; you are to order a full complement of the ingredient, i.e. ensure that your reorder would be sufficient even if there were none of your ingredient on hand. You will then move on to the next product (moving this product to the end of the day’s task list) and try to manufacture that. If there is only one product remaining in the task list and it is lacking one or more ingredients, then that product will be skipped for the day although all necessary reordering of ingredients should be done.

At the end of the shift, you will issue a report detailing a total of what was manufactured (note that the same product may be manufactured more than once – or even via different recipes that use different amounts of ingredients and/or have different yields), the inventory status of ingredients used that day (including those from any “last” product that was skipped), AND a note, only if appropriate, regarding what product was not produced.

Nomenclature note: “ingredient” refers to a raw material used to manufacture a “product” which is always made up of two or more ingredients.

Input

The input to this problem is simply a single line of text naming the facility (a string of lower case letters of length 4 to 8 inclusive) and an integer (1 to 365 inclusive) indicating the day of operation.
Output

The output is a two- or three-line report formatted as in the examples. Note that both the products produced list and the inventory list are presented in alphabetical order of product/ingredient names. [Do not worry if either of the first two lines ‘word wraps’ on the screen or in the examples below. What matters is that the entire product (or inventory) report is on a single line terminated by a newline character.] Example 4 shows what to do if nothing is produced. Example 2 shows a case where all of the recipes in the task list were actually completed.

About the classes

You must use the Recipe, Inventory and Factory classes in your solution to this problem. Otherwise, you will not be able to access the list of products desired, the recipes for said product or the factory inventory. Note that by the very nature of the problem, you will have only one Factory object which in turn will generate only one Inventory object. There will, of course, be many Recipe objects in most simulations. All of the necessary methods are provided for you (although you may not need to use everything that is provided). Be sure to pay close attention to documentation of the class, including the pre- and post-conditions for all of the methods.

Example 1

Input

olean 87

Output (There are only three lines here – word wrap and font size notwithstanding)

Completed: 1 All-Day Sucker, 48 Candy Cane, 180 Caramel Popcorn, 180 Cheese Popcorn, 210 Chocolate Chip Cookie, 1000 Chocolate Milk, 200 Macaroon

On hand: 140 baking powder, 39 brown sugar, 53 butter, 27 cheese, 534 chocolate chips, 2 cocoa powder, 9 coconut, 40 corn syrup, 57 egg, 8 egg white, 662 flour, 12 milk, 22 mint, 249 popcorn, 55 sugar, 72 vanilla

Not completed: 180 Caramel Popcorn

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Example 2

Input

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Output (There are only two lines here – word wrap and font size notwithstanding)

Completed: 2 All-Day Sucker, 48 Candy Cane, 360 Caramel Popcorn, 540 Cheese Popcorn, 462 Chocolate Chip Cookie, 2000 Chocolate Milk, 200 Macaroon
On hand: 143 baking powder, 175 brown sugar, 29 butter, 52 cheese, 820 chocolate chips, 4 cocoa powder, 22 coconut, 12 corn syrup, 50 egg, 8 egg white, 611 flour, 24 milk, 7 mint, 118 popcorn, 20 sugar, 50 vanilla

Example 3

Input

bonas 3

Output (There are only three lines here – word wrap and font size notwithstanding)

Completed: 42 Chocolate Chip Cookie
On hand: 166 baking powder, 338 brown sugar, 106 butter, 147 cheese, 809 chocolate chips, 9 egg, 805 flour, 391 popcorn, 41 sugar, 59 vanilla
Not completed: 180 Cheese Popcorn

Example 4

Input

detroit 1

Output (Font size kept small for the sake of consistency)

Completed: <none>
On hand: 119 cocoa powder, 312 milk, 197 sugar
Not completed: 1000 Chocolate Milk