

Online-3 on Structural Design Patterns

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Problem Statement

Suppose that Professor Severus Snape is one of the most skillful potions masters from Hogwarts School of Witchcraft and Wizardry. This year, he will teach Potions at the school and has planned to teach his pupils how to correctly brew 4 (four) different **potions** including **Polyjuice Potion** (transformation potion), **Felix Felicis** (liquid luck), **Veritaserum** (truth serum), and **Skele-Gro** (bone regrowing potion). However, each of these four potions uses as its base **Maker's Solution** (cough syrup), a mixture of *white spirit* (\$1.23/10g) and *castor oil* (\$2.47/10g). In addition to that, Polyjuice Potion requires *poison ivy* (\$3.38/10g), Felix Felicis requires *unicorn horn* (\$6.31/10g), Veritaserum requires *dragon kidney* (\$5.86/10g), and Skele-Gro requires *Chinese chomping cabbage* (\$4.13/10g) as an ingredient for the preparation. *Note that 25 (twenty five) grams of each ingredient is used in a single jar of potion.* Also, Professor Snape has come up with a penalty scheme to penalize students from Gryffindor house for wasting ingredients in their botched attempts to make potions. *He has decided to deduct 2 (two) house points from Gryffindor for every gram of wasted ingredients.*

Now, Professor Snape has asked you, a Muggle software developer, to design and implement a system. This system is required to take as input the name and quantity (number of jars) of different potions from the professor. Then, the system has to output ingredients, total cost required, and total penalty points for each of the potions corresponding to professor's input. You have to implement necessary classes, following an appropriate design pattern, to capture the scenario above.