Decorator and Proxy

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The subject of this exercise is to model soldier which have some war equipments and point of live:

- You have at least two categories of soldiers : infantrymen and horsemen.
- You have two types of equipment: shields and swords.
- If a soldier hits (method `int hit()` the result of that is the shot strength, This strength depends on the category of the equipment and the soldier. To simplify we suppose that a soldier hits what he is be able to hit and so `hit()` takes no parameter.
- A soldier can ward-off the shot of a certain strength (method `boolean ward-off(int strength)`) - the result is a boolean which indicates if the soldier is already living or not, the efficiency of the methods depends of the equipment and the category of the soldier.

So it will be possible to create horseman with shields, infantrymen with swords and shields ... and to organize battles between them until they die.

Exercice 1

With the Decorator pattern :

1. Elaborate an architecture corresponding to the above domain (obviously you must be able to create a soldier with the whole set of weapons).
2. Give the sequence diagram of the method for the creation of these soldiers and these of the `ward-off` method and the `hit` method.
3. Implementing this architecture with the necessary unitary test.
4. Modify your implementation to be able to obtain a trace for the chain of methods `ward-off` and `hit`.
5. With the using of the Decorator pattern it claims that the functionalities of an object become richer, is it true?
6. If you consider he following constraint: a soldier can not have two occurrences of the same equipment. Does a Decorator have the role to insure this constraint ?

Exercice 2

1. Improve the design that you have made in using the Proxy pattern and in adding an interface for Soldier which contains the specifics methods useful for adding equipment (ie addShield and addSword).
2. Give a solution to satisfy the constraint specifies in 1.6.
3. Modify your design to allow the addition of a new kind of equipment.

Exercice 3

Give a way for the equipment to be deteriorated during the battles, ie add specificities the decoration objects, this modification must stay transparent for the other part of the program.