

Structured and Object Oriented programming Laboratory Assignment #8: Inheritance

In all the following classes the constructors should throw an Exception whenever the creation of an object is not possible.

Task 1

Implement the class Item that has the following properties:

- String name must be not empty and different from null,
- Double weight must be in the range [0.1 ... 10.0]

Do not forget about the toString method.

Task 2

Implement the class Bag. It is supposed to keep some objects of the type Item. The Items are to be stored in an array.

The constructor: Bag(int bagCapacity, double maxWeight) { ...

- The argument bagCapacity must be in the range [1..50] and it specifies the maximal number of items we can carry in the bag
- maxWeight is the maximal, total weight of all items in the bag. Its value is in the range [0.1 ... 20.0].
- The necessary methods:
 - public void removeAllItems() { ...
 - public boolean putIn(Item item) { ... returns false if putting the item would result in exceeding the number of Items or their total weight.
 - public int getCapacity() { ... returns the capacity of the bag
 - public int getItemNo() { ... returns the number of Items in the bag
 - public int getTotalWeight() { ... returns the combined weight of all items in the bag
 - public boolean isEmpty() { ...
 - public boolean isFull() { ...
 - public void removeAll() { ... removes all items from the bag
 - public boolean removeTheHeaviest() { ... remove the heaviest(s) items from the bag
 - public String toString() { ...

Task 3

Implement the class HandHoldBag that inherits from Bag. Each HandHoldBag has the capacity equal to 5 and their total weight should not exceed 2.0. In addition it has a boolean property premiumQuality.

The required methods:

```
public HandHoldBag(boolean quality) {...  
public String toString() {...
```

Task 4

Implement the class `ShoppingBag` that inherits from `Bag`. Each `ShoppingBag` has the capacity equal to 30 and has a boolean property `extremelyRobust`.

The methods:

```
public ShoppingBag(boolean robustness) {...  
public String toString() {...
```

Task 5

Implement a program that creates the 3 types of bags and thoroughly test the classes meaning that each of the methods should be used at least one time. The Boolean methods have to be called at least twice once returning true and once returning false.

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