## Question 1 [40 Points]

You are given the following classes: `Item`, `Book`, and `BottleOfMilk`. The class `Book` and `BottleOfMilk` are subclasses of `Item`. Do NOT modify `Item.java`.

The abstract class `Item` has three common class variables as follow

```
double purchasePrice; //Original purchase price in Baht
double age; //Number of years this item has been purchased
double weight;              //Weight of this item in kg
```

The getters, and `toString()` are already implemented. This class also contains two abstract methods: `getCurrentValue()` and `clone()`. These methods have to be implemented later for each subclass (i.e., `Book` and `BottleOfMilk`) based on its characteristics.

**Task 1 [15 Points]:**

You need to implement the following methods in `Book` and `BottleOfMilk` class (by replacing `//your code goes here` comment in the `Book.java` and `BottleOfMilk.java`). A book allows you to take note on it, and its current value depreciates over time. A bottle of milk is consumable, and its current volume is what is left after you drink some of the milk. Specifically, let ***P*** be the original purchasing price, ***T*** be the age of the item, and ***C*** be the current value.

1. `public double getCurrentValue()` for `Book`.
   The current value of a book depreciates 10% each year. That is:
   $$C = P \cdot (0.9)^T$$
2. `public double getCurrentValue()` for `BottleOfMilk`.
   The current value of a bottle of milk is proportionate to its current volume. Let $V_0$ and $V$ be the original volume and current volume, respectively. The current value is:
   $$C = P \cdot \frac{V}{V_0}$$
3. `public Book clone()` for `Book`.
   This method creates and returns a "deep" clone of this book.
4. `public BottleOfMilk clone()` for `Book`.
   This method creates and returns a "deep" clone of this bottle of milk.

Expected output from `testTask1()` in `ItemTester`:

```
Taking note: "Book 1"
Taking note: "Book 2"
Note on B1: Book 1
Note on B2: Book 1Book 2
Drinking 50.0 ml of milk
Drinking 50.0 ml of milk
Milk left in m1: 250.0 ml
Milk left in m2: 200.0 ml
```

**Task 2 [5 Points]:**
Implement the following static method in ItemTester.java

```
public static ArrayList<Book> getDeepCopyOfBooks(Item[] items)
```

which takes an array of `Item` objects, filters in only books, and returns an `ArrayList<Book>` object containing the deep copies of those books.

Expected output from `testTask2()` in `ItemTester`:

```
Taking note: "Science Book"
Taking note: "OOP Book"
Taking note: "Comic Book"
Drinking 50.0 ml of milk
Drinking 450.0 ml of milk
Taking note: " including Math and Physics"
All books are:
[1] [Book: value = 364.50 Baht, Note = "Science Book"]
[2] [Book: value = 885.74 Baht, Note = "OOP Book"]
[3] [Book: value = 27.00 Baht, Note = "Comic Book"]
```

**Files to submit**: Book.java, BottleOfMilk.java, and ItemTester.java

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