Exercises module 18 – Polymorphism

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18.1 – Polymorphism

1. From the previous module we had the following classes and class-hierarchy:

```java
class Product {
    public int id;
    public String productName;
    public boolean isForSale;
}

class Processor extends Product {

    public int frequency;
    public int numberOfCores;
}

class Keyboard extends Product {
    public boolean gotNumericKeypad;
    public String color;
    public boolean isWireless;
}


class Monitor extends Product {
    public int size;
    public float weight;
}
```

2. We can create for example the following instances:

```java
Processor cpu1 = new Processor();
Processor cpu2 = new Processor();
Keyboard kbd = new Keyboard();
Monitor monitor = new Monitor();

cpu1.productName = "Intel Core I7";
cpu1.frequency = 3000;
cpu2.productName = "Amd threadripper";
cpu2.frequency = 3500;
kbd.productName = "Microsoft Natural keyboard";
monitor.productName = "Samsung T191T";
```

3. Now try to create a collection named **productList** that can contain all the four products and add them four objects created above to the list.

18.2– More polymorphism

1. In the previous step we created a product list that contains 4 product object instances.

2. Now create a method named **printProducts** that will loop through the product list and print out the product name.

    the output should be:

    ```
    Intel Core I7
    Amd threadripper
    Microsoft Natural keyboard
    Samsung T191T
    ```

3. Can we in the **printProducts** method also print out the CPU Frequency field? So that we get a printout like:

    ```
    Intel Core I7
    Freq:3000
    Amd threadripper
    Freq:3500
    Microsoft Natural keyboard
    Samsung T191T
    ```

    Why not?

4. Explore the concept of **casting** and the **instanceof**-operator and see if we could write an **if-startement** inside the **printProducts** method that:
    a. Check if the current object to print is an instance of **Product**
    b. If so cast it to a **Processor** type and then print out the frequency.

    Hints:

    *   Casting objects in Java
        https://stackoverflow.com/questions/5306835
    *   What is the 'instanceof' operator used for?
        https://stackoverflow.com/questions/7313559

Questions and concepts to study further on your own:

- How to determine an object's class (in Java)?
  https://stackoverflow.com/questions/541749
- What is the point of the diamond operator in Java 7?
  https://stackoverflow.com/questions/4166966
- Read more about polymorphism
  https://docs.oracle.com/javase/tutorial/java/IandI/polymorphism.html