CS-0401 – Fall Semester – 21_22
1st Exam Practice

1. Introduction

You have been hired to create a Java application for a company that sells televisions. Your program shall create a Television class and it will be used by the main application to create multiple televisions and perform some simple tasks, such as create a List of TVs, display their features, etc.

The current televisions on sale are the ones shown below, but other models might come in near future.

Figure 1 – Sample of televisions

2. The Television Class

Create a Television Class. As most of the classes that you will create in your life and in this course, this one shall have the following components:

- Class fields.
- Class constructors.
- Getters and setters for the encapsulated fields.
- Class general methods.
- Class `toString` and `equals` methods.

The following sections describe the items above in more detail.

2.1. Class Fields

Based on Figure 1, create the necessary class fields. Encapsulate some of them, such as price, but not all of them. I want to see if you know what is the difference when calling encapsulated and non-encapsulated fields in your main application.

2.2. Class Constructors

Your Television class shall have 3 constructors: 1 default and 2 non-default ones, as discussed in details below.

2.2.1. Default Constructor

Develop a default constructor that creates the Panasonic television shown in Figure 1, since this is the television that your company has the most, and therefore is trying to sell them more than the other ones.

2.2.2. First Non-default Constructor

Develop a non-default constructor that takes 5 inputs (the 5 features of a given Television on Figure 1) and populates the object fields with them. Use the operator "this" whenever possible.

2.2.3. Second Non-default Constructor

Develop a non-default constructor that takes only 1 String input. In the String, all 5 television features are separated by comma. Your constructor shall split the line into its contents and then populate the object fields.

2.3. Class Methods

2.3.1. Getters and Setters

Create getter and setter methods for the encapsulated fields that you have created on Section 2.1. The customer is allowed to ask for a small discount of 3% on the TV price, but no more than that (without a coupon). So, if the current TV price costs $200.00 and the customer ask for $190.00, then it would be rejected, but $195.00 would be ok, since 3% discount on $200.00 would be $194.00. Implement your price setter method for this 3% discount logic.

2.3.2. `toString()` method

Create a `toString()` method that generates the same television information displayed in Figure 1.

2.3.3. `equals()` method

Create an `equals()` method. For this specific class, two televisions are considered equals if they have the same size the same type.

2.3.4. `ApplyCoupon()` method

If the customer comes with the keyword "Banana" they will get a 10% discount. If any other keyword is provided, the method shall print a message in the terminal window that the coupon is invalid.

3. The main application

You shall create a main application that performs the following tasks.

3.1. Creating TV objects

a) Create 5 televisions:
   i) 1 panasonic television (tv01). Can you use the default constructor here?
   ii) 3 non-default televisions, one for each type shown in Figure 1 (tv02, tv03, tv04). Use the first non-default constructor for this step.
   iii) 1 that has the same features as the LG from Figure 1, but has the same screen size as the Panasonic one (tv05). Use the second non-default constructor for this step.
b) Place all these TV objects on a list (not an array).
c) Using the list, loop over all the TVs and print their information using the concept of the `toString()`.
d) Show how you would check if tv02 is equal to tv 04 and same for tv02 and tv05. If they are equal, explain in words why there are equal since most of the TV features are not the same.

3.2. Updating TV prices

a) Try to change the price of tv01 to $500.00. Print tv01 features after this and explain in words what you would expect to happen to the TV price.
b) Try to change the price of tv04 to $445.00. Print tv04 features after this and explain in words what you would expect to happen to the TV price.
c) Apply coupon for tv05 using “Banana”. Print tv05 features after this and comment on what you would expect to happen to the TV price.
d) Apply coupon for tv05 using “NotSure”. Print tv05 features after this and comment on what you would expect to happen to the TV price.

3.3 Accessing encapsulated and non-encapsulated fields

a) Using the print statement, show how you access an encapsulated TV field.
b) Using the print statement, show how you access a non-encapsulated TV field.
c) Explain in words what is the advantage of using data encapsulation in real world.