ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS
DEPARTMENT OF INFORMATICS
Computer Programming with Java
Spring Semester 2019-20

An electronics store sells three main categories of devices: image & sound, gaming, and household appliances. The image & sound category includes TVs, Blu-ray/DVD players, and cameras. The gaming category includes consoles and handheld consoles. The household appliances category includes refrigerators and washing machines. Common characteristics for all types of devices are as follows: code, model name, model year, manufacturer, and price.

In addition to the common characteristics, each type of device has additional features as listed below:

- **TVs**: type (LCD, LED, Plasma), screen size, resolution, ports (HDMI, DVI, Composite)

- **Blu-ray/DVD players**: type (Blu-ray or DVD), resolution, playback format (BD-R, BD-RD, DVD-RW, DVD+RW)

- **Cameras**: type (compact, DSLR, action camera), megapixels, optical zoom, digital zoom, screen size

- **Consoles/handheld consoles**: type (PS4, PS3, Xbox), processor, graphics, sound, hard drive capacity

- **Refrigerators**: type (single-door, double-door, wardrobe), energy class, refrigerator capacity, freezer capacity

- **Washing machines**: energy class, capacity, spin speed

The store offers discounts that apply to all devices belonging to the same main category. For example, a 25% discount for image & sound devices, 10% for gaming devices, and 20% for household appliances.

The store maintains a catalog of devices available for sale, a catalog of devices that have been ordered, and a catalog of devices that have been sold. The catalog of available devices includes, in addition to the characteristics of the devices, the number of units of each model that are immediately available in the store (so that they do not need to be ordered when a customer requests one).

The characteristics of an order are the order code (which is unique and sequential), the device model that was ordered, the customer's full name and phone number, the date of the order, the expected arrival date of the order, the final cost, and the status of the order (pending or completed). The characteristics of a sale are the sale code (which is unique and sequential), the device model that was sold, the customer's full name and phone number, the sale date, and the final cost. The codes for orders and sales are independent.

Requirements:

A) Create the necessary classes of a hierarchy to describe the devices available in the store. Design and implement the class hierarchy such that:

- Code reuse is maximized.

- Common class attributes are gathered as high in the hierarchy as possible.

- Polymorphism is utilized in the invocation of common methods.

- Include the required get and set methods to access class variables.

B) Design and implement the classes "Order" and "Sale". These specific classes should include a reference to the device that was ordered/sold, along with the other details mentioned in the above description.

C) Implement three collections:

1. The catalog of available devices.

2. The catalog of devices that have been ordered.

3. The catalog of devices that have been sold.

The catalog of available devices should include exactly one instance of each device model. The order catalog should include objects of type "Order", and the sales catalog should include objects of type "Sale". For the implementation of the collections, use or extend a suitable collection from the Java.util package.

D) Write a program in Java that initializes the three catalogs:

- The available devices catalog with at least two models for each type of device (TVs, cameras, refrigerators, etc.).

- The order and sales catalogs should be empty at initialization.

Additionally, the program should feature a basic command-line interface (CLI) with the following capabilities via a numbered list of options:

- The main screen should provide options to view all available devices, view all orders, view all sales, or exit the program (e.g., 0 = view devices, 1 = view orders, etc.).

- The option to view available devices should prompt the user to first choose the category (audio & video, gaming, or household appliances), then the device type (TVs, refrigerators, etc.), and finally the specific model. Once the model is selected, the device characteristics should be displayed.

- When the characteristics of a device model are displayed, an option to sell the model should be given, provided there are available units of that model in the store. If not available, the option to order the model should be provided. If the sale can be completed, the user should be prompted to enter the remaining details of the sale, and the final cost should be calculated, taking into account any discount. The sale should be completed by updating the available units of the model, assigning a sale code (the next available number), and recording it in the sales catalog. After the sale is completed, return to the main screen.

- In the order option, the user should be prompted to enter the remaining details of an order. The order should be completed by calculating the final cost, considering any discount, assigning an order code (the next available number), and recording it in the order catalog. After the order is completed, return to the main screen.

- After selecting "view orders," the user should have the option to select a specific order. After selecting a specific order, the order details should be printed, and an option to mark the order as "arrived" should be provided