Seminar 1, Analysis
Object-Oriented Design, IV1350

Intended Learning Outcomes

This seminar concerns the learning outcome *interpret and clarify a given specification by applying established guidelines for analysis.*

Goal

- Get acquainted with a UML modeling tool.
- Practice creating a domain model.
- Practice creating a system sequence diagram.

Literature

- Chapter four in *A First Course in Object Oriented Development.*

Grading

There are three possible grades:

Fail (0 points) To pass the course you must pass all four seminars. If you fail this seminar you have to report it again at the end of the course, at the fifth seminar.

1 point Active participation in seminar discussions. Written report submitted in Canvas including domain model and system sequence diagram with minor defects.

2 points Active participation in seminar discussions. Written report submitted in Canvas including domain model and system sequence diagram without defects. In the written report you must also explain and discuss the result and explain the method.

Tasks

Task 1

- Make a domain model for a retail store. In the current iteration we are implementing both the basic flow and the alternative flows described in the *Process Sale*, requirements specification below. Remember to include also what's written under *Business Rules and Clarifications* below.

- Your domain model *shall not* contain a class called `Program`, `System` or something else that represents the entire program.

- In the `Method` chapter of your report, explain how you used a category list and noun identification to identify classes. Also explain how you decided on attributes and associations.

- In the `Result` chapter of your report, show and briefly explain the domain model.

- In the `Discussion` chapter of your report, evaluate your domain model using applicable assessment criteria from the document `assessment-criteria-seminar1.pdf`, which is available on the *Seminar Tasks* page in Canvas.

Task 2

- Draw a system sequence diagram (SSD) illustrating basic and alternative flows of *Process Sale*, who's requirements specification follows below.

- In the `Method` chapter of your report, explain how you worked when developing the SSD.

- In the `Result` chapter of your report, show and briefly explain the SSD.

- In the `Discussion` chapter of your report, evaluate your SSD using applicable assessment criteria from the document `assessment-criteria-seminar1.pdf`, which is available on the *Seminar Tasks* page in Canvas.

Requirements Specification for Process Sale

The scenarios below describe basic flow and alternative flows for processing a sale at a point-of-sale (POS) in a retail store, figure 1.
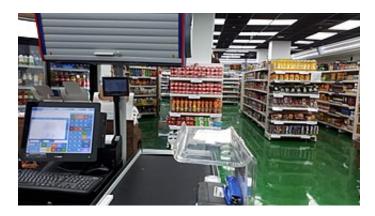

Figure 1: A point-of-sale in a grocery store.

Basic Flow

1. Customer arrives at POS with goods to purchase.

2. Cashier starts a new sale.

3. Cashier enters item identifier.

4. Program retrieves price, VAT (tax) rate, and item description from the external inventory system. Program records the sold item. Program also presents item description, price, and running total (including VAT).

5. Steps three and four are repeated until the cashier has registered all items.

6. Cashier asks customer if they want to buy anything more.

7. Customer answers 'no' (a 'yes' answer is not considered in this scenario).

8. Cashier ends the sale.

9. Program presents total price, including VAT.

10. Cashier tells customer the total, and asks for payment.

11. Customer pays cash.

12. Cashier enters amount paid

13. Program sends sale information to external accounting system (for accounting) and external inventory system (to update inventory).

14. Program increases the amount present in the register with the amount paid.

15. Program prints receipt and tells how much change to give customer.

16. Customer leaves with receipt and goods.

Alternative Flows

3-4a. No item with the specified identifier is found.

1. Program tells that identifier is invalid.

3-4b. An item with the specified identifier has already been entered in the current sale.

1. Program increases the sold quantity of the item, and presents item description, price, and running total.

3-4c. Customer purchases multiple items of the same goods (with the same identifier), and cashier registers them together.

1. Cashier enters item identifier.

2. Cashier enters quantity

3. Program calculates price, records the sold item and quantity, and presents item description, price, and running total.

9a (may also be 10a or 11a) Customer says they are eligible for a discount.

1. Cashier signals discount request.

2. Cashier enters customer identification.

3. Program fetches discount from the discount database, see *Business Rules and Clarifications* below.

4. Program presents price after discount, based on discount rules. See *Business Rules and Clarifications* below for more details on discounts.

Business Rules and Clarifications

Taxes/VAT The VAT mentioned in basic flow, bullets four and nine, is not included in the price stored in the external inventory system. It must instead be added before the total price is calculated. There are three different VAT rates: 25%, 12% and 6%. Each item description in the item registry must contain information about that item's VAT rate.

Receipt The receipt mentioned in basic flow, bullets 15 and 16, contains the following information:

- Date and time of sale.

- Name, quantity and price for each item.

- Total price for the entire sale.

- VAT for the entire sale

- Amount paid and change

Discounts The discounts mentioned in alternative flow 9a are calculated based on bought items, total cost for the entire sale, and customer id. A customer might be eligible for more than one type of discount. There's already a database which contains information about all existing discounts, discount information must be fetched from this database. The discount database contains the following information.

- When passed a list of all bought items, it tells a sum to be reduced from the total cost of the entire sale. The sum is zero if there's no discount.

- When passed the total cost of the entire sale, it tells a percentage to be reduced from this total cost. The percentage is zero if there's no discount.

- When passed the customer id, it tells a percentage to be reduced from the total cost of the entire sale. The percentage is zero if there's no discount.