



Course : Object oriented programming

Tutorial N°8 : Use case diagram

Exercise N°1:

Consider a gas station that distributes fuel. Customers pump the fuel themselves, and the gas station attendant (pompiste) fills the tanks.

1. The customer pumps fuel as follows: they take a nozzle attached to a pump and press the trigger to get fuel. Who is the actor in the system: the customer, the nozzle, the pump, the fuel, or the trigger?
2. Jojo, whose job is a gas station attendant, wants to pump fuel for his car. To model Jojo's activity, should we define a new actor? Draw the corresponding use case diagram.
3. When Jojo comes with his tanker truck to fill the pump tanks, is he considered a new actor? Enrich the previous use case diagram.
4. Among the gas station attendants, some are also qualified to perform maintenance operations in addition to their usual duties such as filling tanks. They remain attendants but are called technicians. Further enrich the use case diagram.

Exercise N°2:

Consider the following use cases:

Order shipment Complete shipment Partial shipment Order management
Place order Place urgent order User identification

Order management refers to the entire process, from placing an order to shipment.

However, it can happen that a placed order is not shipped. Placing an urgent order is a special case of placing an order. To place an order, the user must be validated.

- Propose a use case diagram **without representing the actors**.

Exercise N°3:

We want to model an automatic teller machine (ATM). This machine will be used by clients who want to choose an operation among cash withdrawal (quick or normal) and checking the balance of their account. For each operation, the user must be identified.

The ATM should allow printing receipts for each operation if the user wishes.

An external central system will verify account balances in the case of a large withdrawal and provide the necessary information in the case of a balance inquiry.

- Propose a use case diagram to model the expected functionalities of the ATM system.

Exercise N°4:

We want to design a cash register system. The use of this cash register proceeds as follows:

1. A customer arrives at the register with items.
2. The cashier records the identification number of each item, as well as the quantity if it is greater than 1.
3. The register displays the price and description of each item.
4. When all items have been recorded, the cashier signals the end of the sale.
5. The register displays the total amount of the purchase.
6. The customer chooses their payment method:
 - **Cash:** the cashier collects the money and the register shows the change to be returned to the customer (if any).
 - **Check:** the cashier notes the customer's identity and the register records the amount on the check.
 - **Credit card:** a banking terminal is part of the register and transmits the request to a multi-bank authorization center.
7. The register records the sale and prints a receipt.
8. The cashier hands the printed receipt to the customer.
9. A customer can present discount coupons before payment. When payment is completed, the register sends information about the sold items to the stock management system. Every morning, the store manager initializes the registers for the day.

Some of this information is relevant for creating a use case diagram, and some less so.

- Propose a use case diagram to model the expected functionalities of the cash register system.