University Center of Mila
Institute of Mathematics and Computer Science
Computer Science – Semester 5
Software Engineering
Tutorial Series No. 02

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Tutorial No. 02: Use Case Diagram

Exercise 1:

State what type of relationship is involved in the following cases:

- A customer wishes to withdraw money in euros or in dollars.
- The stock of banknotes is insufficient during a cash withdrawal (for the ATM system).
- A customer must identify himself/herself to withdraw money (for the ATM system).
- A teacher is also a student.

Exercise 2:

Given: A word processing software that allows a user to:

- Create a new document,
- Open an existing document,
- Save a document — the software asks the user for the file name if it is the first time the file is being saved,
- Save a document as (Text or PDF format),
- Undo a modification,
- Make a modification.

Question: Propose a **use case diagram** corresponding to these functionalities.

Exercise 3:

An industrial company has decided to implement software dedicated to the **textile industry**. This software targets different categories of users and is primarily intended to collect information on the products developed within the company. All company personnel can consult the system, either to verify whether a particular product exists or to freely browse the information. Every consultation must be preceded by **light authentication**, in which the person provides their name and department for later statistical purposes. Engineers can perform various **update operations** on the products they are responsible for: adding, deleting, or modifying product information. These operations must be preceded by **stronger authentication**, in which the engineer provides their name, department, and a password that is verified by contacting the personnel management system.

Question: Draw the corresponding **use case diagram** for this system.

Exercise 4:

In a school, it is desired to manage the **reservation of classrooms** as well as **educational equipment** (laptop and/or video projector). Only teachers are authorized to make reservations (subject to the availability of the room or equipment). The **classroom schedule** can be consulted by anyone. However, the **schedule summary by teacher** (calculated from the classroom schedule) can only be accessed by teachers. Finally, for each program, there is a **responsible teacher** who is the only one allowed to **edit the schedule summary** for the entire program.

Question: Draw the corresponding **use case diagram** for this system.

Exercise 5 :

We are interested in a company that manufactures engine components. In terms of production resources, the company has six factories, including one dedicated to assembly. The manufacturing process includes a machining phase, a heat and surface treatment phase, and then the assembly of subassemblies that will be integrated into the engines. The sales department receives customer orders every day. After a technical inspection of the ordered items, the sales department enters the order into the computer and obtains as output the breakdown of composed assemblies into elementary components, which belong to two distinct categories: components manufactured by the company and subcontracted components. The assembly factory can only finalize the order after receiving all the required components. The sales department is also responsible for invoice tracking. The invoice is then transmitted to the assembly factory, which also manages order delivery.

Question: Draw the corresponding use case diagram for this system.

Exercise 6:

This study concerns the design of a **vending machine for beverages (drink-dispensing machine)**. The machine delivers to the user the drink they have selected if they have inserted a sufficient amount of money. The machine may also return change depending on the coin stock available. When the stock of beverages is insufficient, the machine, which is very modern, informs the company in charge of its maintenance through an electronic connection. An operator is then sent by the company to replenish the stock and collect the cash.

Questions:

1. Develop a **use case diagram**.

2. Describe the **use case corresponding to purchasing a beverage** in textual form, and then in the form of a **system sequence diagram**.