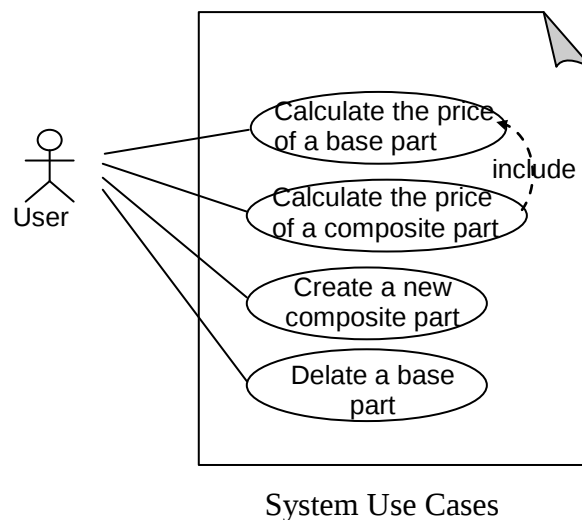


Tutorial N°04: UML diagrams (dynamic view)

I. Exercise1 :

A company manufactures so-called "basic parts" which exist in different forms (cubic, spherical, conical, etc.) and are made of different materials (wood, metal, plastic, etc.). For a basic type of part, we know its name, its dimensions and its reference. For each material, we know its name, its price per kilo and its mass. The company also manufactures parts known as "composite parts" obtained by assembling basic parts.

We want to create a software for managing its references for this company. This software must allow the user of the software to be able to calculate the price of a base part, calculate the price of a composite part, create a new composite part, and delete a base part.



1. Describe use cases textual and/or in the form of a simple sequence diagram
2. The following classes can be identified: Basic part, Composite part, Material, User
 - Draw detailed sequence diagrams for the use cases identified in this exercise
3. Build the corresponding communication diagram.

II. Exercise 2 :

We want to model a library management system. To borrow a book, we have the following scenario:

- The member goes to the counter and the librarian enters the feature to borrow a book from the app.
- First, it is necessary to check whether the member has the right to borrow books (valid card, number of books already borrowed does not exceed a set threshold, etc.). etc.).
- In addition, you have to check if the book is available.
- If all goes well, we create a new loan with the loan date and the return date, associated with the member and the chosen book, we make the book unavailable, and we increase the number of books borrowed by the member.
- Loan request refused, otherwise.

- 1- Diagram the sequence of this Use Case Scenario Borrow Book.
- 2- Build the corresponding communication diagram

III. Exercice3 :

The customer inserts his card, the validity of which is immediately checked. They are then asked to enter the card code. After three unsuccessful attempts, the card is swallowed. Alternatively, the customer can indicate the amount they wish to withdraw, the balance of their bank account is then consulted to ensure that the withdrawal is possible. In the event of an insufficient balance, the customer is informed and can then enter a lower amount. If the balance in the account is sufficient, the ATM will return the card and issue the tickets with a receipt.

1. Describe the operation of this ATM via an activity diagram.

IV. Exercise 4 :

When a distributor has a project to develop or extend its equipment, it must obtain the approval of the head office, which translates into its participation in the financing of the operation. Once established, the project file is submitted simultaneously to the bank and the head office, which responds very quickly. If the head office is unfavourable, the project is abandoned and the bank is notified. If the head office agrees to co-finance the project, we are waiting for the bank's response before deciding whether to continue or re-examine the file. When the two answers are positive, a final financing file is drawn up and the project is launched.

- 1- Establish an activity diagram corresponding to the financing and launch process of a project.

V. Exercise 5 :

In this exercise, we take over the management of the library. More specifically to the life of the objects of the Book class and those of the Adept class. We remind you of some library management rules:

- A member can borrow books.
- He cannot have a maximum of five outstanding loans.
- If he delays in returning a book, he is suspended.

1- Plot the state diagram of an object in the Book class and the state diagram of an object in the Member class.

