

Exercise 1

Model the operation of a video cassette vending machine using a use case diagram, based on the following description:

A user must possess a special magnetic card to use the machine. These cards are obtained from the store that manages the machine, are pre-loaded with a certain amount of dinars, and can be recharged at the store. The rental price is set in 6-hour increments, costing 20 dinars per increment.

Machine Operation:

1. The customer inserts their card.
2. If the card balance is greater than or equal to 20 dinars, the customer is authorized to rent a cassette. Otherwise, they are prompted to recharge their card at the store.
3. The customer selects a cassette and takes it.
4. Upon returning the cassette, the customer inserts it into the machine, followed by their card.
5. The system debits the rental cost from the card.
6. If the debit amount exceeds the card's balance, the customer is instructed to settle their debt at the store, and the system records the customer's debt status.

Accounts receivable management is handled by store staff. This use case focuses solely on cassette rentals and excludes internal vending machine management by store staff (such as cassette stock management).

Exercise 2

A retailer uses an inventory management system with the following functionalities:

- Edit a supplier record.
- Add a new item (this action automatically triggers the editing of the supplier record; if the supplier does not exist, it can be created at this time).
- Edit the inventory: from this screen, users can choose to print the inventory, delete an item, or edit an item's record.

Model this situation using a use case diagram.

Exercise 3: Library Case Study

We are focusing on the following library management features:

- **Document Classification by the Librarian:** When a new document arrives, the librarian must enter it into the database and assign it a library classification code.
- **Document Index Consultation:** Members can consult the list of indexes associated with a given document using terminals available in the library.
- **Book Borrowing (with Librarian Assistance):** A member brings the documents they wish to borrow and their membership card to the circulation desk. The system checks that the member has not exceeded the maximum number of borrowings and has no overdue documents. If the checks pass, the loan is registered and a return date is set.
- **Book Rental:** For certain books, free borrowing is not allowed and a rental fee applies. The rental process is identical to borrowing, with the only difference being that the member must pay the rental fee.
- **Document Returns:** The member brings the documents to be returned and their card to the counter. The librarian records the return in the system.

Additional System Context:

- System access requires an **authentication phase** using a username and password.
- A librarian who is an intern only has the right to classify documents.

- Books can be borrowed either on-site or by correspondence.

Create a use case diagram that incorporates all the described scenarios.