

Department	Computer Science and Information Technology
Course	SWE 401: Software Engineering

➤ **QUESTION 1**

An Artillery Management System (AMS) is a software to manage the weapons of a barrack. Barracks depend on such systems to manage weapons collections and their soldiers' relationships. Artillery Management Systems assist barracks to have records on each weapon and the profile of each soldier. Artillery Management Systems include adding new weapons and recorded weapons that soldiers took until a specific deadline. Given the information below, you have to draw a use case diagram [3Points], a class diagram [3Points], sequence diagram [2Points] and activity diagram [2Points]

The Requirements of the System

1. Any barrack soldier (old or new) can search weapons by name, country of production, category and Service Years.
2. Each weapon has a unique ID and a shelf number to locate it.
3. Soldiers can check-out and reserve any weapon.
4. The AMS can retrieve information such as the soldier checked-out specific weapons.
5. A soldier can check-out a maximum of 5 weapons.
6. A soldier can keep a weapon for a maximum of 10 days.
7. The AMS automatically issues fines for overdue weapons.
8. Soldiers can reserve unavailable weapons.
9. The AMS send notifications for reserved weapons that became available and weapons, which are overdue.

Use case diagram

The system has three main actors:

- **The Captain:** Can add, remove, and update weapons. The captain can register and cancel users (soldiers). The captain can renew a weapon possession, and the captain can also reserve, issue and return weapons.
- **The Soldier:** Can reserve, check-out, return and renew the possession of a weapon. The Soldier can search the weapons catalog as well.
- **The AMS:** send notifications for available weapon that are reserved, cancel reservations that don't meet the requirements and notifies the captain and the user for overdue weapons.

Class diagram

AMS main classes are below:

- **Barrack:** The main institution where AMS will be deployed. The 'Name' attribute distinguishes barracks from each other. The 'Address' attribute describes the location of a barrack.
- **Weapon:** is the basic entity of the AMS. Each weapon has a unique ID, barcode, name, country of production, category and Service Years.
- **Account:** AMS has two kinds of accounts, a general account for soldiers, and admin account for the Captain.
- **Soldier:** Every soldier is given a barrack ID card. The card identifies soldiers while checking-out or returning weapons.
- **WeaponReservation:** Manages weapon reservations.
- **WeaponCheckout:** Responsible for managing weapon checking-out.
- **Catalog:** contains the list of weapons. The user can sort the list according to specific criteria.

- **Fine:** Responsible for issuing and collecting users' fines.
- **ProductionCountry:** Contains information about the country of a production of a weapon.
- **Shelf:** Weapons are placed on shelves. Each shelf has a unique number and a location identifier to determine its physical location in the barrack.
- **Notification:** Responsible of sending notifications to soldiers.

Sequence Diagram:

Register a new soldier

Here are the 'Register a new soldier' steps:

- The Captain requests AMS to create a new soldier account
- The Captain enters the soldier's information
- The soldier's information are verified using the soldiers Database
- The new soldier account is created
- The new soldier's account information are emailed to the soldier

Activity diagram

Check-out a weapon: The Captain or any soldier should be able to perform this activity. Here are its steps:

- Soldier enters his detail into the system
- Soldier scans the barcode of the weapon
- AMS checks if the weapon can be checked-out and if that weapon is not 'for display only'. If no, display an error message.
- If yes, AMS checks the number of weapons checked-out to the soldier. If no, display an error message.
- If yes, AMS check if the weapon has been reserved by any other soldier. If yes, display an error message.
- If no, AMS generates weapon check-out transaction.
- AMS updated the weapon status to 'Checked-out'
- AMS increments the number of weapons Checked-out to the soldier
- AMS marks the reservation status 'Completed'