

# Creating your own conceptual models with UML

## Software Engineering, Course 2022-2023

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**Executive summary.** This document presents some examples of UML models based on partially analyzing some well-known online platforms. These examples are a simplified version of the platforms and based on personal assumptions of the author so it may be not complete and/or inaccurate. It must be used for training/educational purposes in conceptual modelling (no detailed designed).

### 1. Student-Professor-Seminar

In this example, basic entities and relationships between a student and professor are introduced. A student has a name, address, phone number, e-mail, a unique identifier, and average grade. A student can be enrolled in several seminars (at least 1). A seminar has a name (topic) it is identified by a number and may have some fee. A seminar is taught by a Professor identified by an email address and having a name, address, phone number and a salary. Any enrollment in a seminar will also have a grade for the participant students.

### 2. Library

A library is in some address and, it has a descriptive name. A library mainly comprises a catalog of books and, sometimes, it can include new items that are not in the catalog (like a newspapers). A book is identified by an ISBN (a string code) and it must have the following properties: a summary, a publisher, a publication date, a number of pages and the language. An author can write several books and a book can be written by several authors. When borrowing a book, it is necessary to have an account and you can only have at the same time 12 books borrowed. However, it is possible to make the reservation of other three.

### 3. Hospital

This example is taken from the book “Software Engineering” by Ian Sommerville. Any patient has one and only patient record. A patient can attend to several consultations. A consultation can manage different patients at different times. During the consultation, a patient will be attended by at least 1 Doctor. The result of the consultation is that the patient is diagnosed with some conditions and may require a treatment comprising some medication.

### 4. Online-shopping: Amazon

To make orders in Amazon we will assume it is necessary to have an account linked to a user account and containing a billing address. Any customer shall also include some identification, an address, a phone number and an email-address. With this account, the customer can make

payments including a unique identifier for that payment, a quantity, a currency and the status (cancelled, processed, completed). This payment is associated with some order. An order includes a set of items and a quantity for each of these items (a shopping cart) and can be in different states (new, holed, shipped, delivered, closed). An item is basically a product identified by some number and having a name and a supplier.

## **5. Online-booking: AirBnB**

AirBnB is an online platform to rent different types of properties like a loft, a house, or an apartment. A property comprises several rooms and we can rent both the whole property or just a room for a range of time (check-in and check-out dates). These properties are announced by registered users in the platform using pictures and videos (at least one picture or video is mandatory). When making a booking, it is necessary to indicate the information about guests and a booking must have at least 1 guest that must be a registered user. As a recommendation, it is not possible for owners to rent their own properties. The booking must also include some payment method. After completing the stay, the guest can add reviews to both the booking and the property including a number of stars (from 1 to 5) and a descriptive text. It also possible to add pictures or videos to that review.

## **6. Online-project and source code management: Github**

Github is both an online platform for project and source code management and a kind of social network for software (and other artifact) developers. The main entity in Github is the concept of repository (it has an URL, a name and an owner, a registered user). A repository will contain the commits made by users including a list of affected files that can be in different states (added, removed or moved). A repository also serves us to manage issues that can be raised by different users. An issue is classified with different tags and allow us to interact with other users through comments. Finally, we have also the possibility of creating organizations (only registered users) that will own the repositories. In terms of a social network, a registered user can follow both repositories and other users.

## **7. Online-micro blogging: Twitter**

Twitter is a social network for micro-blogging. Essentially, registered users identify by an email and having properties such as a name and a description can follow other users. In the same manner, they can be followed by other registered users. A tweet represents the basic entity of the platform. A tweet is a text including some other resources such as links, images or videos and may also contain different hashtags. Each user has a timeline in which tweets of the followed users are presented. Users can also communicate each other through private messages in a chat.

## **8. Online music streaming service: Spotify**

Spotify is an online service for streaming music. Among many capabilities, a registered user can follow and be followed by other users. A user can crate playlists (by default it always has one). Any

playlist may include different tracks coming from different albums. An album is published by an artist that can be a singer or a group and is composed of several tracks (songs).

## **9. Online CV Management: LinkedIn**

LinkedIn is a big platform to mainly manage a CV. Any registered user can create a CV containing different items like merits, courses or education. Users can also create posts and join different groups in which posting is also allowed. Companies are also present in LinkedIn, any registered user can create, and be the owner, of both a company (an organization) or a group allowing other users to join. The main objective of an organization is to publish job offers in which users can apply to. Furthermore, Premium users are a kind of registered user that are granted to access more services.

## **10. Online Podcast platform analyzer: Ivoox**

Ivoox, one of the largest online podcast platforms, has asked us to build a system to analyze the consumption of podcasts. To do so, they have defined a podcast as a program that has an identifier, a name, a title, a link and it is classified by a topic. A podcast must have at least 1 episode that includes a reference to the MP3 file, a title, a duration, a size in bytes, and a publication date. On the other hand, we have the listeners (users). For each user, the system is capturing information of the user agent: operation system (os) family, os-version, browser family, browser version and the device type (family, brand and model). Furthermore, it is also possible to access the information of the IP used to listen/download an episode containing data such as the city, region, country and GPS coordinates (latitude and longitude). To perform the analytical process, it is necessary to create an observation for each valid entry (download 200 or download 206) in the platform calculating then metrics like “nº of listeners per day” that can be grouped under a certain indicator like “Podcast performance”.