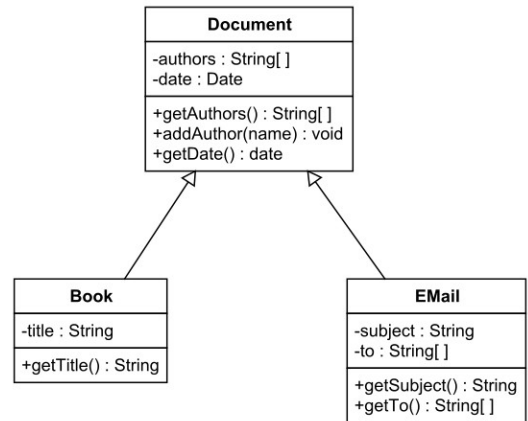


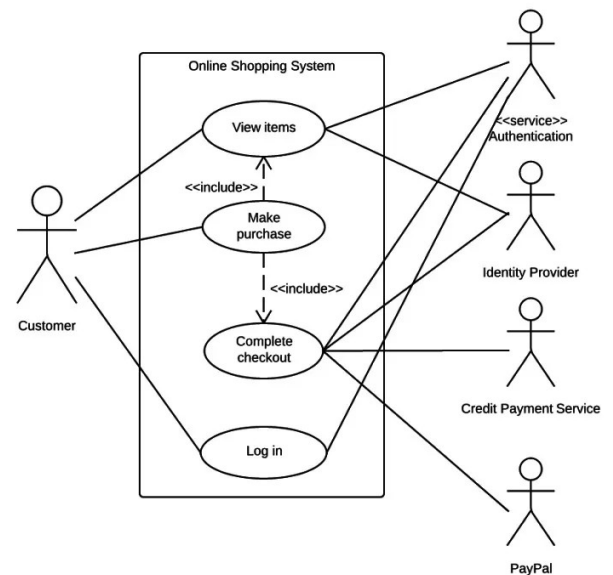
# UML and Class Design

**UML** (or **Unified Modeling Language**) is a set of standardized specifications that can be used to visualize how a system should be designed. There are many types of UML diagrams. More information can be found [on-line](#), including the [official specifications](#).

A **class diagram** identifies the attributes and methods for each class, as well as the relationships (e.g. inheritance) between them. It does NOT describe HOW the classes interact. A class diagram consists of boxes, connected by lines and arrows. A box has three sections: the top section names the class, the middle section lists its attributes, and the bottom section lists its methods. Attributes and methods can be marked as public or private using the “+” and “-” markers (“#” also exists for “protected” attributes and methods). Inheritance is indicated by arrows, which point toward the base classes.



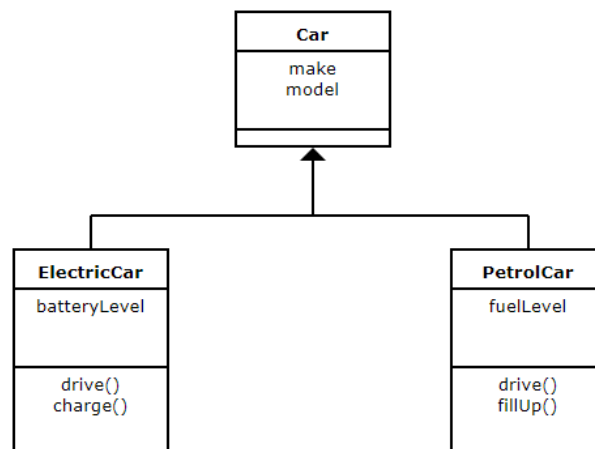
A **use case diagram** models the functionality of a system by showing relationships between **use cases** and **actors**. An actor is typically an individual or another system, while a use case is an action that can be performed by one or more actors. Use case diagrams do NOT describe HOW the use cases operation, but show HOW the actors interact with the system. The system is represented by a rectangle, and the use cases are ellipses inside of the system. Each actor outside of the system is typically represented using a stick figure. Relationships are lines connecting each actor to one or more use cases.



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1. Analyze the following class diagram, and describe the attributes and methods in each class (including those that are inherited from other classes).



2. Create a use case diagram for a program that will sell tickets for sporting and musical events. Identify the actors involved, the use cases that the system should provide, and the relationships between these actors and use cases.
3. Create a class diagram for a program that will be used by a bookstore to catalogue its inventory of books and magazines. Note that books and magazines have some common attributes (e.g. title, price, etc.), but may have different attributes (e.g. multiple authors, etc.). Additionally, books and magazines have unique attributes (e.g. books have ISBNs but magazines do not; magazines have volume and issue numbers, but books do not; etc.).
4. Create a class diagram, and a use case diagram, for a program that acts as a media centre for a Home Theatre PC: organizes and stores music and video files, plays them, manages metadata, etc. For an idea about some of the functionality that may be available, see programs like [Kodi](#) or [MythTV](#).