Exercises
Creating Domain Model (Basic-Class Diagram)

E-1: An art gallery organizes exhibitions that consist of exhibits. An exhibit may be an oil painting, a watercolor, a piece of sculpture or a photograph.

- Identify classes and their relationships.
- Draw a basic class diagram to represent this information (using possible relationships of aggregation and inheritance between classes).

E-2: From the following information, identify classes, their relationships, and construct a basic class diagram (in an incremental way; build up the diagram by drawing the separate parts).
  a) A football club has two grounds
  b) Each ground consists of two or three pitches and a clubhouse.
  c) The football club has lots of members.
  d) A member may be a playing member or a social member, and a playing member may be an adult member or a junior member.
  e) A playing member may be chosen to play for one or more teams, and each team has 11 playing members.
  f) Each team plays a number of fixtures.

E-3-A): The Islamabad Medical Centre is run by five doctors with three practice nurses. When a patient calls for an appointment, he or she usually sees the same doctor, but at busy times patients may see any of the doctors or nurses. Once a patient has been seen by the doctor or
nurse, the medical records are updated and the doctor may also write out a prescription for the patient.

- Draw a basic class diagram to represent this information.

E-3-B): Sometimes the doctor considers that the patient needs further tests. These tests may be routine or intensive; they are carried out at one of the local hospitals.

- Extend the diagram that you drew in **E-3-A)** to include this extra information.

E-4: A product is to be installed to control elevators in a building with m floors. The problem concerns the logic required to move elevators between floors according to the following constraints:
  - Each elevator has a set of m buttons, one for each floor. These illuminate when pressed and cause the elevator to visit the corresponding floor. The illumination is canceled when the elevator visits the corresponding floor.
  - Each floor, except the first floor and top floor has two buttons, one to request and up-elevator and one to request a down-elevator. These buttons illuminate when pressed. The illumination is canceled when an elevator visits the floor and then moves in the desired direction.

- When an elevator has no requests, it remains at its current floor with its doors closed.

Identify meaningful classes in the Elevator Example.
Identify relationships between classes.
Identify Attributes of classes
Draw Domain Model (Basic Class Diagram).

E-5: Nisar's Films is a shop that rents out films on Flash-drive and DVD. Nisar has a large number of customers and keeps a record of the name and address of everyone who hires a Flash-drive or DVD. Regular customers can become members of the shop; this entitles them to certain privileges, such as being able to take out more films at one time. In the case of members, Nisar also keeps a record of their membership number, phone number and the types of film they like to watch. Nisar also keeps records of all films and the copies he stocks of each.

- Draw a Domain Model to represent this information.

E-6: The security alarm is activated by pressing the Set button. The set button is illuminated when the security alarm is activated. The security alarm has a detector that sends a trip signal when motion is detected. The detector is enabled when the security alarm is activated. If the trip signal occurs while the security alarm is set, a high-pitched tone (alarm) is emitted. A three digit code must be entered to turn off the alarm tone. Correct entry of the code deactivates the security alarm.
If a mistake is made when entering the code, the user must press the Clear button before the code can be re-entered.
    Identify Objects/Classes and relationships between Classes.
- Identify attributes for classes.
- Create a Domain Model.

E-7: At an airport cargo and passenger flights are operated regularly. For cargo and passenger flights, cargo and passenger airplanes are operated.

- Identify classes from the above implicit statements.
- Identify relationships between Classes.
- Create a Domain Model.

E-8: A large film organization has several cinemas, which each consists of up to ten separate screens. Filmgoers can book seats in person, by phone or on the Internet. The organization keeps a record of the names and addresses of regular filmgoers for marketing purposes.

- Draw a domain model (basic class diagram) to represent this information.