Exercises
Use Case Modeling- Creating Use Diagrams

E-1: A university operates a fleet of 20 buses that serve approximately 2,000 students in different programs. The bus operation involves 20 regular routes, plus special routes for activities, athletic events, and summer sessions. The university employs 20 full time drivers and 5 to 10 part-time drivers. A dispatcher coordinates the staffing and routes and relays messages to drivers regarding students and parents who call about put pickup and drop-off arrangements.
Identify actors and use cases involved in bus operations.
To identify actors look at the nouns that are doing some work or that initiate some functionality of the system.

E-2: Using the following scenarios of a library system. Identify use cases and actors, and then draw the use case diagram (by depicting relationships of use cases) for the whole library system.

Scenario-A
- A library member chooses three books and takes them to the librarian on the loans desk. The librarian checks how many books the member has out on loan.
- The member has no books already out on loan.
- The librarian registers the loans on the system and issues the books to the member.

Scenario-B
- A library member chooses six books and takes them to the librarian on the loans desk.
- The librarian checks how many books the member has out on loan.
- The member has three books already out on loan.
- The librarian says that the member can only borrow a total of six books.
- The member puts three back.
- The librarian registers the three new book loans on the system and issues the books to the member.

Scenario-C
- A library member chooses four books and takes them to the librarian on the loans desk.
- The librarian checks how many books the member has out on loan.
- The member has six books already out on loan.
- The librarian will not allow the member to borrow any more books until she brings some back.

Scenario-D
- A library member brings back three books to the library.
- She takes then to the returns desk.
- The librarian registers the returns on the system.

Scenario-E
- A library member looks up the online catalogue for a book. She finds the title she wants.
- She checks the title availability and finds that there is a copy in the library.
- She notes down the library reference number for the book.

Scenario-F
- A library member looks up the online catalogue for a book. She finds the title she wants.
- She checks the title availability and finds that all copies are out on loan.
- She makes an online reservation for the book.

Scenario-G
- New books arrive in the library.
- The librarian allocates to each a library reference number.
- She updates the online library catalogue with the new titles.

E-3: A supermarket to increase its sales, encourages its customers to register with supermarket. For this, the customer needs to supply his/her residence address, telephone number, and the driving license number. Each customer who registers for this scheme is assigned a unique customer number (CN) by the clerk. A customer can present his CN to the salesclerk when he makes any purchase. In this case, the value of his purchase is credited against his CN. At the end of each year, the Manager of the supermarket generates winners list to award surprise gifts to 10 customers who make the highest total purchase over the year and to award a 22-caret gold coin to every customer whose purchase exceeded Rs.10,000.

- Identify Actors and Use-Cases
- Draw Use Case Diagram

E-4: Alpha Corporation sells books and CDs through online shopping. The customer adds items to his shopping cart. He may remove items or go to the check-out to make his purchases at any time. The customer reviews his purchases, chooses a payment method, and pays. A sales employee at Alpha Corporation gets the order and purchase confirmation from the system and sends the electronic order to the warehouse. The warehouse employee updates the order status. The customer may check the order status.

- Identify Actors and Use-Cases
- Draw Use Case Diagram

E-5: An organization specializes in providing training and offers courses in a variety of areas such as learning management techniques and understanding different software languages and technologies. Proposed computerized system of the organization is called Courseware System We will create Use-Case Model for the system that is used to manage courses and classes for the organization. Each course is made up of a set of topics. Tutors in the organization are assigned courses to teach according to the area that they specialize in and their availability. The organization publishes and maintains a calendar of different courses and assigns tutors every year. There is a group of course administrators in the organization who manage the courses including course content, assigning courses to tutors, and defining the course schedule. The training organization aims to use the Courseware System to get a better control and visibility to the course management and to also streamline the process of generating and managing schedules for different courses.

- Identify Actors and Use-Cases
- Draw Use Case Diagram (Using "Extend", "Include", and "Generalization" relationships among use cases)

E-6: Dr. Waseem Ahmad, the town's only dentist, has a computer system to help him keep track of patients' appointments and dental treatment. Dr. Waseem's receptionist makes appointments with patients either when they phone up or when they are back in the waiting room after treatment. Sometimes patients phone to cancel appointments or to change them. Dr. Waseem keeps notes on the system about his patients' treatments these are updated each time he sees a patient. The receptionist also makes out bills for patients and records payments on the system.
Sometimes patients phone up to talk to the receptionist about their treatment or to complain of toothache. In these cases the receptionist adds comments to the patient's notes and advises Dr. Waseem that he has done so. Occasionally on the receptionist's off day Dr. Waseem makes the appointments.

- Identify Actors and Use-Cases.
- Draw a use case diagram of the dentist's system.

E-7: Rawalpindi railway station is going to install automatic ticket dispensing machines. Each machine will be able to give passengers up-to-date train timetable and ticket price information. The machines must also issue tickets and transfer statistics about ticket sales to a central computer system. Railway staff must be able to update ticket prices and timetable information.

- Draw a use case diagram to model what the ticket machines must do.

E-8: You have got large amount of music and video CD collection. Some of your music CDs were recorded by just one band/artist and some have several songs/pieces of different bands/artists. Some popular songs are remade several times using different artists. You found it difficult frequently to search for a particular song or movie. Finally you had decided to label the CDs with unique serial numbers and develop a computer program to manage your requirements.
Following requirements are important:
- To add information about CDs; In general, this includes title of the CD, price, date purchased etc. and for music CD, the title of the songs (and its version, if necessary) and the corresponding artist or bands detail, and etc. For the movies, the details of main actor/actress, director, and your own grading, and etc.
- To search for a song on its title, artist or band of searching for your much loved movies
- To search for a movie on its grading (e.g. A(very good) , B(good), etc

Draw a use case diagram (using Generalization, Include, Extend Associations among Use Cases).