Problems on E-R diagram

1. Construct an E-R diagram for the banking system based on the following information:
   - Each bank has a unique code, as well as a name and address.
   - Each bank is related to one or more bank-branches, and the branch-number is unique among each set of bank-branches that are related to the same bank.
   - Each bank-branch has an address. Each bank-branch has zero or more loans and zero or more accounts. Each account has an account-number (unique), balance, & type and is related to exactly one bank-branch and to at least one customer.
   - Each loan has a loan-number (unique), amount, and type and is related to exactly one bank-branch and to at least one customer. Each customer has an SSN (unique), name, phone, and address, and is related to zero or more accounts and to zero or more loans.
2. Consider the following scenario:
   - There are television series, which have names, networks, production companies, and are identified by names.
   - A television series has one or more episodes, identified by episode number. Episodes also have a title and a length.
   - There are also movies. A movie is identified by its title. It also has a studio.
   - An actor is identified by name and birth date, and also has a nationality.
   - A writer is also identified by name and birth date, and also has a literary agency that represents him or her.
   - An actor can appear as a "regular" on a television series, a guest star on an episode, and a performer in a movie.
   - An episode has a writer, and a movie has a writer.

   Draw an E-R diagram that represents this scenario.
3. Construct an E-R diagram for a book stock management system based on the following information:
   - Books are written by authors & published by the publishers. Shopping basket contains books. Ware house stocks books. Customer takes book from shopping basket.
   - Author is uniquely identified by name. It also consists of address and URL.
   - Book is uniquely identified by ISBN. It also consists of year, title and price.
   - Publisher is uniquely identified by name. It also consists of address, phone and URL.
   - Customer is uniquely identified by email. It also consists of name, address and phone.
   - Shopping basket is uniquely identified by basket id.
   - Ware house is uniquely identified by code. It also consist of address and phone.
   - Many author writes many books. A publisher can publish many books. Many books can be stocked in a warehouse. A customer can have many shopping baskets. A shopping basket contains many books.
4. A Blood Bank stores blood of various blood groups. Many donors donate blood, each of different blood group/type. A donor may donate blood more than once and he is identified by a donor id (DID), name, sex, age, address and phone number. The blood donated by the donor is characterized by blood type, code and cost. Before each donor donates his blood, he is required to register himself as a donor with the receptionist who works at the Blood Bank. The receptionist is identified by employee id, name, address and phone number. The Blood Bank receives orders for blood from many hospitals for emergency purposes and other

surgical requirements and each blood bank issues the same required blood type. Each blood bank has its own blood bank number (BNO), issues, orders and blood types stored. The Blood Bank is managed by the blood bank manager who is identified by employee id, name, email_id and phone number. He is responsible for the proper management of the blood bank. The hospitals are identified by name, address and phone number. Represent this scenario using an E-R diagram.

5. Construct an E-R diagram for an airline reservation system based on the following information:
   - The database represents each airport keeping its unique airport code, the airport name, and the city & state in which the airport is located.
   - Each airline flight has a unique number, the airline for the flight, and the weekdays on which the flight is scheduled.
   - A flight is composed of one or more flight legs. Each flight leg has a leg number, departure airport and scheduled departure time, and an arrival airport & scheduled arrival time.
   - A leg instance is an instance of a flight leg on a specific date. The number of available seats and the airplane used in the leg instance are also kept.
   - The customer reservations on each leg instance include the customer name, phone, and seat numbers for each reservation.
   - Information on airplanes and airplane types are also kept. For each airplane type the type name, manufacturing company, and maximum number of seats are kept. The airports in which planes of this type can land are kept in the database. For each airplane, the airplane id, total number of seats, and type are kept.
6. There are many hotels in a country. Each hotel is identified by its id, name and star rate. Each hotel provides many rooms. Rooms are identified by Room number and type. Each room is rented for a cost. Cost is identified by its id and amount. A hotel has many facilities available with it. Facilities are identified by its id and name. A hotel is located at a particular location. Location is identified by street, town and pin code. Identify the entities, relationships, key attributes and other attributes. Design an E-R diagram of this.
7. Construct an E-R diagram for a company based on the following information:
   - The company consists of various departments. Each department has a unique name, a unique number, and a particular employee who manages the department. We keep track of the start date when that employee began managing the department. A department may have several locations.
   - A department controls a number of projects, each of which has a unique name, a unique number and a single location.
   - We store each employee's name, employee id, address, salary, gender, and birth date. An employee is assigned to one department, but may work on several projects, which are not necessarily controlled by the same department. We keep track of number of hours per week that an employee works on each project. We also keep track of the direct supervisor of each employee (who is another employee).
   - We want to keep track of the dependents of each employee for insurance purposes. We keep each dependent's first name, gender, birth date and relationship to the employee.
   - Each department offers multiple courses which has course code, fees and duration.

8. Construct an E-R diagram for a online bookstore based on the following information:
   - Every book has a title, ISBN, year and price. The store also keeps the author and publisher information for all books.
   - For authors, the database keeps the name, address and the URL of their homepage.
   - For publishers, the database keeps the name, address, phone number and the URL of their website.
   - The store has several warehouses, each of which has a code, address and phone number.
   - The warehouse stocks several books. A book may be stocked at multiple warehouses. (In previous sentence, we are not referring to a particular copy of the book. Consider for example "the complete book" for our course. This book may be stocked at multiple warehouses.)
   - The database records the number of copies of a book stocked at various warehouses.
   - The bookstore keeps the name, address, email-id, and phone number of its customers.
   - A customer owns several shopping baskets. A shopping basket is identified by a basketID and contains several books. Some shopping baskets may contain more than one copy of same book. The database records the number of copies of each book in any shopping basket.
9. Universal Music Group has decided to store information about musicians who perform on its albums in a database. Each musician identified by a SSN, a name and an age. Each musician lived in different places. Places are identified by an address and a phone number. Each instrument is identified by a name and a key. Each album has a title, date and a format. Each song has a title and an author. Each musician play several instruments and a given instrument played by several musicians. Each album has number of songs on it, but no song may appear on more than one album. Each song is performed by one or more musicians and a musician may perform a number of songs. Each album has exactly one musician who has produced it. A musician may produce several albums. Design an E-R diagram of this.

10. Construct an E-R diagram for a Library Management System based on the following information:
    - A library consists of a section, a member, a book, a granter, a publisher.
    - Section has section id, name and phone number.
    - Member has member id, address, telephone, occupation, member name. Member name can be divided into first name, middle name, last name.
    - Book has ISBN number, title, author, price.
    - Publisher has publisher id, name, address, phone number.
    - Granter has national id card number, name, address, phone.
    - The section, member, book, granter, publisher are uniquely identified by section id, member id, call number, publisher id, national id card number respectively.
    - One section has many books but one book should keep in one section.
    - One member can borrow many books.
    - Many books may publish by one publisher otherwise one publisher may be published many books.
11. Construct an E-R diagram for a university database based on the following information:
    - University has number of departments.
    - Each department offers different courses.
    - Students can enroll in different courses.
    - Teachers teach different courses of concerned department.
    - A course taught by many teachers.

    Discuss and show all relationship types, participation and cardinality ratio between different entity types using (min, max) representation.