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| **ksuLOGO****King Saud University****College of Computer and Information Sciences****Information Technology** | **IT 222 - Database Principles****2nd Semester 1436/37 H** **Assignment # 1 : ER & EER Moleding****Due Date: 14-Feb**  |
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| **For the following case studies, draw an ER or EER diagram to represent the data requirements as following:** * Identify the main entity types.
* Identify the main relationship types between the entity types.
* Identify attributes and associate them with entity or relationship types.
* Determine primary (or partial) key attributes for each entity type.
* Determine the multiplicity constraints for each relationship.
* Your EER diagram may or may not include features such as specialization / generalization, aggregation, and composition.
* State any assumptions necessary to support your design.

**Q1.** **International School of Technology** International school of technology to assist them in scheduling classes. Below are the list of entities, attributes, and business rules. * Room is identified by Building\_ID and Room\_No and also has Capacity. A room can be either a lab or a classroom, nothing else.
* Computer identified by ComputerID and has attributes ComputerType, TypeDescription, DiskCapacity, and ProcessorSpeed.
* Media is identified by MediaID and has attributes of Media\_Type and TypeDescription.
* Instructor has identifier Emp\_ID and has attribute Name, Rank, and phones.
* Timeslot has identifier TSIS and has attributes DayOfWeek, StartTime and EndTime.
* Course has identifier CourseID and has attributes CourseDescription and Credits. Courses can offer one or more sections and there is no section open until its course was created.
* Section has identifier SectionID (ex 01, 02, etc) and attribute EnrollmentLimit.
* A room cannot be both classroom and a lab. There also no other room types to be incorporated into the system.
* A lab has one or more computer. However, a classroom does not have any computers and it contains different type of board need to be saved.
* A room can be provided with one type of media, several types of media, or no media.
* Instructors are trained to use one, none, or many types of media.
* An instructor teaches one, none, or many sections of a course in a given semester of a given year. An instructor specifies preferred time slots.
* A room scheduled for a section during many time slot in a given semester of a given year.

(Hint: your section is scheduled at specific room for different slot times (Ex: Section 01 scheduled at room no. 3 in (8-9 sat , 8-9 Mon, 8-9 Wed))* Course can have one, none, or many prerequisites courses before you can register for the given course.

**Q2. Library**A library has approximately 16,000 members, 100,000 titles, and 250,000 volumes. The librarian ensures that the books that members want to borrow are available when the members want to borrow them. Also, the librarians must know how many copies of each book are in the library or out on loan at any given time. A catalog of books is available online that lists books by author, title, and subject area. The reference librarian wants to be able to access this description when members request information about a book. Books can be checked out for 21 days.To become a member of the library, applicants fill out a form including their SSN, campus and home mailing address, and phone numbers. The librarians then issue a numbered, machine-readable card with the member’s photo on it. This card is good for four years from the issue date. Professors at the institute are considered automatic members. When a new faculty member joins the institute, his or her information is pulled from the employee records and a library card is mailed to his or her campus address. The library does not lend some books, such as reference books, rare books, and maps. The librarians must differentiate between books that can be lent and those cannot be lent. In addition, the librarians have a list of some books they are interested in acquiring but cannot obtain, such as rare or out-of-print books and books that were lost or destroyed but have not been replaced. The librarians must have a system that keeps tracks of books that cannot be lent as well as books that they are interested in acquiring. Some books may have the same title; therefore, the title cannot be used as a means if identification. Every book is identified by its International Standard Book Number (ISBN), a unique international code assigned to all books. Two books with the same title can have different ISBNs if they are in different languages or have different bindings (hard cover or soft cover). Editions of the same book have different ISBNs.The proposed database system must be designed to keep track of the members, the books, the catalog, and the borrowing activity. **Q3. Retail Company Database**A retail company wishes to establish a database system to record information about employees. The employee data to be recorded in the database consist of employee SINs (which are unique), DOB, age, first names, last names and mobile number. The company has two types of special employees as well as many regular employees who do not fit into one of these categories. First, the company has insured employees. For insured employees, the insurance policy number, the insured amount, and the annual premium are to be recorded. The company also has a second type of employees who are the managers. For the managers, the branch number they work at and the number of profit shares are to be recorded.In addition, they need to record data about branches; (unique) branchnumber, budget, and address should be recorded. Employees must work for one, and only one branch. Branches must have at least one employee, and may (of course) have more than one.Each manager normally manages one branch, but on occasion a manager may beresponsible for more than one branch, but never less than one. A branch can have only one manager, but occasionally will not have a manager.It is necessary to record the dependents of insured employees; the first name, age and relationship (e.g. child, spouse, etc.) of each dependent must be recorded. It is assumed that no two dependents of the same employee will have the same name. An insured employee must have at least one dependent; the dependents must have one and only one insured employee.**Q4.** **Real estate firm**A real estate firm lists property for sale and wishes to establish a database system for its operation. The firm has a number of sales offices in several states. Each sales office has office\_number and address (city, state and zip). Each sales office is assigned one or more employees. Every employee has an employee\_id and employee\_name. An employee must be assigned to only one sales office. If an employee is married to another employee of the firm, the date of the marriage and who is married to whom must be stored; however, no record of marriage is required if an employee’s spouse is not also an employee. For each sales office, there is always one employee assigned to manage that office. An employee may manage only the sales office to which he or she is assigned. In other words, an employee cannot be assigned to one office, yet manage another office. The firm lists property for sale; which has property\_id, and address (city, state and zip). Each property must be listed with one and only one of the sales offices. A sales office may have any number of properties listed or may have no properties listed. Each property has one or more owners. Every owner has an owner\_id and owner name. An owner may own one or more property. The firm wants to keep track of the percentage that a given owner owns a given piece of property. For example, imagine that Smith and Jones both own property A. Smith owns 35% of property A and Jones owns 65% of property A. The firm wants to retain this information and they want to call it percent\_owned. |