

Database Application Laboratory

Course Code 18CSL48/18ISL48

Additional problem definitions.

ER DIAGRAMS

1) ER-Model for Medical Store

Design an ER-Model for a medical store that has medicines of various types and are from various suppliers. The model should record data about medicines such as name of medicine, manufacturer, its chemical composition, date of manufacturing, expiry date and price. Typically in a medical store other items are also stored like health drinks, shampoos, chocolates, band-aids, beauty creams, diapers etc. and the data about these must also be stored. The information about customers and doctors who prescribe that medicine must also be stored for future references and usage. The data thus stored must be used for billing and generating various kinds of reports. The inventory about all data must be updated as and when the medicines arrive with invoices.

From this above description of the students are expected to

1. The various entities and their respective attributes
2. The relationships and cardinality ratios and participation constraints
3. Draw the ER-diagram using a software tool such as dia.
4. The students are expected to check for completeness of the ER-Diagram.
5. Map the ER-to-Relational model, create and populate the database and test.

2) ER Diagram for University

Consider the following information about a university database:

- Professors have an SSN, a name, an age, a rank, and a research specialty.
- Projects have a project number, a sponsor name (e.g., NSF), a starting date, an ending date, and a budget.
- Graduate students have an SSN, a name, an age, and a degree program (e.g., M.S. or Ph.D.).
- Each project is managed by one professor (known as the project's principal investigator).
- Each project is worked on by one or more professors (known as the project's co-investigators). Professors can manage and/or work on multiple projects.
- Each project is worked on by one or more graduate students (known as the project's research assistants).

- When graduate students work on a project, a professor must supervise their work on the project.
- Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each one.
- Departments have a department number, a department name, and a main office.
- Departments have a professor (known as the chairman) who runs the department.
- Professor's work in one or more departments, and for each department that they work in, a time percentage is associated with their job.
- Graduate students have one major department in which they are working on their degree.
- Each graduate student has another, more senior graduate student (known as a student advisor) who advises him or her on what courses to take.

Design and draw an ER diagram that captures the information about the university. Use only the basic ER model here, that is, entities, relationships, and attributes. Be sure to indicate any key and participation constraints.

3) ER Diagram for RoadWay Travels

ROADWAY TRAVELS:

“Roadway Travels” is in business since 1977 with several buses connecting different places in India. Its main office is located in Hyderabad. The company wants to computerize its operations in the following areas: Reservations Ticketing Cancellations Reservations: Reservations are directly handled by booking office. Reservations can be made 60 days in advance in either cash or credit. In case the ticket is not available, a wait listed ticket is issued to the customer. This ticket is confirmed against the cancellation. Cancellation and modification: Cancellations are also directly handed at the booking office. Cancellation charges will be charged. Wait listed tickets that do not get confirmed are fully refunded. Analyze the problem and come with the entities in it. Identify what Data has to be persisted in the databases.

Construct an E-R diagram for the same. Document all assumptions that you make about the mapping constraints.

4) ER model for Online bookstore

Design an ER model for online bookstore. Every book has a title, isbn, year, price and store keeps the author and publisher for any book. 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. 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 basket. 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.

From this above description, students should be able to identify various entities, attributes, relationships and constraints. Design an ER model for a given scenario using standard notations of ER diagram.

5) ER diagram for Airport

To organize the information about all the airplanes stationed and maintained at the airport. The relevant information is as follows:

- Every airplane has a registration number, and each airplane is of a specific model.
- The airport accommodates a number of airplane models, and each model is identified by a model number (e.g., DC-10) and has a capacity and a weight.
- A number of technicians work at the airport. You need to store the name, SSN, address, phone number, and salary of each technician.
- Each technician is an expert on one or more plane model(s), and his or her expertise may overlap with that of other technicians. This information about technicians must also be recorded.
- Traffic controllers must have an annual medical examination. For each traffic controller, you must store the date of the most recent exam.
- All airport employees (including technicians) belong to a union. You must store the union membership number of each employee. You can assume that each employee is uniquely identified by a social security number.
- The airport has a number of tests that are used periodically to ensure that airplanes are still airworthy. Each test has a Federal Aviation Administration (FAA) test number, a name, and a maximum possible score.
- The FAA requires the airport to keep track of each time a given airplane is tested by a given technician using a given test. For each testing event, the information needed is the date, the number of hours the technician spent doing the test, and the score the airplane received on the test.

Draw an ER diagram for the airport database. Be sure to indicate the various attributes of each entity and relationship set; also specify the key and participation constraints for each relationship set.

SCHEMAS AND SQL QUERIES

1) SQL – Database

Create the following database, with all the necessary constraints and answer the queries

CUSTOMER (Cid, Cname, Caddress, City, DOB, Cellno)

RESTAURANT (Rid, RestName, RestAddress, City, OwnerId, PhoneNum)

OWNER (OwnerId, OwnName, CellNum, OwnAddress)

SERVES (Rid, itemId)

VISITS (Cid, Rid)

ITEMS (ItemId, Item Name, Item Price)

LIKES (Cid, ItemId)

Query 1: List all Restaurants located in 'Tilakwadi' and names starting with 'Ra'

Query 2: List all items liked by customer 'Deeksha'

Query 3 : List all customers who are located in the same City as restaurant 'Ajanta'

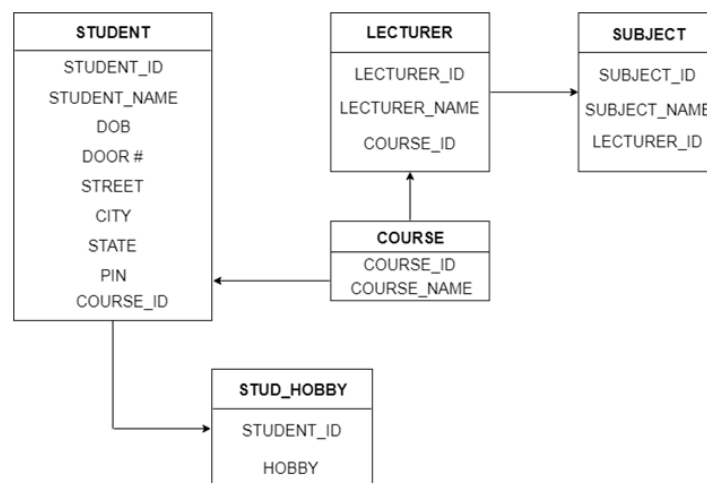
Query 4 : List all restaurants which servers all the items which customer 'Ajay' likes is served

Query 5 : List all Restaurants that customer 'Vinay' visits and what he likes is served there.

Query 6 : List all restaurants owned by Owners located in 'Dharwad' city

2) SQL – Database

Consider the following database schema diagram, with all the necessary constraints and answer the queries



Query 1: List all students who have "Drawing" as a hobby.

Query 2: List details of lecturer's who handle a subject that starts with 'D' or 'd'.

Query 3 :List names & id's of all students and staff for a particular course.

Query 4 :List id's and name's of students who have opted for any course handled by a particular faculty.

Query 5: List details of students who have the same hobby and opted for the same course.

3) SQL – Database

Consider the insurance database given below. The primary keys are made bold and the data types are specified.

PERSON(**driver_id**:string , name:string , address:string)

CAR(**regno**:string , model:string , year:int)

ACCIDENT(**report_number**:int , accd_date:date , location:string)

OWNS(**driver_id**:string , **regno**:string)

PARTICIPATED(**driver_id**:string , **regno**:string , **report_number**:int , damage_amount:int)

- 1) Create the above tables by properly specifying the primary keys and foreign keys.
- 2) Enter at least five tuples for each relation.
- 3) Demonstrate how you
 - a. Update the damage amount for the car with specific regno in the accident with report number 12 to 25000.
 - b. Add a new accident to the database.
- 4) Find the total number of people who owned cars that were involved in accidents in the year 2019.
- 5) Find the number of accidents in which cars belonging to a specific model were involved.
- 6) Count the total number of accidents that took place in each year.

Design a GUI using Java Swing to implement question 3) in the above list of questions.

4) SQL for Movie Database

Consider the schema for Move Database:

ACTOR(Act_id, Act_name, Act_gender)

DIRECTOR(Dir_id, Dir_Name, Dir_Phone)

MOVIES(Mov_id, Mov_title, Mov_year, Mov_lang, Dir_id)

MOVIE_CAST(Act_id, Mov_id, Role)

RATING(Mov_id, Rev_stars)

Write SQL queries to:

- 1) Create the above tables and enter at least five tuples for each relation.
- 2) Find the movie names where one or more actors acted in two or more movies.
- 3) List all actors who acted in a movie before 2000 and also in a movie after 2015.
- 4) Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title.
- 5) To find the titles of all movies that have no ratings.

5. Consider the schema for Flight Database:

Flights(fno: integer, from: string, to: string, distance: integer, departs: time, arrives: time, price: real)

Aircraft(aid: integer, aname: string, cruising range: integer)

Certified (eid: integer, aid: integer) Employees(eid: integer, ename: string, salary: integer)

1. Find the names of aircraft such that all pilots certified to operate them have salaries more than \$80,000.
2. For each pilot who is certified for more than three aircraft, find the eid and the maximum cruising range of the aircraft for which she or he is certified.
3. Find the names of pilots whose salary is less than the price of the cheapest route from Los Angeles to Honolulu.
4. For all aircraft with cruising range over 1000 miles, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
5. Find the names of pilots certified for some Boeing aircraft.
6. Find the aids of all aircraft that can be used on routes from Los Angeles to Chicago.
7. Identify the routes that can be piloted by every pilot who makes more than \$100,000.
8. Print the enames of pilots who can operate planes with cruising range greater than 3000 miles but are not certified on any Boeing aircraft.