Department of Computer Engineering

University of Peradeniya

CO226-Database Systems

Lab Number : 04
Topic : Drawing ER Diagrams using 'Dia'
Lab Date : 08th April 2020 from 2:00 PM to 4:00 PM
Due Date : 15th April 2020 before 11:55 PM

Aim :
The aim of this lab is to provide students a self learning experience on the 'Dia' tool to create Entity Relationship (ER) Diagrams.

Objective :
At the end of this lab, students should be able to draw an ER diagram for a given database requirements using Dia.

Submission :
You only have to submit the task you are assigned for.

Submit a zip file named E16XXXLab4.zip containing both the .dia and .pdf (use export from File menu to create pdf using Dia file) files you created during the lab. Here 'XXX' is your registration number.

Visit below link to check the lab task you assigned for,
https://docs.google.com/spreadsheets/d/1b9fHaeqOwoWyzwx5GY5LMJb05Nu1zMbvFfy9QR1DMg4/edit?usp=sharing

Formula for separating lab tasks = RegistrationNumber MOD 6

Lab Tasks

Task - 01

The details about a faculty are maintained by the Assistant Registrar (AR) office in a DBMS. Suppose it is required to improve the existing database in order to facilitate some new requirements.

The faculty is organized into departments. Each department has a unique name, unique id and a senior lecturer who serves as the head of the department. The start date when that lecturer started heading the department should be recorded. There may be several buildings maintained by a department to conduct practical sessions. Each lecturer has a first name, last name, lecturer id, hometown and salary. A lecturer works for one department and may serve as an advisor for at most thirty students. A lecturer can teach in zero or more course offerings. Each student has a name, student id, national identity card (NIC) number, address, birth date and sex. Both registration number and NIC number have unique values for each student. A student belongs to one department and can enroll into course offerings which are not necessarily handled by his/her department. It is required to keep track of the enrollment key of each enrollment. Each student is assigned to a lecturer of his/her department for academic advising purposes. Each course has a course number, course title, credits, prerequisites and course content. The course number and course title for a course are unique values. A course offering is done depending on the availability of lecturers and demand of students. Each course offering has a year, semester, timings, a lecture room and one or more lecturers. A course offering is handled by a department.

Task - 02

Assume we have the following application that models soccer teams, the games they play, and the players in each team.

In the design, we want to capture the following details. We have a set of teams, each team has an ID (unique identifier), name, main stadium, and to which city this team belongs. Each team has many players, and each player belongs to one team. Each player has a number (unique identifier), name, DoB, start year, and shirt number that he uses. Teams play matches, in each match there is a host team and a guest team.

The match takes place in the stadium of the host team. For each match we need to keep track of the following;

- The date on which the game is played,
- The final result of the match,
- The players participated in the match. For each player, how many goals he scored, whether or not he took a yellow card, and whether or not he took a red card.
- During the match, one player may substitute another player. We want to capture this substitution and the time at which it took place.

Each match has exactly three referees. For each referee we have an ID (unique identifier), name, DoB, years of experience. One referee is the main referee and the other two are assistant referees.

Task - 03

Following case study, which describes the data requirements for a video rental company.

Video rental company has several branches throughout India. The data held on each branch is the branch address made up of street, city, state, and zip code, and the telephone number. Each branch is given a branch number, which is unique throughout the company. Each branch is allocated staff which includes a Manager. The Manager is responsible for the day-today running of a given branch. The data held on a member of staff is his or her name, position, and salary. Each member of staff is given a staff number, which is unique throughout the company. Each branch has a stock of videos. The data held on a video is the catalog number, video number, tle, category, daily rental, cost, status, and the names of the main actors, and the director. The catalog number uniquely identifies each video. However, in most cases, there are several copies of each video at a branch, and the individual copies are identified using the video number. A video is given a category such as Acon, Adult, Children, Drama, Horror, or Sci-Fi. The status indicates whether a specific copy of a video is available for rent. Before hiring a video from the company, a customer must first register as a member of a local branch. The data held on a member is the first and last name, address, and the date that the member registered at a branch. Each member is given a member number, which is unique throughout all branches of the company. Once registered, a member is free to rent videos, up to a maximum of ten

at any one time. The data held on each video rented is the rental number, the full name and number of the member, the video number, title, and daily rental, and the date the video is rented out and date returned. The rental number is unique throughout the company.

Task - 04

A General Hospital wants to develop a database to store its doctors and patient details.

The hospital consists of a number of wards. Each ward has a unique ward number, a name & the number of patients in that ward. A doctor is assigned to a single ward, but a ward can have many doctors.
A ward hosts a number of patients. Each patient's admission number (unique), name, address and telephone number and date of admission is stored.
A hospital DB stores the prescribed treatment for a patient. Each treatment has a unique treatment number and description. It also keeps a track of the treatment dosage for each patient. One patient may be prescribed more than one treatment and the same treatment can be prescribed to many patients.
The hospital also keeps a track of the hospital ID number of each doctor (unique), name, address, telephone number and specialization of each doctor. A patient is assigned to one doctor, but a doctor can treat many patients.

Task - 05

A library service wants to create a database to store details of its libraries, books and borrowers. Details include the following:

A book has a unique ISBN number, a title and one or more authors. The library service may own several copies of a given book, each of which is located in one of the service's libraries. A given library contains many books, and in order to distinguish different copies of the same book a library assigns a different copy-number to each of its copies of a given book; the price that was paid for each copy is also recorded. Every library has a unique name and is either a main library or a branch library. A main library may have zero or more branch libraries and every branch library is a branch of exactly one main library. A borrower has a name and a unique ID code. A

borrower can have many books on loan, but each copy of a book can only be on loan to one borrower. A borrower could borrow the same book on several occasions, but it is assumed that each such loan will take place on a different date.

Task - 06

Construct an ER Diagram for Company having following details :

A company is organized into departments. Each department has a name, a unique number and a telephone number. Each department is managed by one employee. The database keeps 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 project has a name, a unique number and a single location. The database stores an employee number, employee name, address, salary and date of birth. An employee has been assigned to one department, but may work on several projects which are not necessarily controlled by the same department. The database keeps track of the number of hours per week that an employee works on each project. Each employee is supervised by a supervisor. The DB keeps track of dependents of each employee for insurance purposes. The name, DOB and relationship to the employee has to be recorded for each dependent.

Design an ER schema for this application and draw an ER diagram for that schema. Specify key attributes of each entity type and constraints on each relationship type. Identify the weak entity type and give a suitable name for the identifying relationship type. Be certain to indicate identifiers and cardinality constraints.

Note: Any unspecified requirement and make appropriate assumptions to make the specification complete.

Draw the ER schema using Dia and submit the drawing using the above instructions.

★ Installer :
http://dia-installer.de/download/index.html

★ Tutorials :
https://www.youtube.com/watch?v=kixAsBgB6ms
https://www.youtube.com/watch?v=FwD9GsVKvzs