Assignment 5
ER Model
Database Systems Spring 2023

Due Date: Before the start of the class (10 May 2023)

Draw an ER\EER diagram for the problems given below using Chen Notation. Ensure that you indicate all cardinality constraints and your diagram should not contain redundant entity sets, relationships, or attributes. If you need to make any assumptions, include them in your answer. Submitted hand-drawn ER models.

Question 1: The loan office in a bank receives from various parties requests to investigate the credit status of a customer. Each credit request is identified by a Request ID and is described by a Request Date and Requesting Party Name. The loan office also received the results of credit checks. A credit check is identified by a Credit Check ID and is described by the Credit Check Date and the Credit Rating. The loan office matches credit requests with credit check results. A credit request may be recorded before its result arrives; a particular credit result may be used in support of several credit requests.

Draw an ER model for this situation. Now, assume that credit results may not be reused for multiple credit requests. Redraw the ER model for this new situation using two entity types, and then redraw it again using one entity type. Which of these two versions do you prefer, and why?

Question 2: Each semester, each student must be assigned an adviser who counsels students about degree requirements and helps students register for classes. Each student must register for classes with the help of an adviser, but if the student's assigned adviser is not available, the student may register with any adviser. We must keep track of students, the assigned adviser for each, and the name of the adviser with whom the student registered for the current term. Represent this situation of students and advisers and add appropriate attribute if required.

Question 3: Prepare an ERD for a real estate firm that lists the property for sale. The firm has several sales offices in different states. For each office, we record Office Number (identifier) and Location. Each sales office is assigned one or more employees. Each employee has Employee ID (identifier) and name. An employee must be assigned to only one sales office. 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. The firm lists the property for sale. Attributes of the property include Property ID (identifier) and Location. Components of Location include Address, City, State, and Zip Code. Each unit of 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 unit of property has one or more owners. For each owner, we record Owner ID and Owner Name. An owner may own one or more units of property. An attribute of the relationship between property and owner is Percent Owned.

Question 4: Draw the ER model using Chen Notation for cardinality and participation constraint. The basic information is as follows:

XtremePark company wishes to develop a theme park. One of the theme parks' database applications is needed to keep track of all the costumes worn by the workers and ''cast members'' in the parks. Managing the costumes is not an easy task. Virtually all the employees, from the actors and dancers to the ride operators, wear some kind of costume. The cast members are the persons who participate in some act or drama, while the workers are responsible for day-to-day park maintenance like security guards, cleaners etc. The DB needs to keep track of the name, address, phone, gender, and age of each employee. In addition to this, to record the specific information regarding the cast member, such as the name of their acts and timings. For the worker, record the duty hours and place of the duty.

Each costume is typically made up of several garments, each of which is uniquely bar-coded for cast members. Using bar-code scanning, the System tracks the life cycle of every garment. This includes the points in time when a garment is in the storage facility, is checked out to a cast member, is in the laundry, or is being repaired (in-house or at a vendor). The DB should also be used to keep track of the costume parts and cast members. The costume parts records include the type of garment, its size, color, and even such details as whether its use is restricted to a particular cast member and whether it requires a special laundry detergent. Correspondingly, the cast member records include the person's clothing sizes and other specific garment requirements. A cast member may wear multiple costumes during the day depending upon the requirement of his act, while a worker is entitled to only one type of costume.

Question 5: Develop an EER model for the following situation using the chen notation. You have to develop a system for scheduling classes. The basic requirements are as follows:

- Rooms are located in different buildings, identified by Building ID and Room no, and have a capacity. A room can be either a lab or a classroom. If it is a classroom, it has an additional attribute called Board Type.
- Media is identified by MType ID and has attributes of Media Type and Type Description. Note: Here, we are tracking the type of media (such as a VCR, projector, etc.), not the individual piece of equipment. Tracking of equipment is outside of the scope of this project.
- A computer is identified by CType ID and has attributes Computer Type, Type Description, Disk Capacity, and Processor Speed. Please note: As with Media Type, we are tracking only the type of computer, not an individual computer. You can think of this as a class of computers (e.g., PIII 900MHZ).
- The instructor has an identifier Emp ID and has attributes Name, Rank, and Office Phone.
- Timeslot has identifier TSIS and has attributes Day Of Week, Start Time, and End Time.
- The course has an identifier Course ID and has attributes Course Description and Credits. Courses can have one, none, or many prerequisites. Courses also have one or more sections.
- The section has an identifier Section ID and attribute Enrollment Limit.

Some additional business rules are as follows to help you create the initial design:

- An instructor teaches one, none, or many sections of a course in a given semester.
- An instructor specifies preferred time slots.
- Scheduling data are kept for each semester, uniquely identified by semester and year.
- A room can be scheduled for one section or no section during one-time slot in a given semester of a given year. However, one room can participate in many schedules, one schedule, or no schedules; one-time slot can participate in many schedules, one schedule, or no schedules; one section can participate in many schedules, one schedule, or no schedules. Hint: Can you associate this with anything that you have seen before?

- A room can have one type of media, several types of media, or no media.
- Instructors are trained to use one, none, or many media types.
- A lab has one or more computer types. However, a classroom does not have any computers.
- A room cannot be both a classroom and a lab. There also are no other room types to be incorporated into the System.

Following are the practice questions from the book "Fundamental of Database Systems" (not to be submitted)

7.28
8.18
8.20
8.26a