National University

Of Computer & Emerging Sciences Faisalabad-Chiniot Campus

Assignment # 3

CS 2005 – Database Systems

Spring 2022

Submission Guidelines

1. Use your own words to answer the questions.
2. Plagiarism is not allowed.
3. You have to submit **hand written assignment in class**.
4. Mention your **name**, **roll Number** and **section** on first page of your assignment.
5. Late submission is strictly not allowed.

CASE STUDIES:

1

Develop an EER model for the following situation, using the traditional EER subtypes inside supertypes notation, as specified by your instructor:

A person may be employed by one or more organizations, and each organization may be the employer of one or more persons. An organization can be an internal organizational unit or an external organization. For persons and organizations, we want to know their ID, name, address, and phone number. For persons, we want to know their birth date, and for organizations, we want to know their budget number. Employee can be permanent employee or may be a part time job holder but at the same time a person can be both. For permeant they have extra bonus and credit while for part time job older we keep their extra hours. For each employment, we want to know the employment date, termination date, and bonus. Employment of a person by an organization may result in the person holding many positions over time. For each position, we want to know its title, and each time someone holds that position, we need to know the start date and termination date and salary. An organization is responsible for each position. It is possible for a person to be employed by one organization and hold a position for which another organization is responsible.

2

Draw an EER diagram for the following description of a law firm: Each case handled by the firm has a unique case number; a date opened, date closed, and judgment description are also kept on each case. A case is brought by one or more plaintiffs, and the same plaintiff may be involved in many cases. A plaintiff has a requested judgment characteristic. A case is against one or more defendants and the same defendant may be involved in many cases. A plaintiff or defendant may be a person or an organization. Over time, the same person or organization may be a defendant or a plaintiff in cases. In either situation, such legal entities are identified by an entity number, and other attributes are name and net worth.

3

A database is required for judiciary to keep record of law. The organization wants to keep record of prisoner and their cases information. The prisoner has the unique number name address . the perisoner commit different type of crimes. The crime has unique number, punishment type and duration. The crime can be medium, low and high risk crime. **Minimum security prisons** are usually reserved for white collar criminals who have committed acts such as embezzlement or fraud. Although these are serious crimes, they are non-violent in nature and therefore the perpetrators are not considered to be a risk for violence. These perpetrators are sent to facilities that offer a dormitory-type living environment, fewer guards, and more personal freedoms, The characteristic of this type is living environment and punishment duration.

Medium security prisons are the standard facilities used to house most criminals. They feature cage-style housing, armed guards, and a much more regimented daily routine than minimum security. The attributes for this type of crime are punishment amount

High security prisons are reserved for the most violent and dangerous offenders. These prisons include far more guards than both minimum and medium security, and very little freedom. Each person confined to such a prison is considered to be a high-risk individual.

The attributes of high security risk are date of committed crime and severity level. The persior may commit one or all type of crime.

The crime committed by any prisoner have hearing. The cases are of two type either the cases has been closed and their final result has been saved. Or the hearing is continues. In case of continues case the date of next hearing and record of previous findings are store.

DRAW EERD

4

Develop an EER model for the following situation using the traditional EER notation, the Visio notation, or the subtypes inside supertypes notation, as specified by your instructor: An international school of technology has hired you to create a database management system to assist in scheduling classes. After several interviews with the president, you have come up with the following list of entities, attributes, and initial business rules:

• Room is identified by Building ID and Room No and also has 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 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.

• 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).

• Instructor has 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.

• Course has 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.

• Section has identifier Section ID and attribute Enrollment Limit. After some further discussions, you have come up with some additional business rules 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 to 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 types of media.

• 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.

5

Draw an EER diagram for the following situation: TomKat Entertainment is a chain of theaters owned by former husband and wife actors/entertainers who, for some reason, can't get a job performing anymore. The owners want a database to track what is playing or has played on each screen in each theater of their chain at different times of the day. A theater (identified by a Theater ID and described by a theater name and location) contains one or more screens for viewing various movies. Within each theater each screen is identified by its number and is described by the seating capacity for viewing the screen. Movies are scheduled for showing in time slots each day. Each screen can have different time slots on different days (i.e., not all screens in the same theater have movies starting at the same time, and even on different days the same movie may play at different times on the same screen). For each time slot, the owners also want to know the end time of the time slot (assume all slots end on the same day the slot begins), attendance during that time slot, and the price charged for attendance in that time slot. Each movie (which can be either a trailer, feature, or commercial) is identified by a Movie ID and further described by its title, duration, and type (i.e., trailer, feature, or commercial). In

each time slot, one or more movies are shown. The owners want to also keep track of in what sequence the movies are shown (e.g., in a time slot there might be two trailers, followed by two commercials, followed by a feature film, and closed with another commercial).