**Database Management and File Structures**

**Final Project**

Solve the following problems

1. Consider an entity type SECTION in a UNIVERSITY database, which describes the section offerings of courses. The attributes of SECTION are Section\_number, Semester, Year, Course\_number, Instructor, Room\_no (where section is taught), Building (where section is taught), Weekdays (domain is the possible combinations of weekdays in which a section can be offered {‘MWF’,‘MW’, ‘TT’, and so on}), and Hours (domain is all possible time periods during which sections are offered {‘9–9:50 A.M.’, ‘10–10:50 A.M.’, ..., ‘3:30–4:50 P.M.’, ‘5:30–6:20 P.M.’, and so on}). Assume that Section\_number is unique for each course within a particular semester/year combination (that is, if a course is offered multiple times during a particular semester, its section offerings are numbered 1, 2, 3, and so on). There are several composite keys for section, and some attributes are components of more than one key.

Identify three composite keys, and show how they can be represented in an ER schema diagram.

1. Consider a MOVIE database in which data is recorded about the movie industry. The data requirements are summarized as follows:

■ Each movie is identified by title and year of release. Each movie has a length in minutes. Each has a production company, and each is classified under one or more genres (such as horror, action, drama, and so forth). Each movie has one or more directors and one or more actors appear in it. Each movie also has a plot outline. Finally, each movie has zero or more quotable quotes, each of which is spoken by a particular actor appearing in the movie.

■ Actors are identified by name and date of birth and appear in one or more movies. Each actor has a role in the movie.

■ Directors are also identified by name and date of birth and direct one or more movies. It is possible for a director to act in a movie (including one that he or she may also direct).

■ Production companies are identified by name and each has an address. A production company produces one or more movies.

Design an Entity-Relationship diagram for the movie database and enter the design using a data modeling tool such as **MS SQL Diagram**.

1. Design a database in **MS SQL SERVER** to keep track of information for an art museum. Assume that the following requirements were collected:

■ The museum has a collection of ART\_OBJECTS. Each ART\_OBJECT has a unique Id\_no, an Artist (if known), a Year (when it was created, if known), a Title, and a Description. The art objects are categorized in several ways, as discussed below.

■ ART\_OBJECTS are categorized based on their type. There are three main types: PAINTING, SCULPTURE, and STATUE, plus another type called OTHER to accommodate objects that do not fall into one of the three main types.

■ A PAINTING has a Paint\_type (oil, watercolor, etc.), material on which it is Drawn\_on (paper, canvas, wood, etc.), and Style (modern, abstract, etc.).

■ A SCULPTURE or a statue has a Material from which it was created (wood, stone, etc.), Height,Weight, and Style.

■ An art object in the OTHER category has a Type (print, photo, etc.) and Style.

■ ART\_OBJECTs are categorized as either PERMANENT\_COLLECTION (objects that are owned by the museum) and BORROWED. Information captured about objects in the PERMANENT\_COLLECTION includes Date\_acquired, Status (on display, on loan, or stored), and Cost. Information captured about BORROWED objects includes the Collection from which it was borrowed, Date\_borrowed, and Date\_returned.

■ Information describing the country or culture of Origin (Italian, Egyptian, American, Indian, and so forth) and Epoch (Renaissance, Modern, Ancient, and so forth) is captured for each ART\_OBJECT.

■ The museum keeps track of ARTIST information, if known: Name, DateBorn (if known), Date\_died (if not living), Country\_of\_origin, Epoch, Main\_style, and Description. The Name is assumed to be unique.

■ Different EXHIBITIONS occur, each having a Name, Start\_date, and End\_date. EXHIBITIONS are related to all the art objects that were on display during the exhibition.

■ Information is kept on other COLLECTIONS with which the museum interacts, including Name (unique), Type (museum, personal, etc.), Description, Address, Phone, and current Contact\_person. Draw an EER schema diagram for this application. Discuss any assumptions you make, and that justify your EER design choices.