



Assignment # 2

CS 219&203 – Database Systems

Spring 2020

Assigned Date:	Feb 29, 2020
Due Date:	March 9, 2018
Maximum Marks:	30
Weighted Marks:	2

Submission Guidelines.

1. Plagiarism is not allowed.
2. You have to submit **hand written assignment**.
3. Mention your **name, roll Number** and **section** on first page of your assignment.
4. Late submission is strictly not allowed.

Question-1

Galleries keep information about artists, their names (which are unique), birthplaces, age, and style of art. For each piece of artwork, the artist, the year it was made, its unique title, its type of art (e.g., painting, lithograph, sculpture, photograph), and its price must be stored. Pieces of artwork are also classified into groups of various kinds, for example, portraits, still life's, works by Picasso, or works of the 19th century; a given piece may belong to more than one group. Each group is identified by a name (like those just given) that describes the group. Finally, galleries keep information about customers. For each customer, galleries keep that person's unique name, address, total amount of dollars spent in the gallery, and the artists and groups of art that the customer tends to like.

Draw the **ER diagram** for the above database.

Question-2

The IT department builds all their computers from components. Each computer consists of components like graphic cards, network cards, mother boards, memory capsules, hard discs, etc. When a component is bought it is given an ID number, and the component is marked with this number so that it will be possible to track each individual component. Every computer consists of a computer box, a graphic card, one or more hard drives, etc. The finished computer is placed in a room, and gets a person responsible for this computer. Help the department by creating an **ER or EER modelling** computers and components.



Question-3

Consider a database to store information for a social networking website. The database has the following properties:

- Every user has a unique user ID (integer) along with a full name, age and phone number.
- Every group has a unique group ID (integer) and a name. Every group must have at least one user that serves as moderator of the group.
- A user may be a member of zero or more groups; groups may contain zero or more members (and one or more moderators).
- Users are allowed to create zero or more albums. An album has a unique album ID (integer), a creation date, and a name. An album is owned by exactly one user: the user that created it.
- An album can contain zero or more media files. For every media file, we record its unique URL, the date the file was added to the album, and a caption (if one exists).
- Users can zero or more photos to albums. Photos are a type of media file, but we also track the encoding (e.g., JPEG, PNG, etc.) and the size of the photo (in bytes).
- Users may add zero or more videos to albums. Videos are a type of media file, and we track the codec used to encode the video (e.g., MPEG-4), the length of the video (in seconds), and the video's bitrate.
- A media file may belong to at most one album.

Given this description of the database and its constraints, you have to draw an Entity-Relationship diagram, then further think to draw its extension of *Enhanced Entity-Relationship* diagram.

Question-4

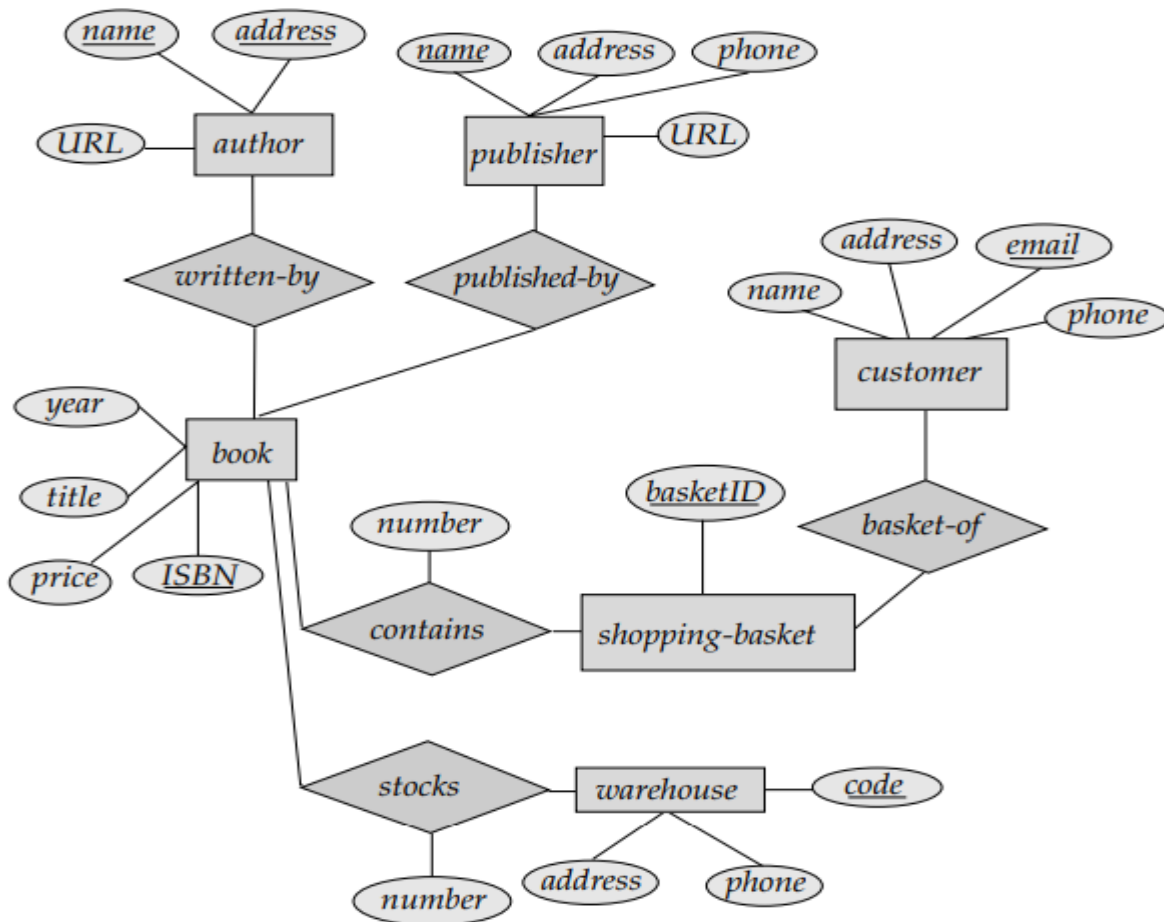
Consider a database (Assume) used to record the marks that students get in different exams of different course offerings.

1. Construct an E-R diagram that model's exams as entities, and uses a ternary relationship, for the above database.
2. Construct an alternative E-R diagram that uses only a binary relationship between students and course-offerings. Make sure that only one relationship exists between a particular student and course-offering pair, yet you can represent the marks that a student gets in different exams of a course offering.

Question-5

Consider the *E-R diagram* in Figure given below, which models an online bookstore.

1. List the entity sets and their primary keys.
2. Suppose the bookstore adds music cassettes and compact disks to its collection. The same music item may be present in cassette or compact disk format, with differing prices. Extend the E-R diagram to model this addition, ignoring the effect on shopping baskets.
3. Now extend the *E-R diagram*, using *generalization*, to model the case where a shopping basket may contain any combination of books, music cassettes, or compact disks.



Question-6

Consider an online auction database system in which members (buyers and sellers) participate in the sale of items. The data requirements for this system are summarized as follows:

- The online site has members who are identified by a unique member id and are described by an email address, their name, a password, their home address, and a phone number.
- User accounts are categorized as buyer and seller. A member is a buyer or a seller, cannot be both of them at the same time.
- A buyer has a shipping address recorded in the database. A seller has a bank account number and routing number recorded in the database.
- Items are placed by a seller for sale and are identified by a unique item number assigned by the system. Items are also described by an item title, an item description, a starting bid price, bidding increment, the start date of the auction, and the end date of the auction.
- Items are also categorized as COMPUTER, HARDWARE, MODEM. An item must belong to one of these categories and it may belong to more than one at the same time.
- Buyers make bids for items they are interested in. A bidding price and time of bid placement is recorded. The person at the end of the auction with the highest bid price is declared the winner and a transaction between the buyer and the seller may proceed soon after. Design an **EER schema** for this application.