**Chapter 1: Problems and Exercises:**

**4) The statement is made that the disadvantages of file processing systems can also be limitations of databases, depending on how an organization manages its databases. First, why do organizations create multiple databases, not just one all-inclusive database supporting all data processing needs? Second, what organizational factors are at work that might lead and organization to have multiple, independently managed databases (and hence, not completely follow the database approach)?**

Organizations create multiple databases over an all-inclusive database to avoid unnecessary circumstances in each department/workgroup database, depending mainly on the functions & size of the organization. Specific information required for one department may not be needed for the whole organization.

The factors rising due to the conflict of having ownership & the responsibilities of who has to maintain the data like recovery, development & backup causes an organization to have multiple databases.

**6) A driver’s license bureau maintains a database of licensed drivers. State whether each of the following represents data or metadata. If it represents data, state whether it is structured or unstructured data. If it represents metadata, state whether it is a fact describing a property of data or a fact describing the context of the data.**

**a. Driver’s name, address and birthdate:**

These are the essential information of the database and considered as Data. The data is structured data.

**b. The fact that the driver’s name is a 30 character field**

The information is Metadata as it specifies the data type & it is a fact describing the property of data.

**c. A photo image of the driver**

It represents the data which is unstructured.

**d. An image of the driver’s fingerprint**

It represents the data which is unstructured.

**e. The make and serial number of the scanning device that was used to scan the fingerprint**

It represents the data & the data is structured.

**f. The resolution (in megapixels) of the camera that was used to photograph the driver**

It represents the data & the data is structured

**g. The fact that the driver’s birthdate must precede today’s date by at least 16 years**

It represents metadata which is a fact describing the context of data.

**Chapter 2: Problems and Exercises:**

**17) Draw an ERD for each of the following situations. (If you believe that you need to make additional assumptions, clearly state them for each situation.) Draw the same situation using the tool you have been told to use in the course.**

**a. A company has a number of employees. The attributes of EMPLOYEE include Employee lD (identifier), Name, Address, and Birthdate. The company also has several projects. Attributes of PROJECT include Project lD (identifier), Project Name, and Start Date. Each employee may be assigned to one or more projects or may not be assigned to a project. A project must have at least one employee assigned and may have any number of employees assigned. An employee's billing rate may vary by project, and the company wishes to record the applicable billing rate (Billing Rate) for each employee when assigned to a particular project.**

**ERD (Entity Relationship Diagram)**



**Do the attribute names in this description follow the guidelines for naming attributes? If not, suggest better names.**

Of course the attributes follow the guidelines for naming attributes.

**Do you have any associative entities on your ERD? If so, what are the identifiers for those associative entities?**

There no associative entities in the ERD which implies no identifiers or them.

**Does your ERD allow a project to be created before it has any employees assigned to it?**

No it doesn’t allow a project to be created without the assignment of employees.

**Explain. How would you change your ERD if the Billing Rate could change in the middle of a project?**

The ERD below consists of billing rate between the attributes of employee & projects considering if the billing rate could change in the middle of the projects.

**17 g ) An art museum owns a large volume of works of art. Each work of art is described by an item code (identifier), title, type, and size; size is further composed of height, width, and weight. A work of art is developed by an artist, but the artist for some works is unknown. An artist is described by an artist lD (identifier), name, date of birth, and date of death (which is null for still living artists). Only data about artists for works currently owned by the museum are kept in the database. At any point in time, a work of art is either on display at the museum, held in storage, away from the museum as part of a traveling show, or on loan to another gallery. If on display at the museum, a work of art is also described by its location within the museum. A traveling show is described by a show lD (identifier), the city in which the show is currently appearing, and the start and end dates of the show. Many of the museum works may be part of a given show, and only active shows with at least one museum work of art need be represented in the database. Finally, another gallery is described by a gallery lD (identifier), name, and city. The museum wants to retain a complete history of loaning a work of art to other galleries, and each time a work is loaned, the museum wants to know the date the work was loaned and the date it was returned. As you develop the ERD for this problem, follow good data naming guidelines.**

**ERD diagram for Art museum:**

* Four entities Artwork, Gallery, Artist and Show.
* The Artwork has mandatory-many relationship with the other three entities.
* Gallery entity has relationship optional-many with the Artwork
* Artist entity has relationship optional-one with the Artwork
* Show entity has relationship mandatory-one with the Artwork



**ERD Diagram for Art Museum**

**23) After completing a course in database management, you are asked to develop a preliminary BRD for a symphony orchestra. You discover the entity types that should be included as shown in Table 2-3.**

**During further discussions you discover the following:**

**• A concert season schedules one or more concerts. A particular concert is scheduled for only one concert season.**

**• A concert includes the performance of one or more compositions. A composition may be performed at one or more concerts or may not be performed.**

**• For each concert there is one conductor. A conductor may conduct any number of concerts or may not conduct any concerts.**

**• Each composition may require one or more soloists or may not require a soloist. A soloist may perform one or more compositions at a given concert or may not perform any composition. The symphony orchestra wishes to record the date when a soloist last performed a given composition (Date Last Performed).**

**Draw an ERD to represent what you have discovered. Identify a business rule in this description and explain how this business rule is modeled on the E-R diagram. Also draw a data model for this situation using the tool you have been told to use in your course.**

**ERD for Symphony Concert:**



**Business Rule for above diagram:**

* In more than one concert there may be or may not have one composition performed.
* The entity that associates the Composition entity & concert entity is the Performance entity.
* Using the relationship between the Performance entity & Soloist entity we can track the derived data of date last performed.
* Between the all entities there exists the ternary relationship.
* There exists M to N relationship of binary between the entity soloist & entity Performance.
* This in turn helps to track one soloist performing many compositions& viceversa.

**14) Develop an EER model for the following situation, using the traditional EER notation, the Visio notation, or the subtypes inside super types notation, as specified by your instructor, A technology company provides offerings to its customers. Offerings are of two separate types: products and services. Offerings are identified by an offering ID and an attribute of description. In addition, products are described by product name, standard price, and date of first release; services are described by name of the company's unit responsible for the service and conditions of service. There are repair maintenance, and other types of services. A repair service has a cost and is the repair of some product; a maintenance service has an hourly rate. Fortunately, some products never require repair. However, there are many potential repair services for a product. A customer may purchase an offering, and the company needs to keep track of when the offering was purchased and the contact person for that offering with the customer. Unfortunately, not all offerings are purchased. Customers are identified by customer ID and have descriptive data of name, address, and phone number. When a service is performed, that service is billed to some customer. Because some customers purchase offerings for their clients, a customer may be billed for services he or she did not purchase, as well as for ones that were purchased. When a customer is billed for a service (although some may never require a service of any type), the company needs to keep track of the date the service was performed, the data bill is due & the amount due.**



**Traditional ERR Notation Diagram**



**Visio Notation of ER diagram**



**The subtypes inside super Types notation**

**15. 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.**



**EER Diagram for Law Firm**