Practical Guide to Database Design 2nd edition Hogan Solutions Manual

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Chapter 2

Questions

1. Define the terms “entity” and “attribute”, and give examples of each.
   ANS:
   An entity is something about which information is known. For example, we store information about Employees.
   Hint – when thinking about an item and deciding if it’s an entity or attribute, we can ask “does it have a single value?”. If not, and multiple items are needed to describe it, it’s an entity.
   An attribute represents a single piece of information that provides something about an entity. For example, each Employee will have an Employee-ID (or something equivalent), which has a single value.

2. In developing a new data model for Customers, some having multiple offices, a data requirement for a “Customer Location” has been identified. Is this an entity, or an attribute, and why?
   ANS:
   “Customer Location” is an entity, and can’t be expressed with a single value. It represents a collection of information about an object which will need attributes such as the address, manager’s id, telephone number.

Referring to the data model shown in Figure 2.8:

3. If the attribute “PreferredCreditCard” is to be added, how would the entity/attribute list change?
   ANS:
   The PreferredCreditCard attribute would be added to the Customer entity.

4. If information were to be added to track the quality of items sold by a supplier, what changes would be made to the data model?
   ANS:
   A “QualityofGoods” attribute would be added to the Restock_Item entity.

5. What’s the difference between the ItemPrice in Advertised_Item and SellingPrice in Ordered_Item?
   ANS:
   ItemPrice is the current selling price for this item; i.e., the price that would be charged for an order placed today. SellingPrice records the price paid for the item when the order was placed.

You are asked to participate in creating a logical data model for a physician’s office.

6. List five entities you would expect to see in this data model, and give a description of each.
   ANS:
   Physician – Information about one of the physician’s working in that office
   Patient – Information about a person receiving or registered to receive medical treatment in that office
   Appointment – Information about a scheduled time for a patient to consult with a physician
   Insurer – Information about an organization providing coverage for medical expenses of patients
   Billing – Information regarding the invoice regarding each patient’s visit to a physician.

7. For each entity, list five attributes that would be appropriate for each.
   ANS:
   Of course, there are many variations of what to do here. Below is just one interpretation.
   Physician
   Physician ID

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Physician Prefix
Physician Specialty Code
Physician First Name
Physician Last Name

Patient
Patient ID
Patient First Name
Patient Last Name
Patient Date of Birth
Insurer ID (Patient's Primary Insurer)

Appointment
Patient ID
Physician ID
Appointment Date
Appointment Time
Reason for Appointment

Insurer
Insurer ID
Insurer Name
Insurer Contact Phone Number
Insurer Contact Fax Number
Insurer website

Billing
Patient ID
Appointment ID
Insurer ID
Patient Payment at Visit
Date Submitted to Insurer

8. For each entity, what attribute(s) would be appropriate as a key?
ANS:
Physician
Physician ID
Patient
Patient ID
Appointment
Patient ID
Appointment Date
Appointment Time
Insurer
Insurer ID
Billing
Billing ID

9. Develop a data model showing these five entities and their relationships.

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<IMAGE EOCQ-1 HERE>

You are asked to lead a design team for a new database to be used by your company.

10. Who would you ask to participate as a member of the design team? Why?
ANS:
Experienced user representatives (minimum 2) – to get user input on what is needed for new system
Software developers – to understand the software that needs to be written
DBAs – to gather input and prepare logical and physical database design
Web developers – to develop web-based user interfaces

11. When developing an initial list of entities for the database, what guidelines would you give the participants on what to consider/not consider?
ANS:
When starting, do brain-storming over the different types of data that might be considered or used. Users need to hear a range of what CAN be done in order to develop an understanding of what to ask for.

12. How would you document the entity/attribute lists as they are developed?
ANS:
If at all possible, document the entity-attribute lists in a data modeling tool such as erwin.

13. What do you feel is the appropriate level for data normalization for the entity/attribute lists to be developed? Why?
ANS:
Third normal form should be used. Fourth and Fifth normal forms are too detailed to be practical.

14. Is the database to be used for implementation a factor at this stage? Why or why not?
ANS:
No, it really isn't. The physical design model can for the most part be created without knowledge of the RDBMS to be used. It's only when the design details start addressing physical storage methods for each column that the RDBMS matters (in particular if Microsoft Access is a possibility).

15. As the logical data model is developed, should any significant usage requirements be noted or documented? Why or why not?
ANS:
Absolutely. Frequent user accesses will generally require a modification to the physical design to obtain acceptable performance levels. This might be as simple as adding an index to a table, but often will require introducing "planned redundancy" in some data element(s) to avoid I/O.

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