NOTEBOOK NOTES DATABASE DESIGN FOR MERE MORTALS

**SUMÁRIO**

[1 PARTE 1 – RELATIONAL DATABASE DESIGN 3](#_Toc112594678)

[1.1 The Relational Database 3](#_Toc112594679)

# PARTE 1 – RELATIONAL DATABASE DESIGN

## The Relational Database

1 - Name the two main types of databases in use today.

R: The two types of databases more used today are: Operational and Analytical.

2 - What type of data does an analytical database store?

R: An analytical database store data which will be used for measurement analysis, graphical comparisons, those data are immutable, don’t change, and are massive stored without be erased or modified.

3 - True or false: An operational database is used primarily in online transaction processing (OLTP) scenarios. R: True

4 - Name one of the branches of mathematics on which the relational model is based.

R: Set.

5: How does a relational database store data?

R: A relational database store data with relationships among the tables, rows, using keys.

6: Name the three types of relationships in a relational database.

R: one-to-one; one-to-many; many-to-many

7: How do you retrieve data in a relational database?

R: we retrieve data in a relational database with SQL, (Structured query language).

8: State two advantages of a relational database.

R: First: The data stored can be structured in a manner that they have relationship, with that you can retrieve a bunch of data from one entity in a way that will bring up more data related to other entities.

Second: Has a possibility for more security, adding constraints in some tables, and the manipulation of data is more accurately.

9: What is a relational database management system?

R: An (RDBMS) is a software that has a function to manipulate a database system. Have tools who make easy many tasks.

10: True of false: Mobile devices are limited to gigabytes of storage.

R: False, but have some issues with that, had a certain limit with that.

11: State why database software companies have had a hard time implementing the relational databases:

R: Because in that time they don’t have all resources which we have today, the machines in that time has little memory than today.

# DESIGN OBJECTIVES

## Database design methods

### Traditional Design Methods

In general, traditional methods of database design incorporate three phases: requirements analysis, data modeling, and normalization.

# TERMINOLOGY

### Note about View:

Although every major database vendor supports the type of view I’ve described in this section, several vendors support what is known as an indexed (or materialized) view. An indexed view is different from a “regular” view in that it does store data, and you can index its fields to improve the speed at which the RDBMS processes the view’s data. A full discussion of indexed views is beyond the scope of this book because it is a vendor-specific implementation issue. However, you should research this topic further if you are working with RDBMS software such as Oracle, Microsoft SQL Server, IBM DB2, or Sybase SQL, or if you are working with a data warehouse or an online analytical processing (OLAP) database.

### Note not confuse Index with keys

An index is a structure an RDBMS provides to improve data processing. Your particular RDBMS program will determine how the index works and how you use it. However, an index has absolutely nothing to do with the logical database structure! The only reason I include the term index in this chapter is that people often confuse it with the term key.

Index and key are just two more terms that are widely and frequently misused throughout the database industry and in numerous database-related publications and websites. (Remember my comments on data and information?) You’ll always know the difference between the two if you remember that keys are logical structures you use to identify records within a table, and indexes are physical structures you use to optimize data processing.

## Types of Relationships

You can characterize every relationship in three ways: by the type of relationship that exists between the tables, the manner in which each table participates, and the degree to which each table participates.

Three specific types of relationship (traditionally known as a cardinality) can exist between a pair of tables: one-to-one, one-to-many, and many-to-many.

# Conceptual Overview

## The importance of completing the design process

One thing I want to make perfectly clear from the very beginning is the importance of completing the design process. I’m often asked if it’s truly necessary to go through the entire design process. My answer is always a resounding, “Yes!” I’m then asked whether it’s still necessary if someone is only going to create a “simple” database. (Simple is one of the most dangerous words known to database developers. Nothing is ever “simple.”) Again, my answer is, “Yes, it’s still necessary.”

## Defining a mission statement and mission objectives

The first phase in the database design process involves defining a mission statement and mission objectives for the database. The mission statement establishes the purpose of the database and provides you with a distinct focus for your design work.

You’ll also define mission objectives in this phase. These are statements that represent the general tasks your users can perform against the data in the database.

Two separate groups of people will be involved in defining the mission statement and the mission objectives. The first group includes the database developer (you), the person who owns the database, and management personnel or the person who is ultimately responsible for the database; this group is responsible for defining the mission statement. The second group includes the database developer (you again), management personnel or the person who is ultimately responsible for the database, and end users; this group is responsible for defining the mission objectives.

## Analyzing the current database

The second phase in the database design process involves analyzing the current database if one exists. Depending on your organization, the database will typically be a legacy database or a paper-based database.

A legacy database (also known as an inherited database) is one that has been in existence and in use for several years. A paper-based database, as you may already know, is a loose collection of forms, manila folders, and the like.

In that phase you have to make some interviews with managers and people of your organization for collect information about how they work with the database and information requirements. These interviews are important for collect information which will be crucial for design a database that truly meets your organization needs.

With the data gathered, now you have to do analysis for compile an initial list of fields, you’ll refine this list. This refined list constitutes your organization’s fundamental data requirements, and are a start point for design a new database.

After your initial field list is complete, you’ll send it to your users and manager for review, requesting a feedback and suggestions. Analyze the suggestions if are they reasonable you’ll implement it, if not take away and move on for the next phase.

## Creating the data structures

This is the third phase design process, you’ll define tables and fields, establish keys, and define field specifications for every field.

Tables are the first structures you’ll define in the database, with the information gathered in the first phases you have subjects to associate them with fields. After this task you review each table to ensure that it represent only one subject, and don’t contain duplicate fields.

Next, you establish the appropriate keys for each table. Your main task is to ensure that each table has a properly defined primary key; this particular key uniquely identifies each record within a table.

The final step in this phase is to establish field specifications for each field in the database. At this point, you conduct interviews with users and management to help you identify the specific field characteristics that are important to them and review and discuss any characteristics with which they may be unfamiliar. After you’ve completed these interviews, you define and document field specifications for each field. The table structures are now ready for the next phase, after you complete any refinements that you identified during the review.

## Determining and Stablishing table relationships

The fourth phase of the database design, this process involves stablishing relationships with tables. You’ll conduct interviews with users and management once again, identify relationships, identify relationship characteristics, and establish relationship-level integrity.

After you’ve identified the relationships, you establish a logical connection between the tables in each relationship with a primary key or with a linking table. Next, you determine the type of participation and degree of participation for the tables in each relationship. In some cases, these participation characteristics will be obvious to you due to the nature of the data stored in the tables. In other cases, you’ll base the participation characteristics on specific business rules.

## Determining and defining business rules

Determining and defining business rules is the fifth phase of the database design process. During this phase, you’ll conduct interviews, identify limitations on various aspects of the database, establish business rules, and define and implement validation tables.

The manner in which your organization views and uses its data will determine a set of limitations and requirements that you must build into the database. Your interviews with users and management will help you identify the specific constraints you will impose on the data, data structures, or relationships. You then document these specifications as business rules.

## Determining and defining views

The sixth phase of the design process involves determining and defining views. Here you’ll conduct interviews (once again), identify various ways of working with the data, and establish the views.

You identify the types of views you need to build in the database by interviewing users and management and determining how they work with their respective data. You may find, for example, that many users require detailed information to perform their work, whereas others need only summary information to help them make strategic decisions for the organization. Each group of users must access information in very specific ways, and you can use views to accommodate these situations.

Next, you define the views you’ve identified during the interview process using the appropriate tables and fields and establish criteria for those views that are required to retrieve specific information. For instance, you would establish criteria for a view that must list all customers located in Texas or a view that must display the total number of authorized vendors (by city) in Washington.

## Reviewing data integrity

The seventh and final phase in the database design process involves reviewing the final database structure for data integrity.

# Starting the Process

## Conduct interviews

Interviews are an integral part of database design, and they play a key role during certain phases of the design process.

Note: Find books about: how to conduct interviews properly.

### Stablish guidelines for interviews

Always establish guidelines for your interviews before you conduct them. This helps ensure that you conduct your interviews in a consistent manner and that they are always (or usually) successful.

## Defining the mission statement

A good mission statement is succinct and to the point, here a example of a typical good statement:

“The purpose of the New Starz Talent Agency database is to maintain the data we generate and to supply information that supports the engagement services we provide to our clients and the management services we provide to our entertainers.”

This mission statement is well defined and uncluttered by unnecessary statements or details. A well-written mission statement is free of phrases or sentences that explicitly describe specific tasks. Se below an example of a bad statement:

“The purpose of the Whatcom County Hearing Examiner’s database is to keep track of applications for land use, maintain data on applicants, keep a record of all hearings, keep a record of all decisions, keep a record of all appeals, maintain data on department employees, and maintain data for general office use.”

The statement above is verbose, the specific purpose of the database is unclear and it describes several specific tasks. You can fix it by removing the references for specific tasks, but take them aside for use in the next step, and rewrite the statement, see below this statement fixed:

“The purpose of the Whatcom County Hearing Examiner’s database is to maintain the data the examiner’s office uses to make decisions on land-use requests submitted by citizens of Whatcom County.”

With this adjust has become clearer.

### Composing a Mission Statement

Conducting an interview with the owner or manager of the organization, for learning about the organization, speak with the owners is better because they have a deep understanding about the organization.

Be sure to ask open-ended questions in the interview, like this one:

“How would you describe the purpose of your organization to a new client?”

This is a good open-ended question because it focuses on the issue and yet gives the participant the freedom to respond with what they feel is a complete answer.

Here are a few sample questions that you can use to arrive at your mission statement:

* How would you describe the purpose of your organization to a new client?
* What would you say is the purpose of your organization?
* What is the major function of your organization?
* How would you describe what your organization does?
* How would you define the single most important reason for the existence of your organization?
* What is the main focus of your organization?

When you believe you have a good mission statement (MS), review it with your client, and make sure that he understands and agrees with, when both are satisfied with the MS you can go on to the next step, which is define the mission objectives.

## Defining the mission objectives

Mission objectives are statements that represent the general tasks supported by the data maintained in the database.

A well-written mission objective is a declarative sentence that clearly defines a general task and is free from unnecessary details, see below some examples:

* Maintain complete patient address information.
* Keep track of all customer sales.
* Make sure an account representative is responsible for no more than 20 accounts at any given time.
* Keep track of vehicle maintenance.
* Produce employee phone directories.

These mission objectives are well defined and easy to understand. Each mission objective represents a single general task and defines the task clearly without unnecessary details. For example, the last mission objective in the list states that employee directories need to be produced, but it doesn’t indicate how they are to be produced. Indicating how the employee directories will be produced is not necessary because that issue is part of the application development process. Remember that the purpose of a mission objective is to help define various structures within the database and to help guide the overall direction of the database’s development.

### Composing mission objectives

Defining mission objectives is a process that involves conducting interviews with users and management and then writing appropriate mission objectives based on the information gathered from the interviews.

The purpose of the interview is to determine what types of general tasks need to be supported by the data in the database.

One very important point to remember is that the interviews you conduct here involve very general discussions. The discussions are more conceptual than analytical; your intent here is not to analyze the current database or database application, but to get an overall idea of the general tasks the database should support.

Here are just a few examples of the types of questions you could pose during the interview:

* What kind of work do you perform on a daily basis?
* How would you define your job description?
* What kind of data do you work with?
* What types of reports do you generate?
* What types of things do you keep track of?
* What types of services does your organization provide?
* How would you describe the type of work you do?

# Analyzing the current database

Here you will conduct some interviews with management and staff users, with that know the current database that they actually use. For these proposes:

* Determine whether the database supports the organization’s current information requirements
* Uncover existing structural deficiencies
* Determine how the database needs to evolve so that it will support the organization’s future information requirements

You can use the existing database as a resource for developing a new database. However, you must carefully judge which aspects of the current database remain useful and which aspects should be discarded. You can make these judgments by answering the following questions:

* What types of data does the organization use?
* How does the organization use that data?
* How does the organization manage and maintain that data?

You can best answer these questions by analyzing your organization’s existing database. It’s very likely that the organization is using some type of database, and it can probably be associated with one of the following categories.

* Paper-based databases. Also known as file systems, these typically consist of various forms and handwritten or printed documents stored in file folders or bound in notebooks.
* Legacy databases have been in existence and in use for several years and consist of various types of data structures and user interfaces that all reside on mainframe computers, network servers, personal computers, or more recently, on the cloud.
* Human knowledge bases (loosely defined) are based on the memory of one or more employees within an organization. These individuals have a specific amount of knowledge regarding a given aspect of the organization (for example, customer information or product details), and they are crucial to conducting the organization’s business.

There’s one rule you should keep first and foremost in your mind as you’re analyzing the current database:

Do not adopt the current database structure as the basis for the new database structure.

## Conducting the analysis

There are three steps in the analysis process:

1. reviewing the way data is collected
2. reviewing the manner in which information is presented
3. conducting interviews with users and management.

You will need to speak to various people in the organization as you conduct the first two steps in this process. Be sure your conversations relate purely to the reviews at hand. You’ll have the opportunity to ask them other in-depth questions later.

### Collecting data

This phase you will collect material for use in the design process, if they’re paper based, you’ll make copies of those that are more complete, photo copies, and store them in a project folder. For example, assume that the organization is collecting supplier data on sheets of paper in a binder. Go through the first few pages of the binder until you find one with an entry that is as complete as possible. When you’ve found an appropriate sample, make a copy of it and save it in the folder.

If they’re legacy database you’ll access these programs for collect screenshots, the objective here is to gather a set of sample screenshots that represent how the organization uses these programs to work with data. They can be spreadsheets, word software’s or be a legacy database program, make sure collect all screens that are relevant.

## Looking at how information is presented