

Introduction to Databases



A database is...

- An information manager.
- Databases make it possible to store, organize and retrieve information in ways that otherwise would not be possible.
- Databases come in all sizes and shapes from mainframe applications that run multi-national corporations to appointment calendars in PDAs.
- Just about any collection of information can be turned into a database.

Why use a database?

- Storing information in a database has many benefits
 - Organize and analyze in different ways
 - Reports
 - Mailing labels
 - Inventory
 - Many advantages over other ways to store data
 - Speed
 - Reliability
 - Precision
 - Ability to automate tasks

Why use a database?

- Databases make it easy to store large quantities of information. The larger the mass of information, the bigger the benefit of using a database.
- Databases make it easy to retrieve information quickly and flexibly.
- Databases make it easy to organize and reorganize information. You can quickly switch between schemes.
- Databases make it easy to print and distribute information in a variety of ways.

Database Organization

- Organized into one or more tables
 - Tables store records
 - Each record is a collection of fields
- Imagine your address book as a database
 - Each listing in the address book is one record
 - Each record has information in fields
 - Name
 - Address
 - City

The screenshot shows a software window titled "Library.fp5" with a menu bar containing "New", "Delete", "Form", "List", and "Reports". The main area is a form for a library record. It includes fields for "Title", "Author", "Publisher", "Date Acquired", and "ISBN". There is a "Loan..." button. Below the form are sections for "Format" (with radio buttons for "Book", "Magazine", "Newsletter") and "Category" (with checkboxes for "Biography", "Management", "Marketing", "Reference", "Technical"). To the right is a "Contents" table with 10 rows and two columns labeled "Articles/Chapters" and "Pages". The status bar at the bottom indicates "Library Template".

The screenshot shows a software window titled "untitled 2 (DB)" with a form for a business address. The form has a teal header with the word "Business" and a vertical label "Names & Addresses" on the left. The form fields include: "PREFIX" (Mr.), "LAST NAME" (Jones), "FIRST NAME" (Bill), "TITLE" (Accountant), "COMPANY", "ADDRESS 1" (123 Gold Ave.), "ADDRESS 2", "CITY" (Seattle), "STATE/PROVINCE" (WA), "ZIP/POSTAL CODE" (98043), "COUNTRY" (USA), "OFFICE PHONE" (206-555-6543), "FAX", "HOME PHONE", "CELLULAR PHONE", "E-MAIL ADDRESS", "NICKNAME", "SPOUSE'S NAME", "CHILDREN'S NAME(S)", "BIRTHDAY", "ANNIVERSARY", and "NOTES" (Payroll tax advisor).

Tables

- The core of a database is a table or series of tables - each table similar to a spreadsheet
- They are also made of rows (records) and columns (fields)



The screenshot shows a database window titled "untitled 2 (DB)". The window displays a table with the following columns: Last Name, First Name, Company, Address 1, and City. The table contains two records. The second record, "Blake, Charles, Blessed Sisters, 123 Shoe St.", is selected and highlighted in blue. The window also shows a sidebar with a record count of 2, a selected count of 1, and a status of "Unsorted".

<u>Last Name</u>	<u>First Name</u>	<u>Company</u>	<u>Address 1</u>	<u>City</u>
Jones	Bill		123 Gold Ave.	
Blake	Charles	Blessed Sisters Cafe Center	123 Shoe St.	

Nuts & Bolts

- Databases have a specialized vocabulary.
- A database is a collection of information stored in an organized form in a computer.
- A database program is a software tool for organizing storage and retrieval of that information.
- Many of the terms that describe the computer come from the file cabinet terminology of the office.
- For databases, the term 'file' means a data file that is a part of a database.
- A 'record' is the information relating to one person, item or event.

Fields and Views

- Each discreet chunk of information in a record is called a **field**
 - There are different types of fields, field types include:
 - A text field that contains text
 - A numeric field which contains only numbers and date fields which contain only dates
 - Other field types can include other types of data including graphics, photos, sounds or even videos
 - Computed fields contain formulas similar to spreadsheets.
- Most database programs have more than one way that data can be viewed. For example, form views show one record at a time and list views which show several records at a time

Operations

- Most database programs can easily import or receive data in the form of text files created with word processors, spreadsheets or other databases
- You can browse through these information records just as you would if they were paper records in a notebook
- You can make an information request from the database called an **information query**
- A query may be a simple search for or a specific record or a search for a group of records that meet a defined criteria
- A **sort command** allows you to arrange records in alphabetic or numeric order based on values in one or more fields
- **Reports** are the most common types of database printouts
- Many database programs don't print themselves, they export data or transport selected records to word processing programs with mail merge capabilities

Database Management System

- A file manager is a program that allows users to work on one file at a time. A true DBMS is a program or a system of programs that can manipulate data in a large collection of files cross referencing as needed
- A file manager is sufficient for mailing lists and other common data management applications
- For large, complex jobs a DBMS is needed
- With a DBMS there is no need to store redundant information in multiple files
- With a DBMS databases that are related are linked using key fields. These are fields that are shared by all files that use data from each other
- Since the files in databases that have DBMSs relate to each other, they are commonly called **relational databases**

Flat file vs. Relational DB

- Flat file databases store all information in a single data table. For large databases this may mean much duplicate information.
- Relational databases have a table for each type of data and the tables 'point' to each other. Thus they are more efficient, though they may be more difficult to manage.