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?

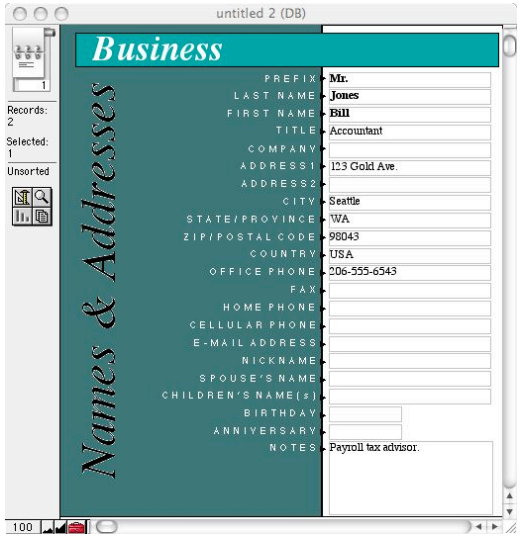
- Storing information in a database has many benefits
  - Organize and analyze in different ways
    - Reports
    - Mailing labels
    - Inventory
  - Many advantages over other ways to store data
    - Speed
    - Reliability
    - Precision
    - Ability to automate tasks

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.

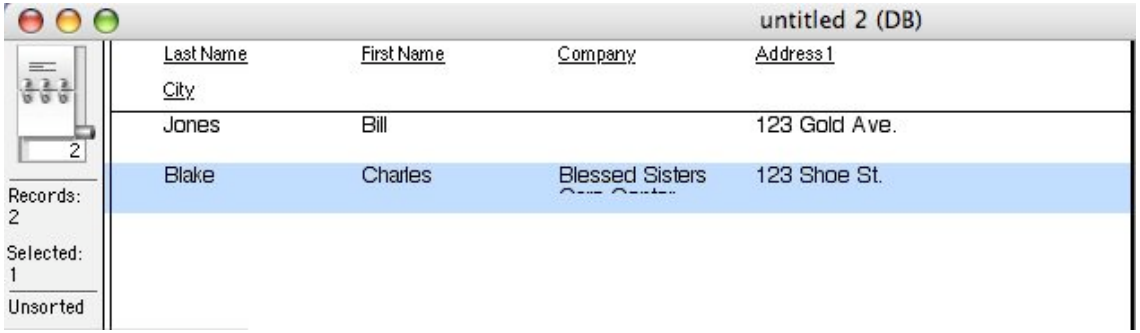
Database Organization

- 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



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)



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.