Today’s Topics

- Elements of a Database
- Importing data from a spreadsheet into a database
- Sorting, Finding and Filtering data

Thanks to Mary Jo Davidson and Curt White for some of the materials in this presentation!

Database Class Schedule

- Tues. 9/15 – Simple Databases
- Thurs. 9/17 – Relational Databases and Normalization
- Tues. 9/22 – Queries and Forms
- Thurs. 9/24 – Reports
- Tues. 9/29 – Database sizing / transmission, binary data.
- Thurs. 10/1 – Review and practice
- Tues. 10/6 – Database Exam
A database

- Supports our work with a particular set of information about something, like –
  - Addresses we want to keep
  - Classes (at DePaul for example)
  - A home improvement store
  - A zoo

In order to make our databases design work

- We need to think abstractly about the data we plan to store.....

- But we will tackle that a bit later....
- First, we’ll learn how to use MS-Access, our database software tool (DBMS), with a simpler set of data

Database Management Systems (DBMS)

- Allow us to build databases that meet our needs, as resources for application software
What will a DBMS do for me?

A DBMS protects data while making it accessible to approved processes, including tools (software components of the DBMS) that perform:

- Database creation
- Reporting
- Query Development (asking questions)
- Addition, change, and deletion of records

Basic Terms

- **Table** – an object you define and use to store data. Each table contains information about a particular subject, such as customers, patients, or orders.
- **Fields** – tables contain fields (columns) such as first name, street address, score.
- **Record** – a logical collection of fields.
- **Query** – an object that provides a custom view of data from one or more tables.

Field Attributes (Data Types)

- You want to create fields for Name, Address, Telephone, Amount Paid,....
- Text – the most common!
- Number – do NOT use unless you plan to do arithmetic with this field.
- Date/Time
- Currency – use with money fields.
- AutoNumber – similar to Number but Access automatically inserts the numbers for you.
- Yes/No (and others)
Simple Databases

- Today, we consider databases that contain only a single table.
- In the next class, we will look at Relational Databases that store multiple tables with relationships between them.

Why a Database (and not a spreadsheet)?

- You have too many separate files or too much data in a single file
- You need to look at the data in many different ways
- You need to share the data
- You want to secure access to the data and control data values

Spreadsheets vs. Databases

- Spreadsheets are
  - Good for small data sets
  - Good for numerical calculations
- Databases are
  - Better for larger, more complex data sets
  - Better for customizing forms and reports (showing data on screen and on paper)
  - Better for finding unexpected patterns in data (data mining)
  - Used with web applications
A Primary Key is a field in a database that has a unique value for every record in the database.

- Examples: Student ID number, Social security number, Product SKU number
- Access can create an Automatic Key field that generates a unique number for each record you add to the database if you want it.
- More on keys later

An Index is a field in a database that is optimized for searching.

- Database creator (that’s you) can choose which fields are indexed.
- Searches on Index Fields are much faster than searches on other fields in the database.
  - How? Access creates hidden index tables behind the scenes to help with fast data lookup.

There are two ‘views’ of a data table in Access that we will use:

- Datasheet View – shows the contents of the table. Data can be added, deleted, modified from this view.
- Design View – shows the attributes of the fields in the table. Fields can be added/deleted and field attributes can be modified from this view.
- There are other views, but we don’t consider them right now.
Simple Database Operations

- What can you do with a single-table database?
  - Add, Delete, Modify data in the table
  - Sort data using a particular field
  - Find a particular value within the database
  - Filter the database so that only a subset of the data records matching a filter criterion are visible.

Finding a Record

- A very simple way to look for a record
- But you can only search in one table, and you can only look for one field
- Open the table, then on the Home tab click on Find (or CTRL-F)
- Enter values as necessary
- Wildcard character: *
- Find is nowhere near as powerful as performing a query (later)
- We’ll try FINDing a record in a few moments
## Filtering Records
- If you want to see all the rows in a table that match any part of a value, you can use the Filter command.
- A couple different forms of Filter. Let’s look at **Filter by Selection**.
- Open the table you want to filter. Highlight the field you want to filter on. Then on the **Home** tab click on **Selection**.
- To undo filtering, click on **Toggle Filter**.
- We’ll try filtering in a few moments.

## Importing Data into a “Flat” Access Database
- Many times you want to take an existing data set and “import” it into an Access database.
- The existing data set can be plain text (.txt), a spreadsheet (.xls), or other forms of existing databases.
- Let’s consider the example of importing a spreadsheet into an Access database.

## Importing Spreadsheet Data
- Create a new (blank) database (unless you are importing into an existing database, then simply open that one).
- Select External Data from the top tabs.
- Select the appropriate type of file that you want to import.
Importing Spreadsheet Data

- You probably want to import the data into a new table
- If the spreadsheet you are importing has more than one worksheet, select the appropriate worksheet
- Does the first row contain column headings?

Importing Spreadsheet Data

- Now you can tell the wizard which fields should be indexed in the new table
- Choose your own primary key or let Access add a primary key?
- Give the table a name and click on Finish
- You may have import errors – check the file xx$_ImportErrors

In-Class Activity #1

- Let’s practice using simple databases with In-Class Activity #1.