

Files vs. Databases

- Data used to be tied to the programs which use it
 - The data had meaning because a program was reading it
- Each language had a file format that it read easily
 - Other language had problems with foreign files
- A lot of time and effort was spent moving data around
- Files are very physical

Files vs. Databases

- Databases separate data and code
- The database takes care of the data
- Any host language can read and use the data in a database

Host Language vs Database

- SQL sits between the database and the host program which runs the application
 - SQL has no I/O of its own
 - SQL datatypes are not the same as the host program datatypes
 - There are rules for datatype conversions

Databases -1

- A collection of facts stored in a single central system
 - E.F. Codd
- It should be a model of the "real world"
 - The "real world" can be its own kind of fiction
 - It is not a complete model because you cannot capture everything
- When the world changes, the model should be able to change also.

Databases -2

- Files are faster, so why bother with a database?
 - Speed does not replace correctness.
 - Repetition is dangerous: A man with two watches is never sure what time it is
 - Repetition of data is expensive
 - Files are not multi-user by nature

Database vs. Files -1

- Files are defined by the program that uses them
 - READ (a, b, c) FROM (fileX) is not the same as READ (c, b, a) FROM (fileX)
 - Even datatypes are determined by the calling program
- Databases define themselves
 - SELECT a, b, c FROM TableX is the same as SELECT c, b, a FROM TableX
 - More on this later

Database vs. Files -2

- Files are independent of each other
 - A change in file X does nothing to file Y
 - You can open FileX without opening FileY
- Tables in a database can be related to each other
 - A change in TableX can change TableY
 - You open the entire database or nothing -- but you might not have access to all tables
- Learning to think about the schema as a whole and not the individual tables is a major jump.