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A Quick Tour of Data Management Issues

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Internet Book Store Example

- Catalog of books
 - ISBN, title, author, qty_in_stock, price, year_published
- Customers
 - CID, Name, address
- Orders
 - ISBN, CID, cardnum, qty, order_date, ship_date

Non-Database Solutions

- Datastructure design
 - eg. should cardnum be part of orders or customers structure ?
 - Unique identifiers and references. eg. orders.isbn references books.isbn
 - Updating multiple copies of data can be tricky
- In-memory array of objects
 - Limited by memory size & possibly 32 bit pointer size
 - Search and insert algorithm closely tied to ordering of items in array
 - Auxiliary “index” arrays can be used for searching on multiple attributes

Non-Database Solutions (cont)

- File-based solutions
 - One file per array or many files per array ?
 - All data on disk with indexes in memory? Cache some data in an in-memory array ? Search becomes tricky.
 - How should the data items in each file be ordered ?
 - Random access is slow for files sitting on hard disks
- Supporting multiple concurrent users
 - How do we ensure correct semantics when multiple users need to update or write to the same data item ?
 - What happens if the customer's browser crash in the middle of purchasing a book ?

Database Solution

- Start the DBMS software
- Create a database for the internet store
- Connect to the database
- Create the tables for the data
 - For now let's stick with the naïve 3 table design
- Inserting data into the tables
- Updating data in existing tables
- Querying a single table using SQL queries
- Querying multiple tables by joining them together