

CMSC424: Database Design

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Databases

- ▶ **Data Models**
 - Conceptual representation of the data
- ▶ **Data Retrieval**
 - How to ask questions of the database
 - How to answer those questions
- ▶ **Data Storage**
 - How/where to store data, how to access it
- ▶ **Data Integrity**
 - Manage crashes, concurrency
 - Manage semantic inconsistencies

Outline

- ▶ Overview of modeling
- ▶ Entity-relationship Model (E/R model)
- ▶ Relational Model
- ▶ Converting from E/R to Relational
- ▶ Extra slides

Data Modeling

- ▶ Goals:
 - Conceptual representation of the data
 - “Reality” meets “bits and bytes”
 - Must make sense, and be usable by other people
- ▶ We will study:
 - Entity-relationship Model
 - Relational Model
 - Note the difference !!
 - May study XML-based models or object-oriented models
- ▶ Why so many models ?

Data Modeling

- ▶ Why so many models ?

- ▶ Tradeoff between:
 - Descriptive capabilities
 - How many concepts it has ?
 - What can't it capture ?
 - Is it reasonably easy for humans to use and reason about ?

 - Performance
 - Can it be implemented reasonably efficiently ?

Motivation

- ▶ You've just been hired by Bank of America as their DBA for their online banking web site.
- ▶ You are asked to create a database that monitors:
 - customers
 - accounts
 - loans
 - branches
 - transactions, ...

- ▶ Now what??!!!
 - Start with modeling the information that needs to be stored..