Database Design Concepts and Practices
IT4GIS
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Basic Steps in Database Design
- Understand and document the business’ needs.
  - Problem statement
  - Business object types
  - Business relationships
  - Business constraints
- Create an ERM
- Data and process inventory
- Develop tuple types
- Tuple types to tables
  - Integrity
  - Implement the database

Today’s goal
- Become more familiar with database design.
- Learn to read and interpret a database design (aka, schema).
Database Design

- Why spend so much time and effort?
  - Efficiency (speed, storage)
  - Client satisfaction
  - Flexibility
  - Cost savings realized

Design Considerations

- Basic steps (described earlier)
- Data types (Data Modeling)
- Normalization
- With >1 table, relationships must be examined

Relationships

- Determine where relationships exist between tables
- Determine the type of relationship that exists
  - One-to-one
  - One-to-many
  - Many-to-one
  - Many-to-Many
Generic Design Symbology

- Database
- Table

Generic Table Symbology

- Parcels
- Parcel_ID
- TRS
- Value
- Zoning

List of all attributes stored in this table as they will appear in the table

Generic Relationship Symbology

- Table A
  - A_ID
  - Relate_field
- Table B
  - B_ID
  - Relate_field

- Draw schema of RDB
- Determine relationship fields
- Connect
Symbolizing Relationship Type

- One-to-one
- One-to-many
- Zero?

The Relationship Type...

- Also known as
  - Cardinality (ArcGIS terminology)
  - Multiplicity (UML terminology)

Object Oriented Design

How does it fit?
Generalized Process

- Inception
- Elaboration
  - Construction
  - Transition

Elaboration Exercise

You will be building a new database listing and describing all things that are RED in color. Let’s start with a brainstorming list!

Questions?

- Your assignment
  - Follow the ReadMe.txt document in this week’s exercise file.
  - Use the exercise handout as a guideline to reading and interpreting a relational database design.