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
- 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

Generic Table Symbology
- Table name
- Divider
- List of all attributes stored in this table as they will appear in the table

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

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

Table A
- A_ID
- Relate_field

Table B
- B_ID
- Relate_field

The Relationship Type...

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

Object Oriented Design

How does it fit?
Process
• Inception
• Elaboration
  • Construction
  • Transition

Elaboration Exercise
• Divide into task force teams
  – Red team
  – Blue team
• Create a list of things that are:
  – Red
  – Blue
• Brainstorm for 5 minutes

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.