

# 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



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## Today's goal

- Become more familiar with database design.
- Learn to read and interpret a database design (aka, schema).

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## Database Design

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

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## Design Considerations

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

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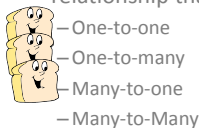
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## Relationships

- 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



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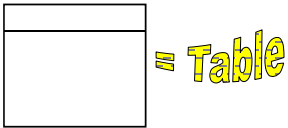
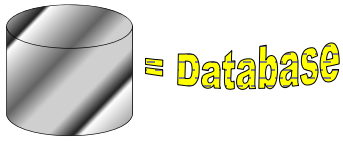
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## Generic Design Symbology



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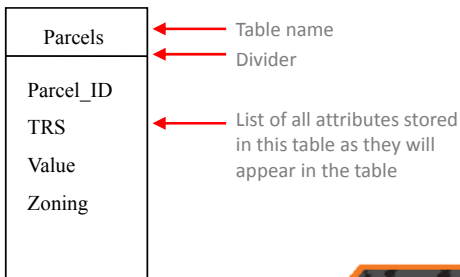
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## Generic Table Symbology



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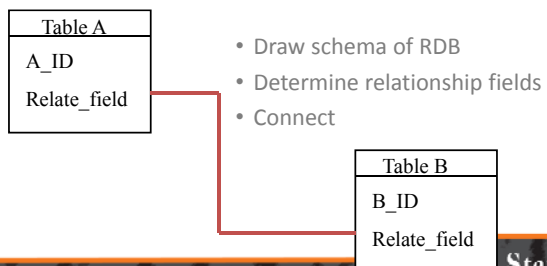
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## Generic Relationship Symbology



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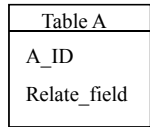
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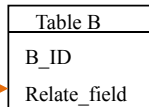
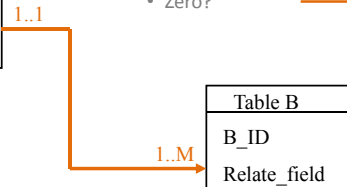
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## Symbolizing Relationship Type



- One-to-one  $1..1 \rightarrow 1..1$
- One-to-many  $1..1 \rightarrow 1..M$
- Zero?



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## The Relationship Type...

- Is also known as the
  - Cardinality (ArcGIS terminology)
  - Multiplicity (UML terminology)

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## Object Oriented Design

How does it fit?



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## Process




Inception



Elaboration

- Construction
- Transition

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## Elaboration Exercise

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



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## 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.

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