

# GEOG 204

## LECTURE 3

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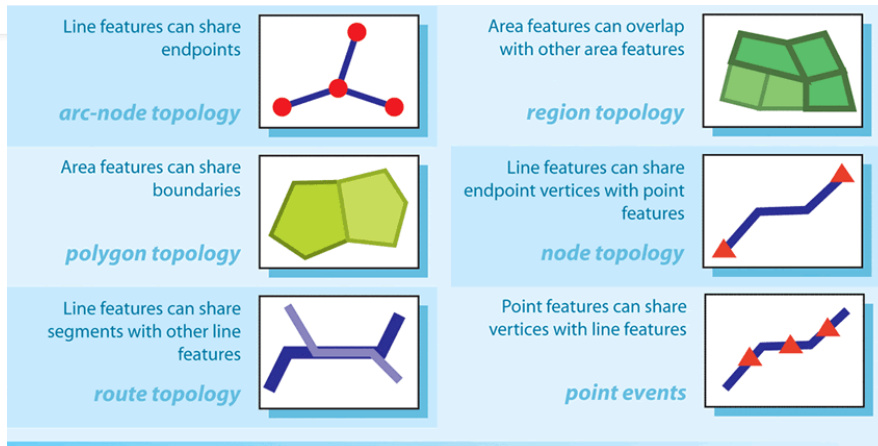
## Topology

- Topology: The spatial relationships between adjacent or neighboring features.
  - Based on 3 basic elements, Adjacency, Containment and Connectivity
  - Allows analyses like as contiguity, containment, connectivity, overlap...
    - For example, it is used in routing through linear networks. Routes cannot be established through the network if the line features do not share nodes/vertices.

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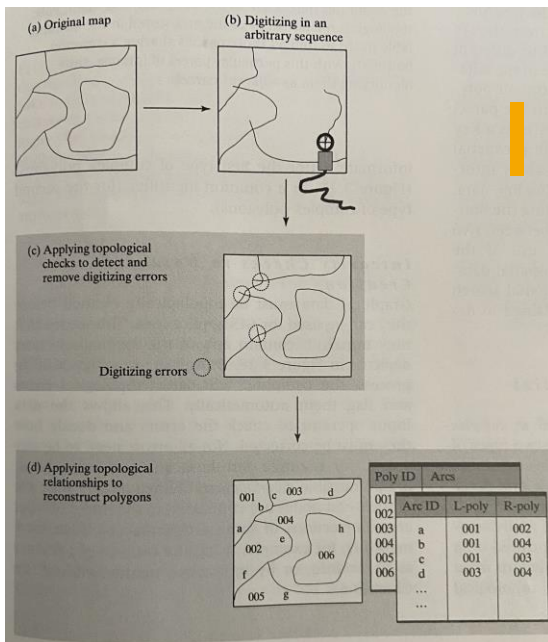
# Topology



Source: ESRI

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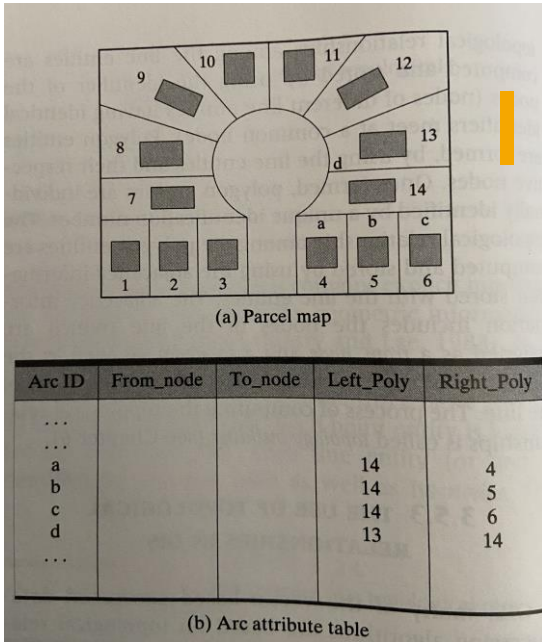
## Topological Relationships: Areas of Usage

- Data input and representation
  - Identify and store adjacency, connectivity & containment information
    - field data collection, digitizing
    - E.g. Left/Right of polygon or line

Lo and Yeung (2006) Concepts and Techniques of Geographic Information Systems, Prentice Hall

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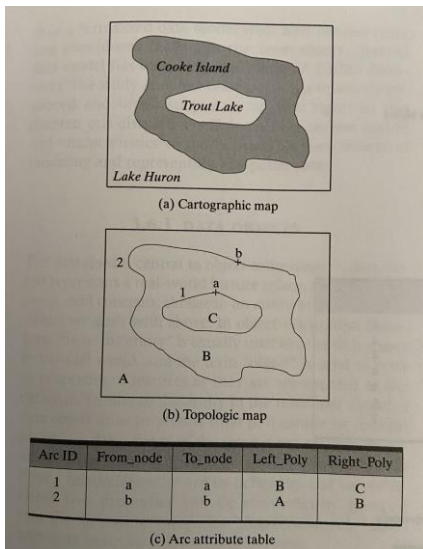
## Topological Relationships: Areas of Usage

- Spatial Search by Topological Relationships
  - Find features by adjacency, containment and connectivity

Lo and Yeung (2006) Concepts and Techniques of Geographic Information Systems, Prentice Hall

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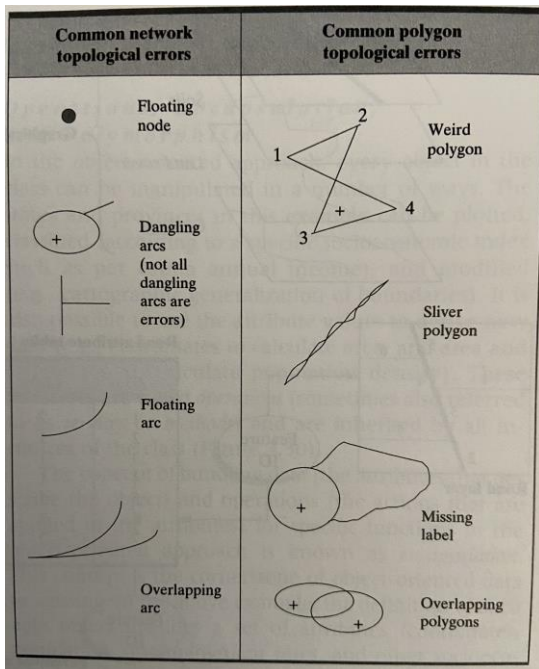
## Topological Relationships: Areas of Usage

- Construction of Complex Spatial Relationships
  - E.g. Holes on polygons
  - Multipart polygons

Lo and Yeung (2006) Concepts and Techniques of Geographic Information Systems, Prentice Hall

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## Topological Relationships: Areas of Usage

- Integrity checks and balances
  - Essentially the removal topological errors
    - E.g. No dangling arcs or overlapping polygons

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## Data Representation and Analysis

- Vector and Raster data models are ideally suited for solving different problems
  - Raster Model: phenomena that exhibit spatial variability
    - Temperature, topography
    - Environmental aspects at a regional or national scale
      - Habitat, biodiversity analysis

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# Data Representation and Analysis

- Vector and Raster data models are ideally suited for solving different problems
  - Vector Model: phenomena necessitates the need for location and individuality of spatial objects
    - Land title management, transportation management and planning, facilities management
    - Environmental aspects at a local scale (as opposed to a regional or national scale)

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- What are some relative merits of the vector and raster data models?
- Examples of real-world topology rules?

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