

GEOGRAPHICAL INFORMATION SYSTEMS

Spatial Data Models

by

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CHAPTER OUTCOMES

- By the end of this chapter, students should be able to:
 - ✓ Explain the two main data categories involved in GIS
 - ✓ Explain and differentiate between two spatial data types
 - ✓ Give examples of each spatial data types
 - ✓ Have the idea of how to decide on what type of data to be used in various GIS projects

CONTENTS

- GIS data types
 - ✓ Spatial
 - ✓ Attribute

- GIS data models
 - ✓ Vector
 - ✓ Raster

GIS data types

- There are two main types of data involved in GIS:
- **Spatial data** – Data with geographical reference (coordinates, locations)
- **Attribute data** – Data that describes the spatial feature (any non-geographic information)
- In GIS, both types of data are important and dependent on each other.

GIS data types: Spatial and Attribute

Spatial Data

Latitude: 33 44 58.9584 N
Longitude: 84 23 05.99513 w
Elevation: 172.39 feet

Attribute Data

Feature Name: Water Well
Output Capacity: 1200 gph
Owner: City of Valdosta
Depth: 300 feet
Pump Service Date: 12/01/04

Geographical data

Non-geographical data

Source of picture: http://www.valorgis.com/gisis_c.html



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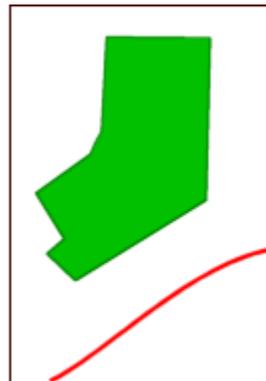
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Spatial Data Model

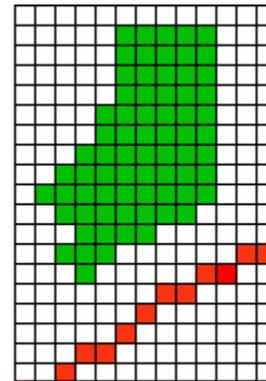
- GIS data models are used to represent real world
- There are two types of GIS data models: Vector and Raster
- **Vector data** – Formed from connection of vertices
- **Raster data** – Formed from combination of pixels



Real World



Vector



Raster

Source of picture: <http://www.geography.hunter.cuny.edu>



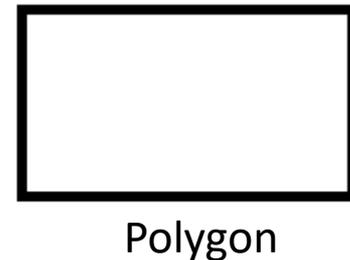
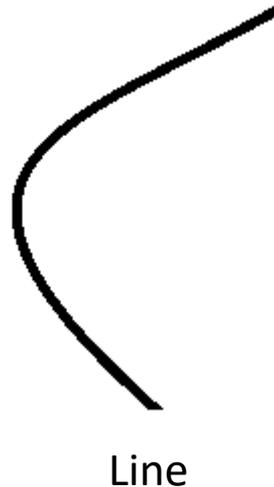
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Spatial Data Model ..(cont'd)

- Vector data
 - ✓ Formed from connection of vertices
 - ✓ Each vertex has coordinates
 - ✓ Three basic types of vector data:

- Point
- Line
- Polygon



Spatial Data Model ..(cont'd)

- Raster data
 - ✓ Formed from combination of pixels
 - ✓ Each pixel has value
 - ✓ Each pixel has coordinates based on its location (row and column)



Raster data

Source of picture: <https://commons.wikimedia.org>



By: T.Nijeholt at nl.wikibooks



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Data Sources

- **Vector data:**
 - ✓ From digitization
 - ✓ From devices (GPS, etc)
 - ✓ From raster data conversion (raster to vector)
- **Raster data:**
 - ✓ From images
 - ✓ From maps
 - ✓ From satellite images
 - ✓ From vector data conversion (vector to raster)

Think GIS way...

**What are the
GIS problems
that you can
solve using raster
and vector data?**

