GIS

Geographical Information System

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Objectives

- What Is GIS?
- Principle Of GIS.
- Function Of GIS.
- Components Of GIS.
- Type Of GIS.
- Advantages Of GIS.
- Applications Of GIS.

What Is GIS?

- "GIS is a computer system capable of assembling, storing, manipulating, and displaying geographically referenced information, i.e. data identified according to their locations."
- "A GIS is an organized collection of computer hardware, software, geographic data, and personnel to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information."

Principle

- Data Capture
  - Data sources are mainly obtained from manual digitization and scanning of aerial photographs, paper maps, and existing digital data sets.
- Database Management and Update
  - data security, data integrity, and data storage and retrieval, and data maintenance abilities
- Geographic Analysis
  - The collected information is analyzed and interpreted qualitatively and quantitatively.
- Preparing Result
  - One of the most exciting aspects of GIS technology is the variety of different ways in which the information can be presented.

Functions

- Data Capture
  - The input of data into a GIS can be achieved through many different methods of gathering. For example, aerial photography, scanning, digitizing, GPS or global positioning system is just a few of the ways a GIS user could obtain data.
- Data Storage
  - Some data is stored such as a map in a drawer, while others, such as digital data, can be as a hardcopy, stored on CD or on your hard drive.
- Data Manipulation
  - The digital geographical data can be edited, this allows for many attribute to be added, edited, or deleted to the specification of the project.
- Query And Analysis
  - GIS was used widely in decision making process for the new commission districts. We use population data to help establish an equal representation of population to area for each district.
- Visualization
  - This represents the ability to display your data, your maps, and information.

Components

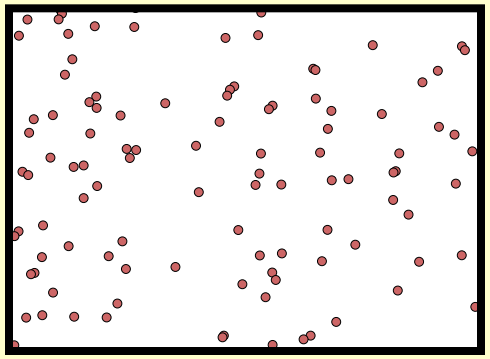
- Hardware
  - Computer System, Scanner, Printer, Plotter, Flat Board
- Software
  - GIS software in use are MapInfo, ARC/Info, AutoCAD Map, etc. The software available can be said to be application specific.
- Data
  - A GIS will integrate spatial data with other data resources and can even use a DBMS, used by most organization to maintain their data, to manage spatial data.
  - Geographic data and related tabular data can be collected in-house or purchased from a commercial data provider.
- People
  - GIS users range from technical specialists who design and maintain.
- Method
  - The map creation can either be automated raster to vector creator or it can be manually victories using the scanned images.

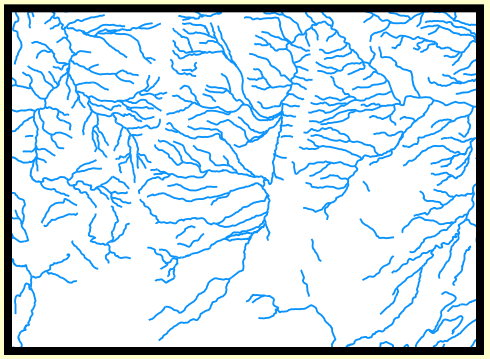
Data Types

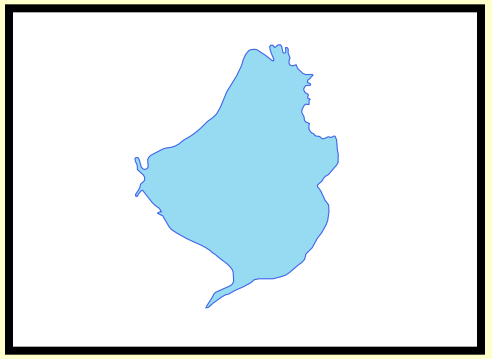
- Vector
  - Points
  - Lines
  - Polygons
- Raster
  - Cell
  - Pixels
  - Elements

Vector

- Points, lines, polygons
- More closely resembles real world

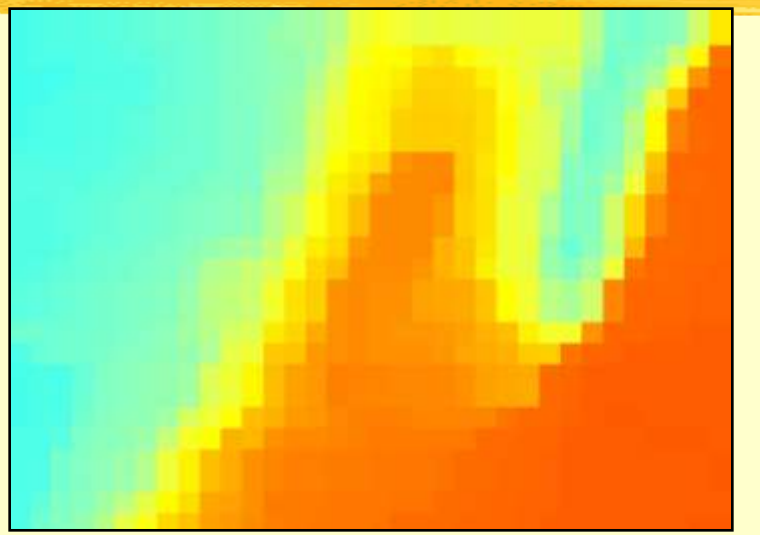


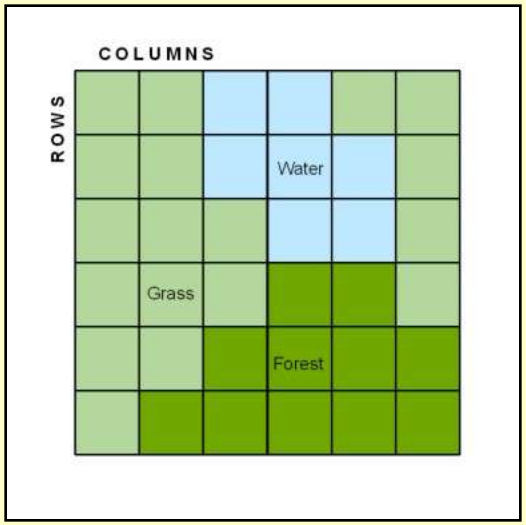




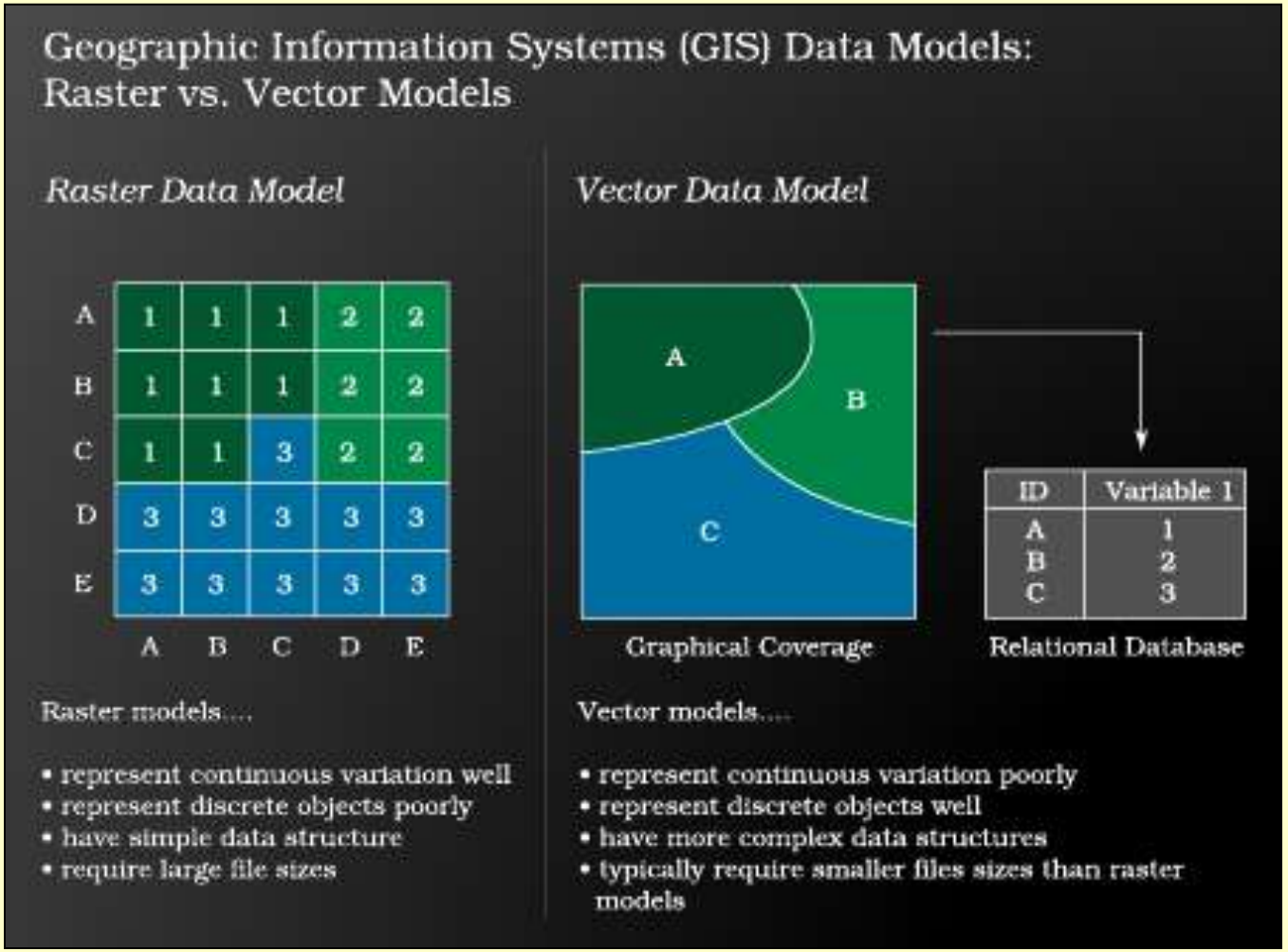
Raster

- Areas broken into 'pixels' or cells
- Each cell contains data
- Good at representing dense data
  - land cover
  - elevation





Raster VS Vector



Advantages (Vector)

- Good Representation of data.
- Use small File Size.
- Accurate map output.

Disadvantages (Vector)

- Complex Data Structure.
- Expensive Technology.
- Analysis is Complex.

Advantages (Raster)

- Simple Data Structure.
- Cheap Technology.
- Analysis is Simple.
- Same grid cell for several attributes.

Disadvantages (Raster)

- Large Data Volume.
- Inefficient use of computer storage.
- Difficult network analysis.
- Less accurate or attractive maps.
- Loss of information when using large cells.

Advantages of GIS

- GIS allows us to view, understand, and visualize data in many ways that reveal relationships, patterns, and trends in the form of maps, globes, reports, and charts.
- A GIS helps you answer questions and solve problems by looking at your data in a way that is quickly understood and easily shared.
- GIS give the accurate Data.
- Better Predictions and Analysis.

Disadvantages of GIS

- Excessive damage in case of internal fault. Long outage periods as Repair of damaged part at site may be difficult.
- Expensive software.
- Integration with traditional map is difficult.

Any Questions ?

Thank You