



GIS

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Introduction to GIS

- Describe GIS applications and use cases
- Describe and define GIS concepts and terminology
- Navigate the ArcGis interface
- Communicate using GIS terminology
- Differentiate between Raster and Vector Data
- Explain the history of GIS
- Get help in using ArcGis
- Describe Skills needed as a GIS Analyst

GIS Used in

- Network of population Information

- Routing Problems
- Infrastructure Planning
- Land Use Planning
- Crop Yields
- Species Range documentation
- Agriculture Economics
- Emergency Management

Defining GIS - ESRI

An integrated collection of computer software and data used to view and manage information about Geographic Places, analyse spatial relationships, and model spatial processes. A GIS provides a framework for gathering and organising spatial data and related information so that it can be displayed and analysed.

Components of GIS

- Design
- Workflow and organisations
- Technology
- Specifications
- Algorithm
- Research

Types of Questions we can ask

- What exists certain location
- Spatial Pattern
- Future Predictions
- Place changes

ArcGIS -

How it looks

- Process information

- Observable information

How it works

- Process information
- constructing Meaning
- Used for prediction

Data Processing

- Viewing the data
- Creating New Data
- Transform the Data
- Display the data
- Integration

Mapping APPS: -

- Cartography - Map Making
- Databases - Information storage & Retrieval
- Topology - Spatial Relationships
- Monitoring - Temporal data Gathering
- Change Detection - Spatial unit change per unit time change

Running an Analysis

- Selection a location
- Formulate a Question/Hypothesis
- Analyze a data
- Make a Map (or other product)
- Enhance, Modify, or refine
- Repeat

Types of GIS

Desktop GIS

- Interactive
- open-ended GIS
- Custom workflows
- User in the Analyst
- ESRI

Server side GIS

- Formalised workflows
- Resource heavy calculations
- Results Delivered to Analyst - Map server

Decision Support Tools & WebGis

- Display of information to consumers
- Allows for configuration
- User is Decision Maker or consumer - Google earth - ESRI(ArcGIS) Online.

GIS Terminology

At the end of this lesson, you should be able to define the following GIS- specific terminology and technology

- Points,Lines, Polygons
- Attribute Tables
- Vectors and Features
- Rasters and Imagery
- Geoprocessing tools
- Geodatabases
- Shapefiles
- Map documents
- Layers

Vector and Feature Data

- Categorical and Multivariate Data eg: Land, sea, ocean

Vector data also has something that we could call an attribute table., its a data table, sort of like an spreadsheet, if you are not used to databases, that is attached to each vector or featured data set.

Every record in that data table corresponds to features in the GIS space.

if you need to create vector data we need points, lines, and polygons. so points build lines, lines build polygons, finally it comes polygon shape.

Points:

- Dimensionless

Lines:

- One Dimension
- Can Have an attribute Record

Polygons

- Two Dimensions
- Can Have an attribute Record

Raster Data

Raster data is the counter part to vector data, its the type of data that your digital camera takes. its best to used for imagery like digital images or continuous surfaces.

- Grid of Fixed - Size Pixels
- Imagery
- Attributes are per value (Not pixel)

To process the data we use Geoprocessing

Geoprocessing

- ArcGis tool box
- Algorithms to process or transform data
- Geoprocessing tools are used to analyze data

- Geoprocessing Tools are chained together in order to Answer Questions

Geodatabases

- Where we hold our data
- Containers for spatial data
- Geodatabases is a generic concept, and come in several formats: - File Geodatabases - Personal Databases - SQLite/ Spatialite Geodatabases
- Store tables, feature classes, rasters, relationships, annotation, and more.

Shapefiles

- Specific ESRI format
- Standard format used by most GIS systems
- 3-7 Files comprise a Shapefiles
- Rely on old dBase IV data tables.
- Slow, large, limiting, but still useful

Map documents

Map documents are the work space we use to view and analyze our data.

- Workspace to view/ Analyze data
- Stores representation of data
- Allows for geoprocessing
- Data is referred to on disk- it is not embedded.
- Layers - Representation of geographic data in document. Layers can - Stack - Overlay - Work like Photoshop Layers