Analysis & Geoprocessing: Case Studies – Problem Solving

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Overview

- Analysis & Geoprocessing Review
  - What is it?
  - How can I use it to answer questions?

- Case Studies – Problem Solving
  - Case 1: Create a Disaster Database
    - ArcMap, ArcCatalog and ArcToolbox
  - Case 2: Create a Potential Shelter Inventory
    - ModelBuilder
  - Case 3: Continuation with Case 2
    - ModelBuilder

- Questions and Answers
Analysis & Geoprocessing Review
Geoprocessing

- A GIS operation used to manipulate GIS data.

- Common GP Operations
  - Geographic Feature Overlay
  - Feature Selection & Analysis
  - Raster Analysis
  - Data Conversion
  - Data Management
Geoprocessing Framework

- Multiple environments

- Tool Dialog
- Command Line
- Models
- Scripts
## Geoprocessing Framework

- **Multiple environments**

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A process for highlighting patterns and/or relationships in geographic data.

- Gives insight into places of interest
- Helps us focus on best options

Consists of 3 basic types of operations

- Attribute Queries
- Spatial Queries
- Generation of new datasets based on attribute information and/or spatial relationships.

Determine the relationship between school locations and crimes

Buffers with Schools

Determine the relationship between school locations and crimes

0.1 mile buffer

Schools

Crimes
Analytical Process

1. Frame the question
   - What is your objective?
   - What information is needed?

2. Understand your data
   - Know what features & attributes you have.
   - Know what you need to obtain and/or create.

3. Choose method(s)
   - Many ways to achieve results!

4. Process data
   - Understand the context for choosing analysis parameters.

5. Look at the results
Environment Settings

- Additional parameters that affect a tool’s result.
  - Current Workspace
  - Output Coordinate System
  - Output Extent
  - Analysis Mask

- Can be applied at different levels
  - Environments are “passed down” to tools and processes.
  - At each level, you can override the “passed down” settings.
Case Studies
Case Study 1: Create a Disaster Database

- **Goal**: To gain a basic understanding of common tasks and problems associated with data migration.

- **ArcToolbox**
  - Primary “entry point” into the Geoprocessing framework; providing organized access to all tools in ArcGIS as well as providing a mechanism to find and execute tools you want to use.
  - Learning the tools available enables you to solve real world problems.
Case Study 1: Create a Disaster Database

- **Analytical Process:**
  1. Frame the question
     - Manipulate and consolidate existing data for 2 Florida counties, Lee and Collier, into a single database
  2. Understand your data
     - The inputs are shapefiles stored in folders
     - The output will be feature classes in a file geodatabase.
  3. Choose method(s)
     - Define Projection Tool; ArcMap Selection, Join and Export tools; Clip Tool; Select Tool; Import / Export tools & Merge Tool
  4. Process data
     - ArcMap, ArcCatalog and ArcToolbox
  5. Look at the Results
Case Study Review

Create a Disaster Database
Case Study 2: Identify Public Shelter locations

- **Goal**: To gain a basic understanding of automating and better managing a workflow by building a model

- **Model**: A process or a sequence of processes connected together

- **ModelBuilder: An Introduction**: The interface used to build and edit geoprocessing models in ArcGIS.
  - Visual Programming
Case Study 2: Identify Public Shelter locations

**Analytical Process:**

1. **Frame the question**
   - To identify potential public shelters that could be opened in the event of an emergency

2. **Understand your data**
   - The inputs are geodatabase feature classes

3. **Choose method(s)**
   - Buffer, Clip, Summary Statistics, Erase, Select, Merge, Add Field and Calculate Field

4. **Process data**
   - Create a Model that will automate and document the process

5. **Look at the Results**
Case Study Review

Building a model to identify suitable public shelter locations
Case Study 3: Identify Public Shelter locations

- **Goal**: To investigate some advanced features of ModelBuilder

- **ModelBuilder: Advanced Techniques**
  - Model Parameters
  - Interactive Input
  - Model Iteration
  - Documentation
Case Study Review

Building models to identify suitable public shelter locations that allowed user input, interactive input and/or iteration
Concluding Remarks
Using and Creating Models

- **Converting Models to Scripts**
  - Incorporate logical statements
  - Run code at specific dates and times
    - Windows AT command
    - Windows scheduler

- **Can publish Models to ArcGIS Server**
  - Perform geoprocessing tasks in multiple clients
    - ArcMap
    - ArcGlobe
    - ArcGIS Explorer
    - Web ADF
    - Custom Applications

- **Development team can call models from code**
Training Seminars
http://training.esri.com

- Using ArcGIS Server Geoprocessing Services
- Authoring and Publishing Geoprocessing Services
- Understanding Spatial Statistics in ArcGIS 9
- Geoprocessing Using ModelBuilder
- And more...
Virtual Campus Courses

http://training.esri.com

- Geoprocessing with ArcGIS Desktop
- Spatial Analysis of Geohazards Using ArcGIS 9
- Understanding GIS Queries
- Turning Data into Information Using ArcGIS 9
- Analyzing School Safety Using ArcGIS
- Solving Disaster Management Problems Using ArcGIS 9
- Introduction to ArcGIS Military Analyst 9.2
- Creating and Integrating Data for Natural Resource Applications
- And more...
Instructor Led Courses

http://training.esri.com

- Advanced Analysis with ArcGIS
- Introduction to Geoprocessing Scripts Using Python
- Writing Advanced Geoprocessing Scripts Using Python
- Introduction to Programming ArcObjects Using VBA
- Introduction to Programming ArcObject (.NET)
- Working with ArcGIS Spatial Analyst
- Working with ArcGIS Spatial Analyst for Geospatial Intelligence
- And more…
- Introduction to Programming ArcObjects (Java)
Questions & Answers

Thank You!!

Please don’t forget to fill out your evaluations