Basic Geo-processing Operations
GIS and SedNet Training

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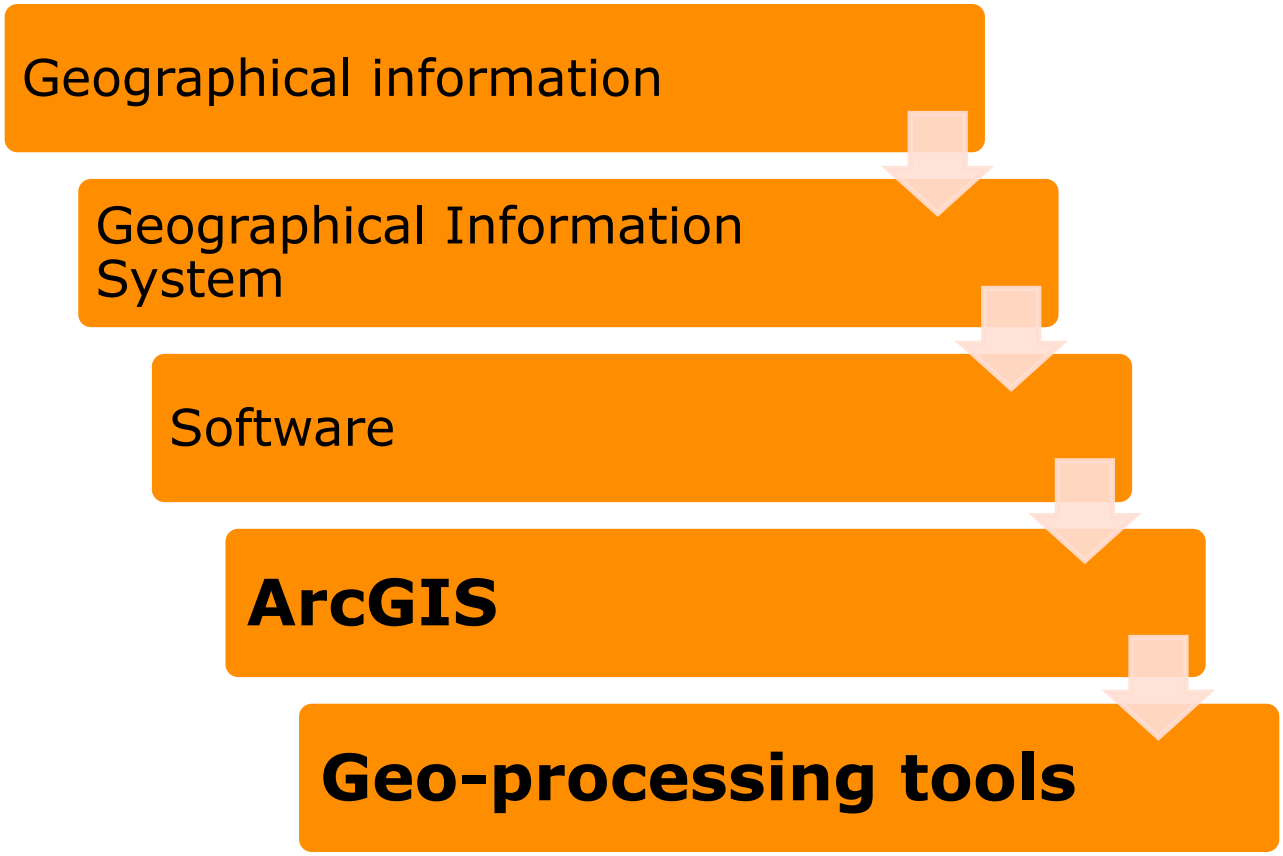
Outline of presentation

1. Learning Outcomes
2. ArcGIS and Data formats
3. Geo-processing and some of its most impt. tools
4. Summary

Leaning outcome:

1. Familiarize in the data formats in GIS
2. Define Geo-processing
3. Familiarize the geo-processing tools needed in the GIS operations
4. Be able to perform geo-processing

ArcGIS


Geographical information
Geographical Information System
Software
ArcGIS
Geo-processing tools

ArcGIS

- is a geographic information system (GIS) for working with maps and geographic information
- It is used for
  - creating and using maps
  - compiling geographic data
  - analyzing mapped information
  - sharing and discovering geographic information
  - using maps and geographic information in a range of applications
  - and managing geographic information in a database.

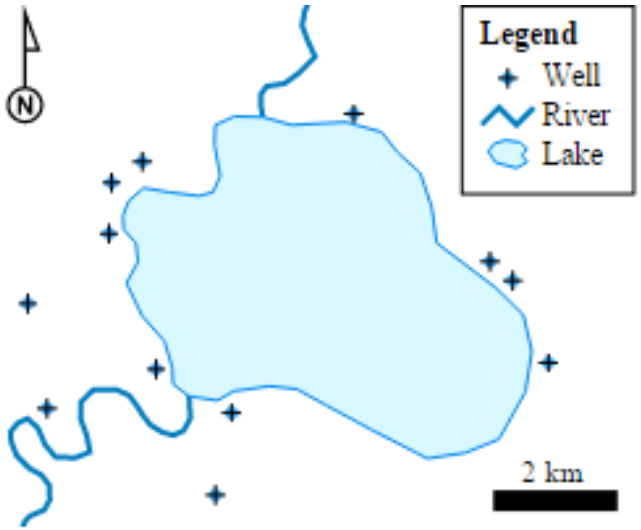
Data Formats

Raster Data

- a raster consists of a matrix of cells (or pixels) organized into rows and columns (or a grid) where each cell contains a value representing information, such as temperature.
- Rasters are digital aerial photographs, imagery from satellites, digital pictures, or even scanned maps.

Vector data

- Points (x, y) coordinates
- Lines (x1,y1 to x2, y2)
- Polygons - area or surface



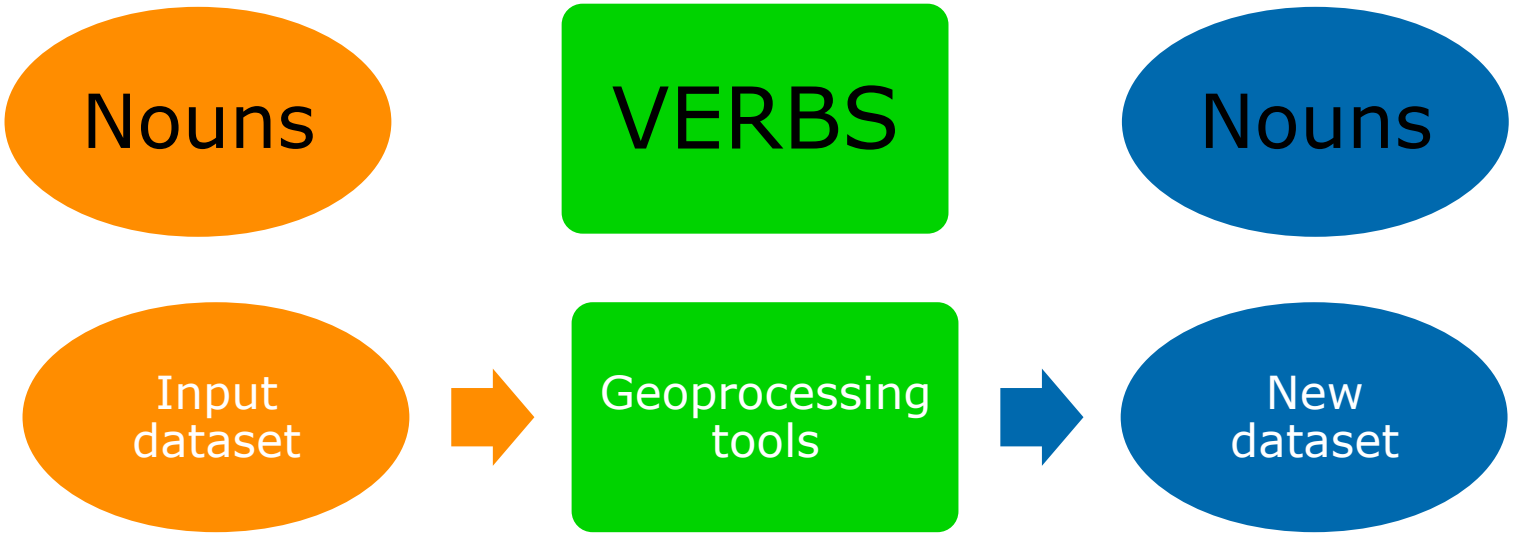
Geo-processing

Geo-processing

- a GIS operation used to manipulate spatial data.
- Sole purpose is to automate GIS tasks (mundane and redundant operations)

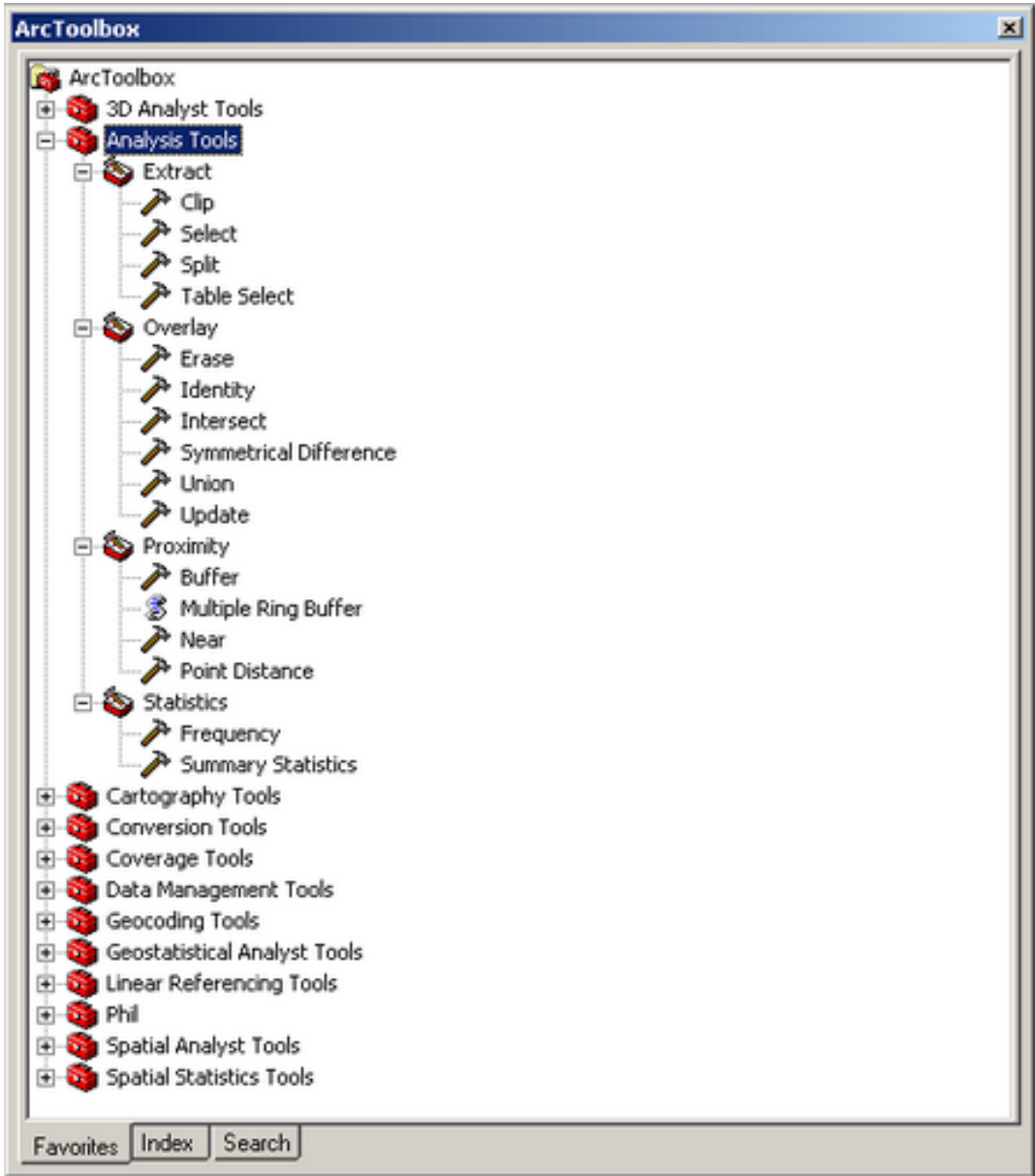
- Geoprocessing allows for definition, management, and analysis of information used to form decisions

Geo-processing tools

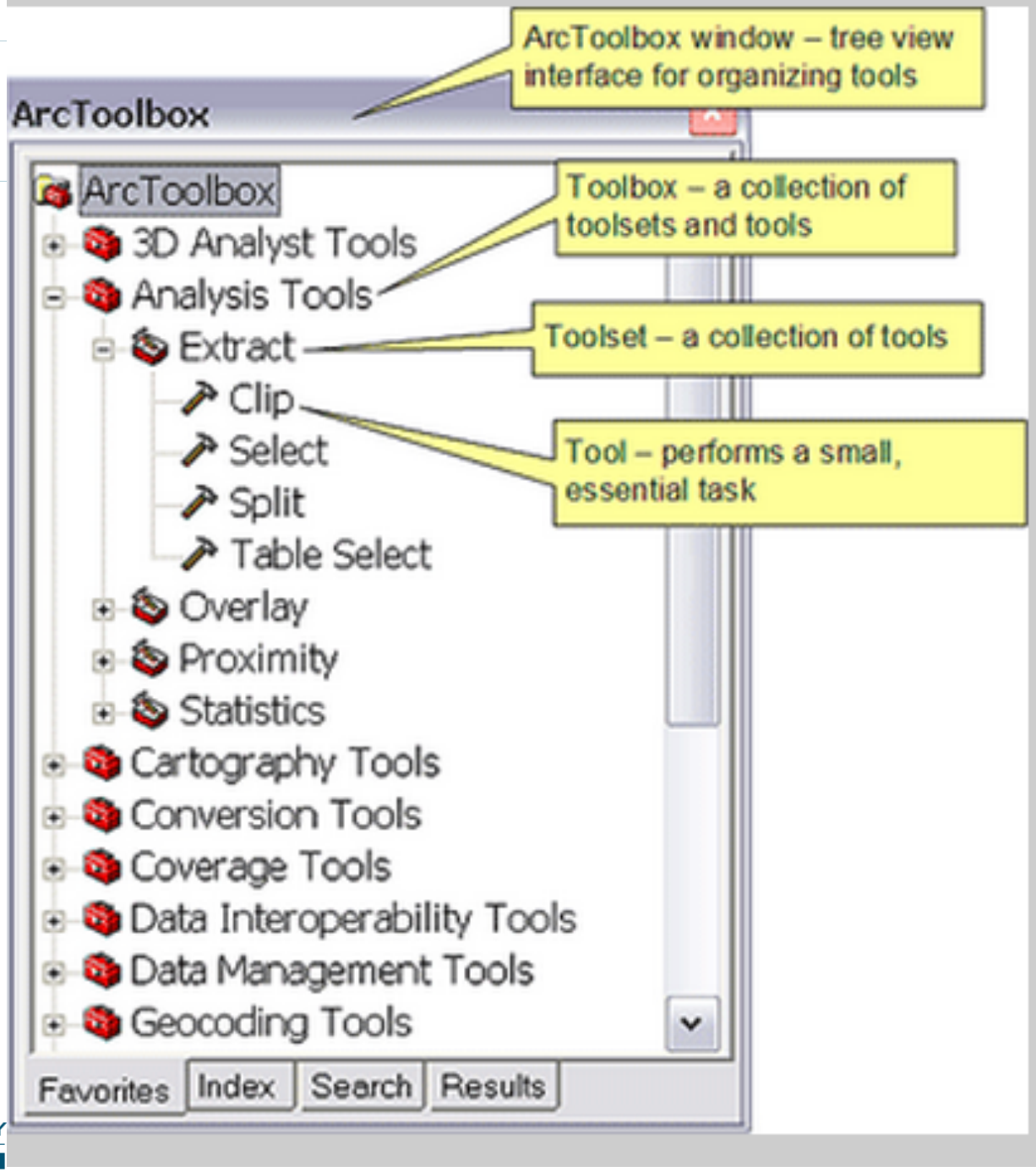


Important geo-processing tools:

- Project
- clipping/masking
- -intersecting
- -buffering
- Attribute table operation
- -data manipulations
- -calculations
- -import/export



ArcToolbox


ArcToolbox window – tree view interface for organizing tools
ArcToolbox
ArcToolbox
3D Analyst Tools
Analysis Tools
Extract
Clip
Select
Split
Table Select
Overlay
Proximity
Statistics
Cartography Tools
Conversion Tools
Coverage Tools
Data Interoperability Tools
Data Management Tools
Geocoding Tools
Favorites
Index
Search
Results
Toolbox – a collection of toolsets and tools
Toolset – a collection of tools
Tool – performs a small, essential task

… *Important geo-processing tools:*

Project (Data Management)

- Projects spatial data from one coordinate system to another.
- This allows you to specify the data's coordinate system **without** having to modify the input data

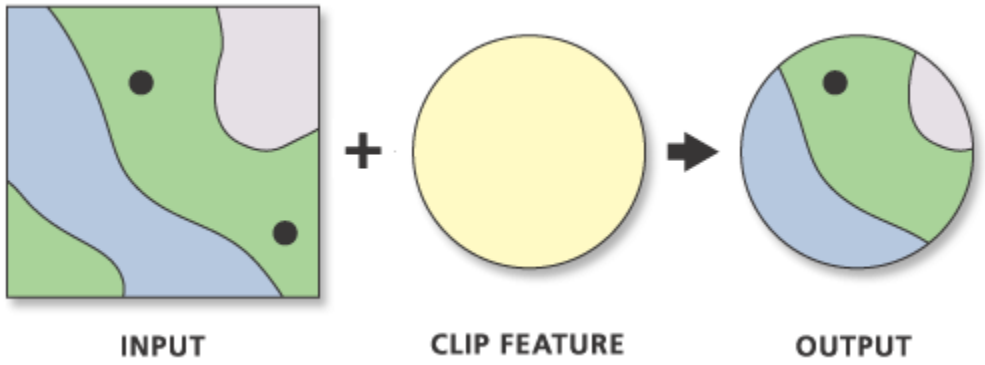
Define Projection (Data Management)

- **permanently** overwrites the coordinate system information (map projection and datum) stored with a dataset

… *Important geo-processing tools:*

Clip (Analysis)

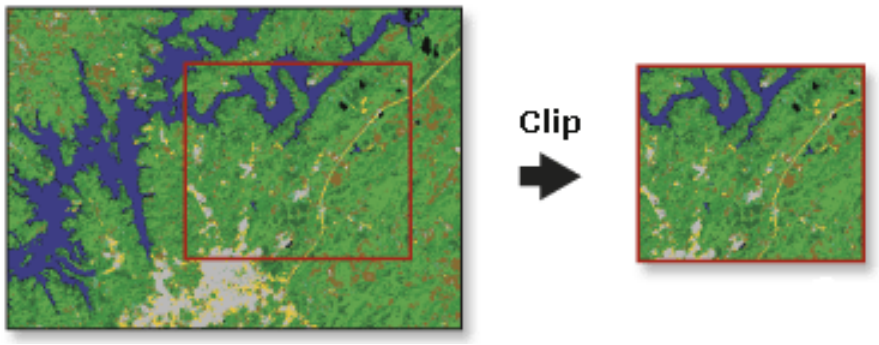
- Extracts input features that overlay the clip features
- Use this tool to cut out a piece of one feature class using one or more of the features in another feature class as a cookie cutter



… *Important geo-processing tools:*

Clip (Data Management)

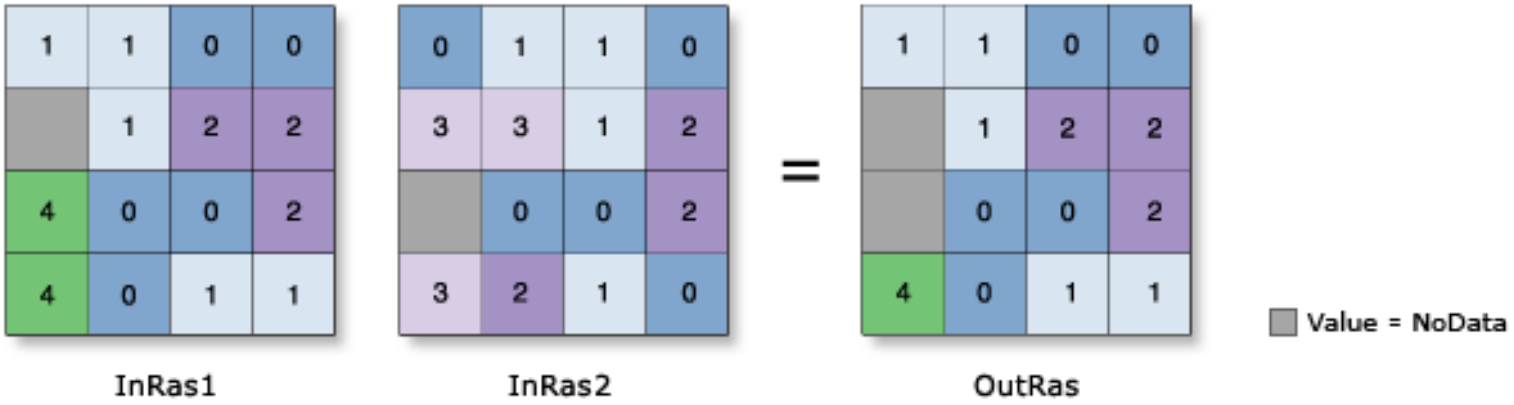
- Creates a spatial subset of a raster, including a raster dataset, mosaic dataset, or image service layer.
- This tool allows you to extract a portion of a raster dataset based on a template extent



… *Important geo-processing tools:*

Extract by Mask (Spatial Analyst)

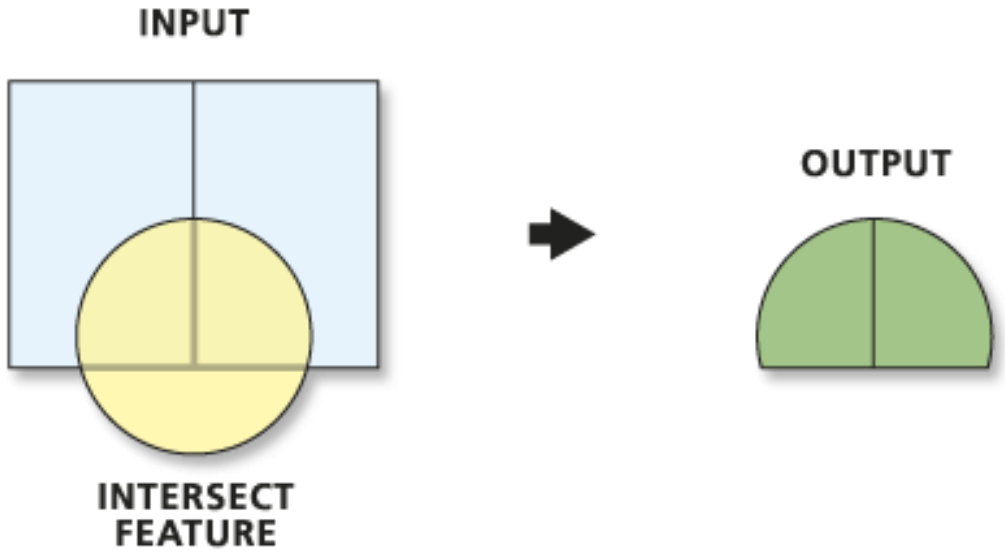
- Extracts the cells of a raster that correspond to the areas defined by a mask.
- Raster to raster data format



… *Important geo-processing tools:*

Intersect (Analysis)

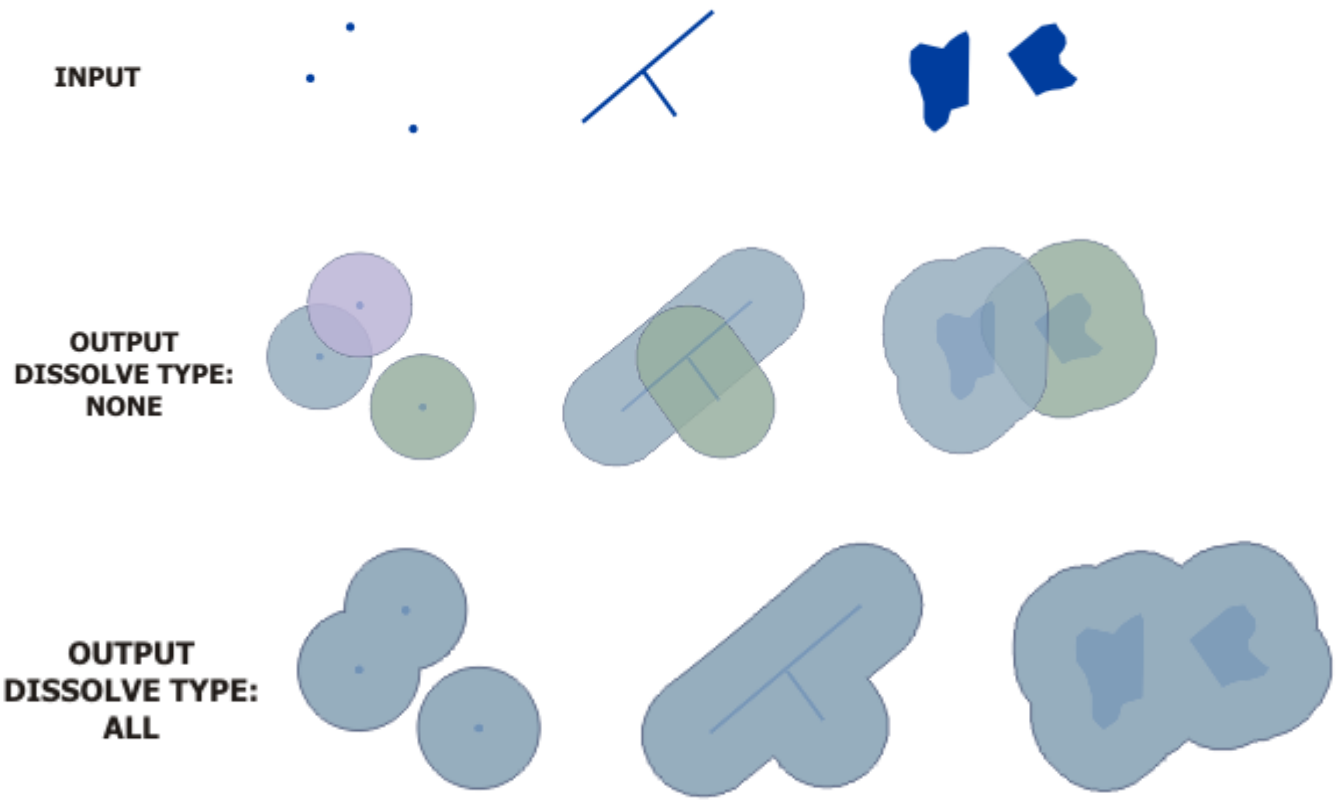
- computes a geometric intersection of the input features. Features or portions of features which overlap in all layers and/or feature classes will be written to the output feature class.



… *Important geo-processing tools:*

Buffer (Analysis)

- Creates buffer polygons around input features to a specified distance.
- Need same coordinate system



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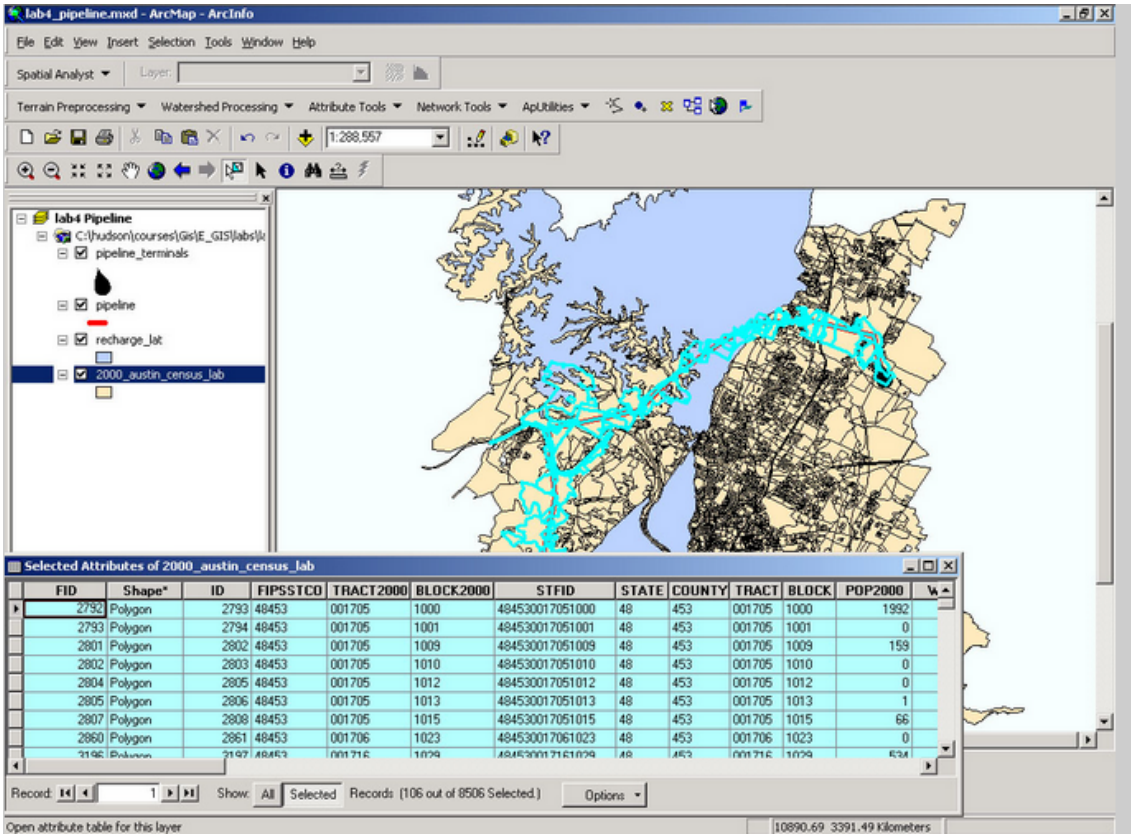
… *Important geo-processing tools:*

Attribute table

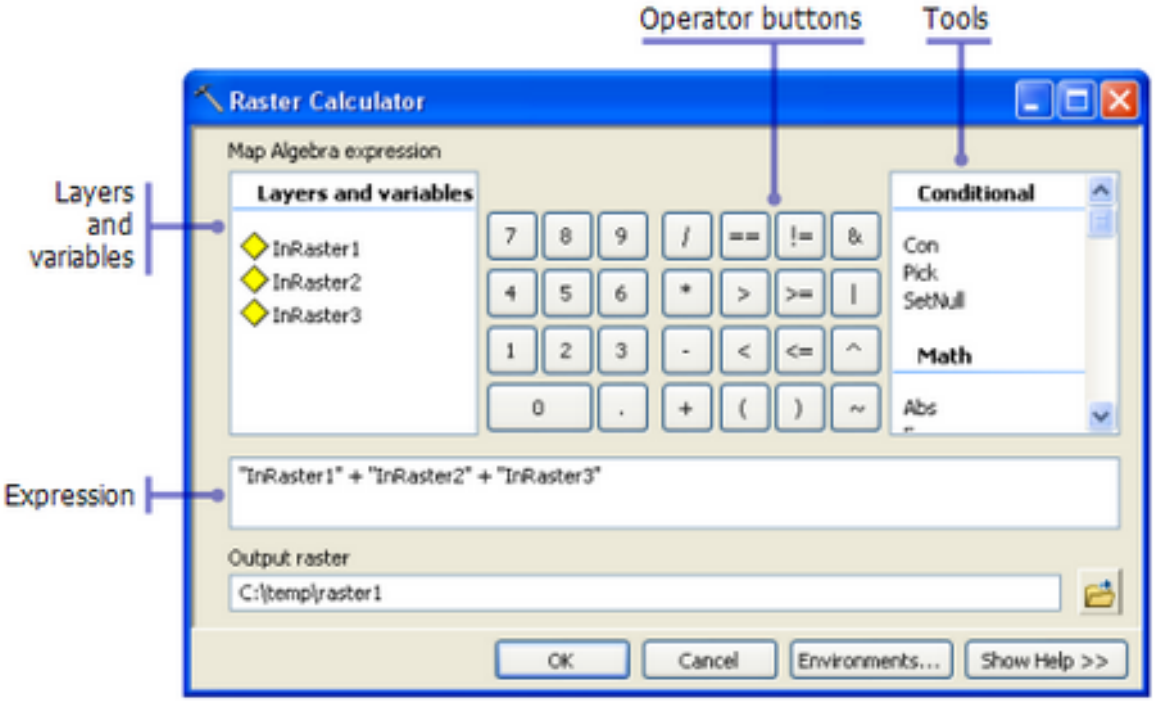
- A database or tabular file containing information about a set of geographic features, usually arranged so that each row represents a feature and each column represents one feature attribute



… *Important geo-processing tools:*

Raster Calculator (Spatial Analyst)

- Builds and executes a single Map Algebra expression using Python syntax in a calculator-like interface.



Raster Calculator tool dialog box example

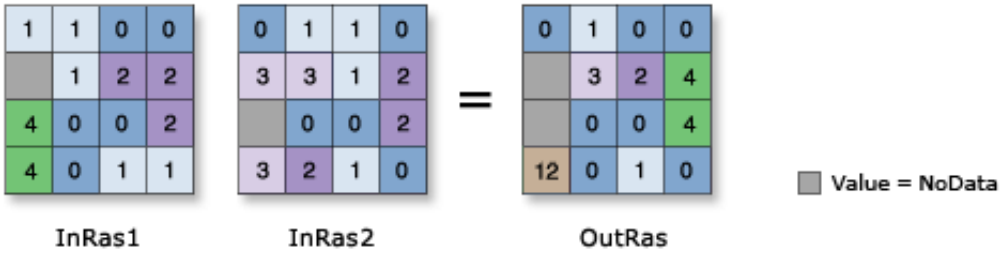
… *Important geo-processing tools:*

Math Toolsets (Spatial Analyst)

- The Math toolset contains tools that perform mathematical operations on rasters

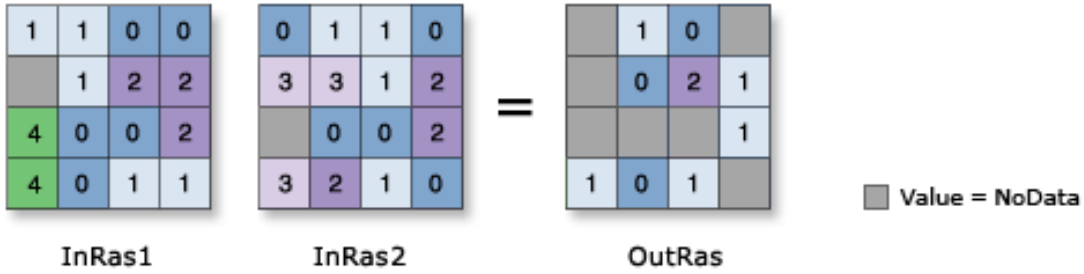
Times (Spatial Analyst)

- Multiplies the values of two rasters on a cell-by-cell basis



Divide (Spatial Analyst)

- Divides the values of two rasters on a cell-by-cell basis

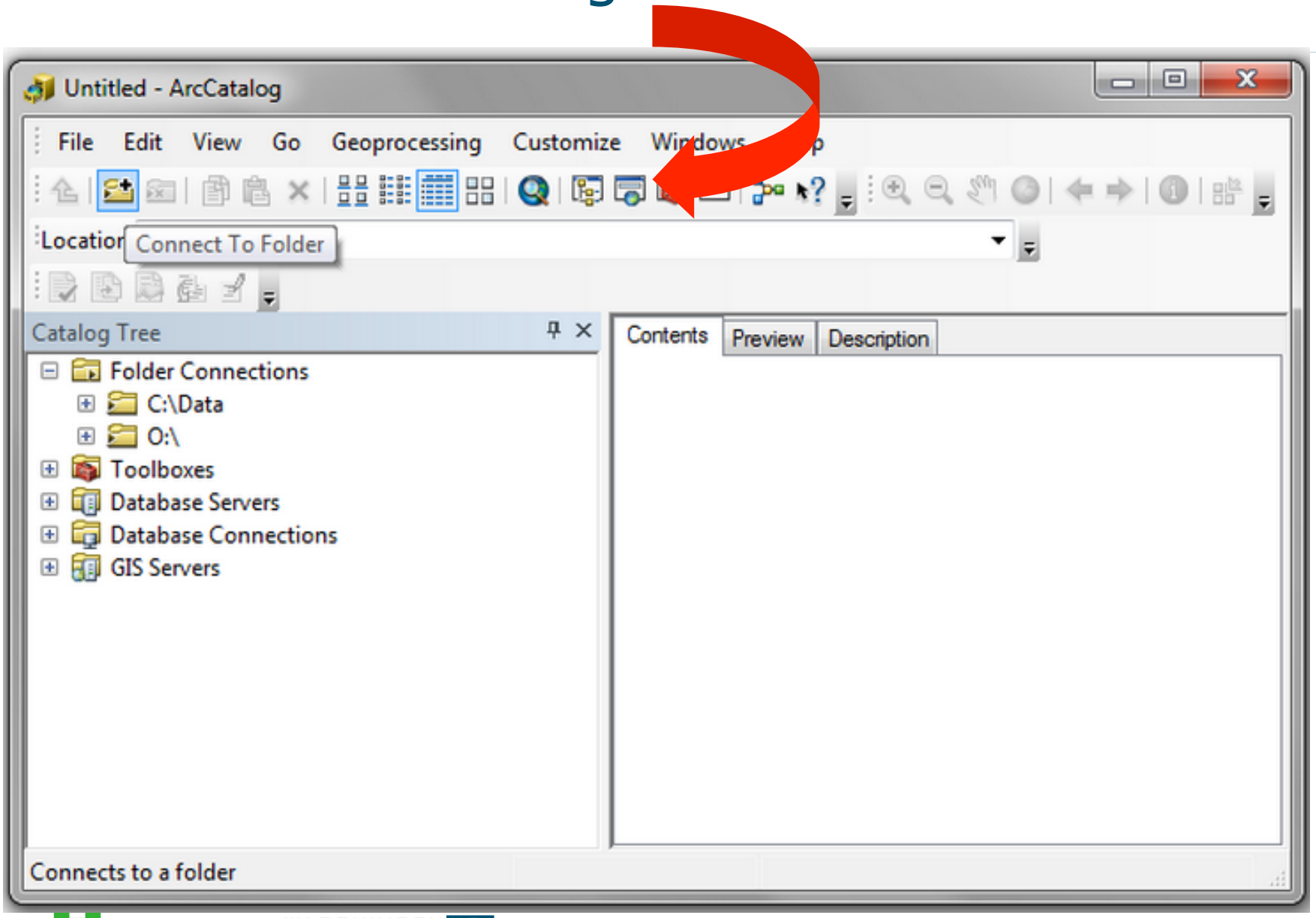


… *Important geo-processing tools:*

Importing maps and Exporting maps is best shown on the hands-on training

When in doubt???

Use the arcCatalog Search button!!!



Summary

- ArcGIS is an example of geo-information system under softwares
- rasters and vectors are the simplest data formats in GIS
- Geo-processing is important to manipulate spatial data
- Geo-processing tool automates mundane operations in GIS

Questions????

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