



Aalto University  
School of Arts, Design  
and Architecture

# MAR-E1004 Basics of GIS: Recap

*Jaakko Madetoja*

*23.10.2017*

# Contents

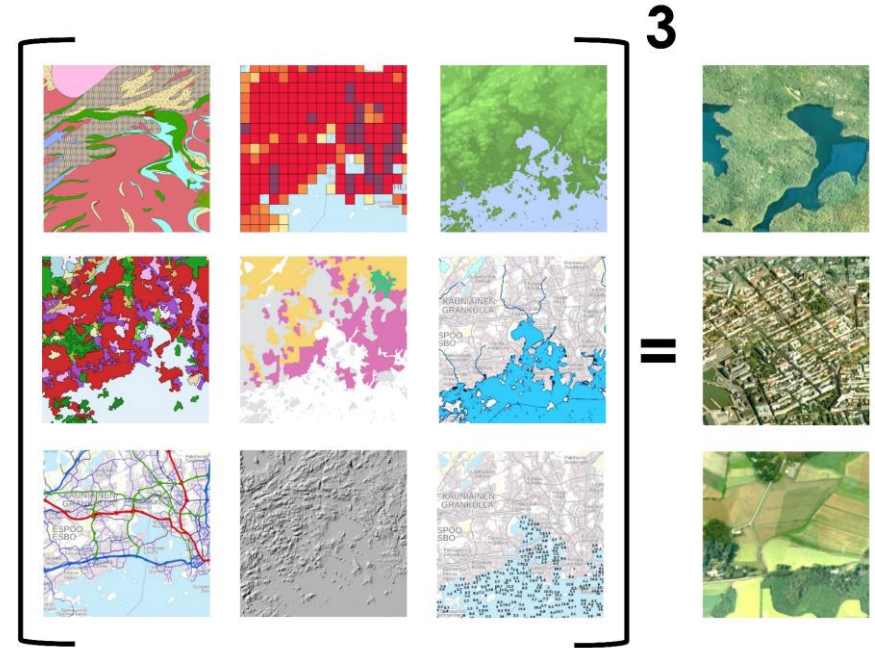
## A recap of topics

- **Coordinate systems**
- **Selection, drawing, tables**
- **Finding data**
- **Vector map overlay**
- **Visualization**
- **Map algebra**
- **Visibility**

# Why GIS in landscape characterization?

Landscape characterization is a GIS operation

- GIS provides tools for storing, processing, analysing, and visualizing spatial information



**GIS Landscape Characterization  
of the Uusimaa Region**  
Basics of GIS

# Coordinate systems

- **Geographic and projected coordinate systems**
  - WGS84
  - ETRS-TM35FIN and KKJ (or Finland Zone # in ArcMap)
- **Always remember to set the correct coordinate system; ArcMap will automatically show layers with different systems correctly**

# Selections

- **Manual selection tools**
  - From map, from attribute table
- **Select by attributes**
- **Select by location**
- **Create layers from selected features**

# Drawing

- **Sometimes manual drawing is the best solution**
- **You can create new layers using Windows -> Catalog**
- **You need to start editing using the Editor toolbar from Customize -> Toolbars**
- **Remember to save edits and stop editing when you're done; some tools won't work if editing is on!**

# Tables

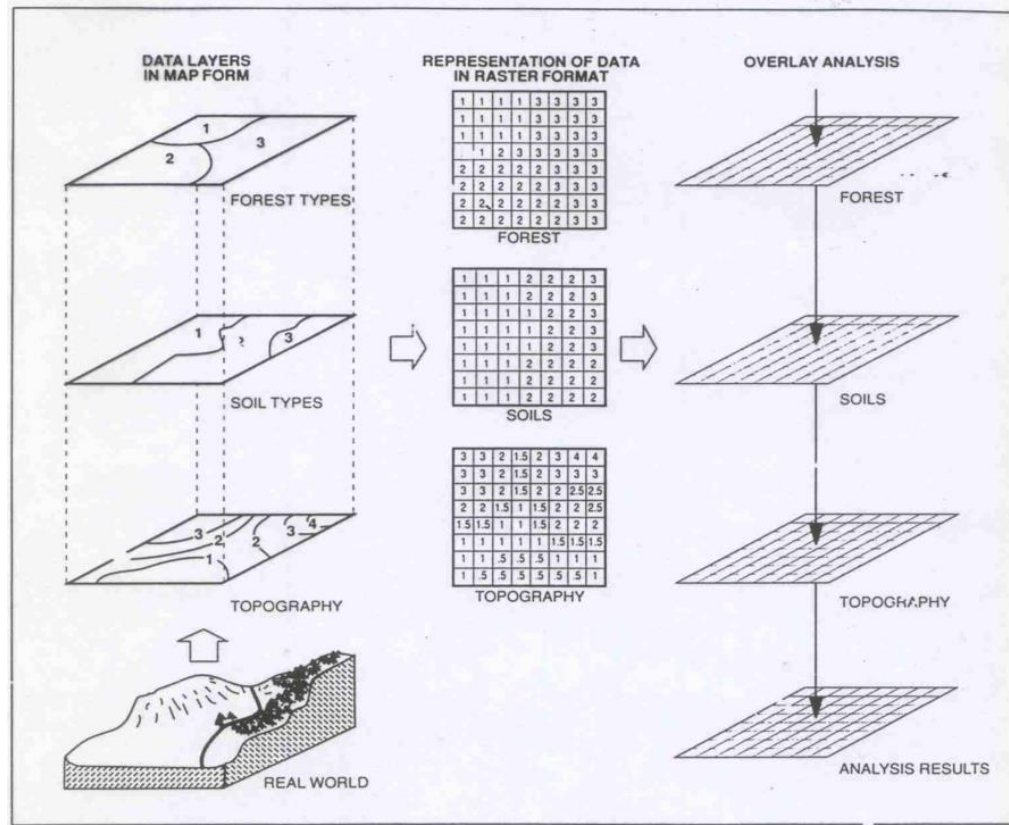
- **Spatial data includes location and attributes; attributes are stored in the attribute table**
  - You can create new attributes, calculate values, calculate geometry (e.g. area, length)
- **Data from table: You can create points based on coordinates as columns in an Excel table using Display XY Data**

# Where to find data

- **Paituli has a large collection of data sets**  
**(<https://avaa.tdata.fi/web/paituli>)**
- **Others? SYKE, GTK (Geological Survey of Finland), StatFin, Google Earth, OpenStreetMap**

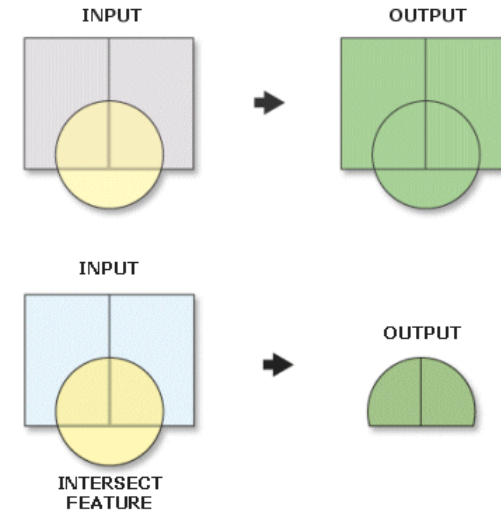


# Map overlay



# Vector overlay

- **Union**
- **Intersect**

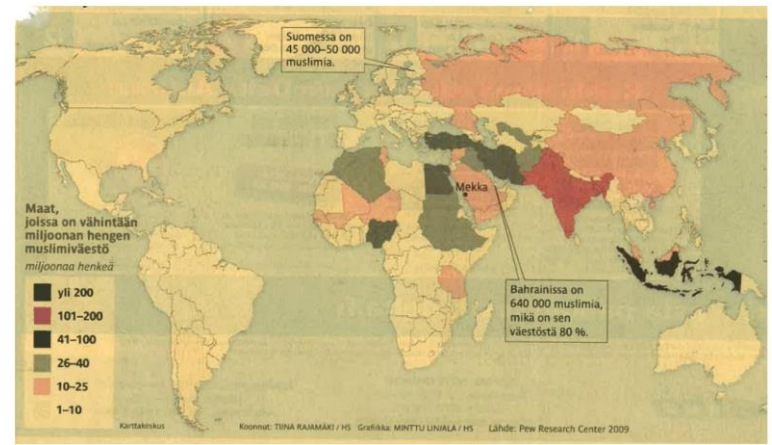


- **The output includes attributes from all input layers!**

See more info in

<https://desktop.arcgis.com/en/arcmap/10.3/tools/analysis-toolbox/an-overview-of-the-overlay-toolset.htm>

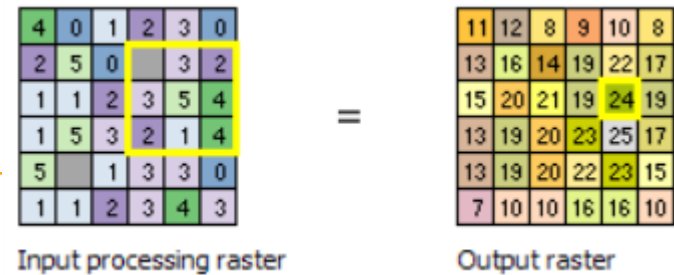
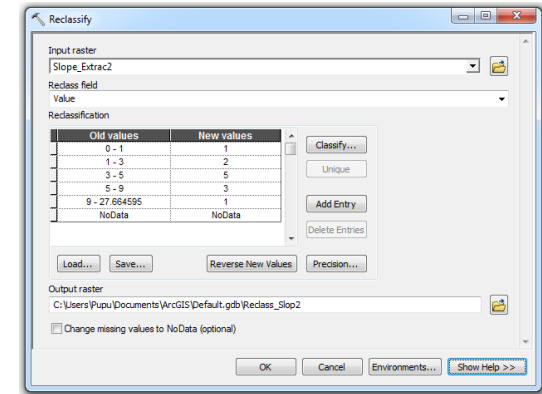
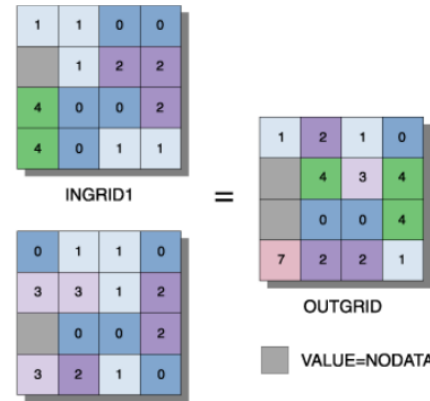
# Visualization



- **Maps communicate a message**
  - Think about what you are trying to say; does the map communicate that?
- **Are the colors logical?**
- **Do you need normalization?**
- **Do you have all the required elements (title, legend, author, source, scale bar)?**

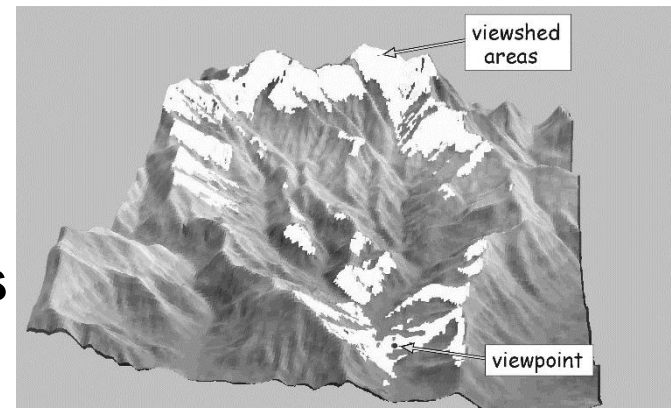
# Map algebra

- Raster version of map overlay
- Local map algebra
  - One pixel at a time, possibly many layers
  - Reclassify
- Focal map algebra
  - Pixel and its neighborhood
- Zonal map algebra
  - All pixels in a zone



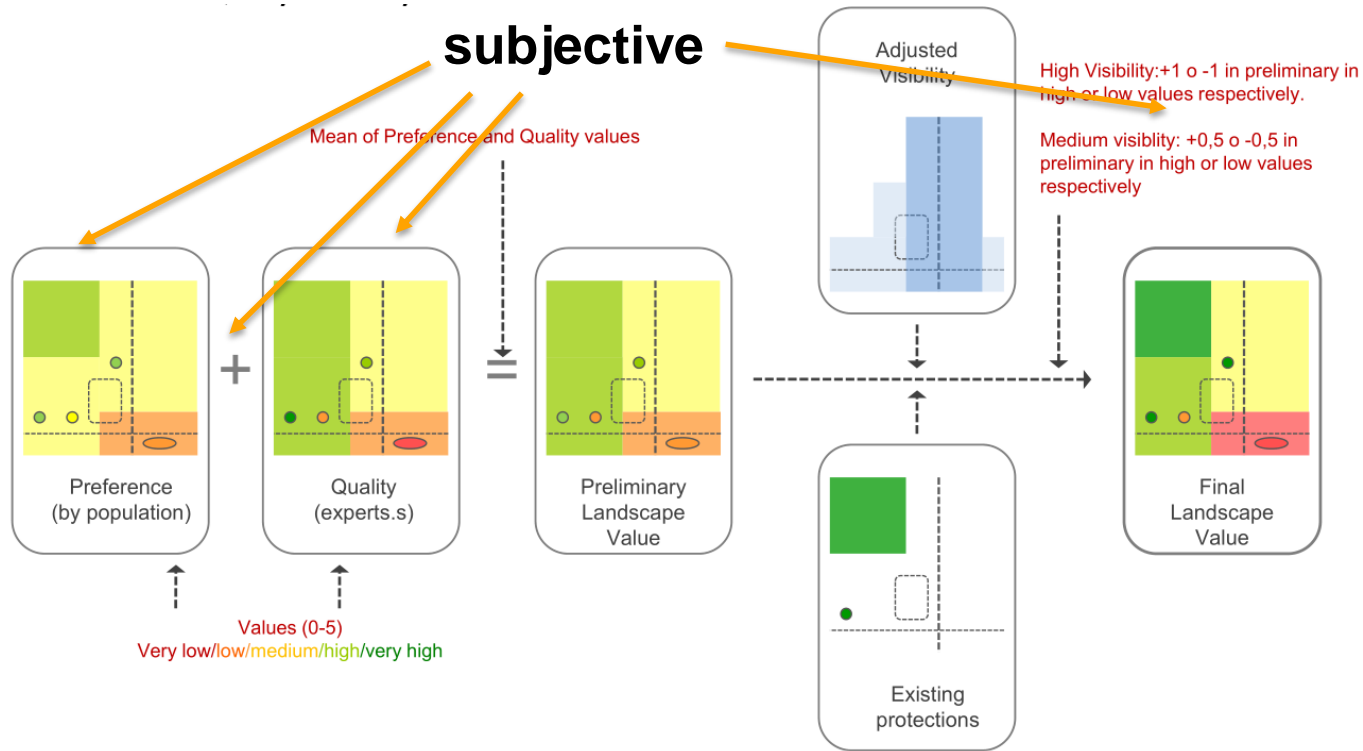
# Visibility

- **Viewshed: area visible to input locations**
- **Calculation in ArcMap:**
  - DEM (+ buildings + forests?) as the surface
  - One or more points or lines as observer location
  - OFFSETA (observer height) and OFFSETB (target height)
  - Output values show the amount of observer locations that can see a certain target point



Bolstad: GIS Fundamentals

# GIS in landscape characterization



# GIS in landscape characterization

- **GIS only gives you the tools for landscape characterization; you have to decide how to apply them**
  - Preferences for tourists, locals, experts...
  - How do you weight different preferences
  - How do you add visibility