

Geol 588

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GIS for Geoscientists II

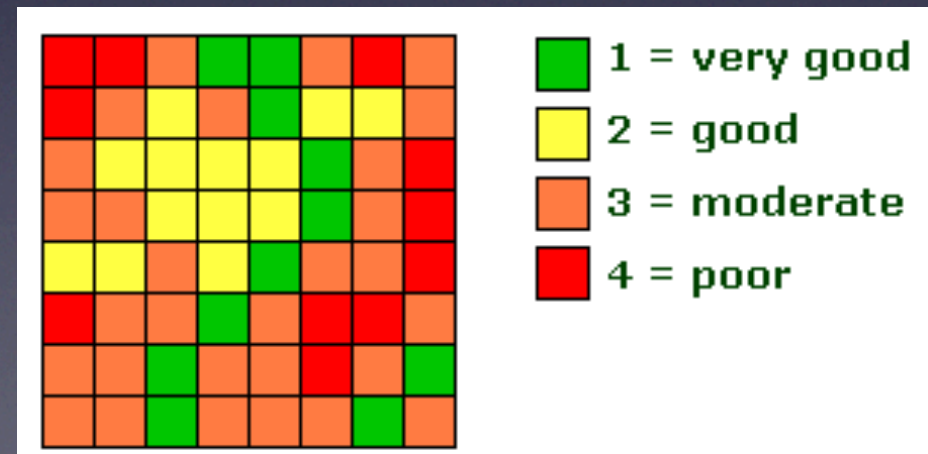
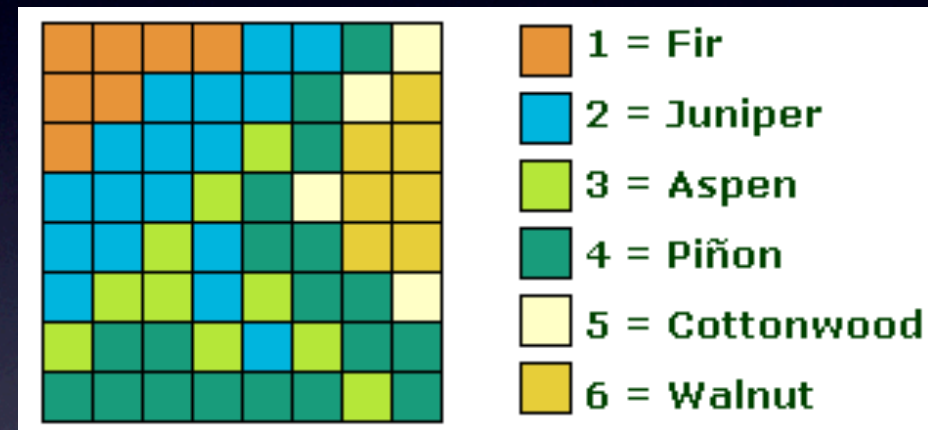
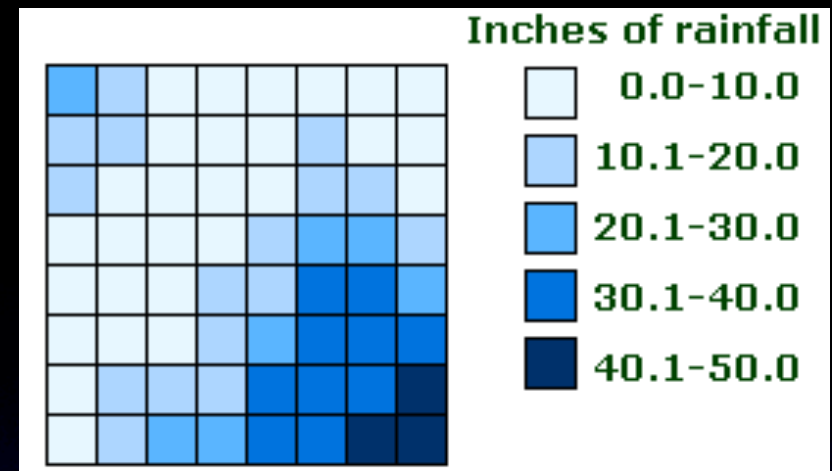
Lecture 8

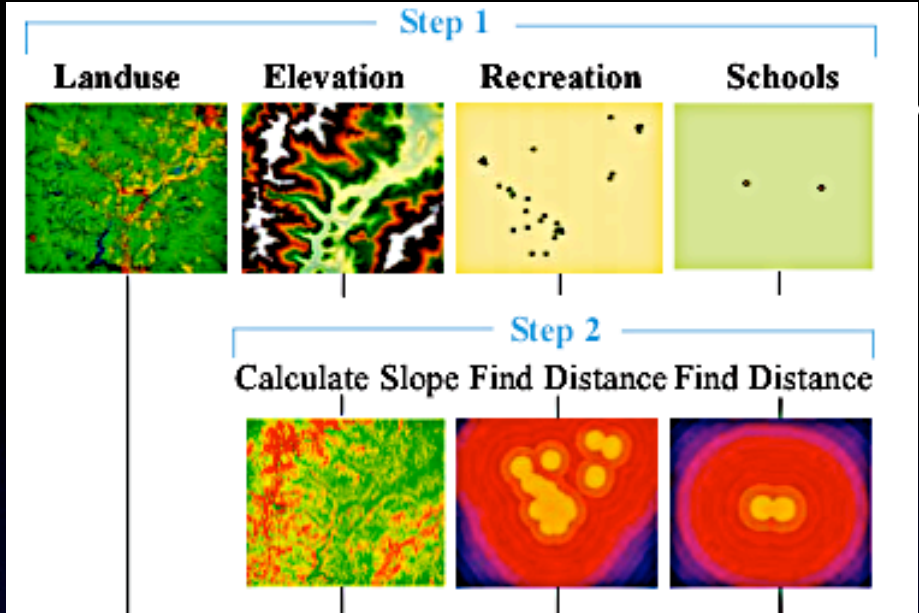
# Today

- Suitability modeling in GIS
- Reclassification, Weighted Overlay tool
- Spatial Analyst Tutorial (Midterm take home)
- Midterm Multiple choice this Thursday
  
- Lidar data?
- TIN (triangulated irregular networks) ?

# Data Types

- continuous (floating point, floats)
- discrete
  - whole numbers (integers, ints)
  - names/categories (IDs, ZIP), encoded as integers with a lookup table
- What type is suitability?

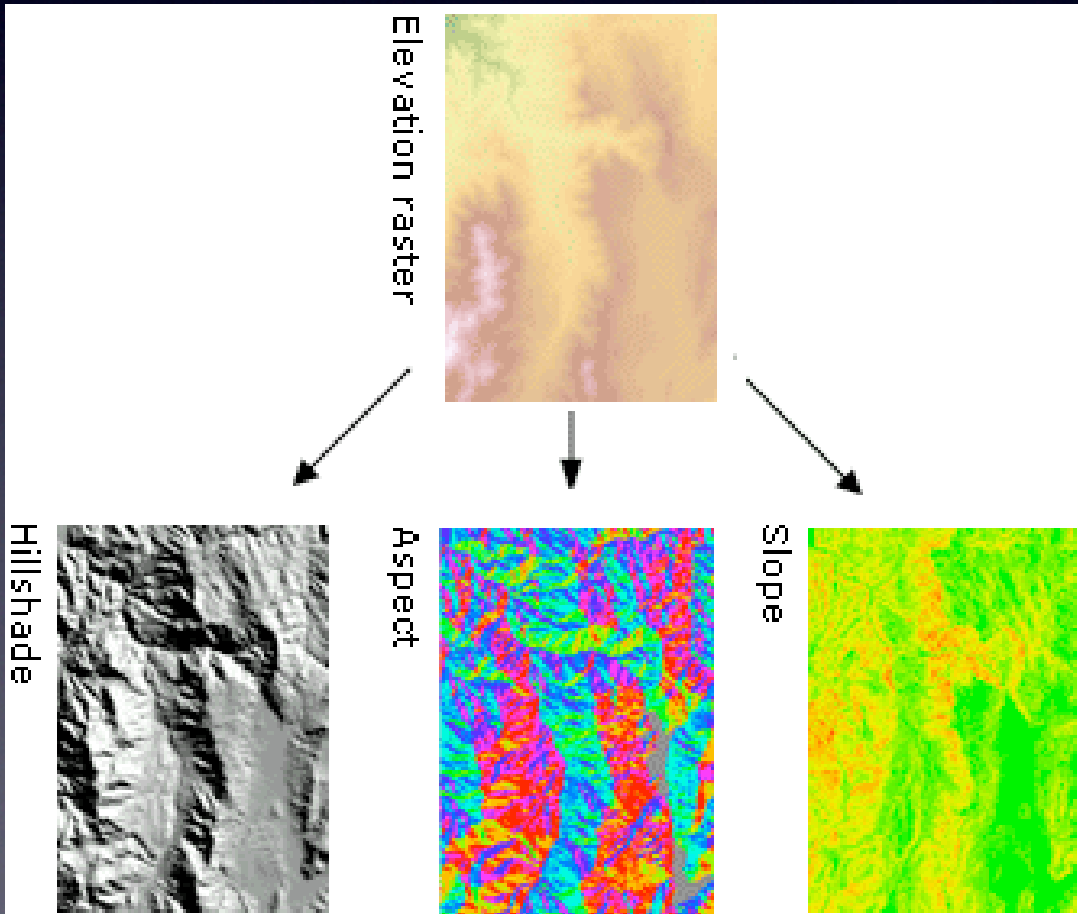


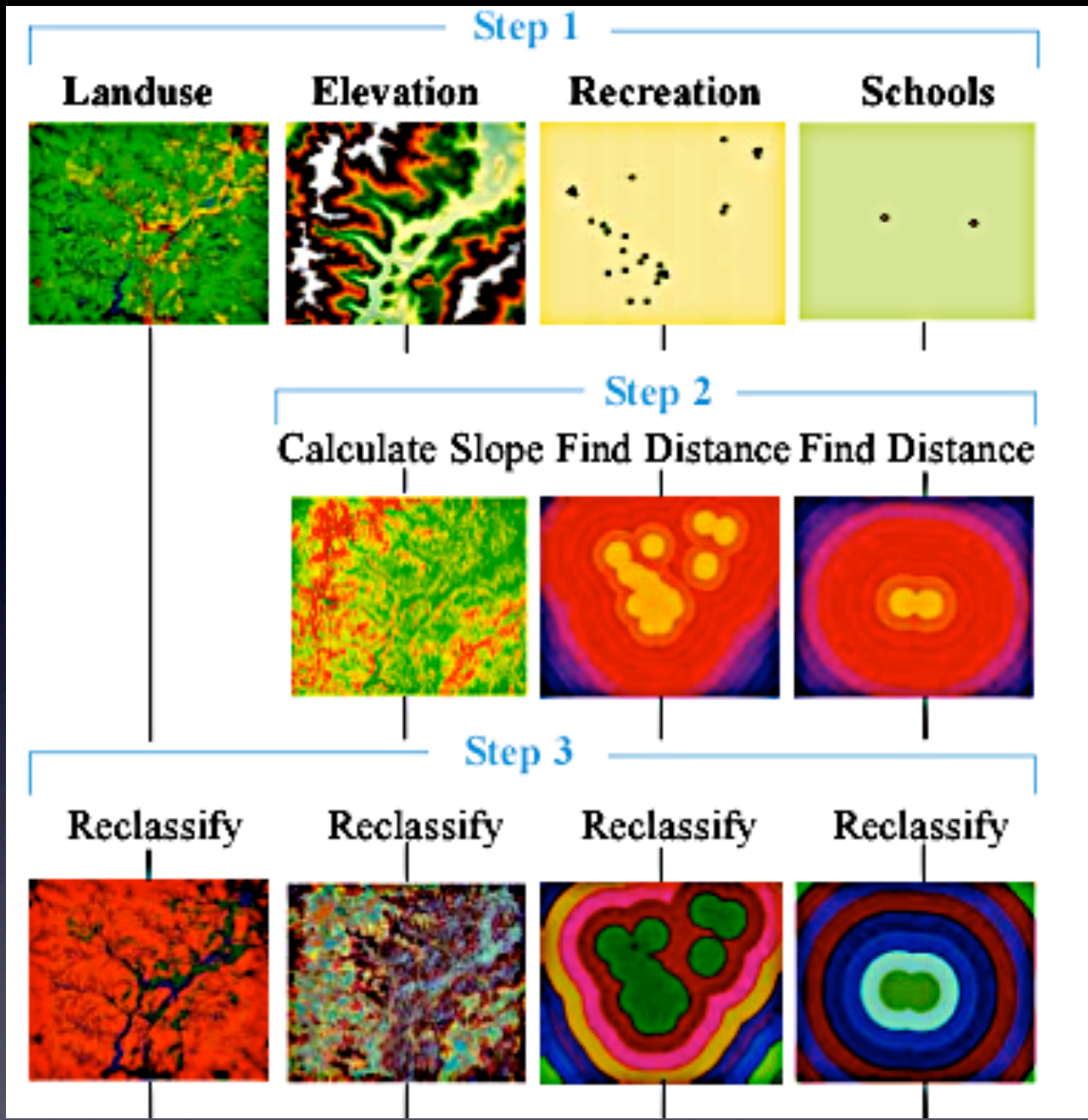


“Raw” Data sets

Derived data sets

- Deriving new data is more than visualizing data in different ways!
- Ask: has the data base changed?(attributes, cells)





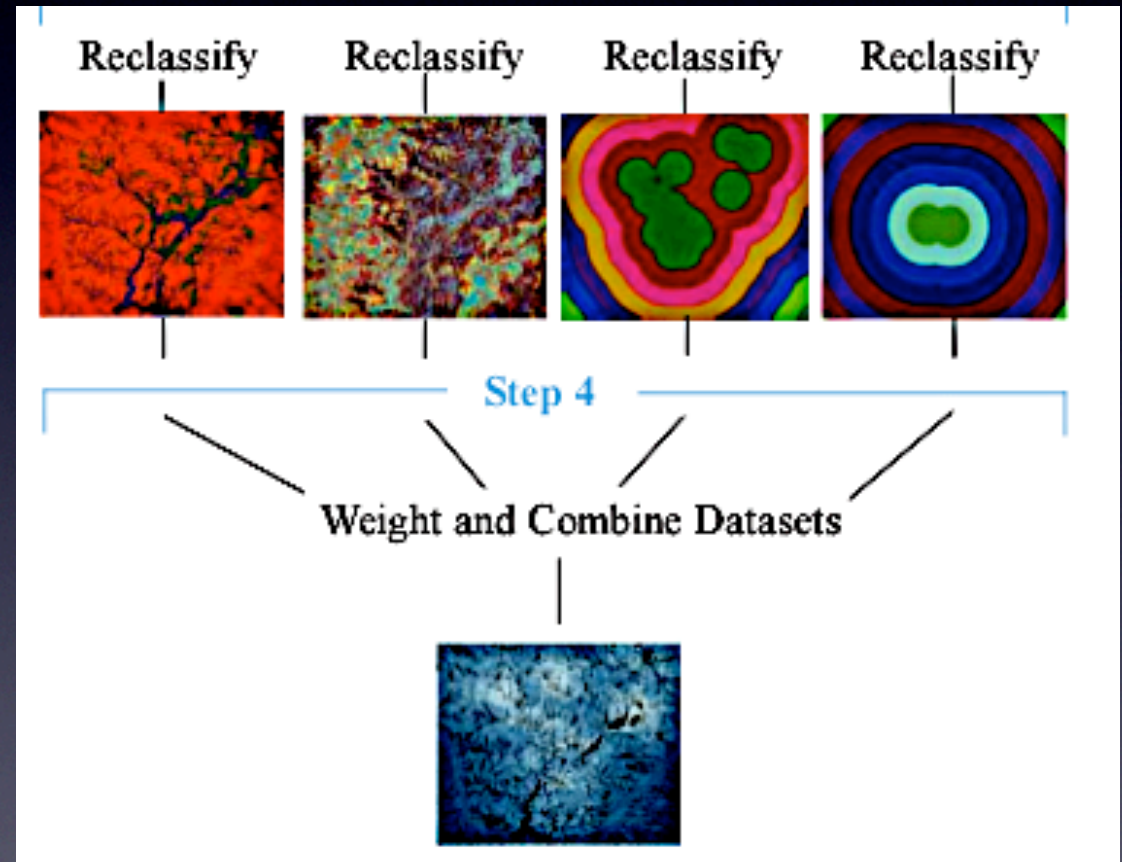
- Goal: combine derived and raw data
- Need: common measurement **scale** (1-10)
- Reclass(ify) (into integers)
- (Tip: use the same color scheme, to compare unlike here!)

# Reclassify

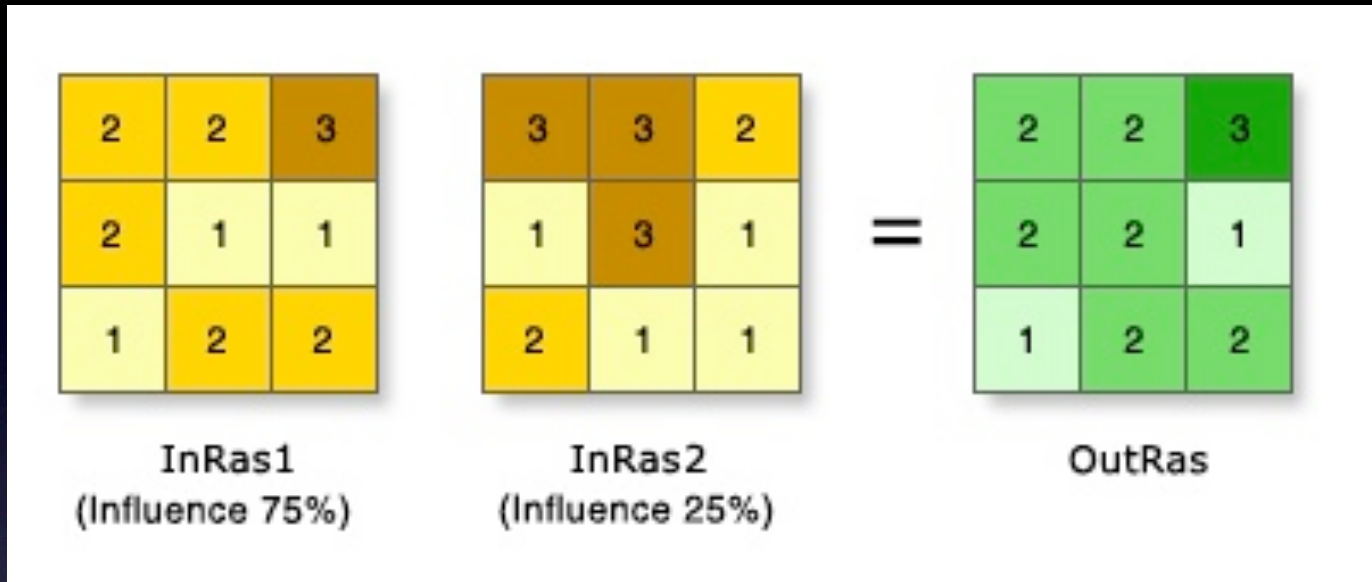
- Classification Method (Equal interval, Defined interval, Std. deviations, etc.)
- Unique: 1-to-1 connection, no classes
- “Direction”: high(low) input value to high or low reclass (scale) value?
- Slope (0 - 45.5) for engineering ( 1 - 10) ?
- categorical input (unique):
- assign a reclass value for each (or use ranges)
- ex: reclass LU 1-3 to 1, LU 4-5 to 2, LU 7 to 3

# Combining and weighing data sets

- Need weight factors for each reclassified data set
- A (worth 30%) + B (worth 20%) + ... = 100%
- use weighted overlay tool
- Raster calculator:  
 $A * 0.3 + B * 0.2 \dots$



# Weighted Overlay tool



- Spatial Analyst Tools
- same as Raster calculator:  
$$\text{OutRas} = \text{InRas1} * 0.75 + \text{InRas2} * 0.25$$



# The “restricted” value

- Used only in Weighted Overlay tool
- this cell’s result will be “restricted” regardless of the value
- Always: Smallest suitability value minus 1
- ex: suitability 1 - 9 => restricted value is 0
- effect: result (overall suitability) is 0 (“restricted”) whenever it is involved
- Why use restricted value? Allows NoData for other meanings (i.e. true data errors)

# Midterm “take home” exam

- Look at [ftp://pub.gis.iastate.edu/ESRI/v93\\_Tutorials/Spatial\\_Analyst\\_Tutorial.pdf](ftp://pub.gis.iastate.edu/ESRI/v93_Tutorials/Spatial_Analyst_Tutorial.pdf)
- You could get the Spatial (Analyst) tutorial **data** from [ftp://pub.gis.iastate.edu/ESRI/v92\\_TutorialData/Spatial/](ftp://pub.gis.iastate.edu/ESRI/v92_TutorialData/Spatial/) or `\\delphi\geol558\data\SpatialAnalystTutorialData.zip`
- Only work on **Ex. 2 and 3**, make sure you know how to save and later reload your "personal" toolbox and tools for using ModelBuilder
- Deliverables: simple electronic "poster" (something large with a 4:3 ratio, like 36" x 24", keep it < 20-30 Mbs (less, if possible) but check if the text can be read.
  - - explain the nature of two tasks a short text (5 pts)
  - - show the original data (only) (i.e. the data you start with), incl. simple legends (3 pts)
  - - show the final modelbuilder flow diagram graphic for ex. 2 (4 pts)
  - - show the suitability map only (result of ex. 2) with a legend (5 pts)
- (optional: show a 3D ArcScene graphic of the suitability values as elevation colored by the hillshaded suitability map, 3 pts)
  - - show the final modelbuilder flow diagram graphic for ex. 3 (4 pts)
  - - come up with 2 more weighting scenarios for the landuse vs slope weight (p. 54) e.g. 10%/90% and 90%/10% and rerun the ex.3 model (5 pts)
  - - show maps of these three solutions with a legend (5 pts) - make clear which solution is based on which weight mix!
- (optional points (1-5) for nice layout, scales, north arrows, etc.)
- 31 (+3+5) total points