GEOL 452/552 - GIS for Geoscientists I
Lecture 16 - Chapter 7 Geoprocessing

- HW5 (6?) corrected
- Chapter 7: Geoprocessing (“Overlays”)
- Today: intersections, union, clip, erase
  (next lecture: dissolve, buffer, merge)
- clip to shape (graphical-only clipping)
- class exercise: copy follow_along_data\Ch7A_class_ex folder and run mxd file inside
- (Short version of the tutorial, so you can concentrate on mini proj.2 in today’s lab ...)

Overlay operations (fig. 7.8, p. 189)

- Creates new shapes
- Think: cookie cutter
- Layer Order matters
- Attributes not joined

Clip:

Erase:

Intersect:

Union:

Why overlay procedures?

- Which polygon is each road (segment) in?
- Spatial Join would only be able to fit the leftmost line into Poly 1
- But: the other lines cover more than one polygon
- Geoprocessing splits the road along the polygon shape (into 3 + 2 new lines)
- Use intersection method create a new layer with split lines
- Intersect can assign the polygon’s name to each line segment (i.e. free join :)
- How would you get the total length (post split) per polygon?
Intersect: Output type geometry

Polygon - line intersection can create lines or points:

Polygon - polygon intersection can create polygons, lines or points:

ArcGIS Help: Intersect Tool - Tools Help - Learn how intersect works

ArcTools: Intersect and Union

- Intersect: combines features and keeps what is common to both
- Union: combines features from different layers
- Works on feature shape AND feature attributes!
- To perform a spatial join set Join Attributes to ALL

Intersect vs. Union of 2 polygon layers

Intersect gives only those polygons present in both layers (Boolean AND)

Union combines polygons from all layers (Boolean OR)

Output layer: Join all attributes from each table

Class ex. - Intersect and Union

- Open ArcToolbox - Analysis Tools - Overlay
- Total length of streams inside the Des Moines Lobe?
- Run Intersect tool - Show Help
- Input features: both layers - order does not matter
- output: DMLobe_rivers_intersect (in Ch7a_class_ex Default.gdb)
- Set JoinAttributes to All
- Output type: Input (What will the Output geometry be?)
• What area is covered by the DM lobe or by Middle devonian rocks?
• Analysis Tools - Overlay - Union
• JoinAttribs = All
• Output: DMLobe_MDev_Union
• Examine Table - which features cover BOTH?

Could be graphically dissolved into 1 single polygon

Clip and Erase - extraction operations
• Work on feature shape only, do not alter (join) the attributes
  – Clip extracts features inside the boundary
  – Erase keeps features outside the boundary

• Get Results window
• drag in a corner
• Will show you data on each tool used
• Good to find errors
• To repeat a tool, 2 x click on it!

Erase the Mera Formation from the Des Moines Lobe
• Analysis Tools - Overlay - Erase
• Input Features (Dough): Des Moines Lobe
• Erase Feature (Cookie Cutter): Mera Formation
• Output: DMLobe_Mera_Erased
• Table of output?
• Clip the Des Moines Lobe (Dough) with Middle Devonian (cutter)  
• Analysis Tools - **Extract** - clip  
• Input Features (Dough): Des Moines Lobe  
• Erase Feature (Cookie Cutter): Middle Devonian  
• Output: DMLobe_MDev_Clipped  
• Table of output?

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**Graphical (On-the-fly) clipping: Clip to Shape**

• Temporary clip applied to a map layout  
• Does not create new layers  
• Can be performed on many layers simultaneously  
• Can be removed when no longer needed  
• Set as a data frame property

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**Wrap up**

• Lab: Work on HW 8 (create 2 interesting chains of query/joins (Due Thursday)  
• Look at data in \\pub\pub\IowaDNR\Iowa_State  
• I’m here to give you feedback on your ideas  
• On Thursday: Will start Mini proj 3 (HW9) - will focus on overlay operations (no HW from ch. 7 book ex.)  
• Tutorial for CH 7 is optional (after you’ve done HW 8!)