King Abdul-Aziz University	Computer Applications in LA (LA561)
Faculty of Environmental Design	Dr. Eng. Ragab Khalil
Landscape Architecture Department	*Exercise # 4*

GIS Lab #4: Creating Feature Datasets & Vector Editing

Objectives:

- Creating new feature layers by query of existing feature layers
- Building a new layer from scratch

Digitizing features

Some general strategies for digitizing:

- Digitize a map boundary polygon first.
- Set the Snapping before starting and check and/or reset Snapping as new feature classes are digitized (Setting snapping is ***absolutely essential*** when digitizing. It is impossible to guess when a line you are digitizing is touching another line unless you can snap to it.).
- Try hard to assure that all line features that intersect other lines or polygons are snapped to those lines or polygons.
- Work from one edge of the map to the other; examine the map carefully and try to think a few steps ahead.
- Attribute as you go. Keep the feature class' attributes, accessible on the editing toolbar, open as you work and fill in the fields after completing each feature.
- A final word about editing... selecting features for editing can be difficult if more than one layer is selectable - you can accidentally select a layer that is underneath the one you're trying to select. To avoid this problem, the "selectability" of layers can be turned on or off. The easiest way to do this is by clicking on the "Selection" tab at the bottom of the table of contents and clicking the box next to each layer to turn selectability on or off. Likewise, when you try to select a layer and can't, check the Selection tab to see if it is turned off for selection.

The generalized Digitizing/Editing procedure is:

a) From the Editing toolbar menu, Start Editing;
b) On the toolbar set Target to the file you will digitize into;
c) Set Snapping (under the Edit menu on the Editing toolbar)
d) Choose Task – e.g. "Create New Feature" – on toolbar;
e) Select Tool – Pencil (for other tools see Help files) on toolbar;
f) Begin outlining feature – create a "Sketch" - Click to create a vertex; create as needed to outline feature.
g) Finishing feature outline with double click, or a right-click, then "Finish Sketch";
h) SAVE EDITS (on editing toolbar menu, NOT the ArcMap toolbar).

i) Open the table for the newly created feature (table icon on edit toolbar) and enter attributes.
j) SAVE EDITS.
k) Repeat for the next feature.

Overview

1. Start ArcGIS
   1. Add *stands* layer to the data frame
   2. Rename the data frame to **stands**
2. Query a layer to select a subset of features
   1. In this exercise, create a shape file from the **stands** (ArcInfo coverage) layer, consisting only of stands between the ages of 15 and 30.
   2. From the menu, select **Selection > Select By Attributes**.
   3. Perform this query statement **"AGE_2003" > 15 AND "AGE_2003" < 30**.
   4. Click the **Apply** button, and dismiss the dialog
3. Convert the selected set of features to a shapefile
   1. right-click the layer's name and select **Data > Export Data**
   2. Save the data set as **stands_15_30**
   3. Click **Yes** when asked to add the shapefile to the data frame
   4. Repeat the process with CAD file
4. Create (digitize) a new polygon layer and modify its legend
   1. Open ArcCatalog by clicking the **ArcCatalog** button
   2. Navigate your directory within ArcCatalog.
   3. **Menu> File> New > Shapefile**
   4. Choose a name for the new shapefile. Select **Polygon** as the **Feature type**
   5. Click **Edit** in the **Spatial Reference** control panel. Click **Import** and navigate to **packgis\forest**, click **roads**, and click **Add** to define the new shapefile's coordinate system.
   6. Click **OK**
   7. You will see the new shapefile in ArcCatalog. Drag it onto your map display within ArcMap.
   8. Change the **Fill Color** to **No Color**, the outline width to **2**, and the **Outline Color** to a bright red.
5. Alter the attribute table
   1. Right-click the layer and select **Open Attribute Table**.
   2. Minimize (but do not close) the attribute table.
6. Set the snapping environment
   1. **View > Toolbars > Editor.** select **Start Editing**
   2. Add the **Snap Tolerance** tool to the editing toolbar. **Tools > Customize > Commands.** Find the **Editor** Category and the **Snap Tolerance** Command
   3. Drag the Tool onto the Editor toolbar
   4. Select **Snapping** from the Editor menu. Click all checkboxes for the **new** layer

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5. Using the **Snap Tolerance** tool , click and drag a distance as your snapping tolerance
6. You can check or set the snapping tolerance by looking at **Editor > Options** from the menu.

7. Add features and attributes to the new layer
   1. Verify that the **Task** is **Create New Feature** and the **Target** is **the new layer**. Use the **Sketch** tool to add the first polygon
   2. Notice the attribute table.
   3. The next steps will be to add new polygons with the auto-complete option
   4. **View > Toolbars > Topology.** Click the **Map Topology** tool . Click the checkbox for **the new layer**. Click **OK**
   5. Alter the **Task** to **Auto-Complete Polygon**
   6. Add a new adjacent polygon by making the first click *within* the existing polygon, then move outside the existing polygon, adding vertices as needed. To finish the new adjacent polygon, double-click again within the first polygon.
   7. Each time you add a polygon, it will be selected. Update the records for each polygon as they are added.
   8. You may need to **Options > Reload Cache** in the table, or close and reopen the table in order to see all the records.

8. Edit features with Split and Merge
   1. First, save your current edits (**Editor > Save Edits**) and **File > Save**
   2. Select a record in the table for the polygon shapefile.
   3. Change the **Task** to **Cut Polygon Features**. Define a line that splits the polygon (making sure to start and end outside the selected polygon). Double-click or **<F2>** to end the line.
   4. Use the **Edit** tool to select half of the split polygon and an adjacent polygon
   5. Select **Editor > Merge**
   6. Select and merge the other half of the polygon with its adjacent polygon

9. Stop editing and save your edits
   1. **Editor > Stop Editing**. Click **Yes** in the **Save** dialog

10. Create a new point layer
    1. Create a new shapefile (as you did before), but this time make it a point data set and call the shapefile **crossings**
    2. Open the attribute table for the **crossings** point layer and add the fields **Stream** (type = text, length = 25) and **Road** (type = text, length = 25).
    3. Add the shapefile to the data frame and start editing
    4. On the **Editor** toolbar, select the **Create New Feature** task. Select the **Sketch** tool to add point features at the intersections of road and stream
    5. In the attribute table, add the road and stream's names.
    6. Stop editing and save changes

11. Create a new line layer
    1. Create a new shapefile (**new_roads.shp**). Make sure this is a **Polyline** feature class. Import its coordinate system parameters from the roads

2. Add the **\packgis\forest\ortho_96.bil** image data source and the **roads** feature class
3. Set the Snapping environment and reset the snapping tolerance if necessary
4. Zoom in and start digitizing some roads based on what you see in the image.
5. Stop editing and save changes

12. Close the map document