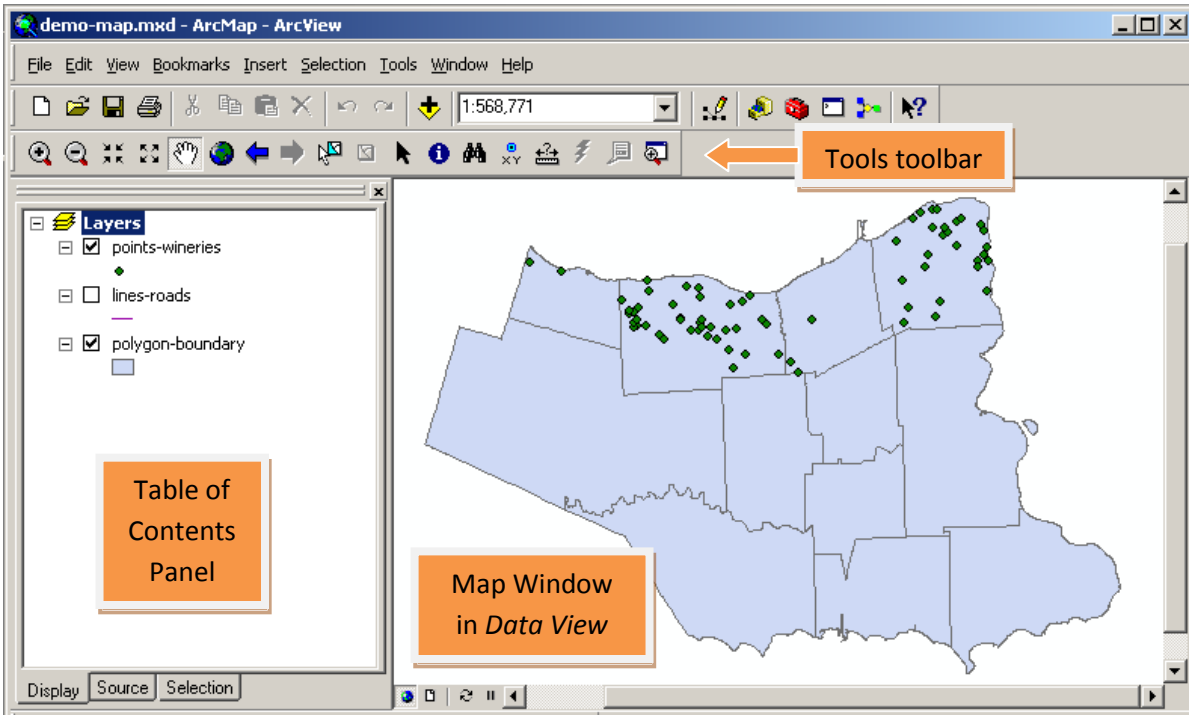
Intro to GIS for Computing in History

What is GIS?

GIS stands for Geographic Information Systems. A GIS combines the graphics that make up a map with a table of associated attributes. GIS is a tool used to display, analyze, create and manipulate spatial information.

A. Introducing ArcGIS - ArcMap

1. Run ArcMap from the shortcut on the desktop.
2. Select ***Start using ArcMap with: an existing map*** and browse to the map document ***M:/INSTRUCTION/History/demo-map.mxd***

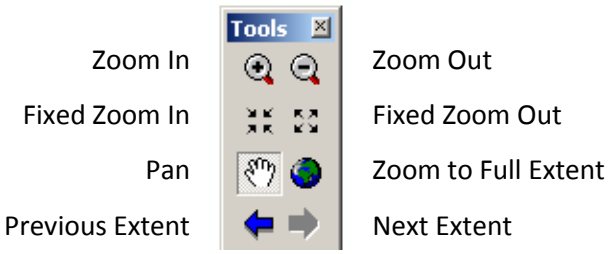


Exploring Layers

1. Click the white box beside the lines-roads layer in the Table of Contents to turn that layer on.
2. Click the checked box beside the polygon-boundary layer to turn it off.
3. To change the order of layers, click and drag a layer up or down in the table of contents. Notice the effect when the polygon layer is above the line or point layer.
4. To change the default symbol of a layer, click the symbol to access the Symbol Selector dialogue box.

Zoom, Pan and Bookmarks

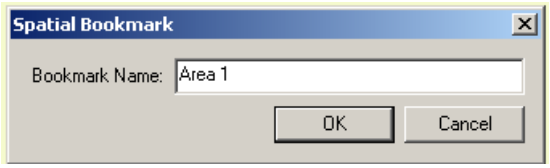
Zooming, panning and creating bookmarks manage the display of the map.

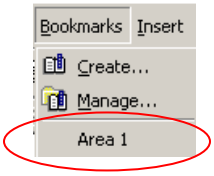


Explore the zoom tools using the above descriptions for guidance.

Creating a Spatial Bookmark

1. With the map set at a certain zoom level and location, select **Bookmark > Create Bookmark**.
2. Enter an appropriate name and click OK.

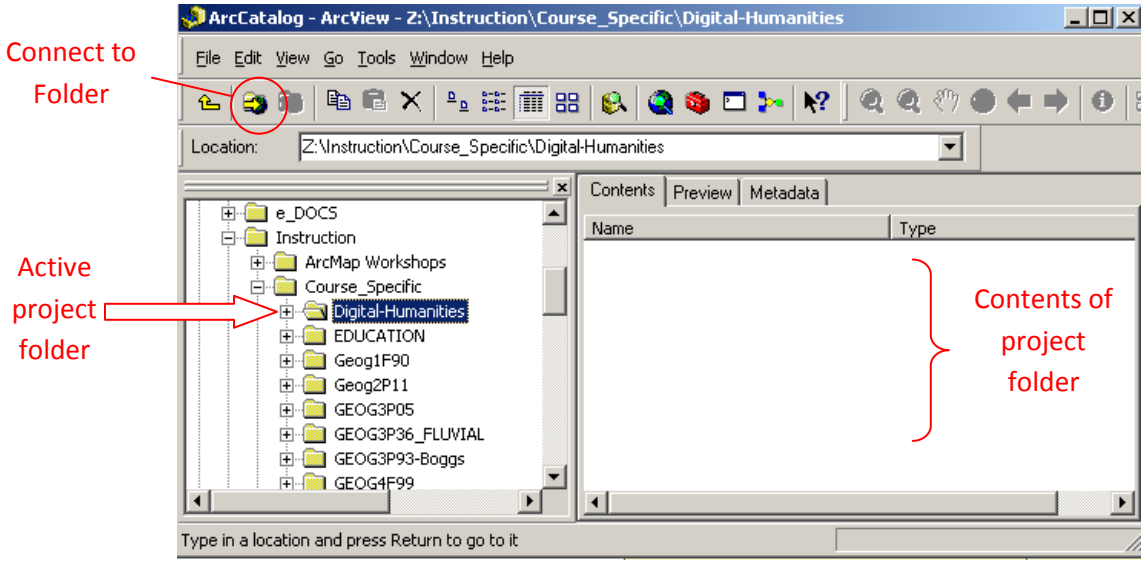




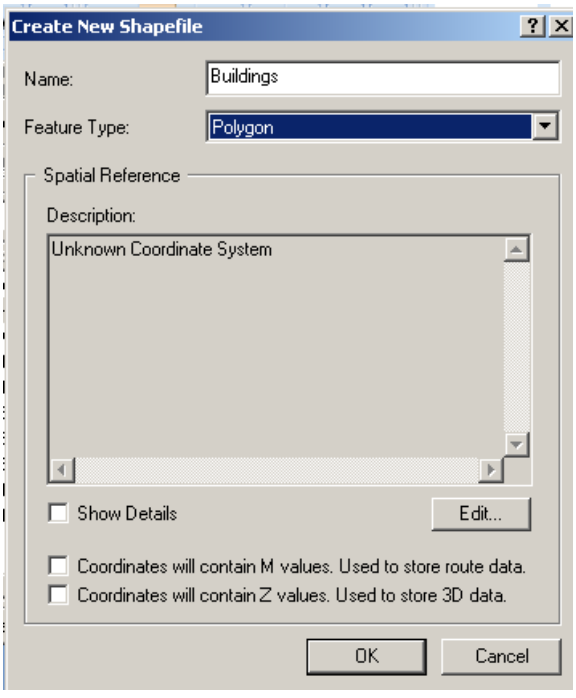
If the view is shifted or moved the saved view may be accessed by selecting the appropriate bookmark from the dropdown menu.

B. <u>Creating a new shapefile</u>

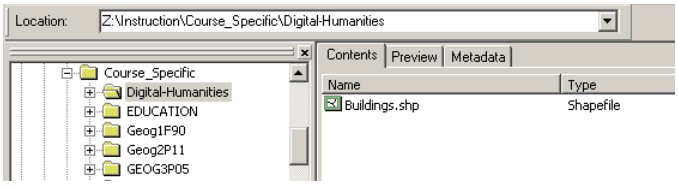
1. Run ArcCatalog by clicking the button  from the STANDARD toolbar in ArcMap.



2. Click the *Connect to Database* button and select your student directory. Click OK.
3. Select the folder where you want to save your work and view the contents in the window on the right.
4. Select **File > New > Shapefile**
5. In the name field type *Buildings*.
6. From the feature type dropdown, select *Polygon*.
7. Click OK.



The new shapefile appears in the project folder.

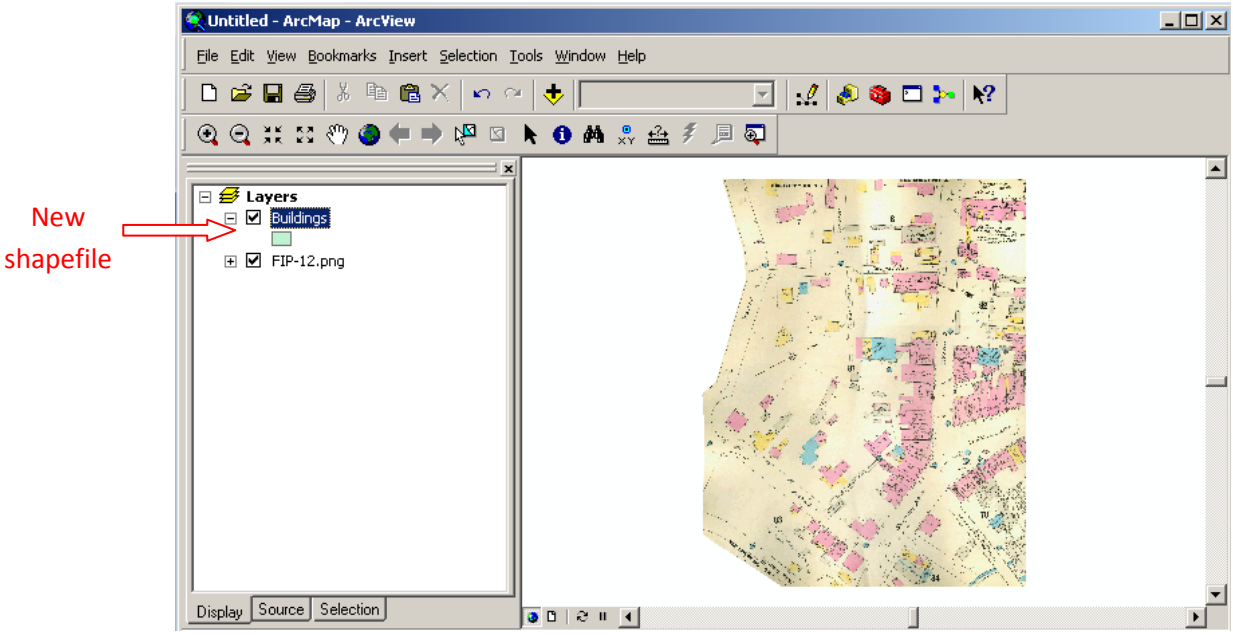


A new shapefile is required for each feature type (points, lines and polygons).

Close the ArcCatalog window.

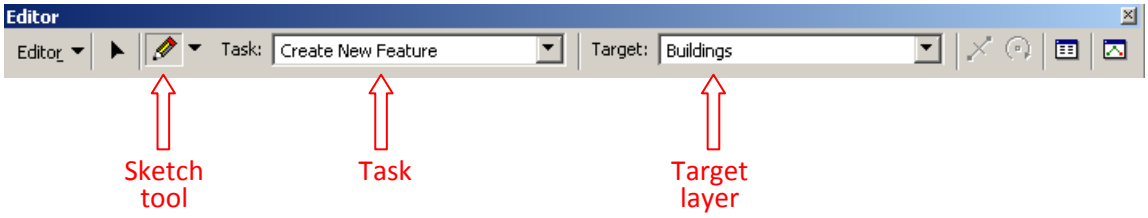
C. Adding layers to a map

1. In ArcMap select **File > New** to create a *Blank* document. Do not save changes.
2. Click the Add Data button.
3. Browse to the folder holding the Fire Insurance Plan image. ***M:/INSTRUCTION/History/FIP-12.png***
4. Select an image and click Add.
5. Click OK on the warning message about the layer's missing spatial reference.
6. Repeat the above steps to add the polygon shapefile ***from your student directory*** created in the previous section. The new shapefile is added to the map, although there are no features in the shapefile yet.

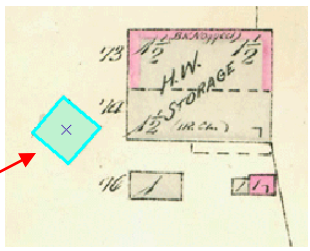


D. Digitizing & editing features

1. Use the Zoom-in tool to enlarge the view of an area to work on.
2. Click Tools > Editor Toolbar. The Editor toolbar appears.
3. From the Editor toolbar click *Editor* > *Start Editing*. If necessary, select the folder containing the shapefile to be edited.
4. Select the *Target* layer to be edited; the Task as *Create New Feature* and click the *Sketch tool*.

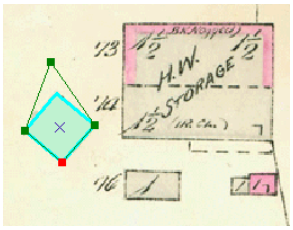


5. Position the crosshair cursor anywhere on the map and click the left mouse button to place a vertex.
6. Move the mouse and click a series of vertices, one at a time to form a polygon.
7. Double-click the last vertex, placing it just before the first vertex that you entered.



Practice editing a feature

1. From the Editor toolbar, select the Edit tool.
2. Click the polygon to select it.
3. With the polygon selected, click and drag the polygon to a new position.
4. To reshape the polygon, double-click the outline of the polygon. Grab handles appear at each vertex.
5. Position the cursor over one of the vertices.
6. Click and drag the vertex to a new position.
7. Click anywhere on the map to confirm the new shape.
8. To delete a shape, select it and hit Delete on the keyboard.



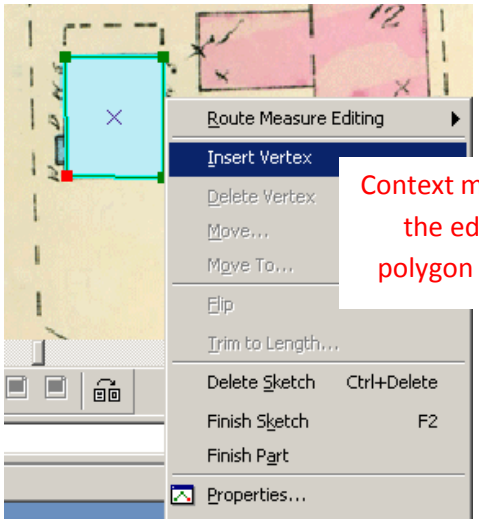
Point and line features are created in a similar fashion once the initial shapefile as been created.

9. Select Edit > Save edits to save changes to the features.
10. Select Edit > Stop editing to complete an edit session.

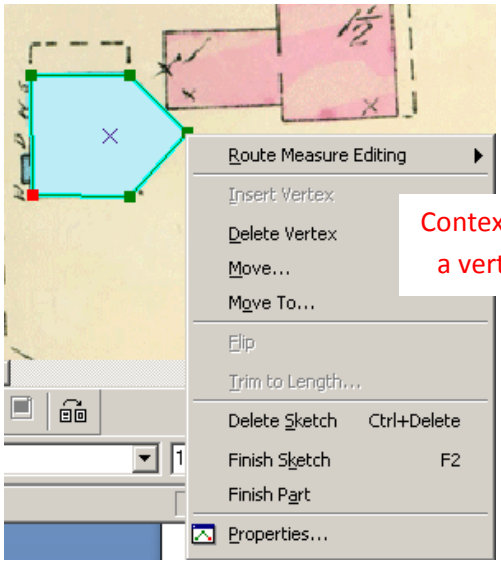
Drawing and Editing Tips

Many editing features are available during an Edit session.

1. From the Editor toolbar, select the Edit tool.
2. Double-click a polygon to begin editing.
3. Right-click along the border to access a context menu.
4. Click *Insert Vertex* to create additional vertices on the polygon.
5. Click a vertex on the polygon then right-click to access different options in the context menu.



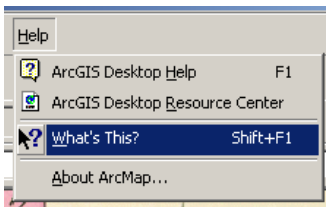
Context menu when the edge of a polygon is clicked

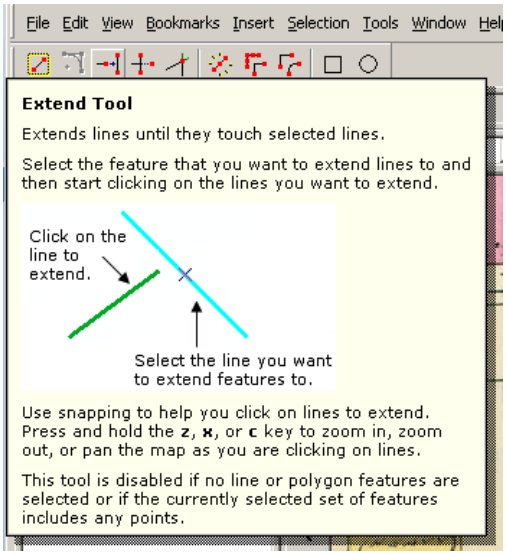


Context menu when a vertex is clicked

6. Select **Editor > More Editing Tools > Advanced Editing**. A new toolbar appears offering advanced editing tools. Explore the various options to become familiar with the editing tools of ArcMap.

To learn more about the tools, use the "What's This?" feature in the Help menu. Select this feature, and then click on a tool to access a description of the tool.

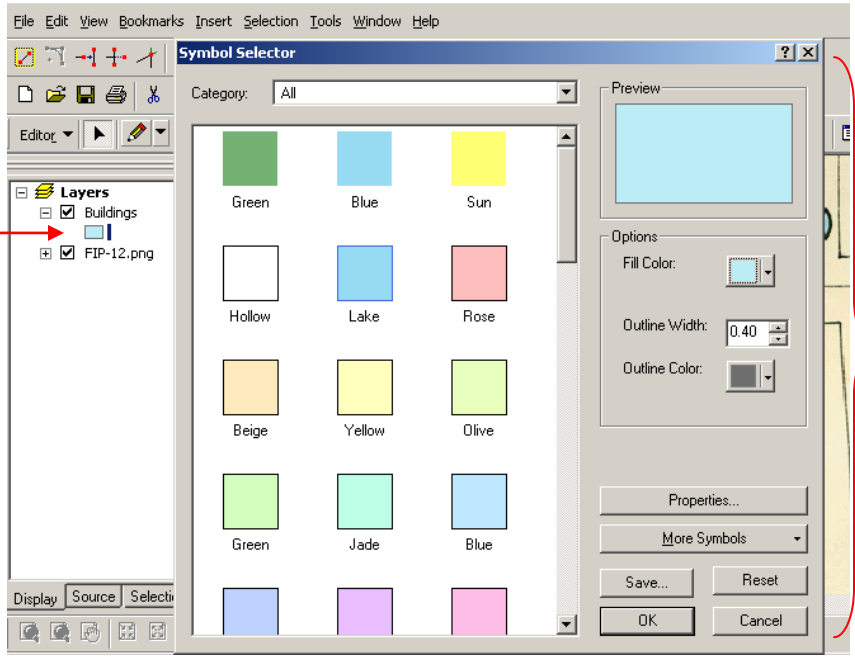




Symbology

ArcMap assigns default symbology that is often not suitable for the features being represented. Use the following tips to apply custom symbols to your map layers.

1. To change the symbology of a layer, click the symbol in the Table of Contents. The Symbol Selector dialogue box opens.



Click this symbol to access the Symbol Selector

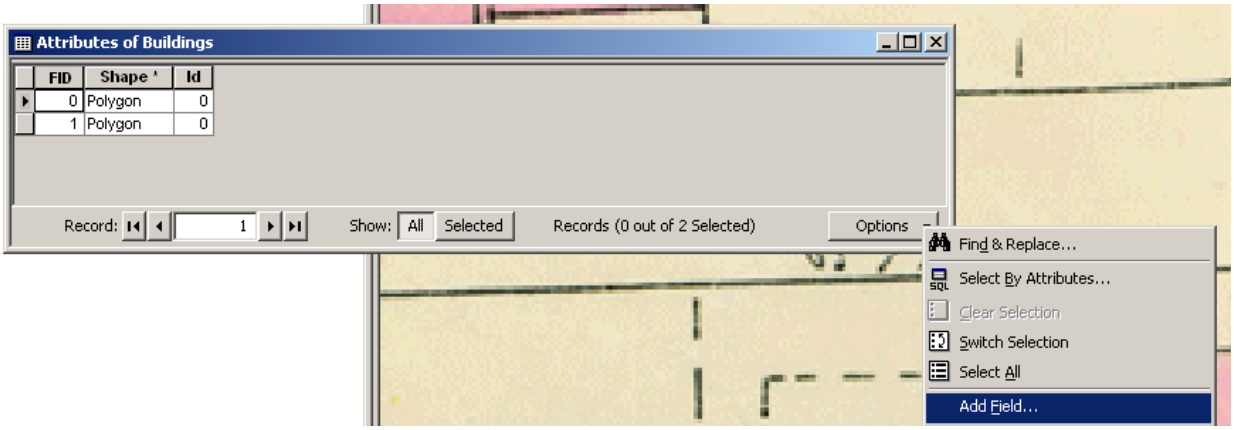
Symbol Selector dialogue box

2. Explore the options available through this window. A wide variety of symbols are available for all feature types (points, lines and polygons).
3. Click OK to accept any changes.

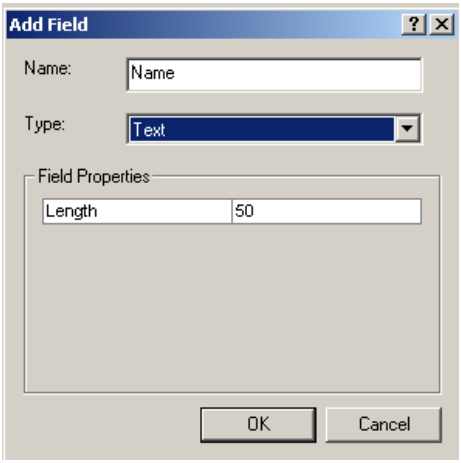
E. Adding Data to the Attribute Table

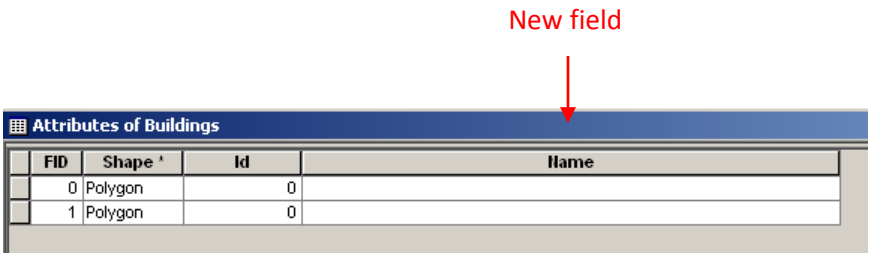
Information can be added to the attribute table of a feature layer during an Edit Session. Before starting an Edit session, view the attribute table associated with the feature class.

1. Right-click a feature layer in the Table of Contents and click Open Attribute Table. The default fields include “FID”, “Shape” and “Id”.

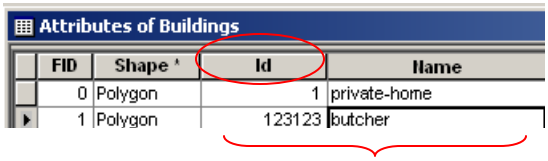


2. To make additional fields, click **Options > Add Field…**
3. Enter a Name; select a format Type from the dropdown; click OK.





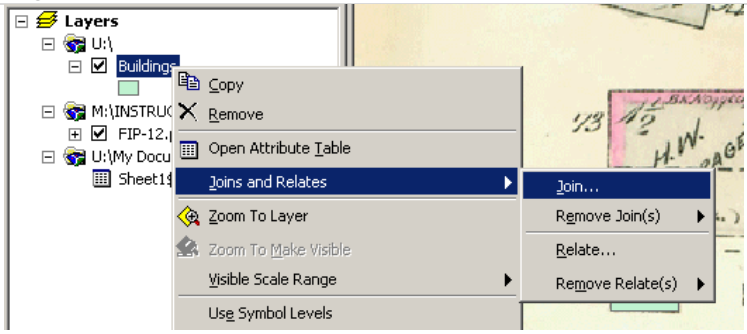
4. Start an *Edit Session* to add details to the attribute table.
5. Each row represents a feature on the map. Stop editing and save edits before proceeding.



Updated fields of feature attribute table

Excel file with common unique identifier field

6. Additionally, an external file such as an Excel file can be opened and joined with the feature attribute table based on a common field. Use the “Id” column to apply a unique identifier to each feature, then develop a database of information about that feature within a program like Excel (where each feature is represented by the same unique identifier).
7. Click the Add Data button. Browse to the excel file.
8. From the Table of Contents, right-click the polygon layer and select **Joins and Relates > Join…**

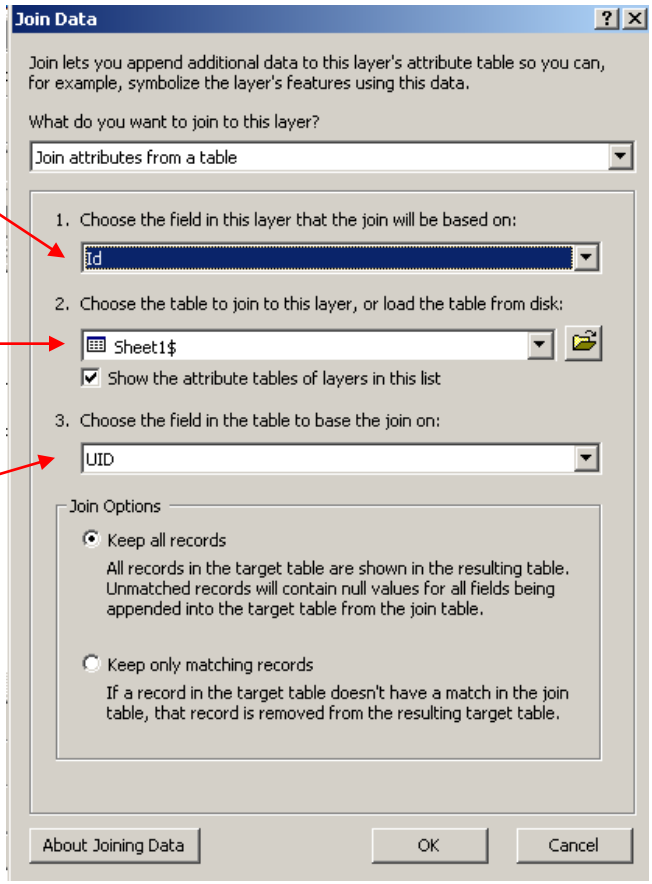


The Join Data dialogue box appears. Read through the options, filling in the blanks to complete the details.

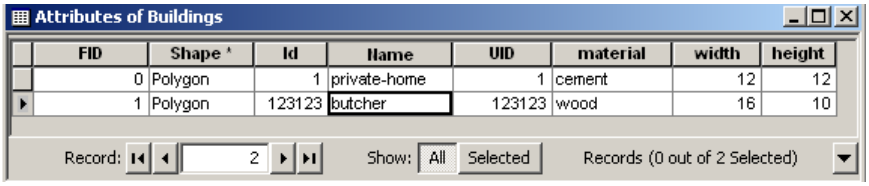
The field holding the unique ID number assigned to a polygon, point or line feature.

The Excel sheet to join to the feature attribute table.

The field from the Excel file holding the unique ID number assigned to a feature record.



9. Click OK to complete the join.
10. Notice the additional fields added to the attribute table of the polygon layer.



F. Saving an ArcMap Document

1. To preserve the work of an entire project, select **File > Save as…**
2. Browse to a storage location and enter a suitable file name.

   VERY IMPORTANT: File names, folder names, document names and directory paths should NOT include spaces or unusual characters such as #, $, %, &, etc. Use the underscore, if necessary.
3. When you return to continue work on the project, run ArcMap and select the option to **Open an Existing Map**.

Additional Sources

ArcGIS Help Files

GIS Tutorial: Workbook for ArcView 9 MapBK G 70.212 G74 2005

ArcGIS 9: Getting Started with ArcGIS MapBK G 70.212

ArcGIS 9: Using ArcMap MapBK G 70.2 U85 2004