**Assignment 2: Editing Data**

For this second tutorial assignment, we'll use tutorials Esri has produced for learning how to use the editing tools in ArcGIS. You can find this tutorial online in the ArcGIS help here. Complete all of exercise 1 (exercises 1a-1d) to get the necessary practice. You're welcome to continue on to the other exercises if you wish, but they aren't necessary for this course.

This exercise uses tutorial data that comes as a separate download with ArcGIS. If you don't already have it downloaded from when you installed ArcGIS, you can download the tutorial data from here. When prompted, the username is "coursera" and the password is "I love GIS!" - each without the quotes around them. Once the file is downloaded, run it to install the tutorial data. Then, open the exercise linked above, and it will guide you through using the data.

# Exercise 1a: Creating new points

ArcMap 10.7 | Other versions



**Complexity:**
Beginner

**Data Requirement:**
ArcGIS Tutorial Data for Desktop

**Data Path:**
\ArcGIS\ArcTutor\Editing

## About creating new points

In this exercise, you will use an aerial photograph to create a new point feature representing a park ranger station in Zion National Park. Once the feature is created, you will then add attribute values to the point. You are introduced to the Editor toolbar, the Create Features window, and the Attributes window, which are the main elements of the ArcMap user interface when editing.

To start this exercise, you first need to zoom the map to your area of interest. A spatial bookmark, which is similar to a bookmark in a Web browser, is a way to save frequently used locations on your map so you can easily access them. A bookmark has been created for you containing the map extent in which you will be working.

Note:

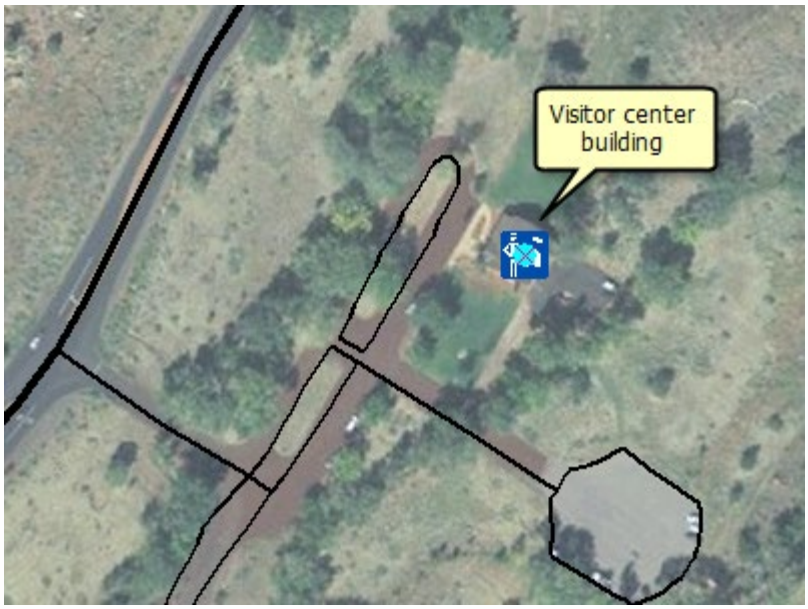
This exercise requires an active Internet connection since it uses imagery served from the Web. If you do not have an Internet connection or if the imagery is loading slowly, you can still perform the tutorial using an image that is installed with the tutorial data. You need to turn on the **DOQQ imagery (local)** layer in the table of contents, then you can turn off the **World imagery (Web)** layer.

## Prerequisite:

Start ArcMap.

1. Click the **Open** button on the **Standard** toolbar.
2. Navigate to the **Exercise1.mxd** map document in the Editing directory where you installed the tutorial data. (C:\ArcGIS\ArcTutor is the default location.) If the **Getting Started** window opens, choose to browse for an existing map and navigate to Exercise1.mxd.
3. Click the map and click **Open**.
4. If you are prompted to enable hardware acceleration to improve performance, click **Yes**.
5. Click the **Bookmarks** menu and click **Visitor center** to zoom you to the area around a visitor center ranger station at the south entrance of Zion National Park.
6. Click the **Editor Toolbar** button on the **Standard** toolbar.
7. Click the **Editor** menu on the **Editor** toolbar and click **Start Editing**.
8. Open the **Create Features** window by clicking **Create Features** on the **Editor** toolbar.
9. In the **Create Features** window, click the **Ranger stations** point feature template. This sets up the editing environment so that you will be creating new point features in the Ranger stations layer.
10. Click the **Point** tool on the **Create Features** window.
11. Using the aerial imagery, click the map to place a point directly over the visitor

center building in the center of the display. Since you are creating points, clicking the map once adds the feature. If you were drawing lines or polygons, however, you would need to use more than one click so you could create segments in between vertices.



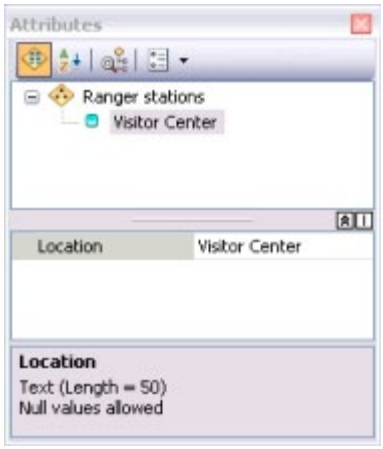

Notice that the center of the symbol contains a solid, cyan-colored (light, bright blue) circle. By default, as soon as you create new features when editing, they are selected. This allows you to easily identify the new feature and add attribute values to it.

12 Click the **Attributes** button on the **Editor** toolbar.

Using the Attributes window is a quick way of updating the attribute values of one or more selected features when you are editing. The top of the window shows a hierarchy of the name of the layer and, underneath it, an identifier for the individual feature from that layer. The bottom of the window shows the field (a column in a table) names and the attribute values (a row in a table) for the feature.

13 Click inside the box for the **Location** property value, which is currently blank or **<Null>**.

14 Type **`Visitor Center`** and press ENTER. This action stores the attribute values for that feature. Notice that the entry for the feature on the top of the window is no longer a generic number but has been replaced with the more descriptive Visitor Center.




15 Close the **Attributes** window.

16 To continue to the next exercise, click Exercise 1b: Digitizing lines and snapping.

You have now completed the first exercise and created a new point feature. In the next exercises, you will learn how to create new lines and polygons.

# Exercise 1b: Digitizing lines and snapping

ArcMap 10.7 | Other versions



**Complexity:**
Beginner

**Data Requirement:**
ArcGIS Tutorial Data for Desktop

**Data Path:**
\ArcGIS\ArcTutor\Editing

## About digitizing with snapping

In the first exercise, you digitized a point over an aerial photograph; in this one, you will trace over the image to create a new line representing a road.

Because part of the road has already been created, you should use snapping to help ensure the new road feature connects to the existing roads. When snapping is turned on, your pointer will jump, or snap to, edges, vertices, and other geometric elements when it is near them. This enables you to position a feature easily in relation to the locations of other features. All the settings you need to work with snapping are located on the Snapping toolbar.

**Note:**

This exercise requires an active Internet connection since it uses imagery served from the Web. If you do not have an Internet connection or if the imagery is loading slowly, you can still perform the tutorial using an image that is installed with the tutorial data. You need to turn on the **DOQQ imagery (local)** layer in the table of contents, then you can turn off the **World imagery (Web)** layer.

# Setting options for snapping

## Prerequisite:

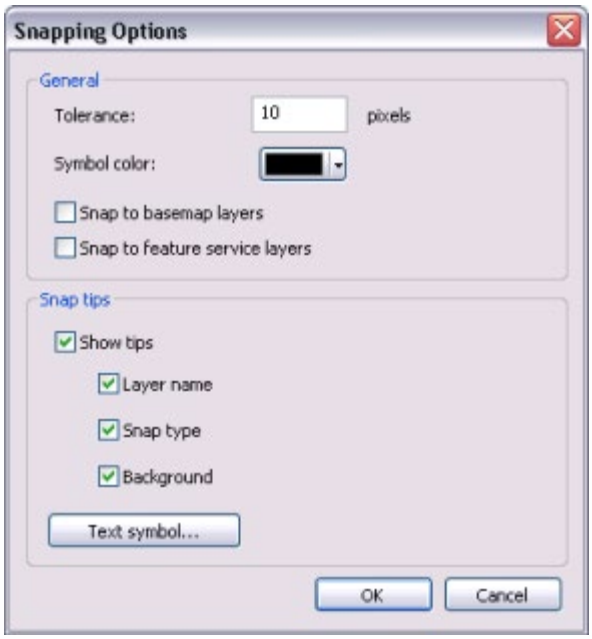
The Exercise1.mxd is open and you are in an edit session.

1. Navigate to the **Digitizing roads** bookmark. The extent is just south of the point feature you created in the previous exercise.
2. Add the **Snapping** toolbar to ArcMap. You can add a toolbar by clicking the Customize menu, pointing to Toolbars, then clicking the toolbar's name in the list. You can also add the Snapping toolbar by clicking the Editor menu, pointing to Snapping, the clicking Snapping Toolbar.
3. On the **Snapping** toolbar, click the **Snapping** menu and confirm that **Use Snapping** is checked. If it is already checked, do not click it again, since that will turn off snapping. If **Use Snapping** is not checked, click it to enable snapping.
4. Look on the **Snapping** toolbar and confirm that **End**, **Vertex**, and **Edge** snapping types are active. When enabled, the buttons are highlighted. If they are not enabled, click each button to enable those agents.
5. Click the **Snapping** menu and click **Options**. From this dialog box, you can specify settings for snapping in ArcMap.
6. Ensure the snap tolerance is at least **10** pixels.

The snapping tolerance is the distance within which the pointer or a feature is snapped to another location. If the element being snapped to—such as a vertex or edge—is within the distance you set, the pointer automatically snaps to the location.

7. Check the boxes for **Show tips**, **Layer name**, **Snap type**, and **Background**. Most

likely, you only need to check on **Background**, as the others are turned on by default. A SnapTip is a small piece of text that pops up to indicate the layer you are snapped to and with which snap type (edge, end, vertex, and so on). The background is useful to help you see the SnapTip when working over an image.




8 Optionally, you can change the color used for the snap symbol and set SnapTip display options, such as the size or font of the tip.

9 Click **OK** to close the **Snapping Options** dialog box.

# Enabling the Feature Construction toolbar

The Feature Construction toolbar is a small, semitransparent toolbar that allows quick access to some of the most common tools and commands used when editing. As you are digitizing, the toolbar appears near your pointer and moves as you place vertices. The Feature Construction toolbar is turned off by default, but you are going to use it in the tutorial so you can be introduced to it. If you later decide that you want to disable it, many of the same commands are found on the Editor toolbar or you can also make it display only temporarily.

1 Click the **Editor** menu and click **Options**.

2 Check **Show feature construction toolbar**.

3 Click **OK** to close the **Editing Options** dialog box.

# Digitizing a line

1 You are now ready to begin digitizing the new road. In the **Create Features** window, click the **Local road** line template, which is grouped under Roads. This feature template was created for you and saved in the tutorial map document. The list of available construction tools at the bottom of the window changes to those used to create lines. Since the **Line** tool is the default tool for this template, it is activated automatically.

2 Rest your pointer over the endpoint of the existing line in the western portion of the map display, but do not click yet. Notice that the pointer icon changes to a square snap symbol and a SnapTip appears with the name of the layer (Roads) and the snap type (Endpoint) in use. You can zoom or pan closer if you need to do so.

3 Click once.


You digitize, or sketch, a new line or polygon by defining the feature's shape. You see a preview with the actual symbology used for that feature, with vertices symbolized as green and red boxes. If you find that the Feature Construction toolbar appears where you want to add a vertex, press the TAB key to reposition it or move it manually.

4 Using the aerial photo as a guide, digitize the new line by clicking the map each

place you want to add a vertex.


5 Once you have digitized the new line, snap to the end of the existing feature and click to place a vertex there.

6 Press the F2 key, which finishes the sketch to turn your shape into an actual feature in the geodatabase. You can finish a sketch in one of several ways: pressing F2, double-clicking, or using the right-click menu or the Feature Construction toolbar.

7 To continue to the next exercise, click Exercise 1c: Setting feature template properties.

In this exercise, you learned how to set up snapping and use it to help you digitize a new road that connects to existing roads.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# Exercise 1c: Setting feature template properties





**Complexity:**
Beginner

**Data Requirement:**
ArcGIS Tutorial Data for Desktop

**Data Path:**
\ArcGIS\ArcTutor\Editing

## About feature template properties

The **Template Properties** dialog box allows you to review and change the template settings. For example, you can rename a template, provide a description, set the default construction tool, and specify the attribute values that should be assigned to new features created with this template.

In the first exercises, you used feature templates that had their properties already set for you. Now, you are going to set the properties of a feature template for a polygon layer representing private landownership. Before you create features, you should review a template's properties to ensure they are set appropriately.

Exercise 4: Editing shared features and topologies

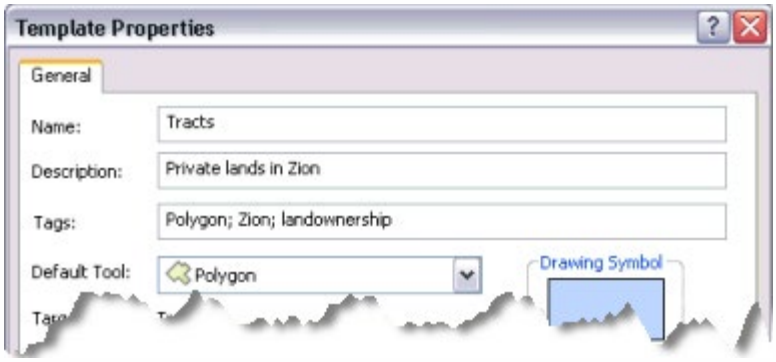
Exercise 5: Using spatial adjustment

# Prerequisite:

The Exercise1.mxd is open and you are in an edit session.

1. In the **Create Features** window, double click the **Tracts** feature template. This opens the **Template Properties** dialog box.

2. In the **Description** box, type **`Private lands in Zion`**. The description appears when you rest your pointer over a template in the Create Features window.




You can also use tags to identify and help search for templates in the future. A tag representing the layer type—Polygon—is added automatically.

3. Click in the **Tags** box immediately after **`Polygon`**, type a semicolon (**`;`**), add a space, then type **`Zion`**. Type another semicolon, add a space, and type **`landownership`**.
   The **Tags** box should look like this when the tags are entered: **`Polygon; Zion; landownership`**.

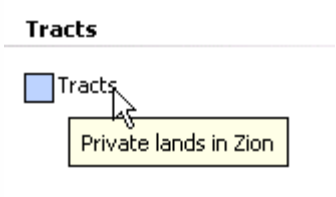
4. The default tool should be Polygon. If it is not, click the **Default Tool** arrow and click **Polygon**. This ensures that the Polygon tool activates each time you choose the Tracts template.

5. Click the **Ownership** field in the grid. System information about the field is listed at the bottom of the dialog box.

6. Click **<Null>** for the value on the right side to clear the text and type **`Private`**, which will assign the attribute value Private. This sets Private as the default attribute value for that field for all new features created with this template.

7 Click **OK**.

8 When you rest your pointer on the template, you see the text you entered for the description.




9 To continue to the next exercise, click Exercise 1d: Creating new polygon features.

You are now ready to create features using the properties specified in this feature template.

# Exercise 1d: Creating new polygon features





**Complexity:**
Intermediate

**Data Requirement:**
ArcGIS Tutorial Data for Desktop

**Data Path:**
\ArcGIS\ArcTutor\Editing

## About creating polygons

Since you have been exposed to the basic concepts and user interface elements of editing and creating features, you are now ready to learn advanced feature creation techniques. You will use several different methods to construct the polygon tract boundaries, including snapping, entering measurements, and drawing rectangles. You also will use keyboard shortcuts and right-click menus to improve productivity while creating features.

When Zion National Park became a protected area in the early 1900s, multiple owners held the land that became the park. Although Zion is mostly United States federal government land now, there are some areas within the park that are still owned privately. In this exercise, you will create some boundary lines representing the privately

held features.

> **Note:**
>
> The values, shapes, measurements, and attributes in this exercise are for demonstration purposes only and do not reflect the actual property records.

# Creating polygons using different construction methods

## Prerequisite:

The Exercise1.mxd is open and you are in an edit session.

Choosing a template sets up the editing environment for the settings in that template. This action sets the target layer in which your new features will be stored, activates a feature construction tool at the bottom of the Create Features window, and prepares to assign the default attributes to the new feature. Since the layer's template is set up so the Polygon tool is the default feature construction tool, the Polygon tool becomes active.

By default, the Line and Polygon tools create straight segments between the vertices you click. These tools also have additional ways to define a feature's shape, such as creating curved lines or tracing existing features. These are known as construction methods and are located on the Editor toolbar.

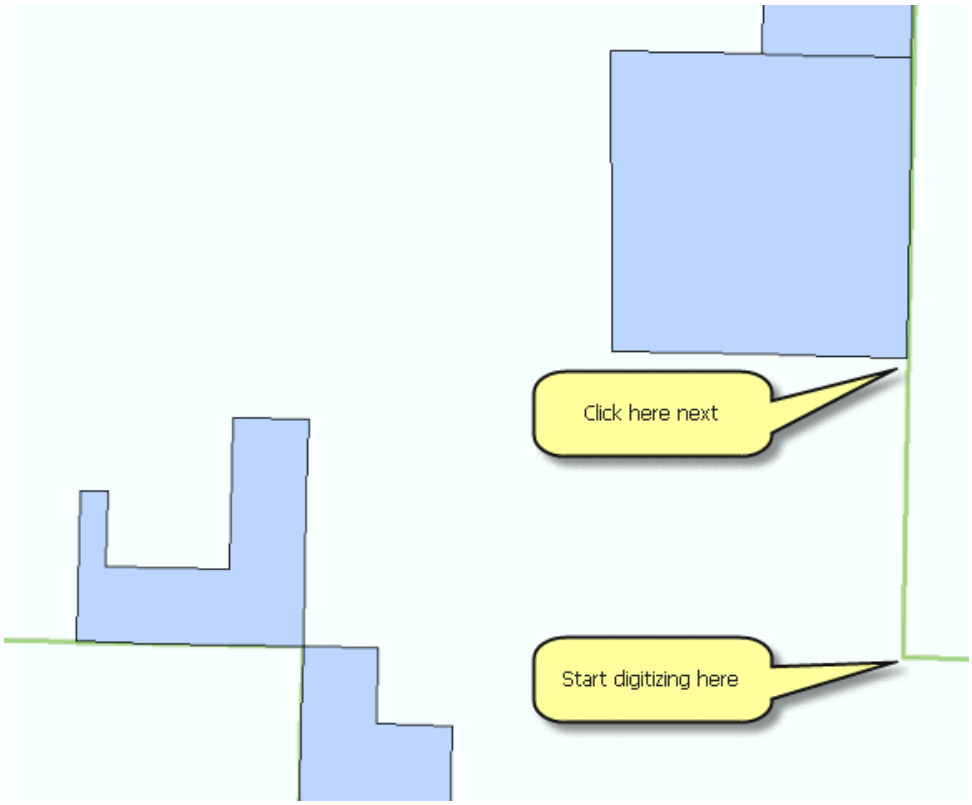
1. Turn off the **World imagery (Web)** layer in the table of contents.
2. Zoom to the **Tracts** bookmark.
3. In the **Create Features** window, click the **Tracts** template. This activates the **Polygon** construction tool, which you set as the default tool using the Template Properties.

Since the tracts share an edge with the park boundary and an adjacent tract, you can use them to help you construct the shape of the polygon.

4. Click the **Straight Segment** construction method on the **Editor** toolbar.

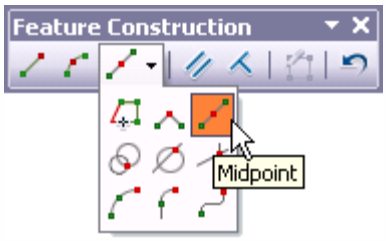
With the Straight Segment construction method, a vertex is placed each time you click, with the segments between vertices being straight lines.

5 Snap to the intersection of the park boundary polygon and the tract line feature and click once.




6 Move your pointer up (to the north), snap at the corner of the tract and the park boundary, then click again. You now have created two vertices with a straight line connecting them to define the eastern boundary of this tract.

7 Click **Midpoint** on the palette on the **Editor** toolbar or the **Feature Construction** mini toolbar. This changes the active segment construction method from Straight Segment to Midpoint, which creates a vertex in the center of two locations you click. You will use Midpoint to create a vertex between two corners of the existing tract.

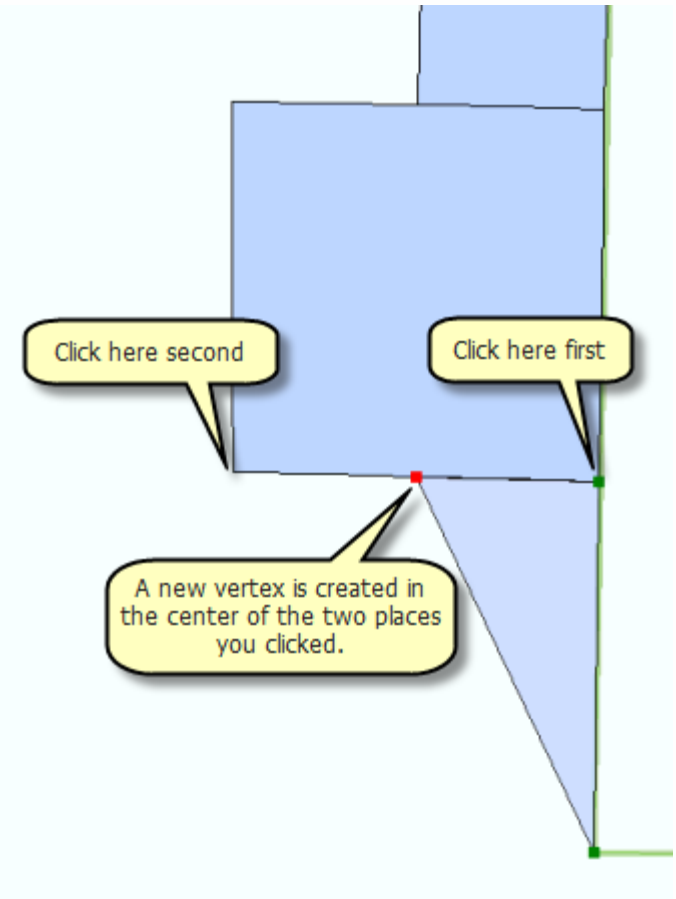



If the Feature Construction toolbar did not appear automatically, you can either enable it on the Editing Options dialog box or press the TAB key to make it appear temporarily. If

you click a segment construction method on the Feature Construction toolbar, it then becomes active on the Editor toolbar, and vice versa. Two of the most common segment construction methods, Straight Segment and Endpoint Arc Segment, are located directly on the toolbars, but there is a palette to the right of these buttons containing additional methods.

8 Move the pointer to the right and click the eastern corner of the tract (the previous vertex you added). As you move the pointer, notice a black line with a small square in the middle. The square indicates where the new vertex will be added.

9 Move your pointer to the left and click the western corner of the existing tract. The new vertex is added where the square was located as soon as you click the second point.

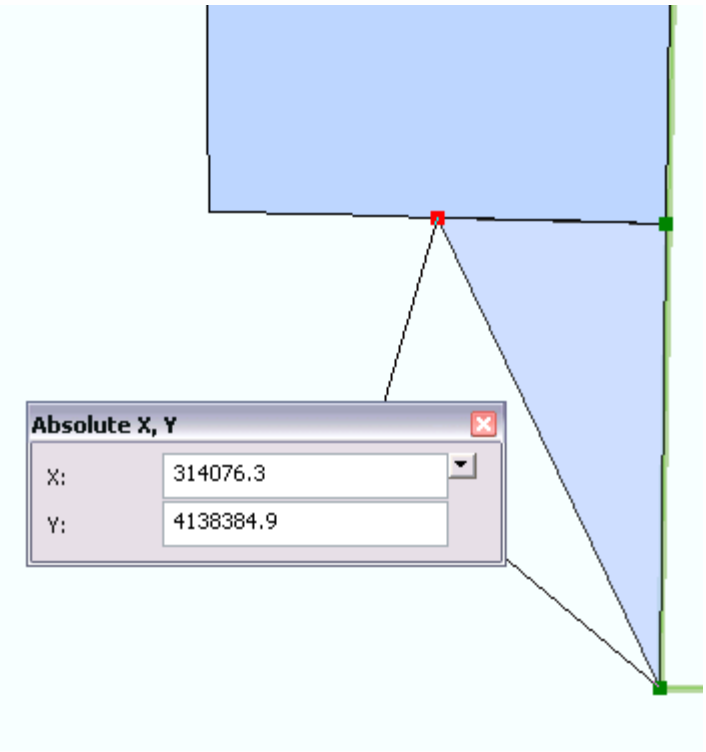



10 Click the **Straight Segment** construction method on the **Editor** toolbar or **Feature Construction** mini toolbar.

This changes the active segment construction method back to Straight Segment rather than Midpoint.

11 To enter the final measurement for the corner, you need to type a specific coordinate.

12 Press the F6 key. This is the keyboard shortcut for Absolute XY, which allows you to type an exact x,y coordinate for the next vertex. By default, the values you enter are in map units, which are meters for this map. If you want to enter values in decimal degrees or other formats, you can click the arrow to change the input boxes.




Tip:

If you make a mistake and want to cancel out of a sketch constraint, which is a command that limits the placement of the next vertex, you can press the ESC key. Once a vertex is added, you can delete it by pressing the **Undo** button on either the **Feature Construction** toolbar or the **Standard** toolbar.

13 Type **`314076.3`** in the **X:** box, type **`4138384.9`** in the **Y:** box, then press ENTER. A new vertex is automatically created in that location.

14 Press F2 or click **Finish Sketch** on the **Feature Construction** mini toolbar.

You have created the first polygon lot feature. You could also use the F2 key, double-click the map, or right-click to finish the sketch.

15 Click the **Identify** tool on the **Tools** toolbar.

16 Click the new feature and notice that the attribute value for the Ownership field is

Private, which is the default value you set in the template's properties.

If you identified a different layer, click the **Identify from** arrow, click the **Tracts** layer, then try clicking the feature again.

17 Close the **Identify** window.

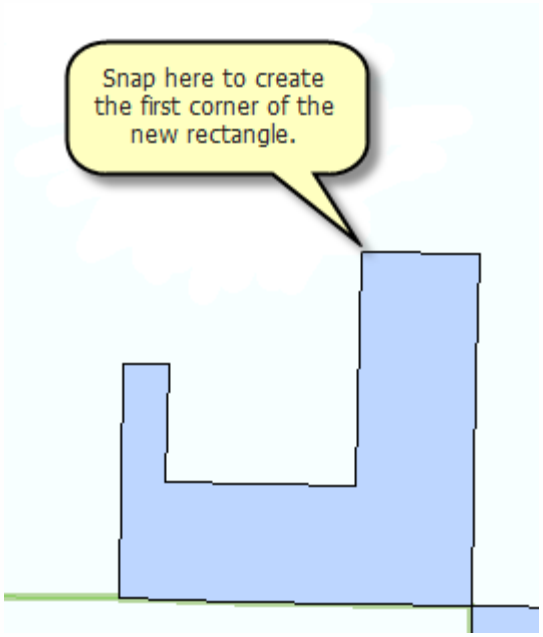
# Creating rectangular polygons

Sometimes you need to create rectangular polygons. Rather than clicking each vertex individually as you have been doing, you can use the Rectangle construction tool. The first click with the Rectangle tool creates the first vertex, then the second click establishes the "angle" of the rectangle, and the final click adds the remaining corner vertices. In addition, the Rectangle tool allows you to enter x,y coordinates for the vertices, as well as directions and lengths for the sides.

1 Click the **Pan** tool on the **Tools** toolbar and pan the map slightly to the west so the J-shaped polygon is centered in the display.

2 Click the **Tracts** template, then the **Rectangle** tool on the **Create Features** window to make it the active construction tool.

3 Snap to the upper left corner of the J-shaped polygon and click to set the first corner of the rectangle.

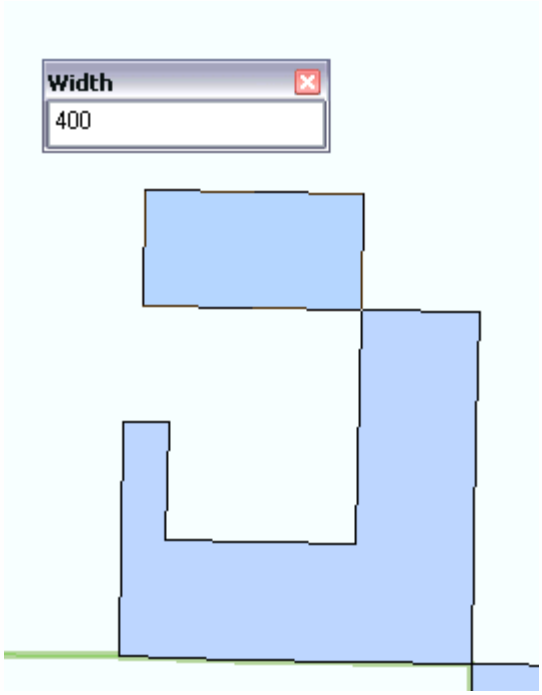



Press the D key, type **179** (as in 179 degrees), then press ENTER. This establishes

4 the angle for the rectangle. As you move your pointer around the map, you see a rectangle preview of the feature.

By default, angles are entered in degrees using the polar system, which is measured counterclockwise from the positive x-axis. You can specify a different direction measuring system or unit on the Editing Options dialog box > Units tab.

5 Press the W key, type **400**, then press ENTER. This is the shortcut to set a width of 400 meters, which are the map units.




6 Move your pointer up and to the left so the rectangle is created in the correct position in relation to the existing feature. Press the L key, type **800**, then press ENTER. This is the shortcut to set a length of 800 meters.

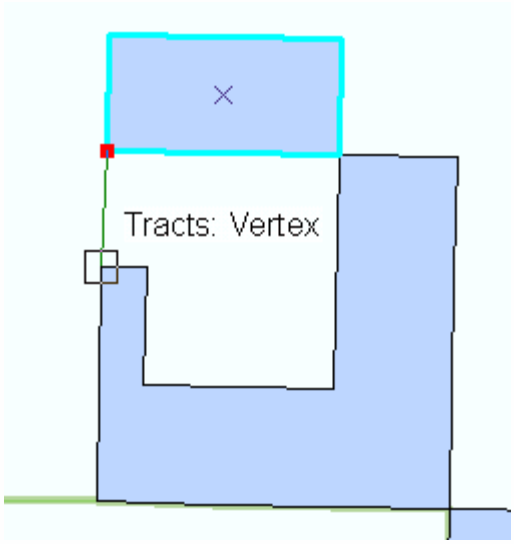
□ Tip:

In addition to using these keyboard shortcuts, you can right-click to access a menu containing commands for the direction, length, width, and other settings for creating a rectangle.

# Creating adjoining polygons

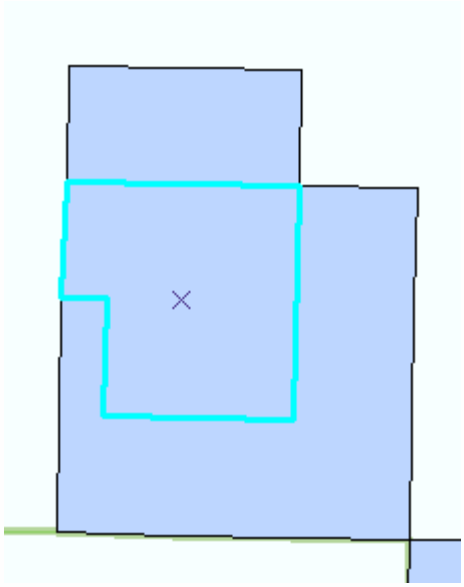
You now need to create one more polygon to fill in the space between these two polygons. You could snap to every vertex, but an easier way is to use the Auto-Complete Polygon tool, which uses the geometry of existing polygons to create new adjacent polygons that do not overlap or have gaps.

1. Click the **Tracts** template, then the **Auto-Complete Polygon** tool on the **Create Features** window to make it the active construction tool.
2. Snap to the lower left corner of the rectangle you just created and click.
3. Move southward, snap to the corner of the original existing J-shaped polygon, and click to add a vertex.




4. Press F2 or click **Finish Sketch** on the **Feature Construction** mini toolbar.

When using the Auto-Complete Polygon tool, ArcMap automatically uses the shapes of the surrounding polygons in that layer to create the geometry for the new polygon.



5. Click the **Editor** menu on the **Editor** toolbar and click **Stop Editing**.
6. Click **Yes** to save your edits.
7. Close ArcMap if you are done working with the tutorial. You do not need to save the map document.
8. To continue to the next exercise, click Exercise 2a: Defining new types of features to create.

The new features have been created with the default attribute values (Private) specified in the template. If you wanted to add other information, such as ID numbers, select the features and type the values into the Attributes window.

Developer Summit

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%Tell us what you think.