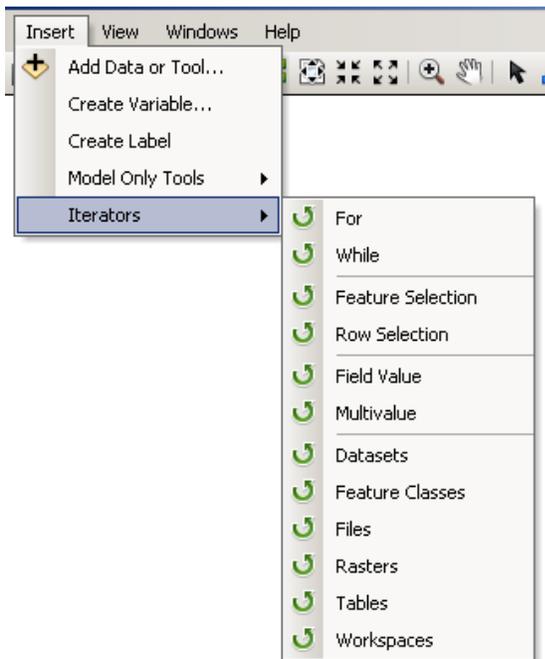


How to make a model to iterate through features or feature classes.

First you'll want to make a new, empty model to build your application. If you already know how to do this, or have one already made then skip down a bit.

1. Open ArcMap, then open the Catalog window (side tab on the right of your map window). Go ahead and pin it in place. You can make a custom toolbox in any folder, in any geodatabase, or in the folder that Esri provides called "My Toolboxes". For this example, I'm making one in the My Toolboxes folder.
2. Right click the folder and select New > Toolbox. A new toolbox is made called NewToolbox, which you should immediately rename. I called mine Iterators.
3. Next you'll create a new, empty model. Right click the toolbox Iterators and click New > Model. This will create a new model called Model, and open the modeling window.
4. In the modeling window, click Model > Model Properties. Rename the model, and give it a description. Then click OK and save the model. The name in the toolbox will change when the model is saved.

With the new model created, you will now want to try out some of the iterators. The available iterators are shown here (click Insert > Iterators to see the list):



Here's what they do (search the ArcGIS Help on "Model iterators" to get this list):

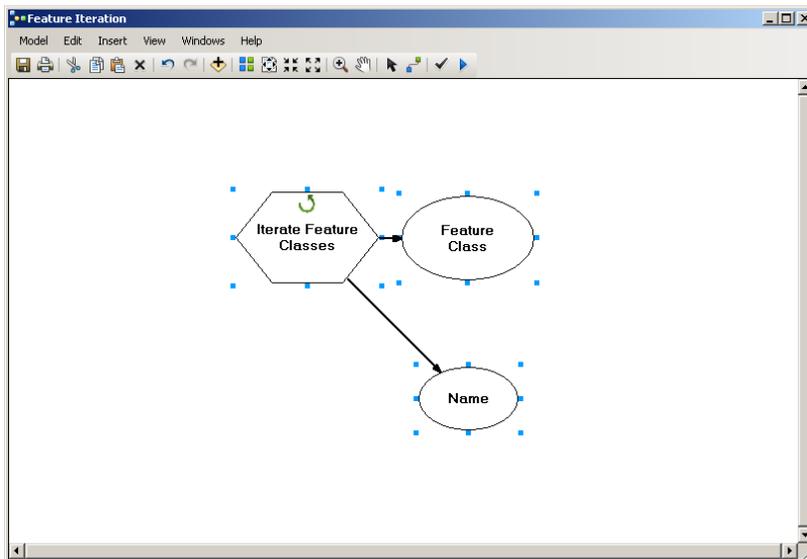
Task	Iterator for the task
Run a workflow a specific number of times, from a starting number to an ending number.	For
Run a model until a particular variable or condition is True or False.	While
Repeat a process for each feature in a feature class (iterate a selection through all features with shared attributes).	Iterate Feature Selection
Repeat a process for each record in a table (iterate a selection through all records with shared attributes).	Iterate Row Selection
Repeat a process for each value in a field.	Iterate Field Values
Repeat a process for each value in a list of input values.	Iterate Multivalue
Repeat a process with each dataset in a workspace.	Iterate Datasets
Repeat a process with each feature class in a workspace.	Iterate Feature Classes
Repeat a process with each file in a folder.	Iterate Files
Repeat a process with each raster in a workspace.	Iterate Rasters
Repeat a process with each table in a workspace.	Iterate Tables
Repeat a process with each workspace in a folder.	Iterate Workspaces

I'm going to demonstrate two of these, but you will be able to apply the same principles to any of the iterators.

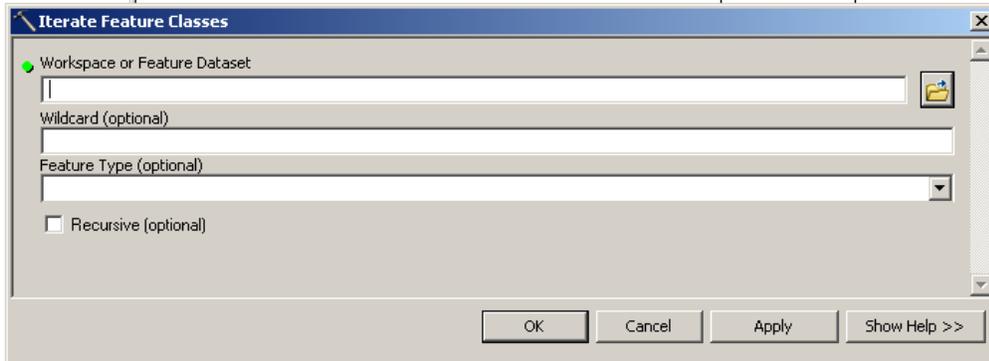
Example 1: You want to convert a list of shape files into a geodatabase.

I've got a list of shapefiles in a folder that I want to convert into a geodatabase (which has already been created). The Iterate Feature Classes iterator will perform an operation on every layer in the named workspace, so that's the one I'll use.

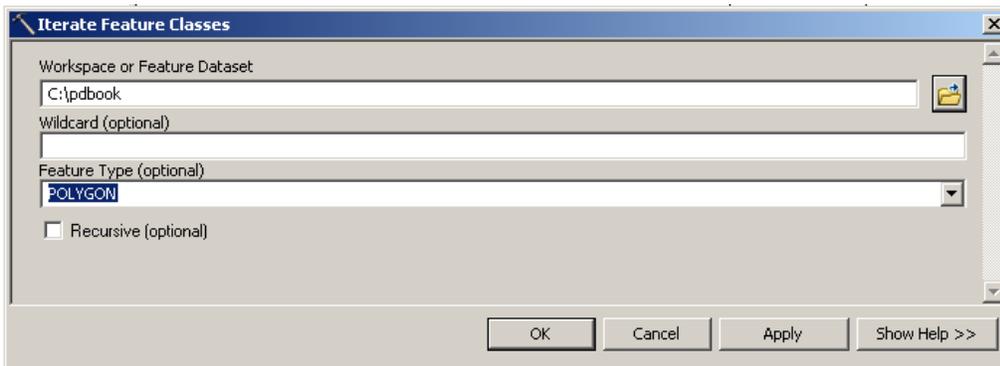
1. In the modeling window, click Insert > Iterators > Iterate Feature Classes. The tool is added to the model canvas.



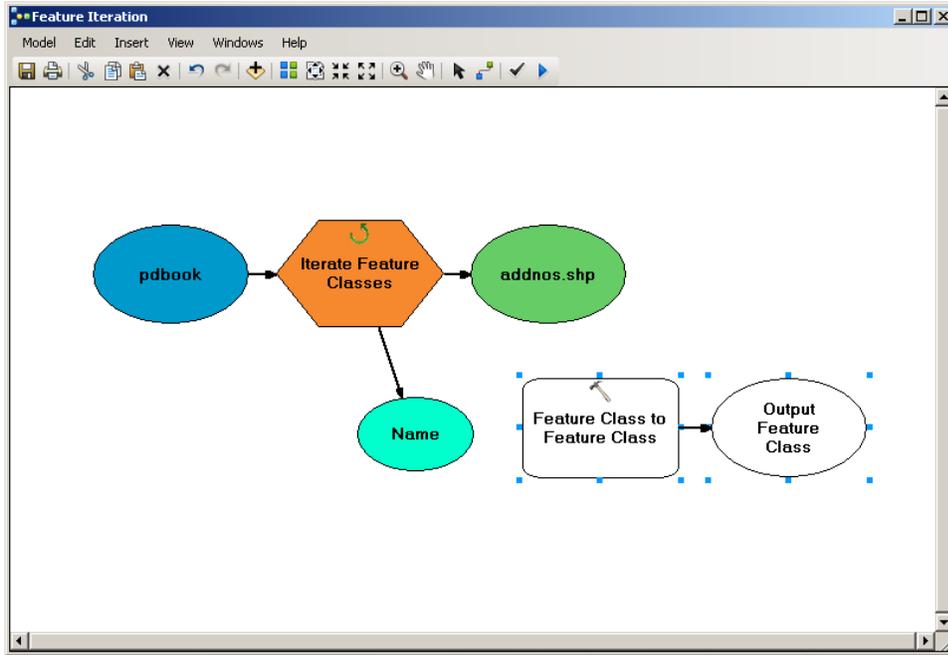
2. Double click the Iterate Feature Classes tool to open the parameters dialog. You will set these to handle all the files.



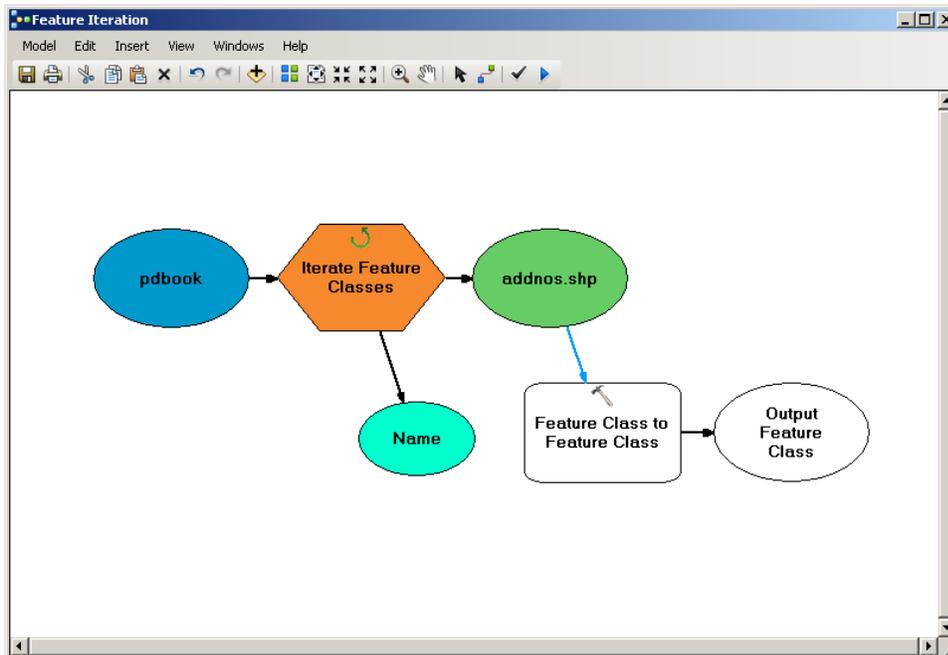
3. Under Workspace or Feature Dataset, use the browse button to point to the folder containing all your shapefiles. The setting for Wildcard would let you select only certain shapefiles to process, for instance Water* would get only the shapefiles that start with Water. The Feature Type setting will let you process only a specific type of feature, for instance point, line or polys. In this example, I'm processing all the polygon layers (feature classes or shapefiles or whatever) in the folder c:\pdbname.



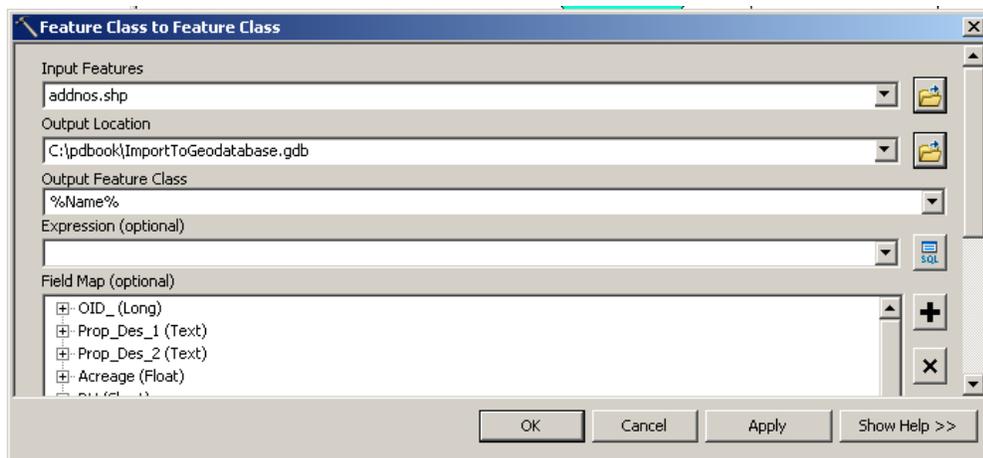
4. This process will be to convert the inputs into a geodatabase, so I'll add the Feature Class to Feature Class tool to the model. You can find it in the Catalog Tree, or search for it in the Search window, then drag the tool into the model.



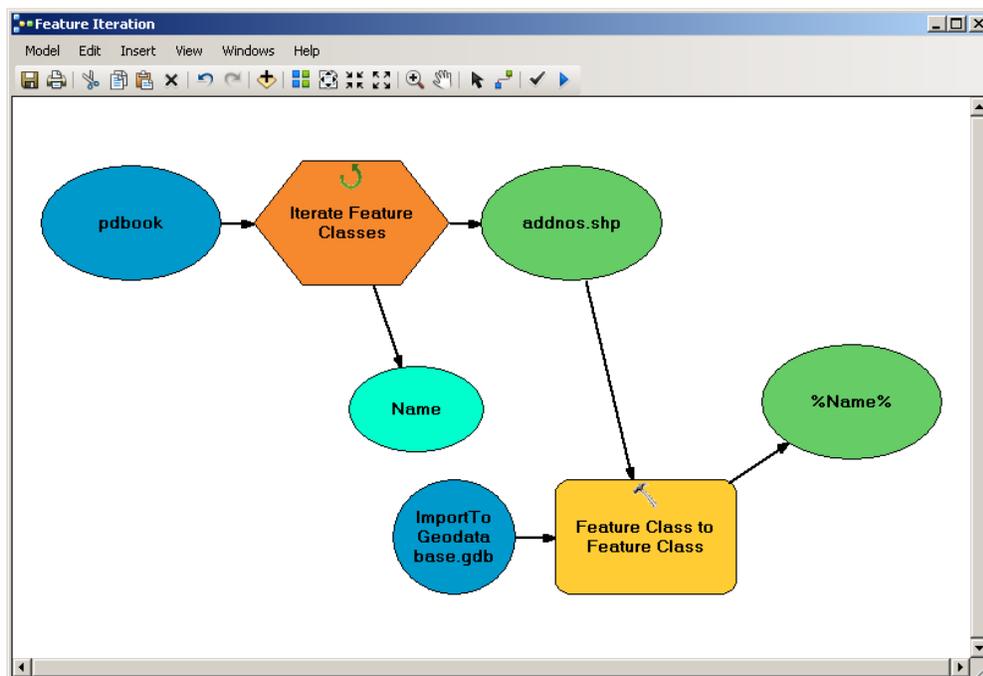
- Next, use the connector tool to connect the output shapefile (addnos.shp) as input features to the conversion tool.



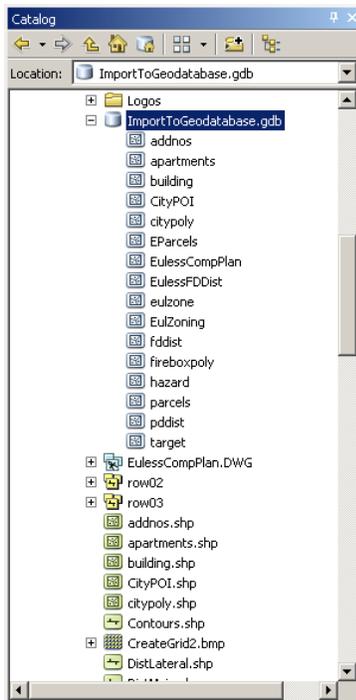
- Now double click the Feature Class to Feature Class tool to set its parameters. The Input Features are already set to be the output of the iterator. Set the output location to be the new geodatabase, and the Output Feature Class to be %Name%. This will insert the same name as the input feature class using variable substitution.



7. Click OK and the model is Ready To Run.



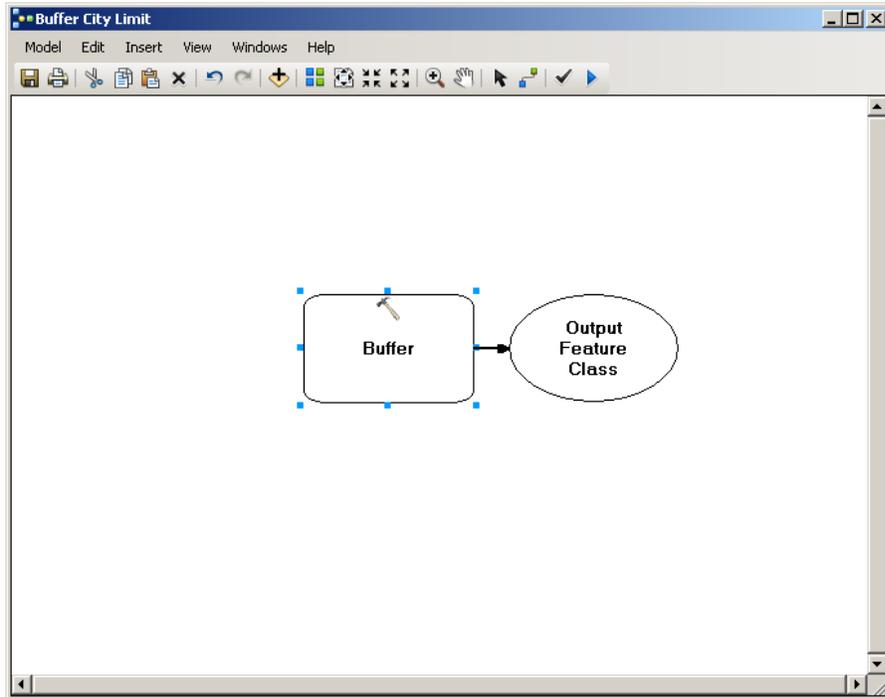
When it's run, each layer (shapefile or feature class) will be fed into the conversion tool one-by-one, and will be placed into the output geodatabase with the same name as the input file.



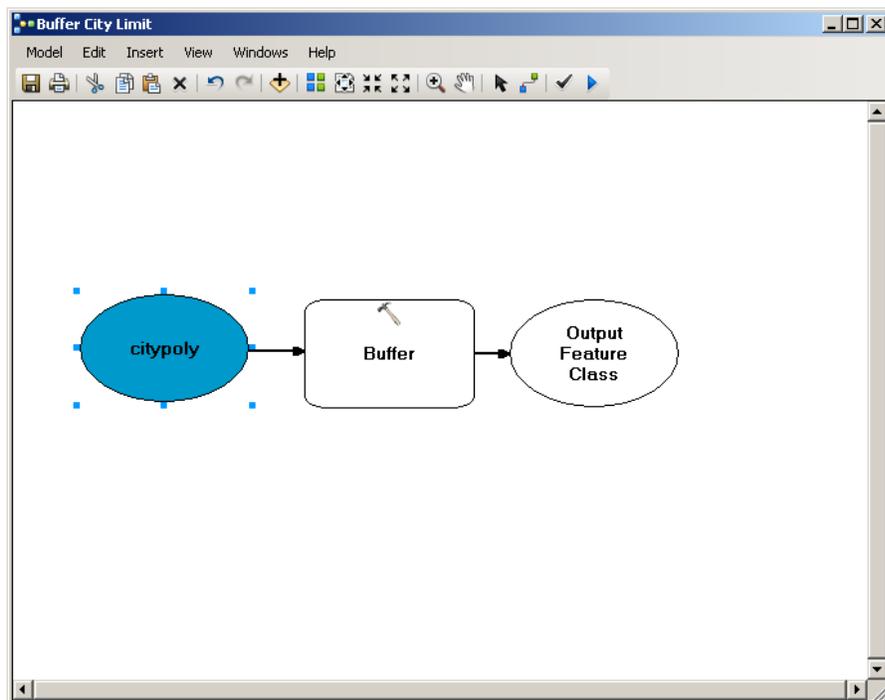
Example 2: I need to take my city limit line and buffer it various distances, but I would like each output buffer to be in its own feature class.

Obviously this is a pretty simple thing to do, but I wanted to focus on the processes, not the task.

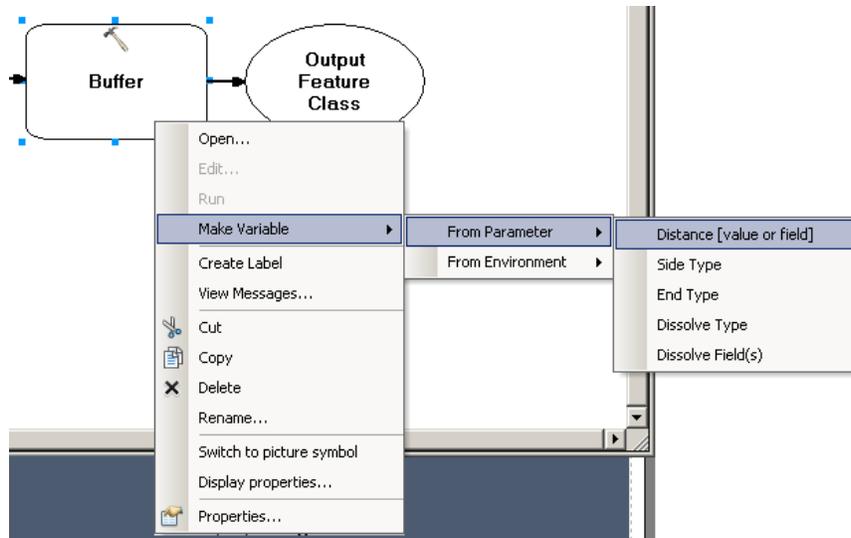
1. Create a new model and call it BufferCityLimit. Drag the Buffer tool onto the model canvas.



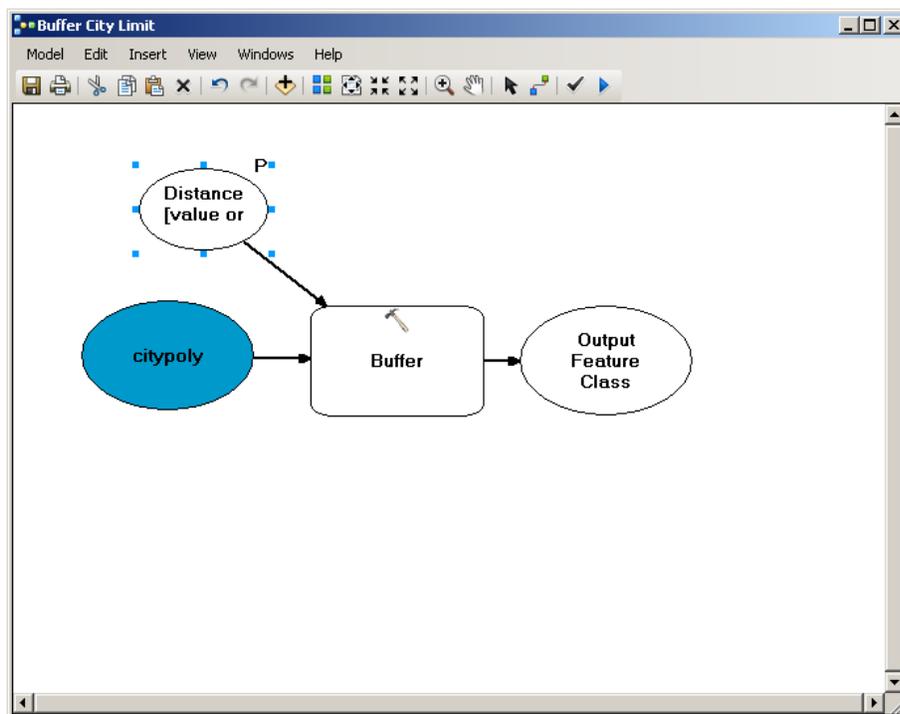
2. Next, drag in and connect as input features the polygon feature class you're going to buffer. In my case, I have a city limit file.



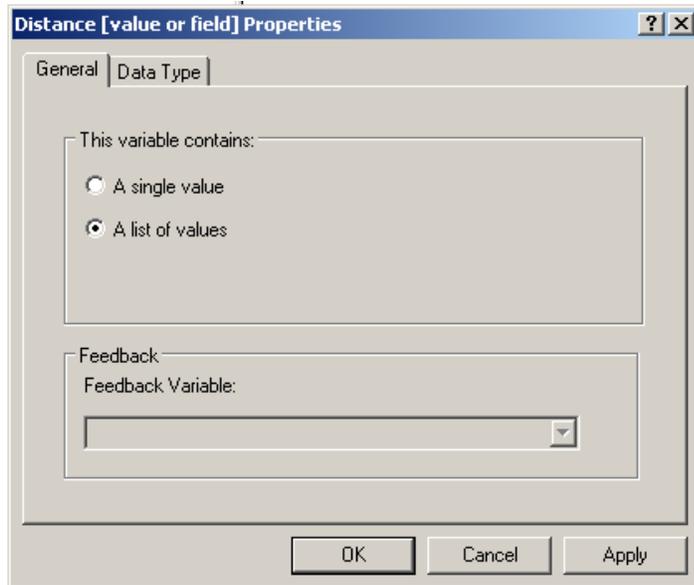
3. Now we need to make the buffer distance a user definable parameter that will accept multiple entries. Right click the Buffer tool and select Make Variable > From Parameter > Distance.



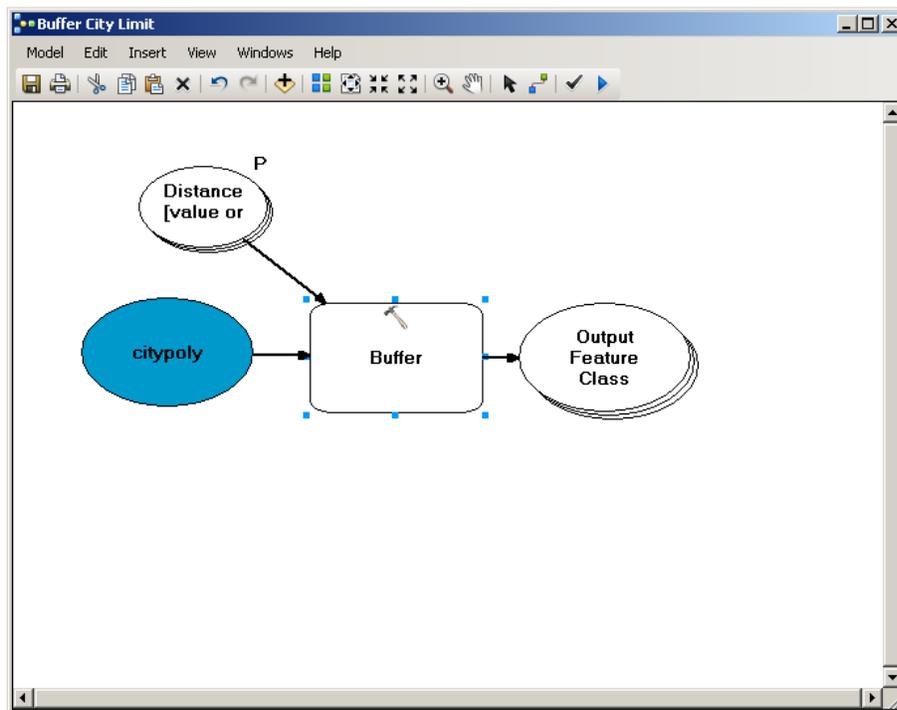
4. This will add a variable called Distance. Right click it and select Model Parameter, which will make this a user definable entry when the model is run. You'll know this is set when a little P is placed at the top right of the variable.



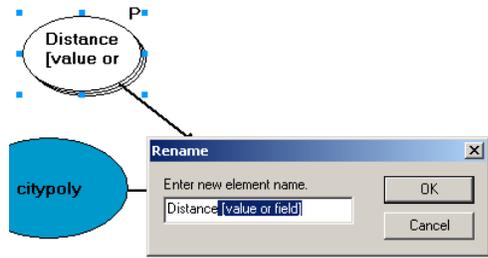
5. Now right click the Distance variable and select properties. Under the General tab, select "A list of values", then click OK.



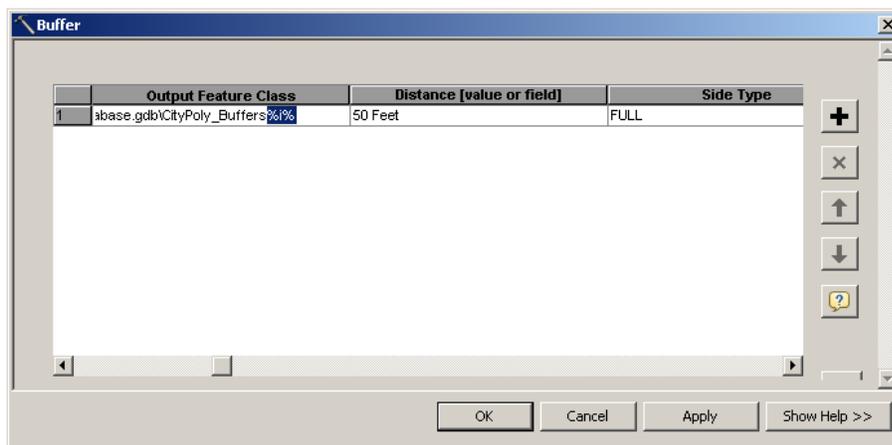
6. You'll notice that the symbols for the input and output variables now look like a stack of ovals, representing that these will be dealing with multiple values.



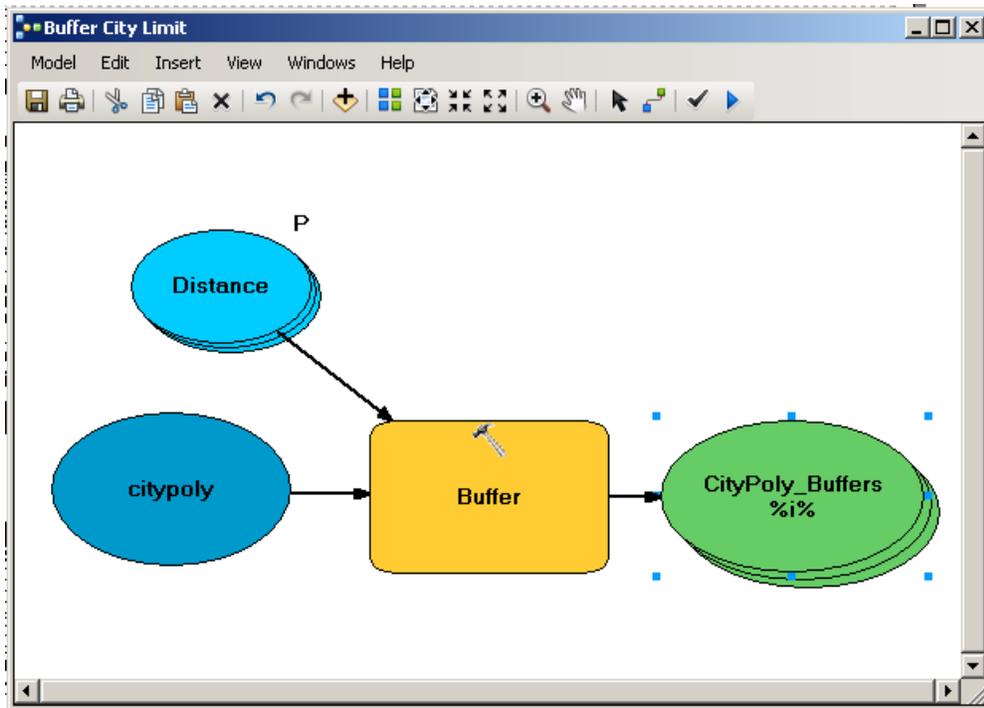
7. For convenience sake, right click the Distance [value or field] variable and select rename. Change its name to simply Distance.



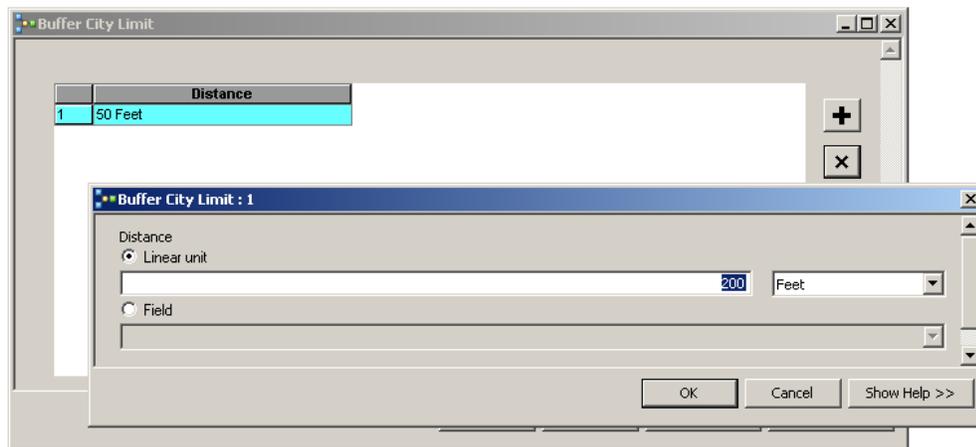
8. Finally, double click the Buffer tool to open its properties. We need to change the output file name so that it will be unique for each iteration of buffers. The way to do that is by using in-line variable substitution. There are pre-defined system variables I can use, such as %i% which tracks the iteration number. At the end of the output filename, add %i%. You should also add a default value for buffer distance (I made mine 50 feet). Click OK to close the properties and save the model.



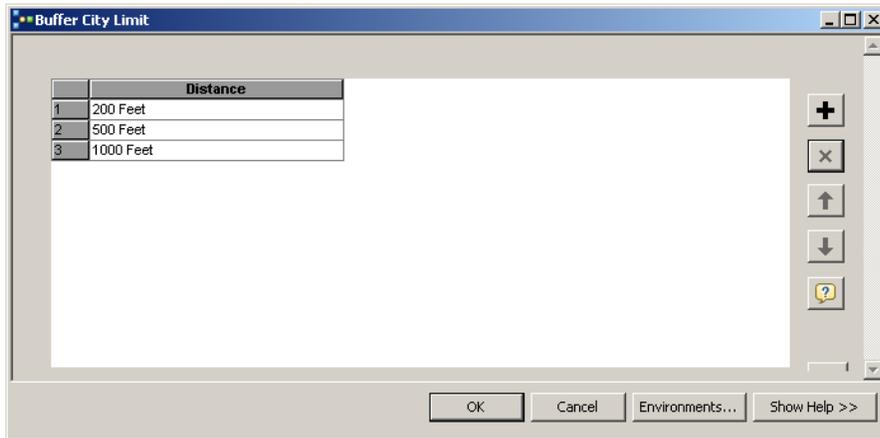
9. The model is now in the Ready-to-Run state. However, since we set a model parameter, the model MUST be run from the toolbar NOT the modeling window. Close the modeling window.



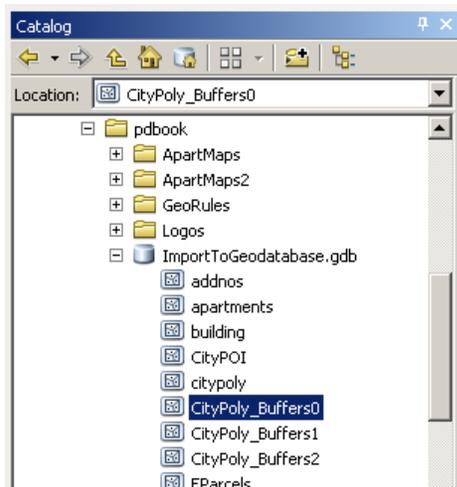
- In the toolbox, double click the model to run it. The dialog present the data input matrix, with the default of 50 feet already set. To change it, double click the value and the new entry box will appear. Type in 200 feet and click OK.



- To add more values, click the Plus sign  which will add more rows to the input matrix. The double click each value to set it. I've added buffers for 500 and 1000 feet. Click OK when you're done.



12. The model will run, and make 3 new feature classes, and use the system variable to make the output file names unique. By the way, it wouldn't care if you set the distance units of the buffers to be different things. For example, I could buffer by 1000 feet, 2 miles, and 5000 meters.



I hope this gives you an idea of how to use iterators in a model, and how to control multiple entries and outputs.

Watch for the new book “Getting to Know ArcGIS ModelBuilder” to come out May 1st. It can be pre-ordered on Amazon now to make sure you get one of the very first copies.

