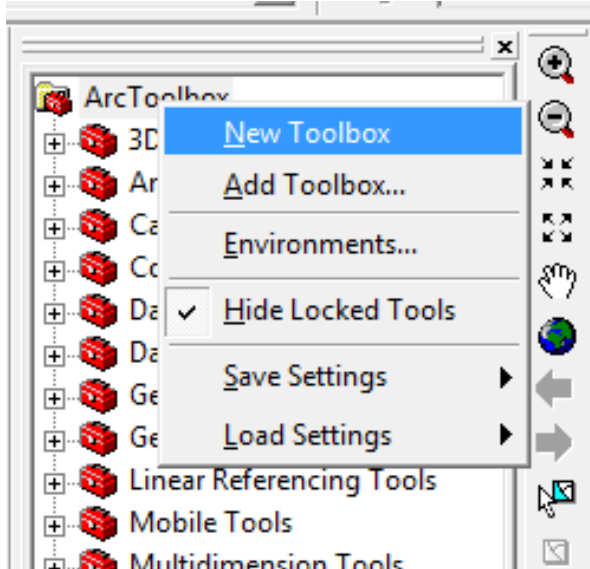


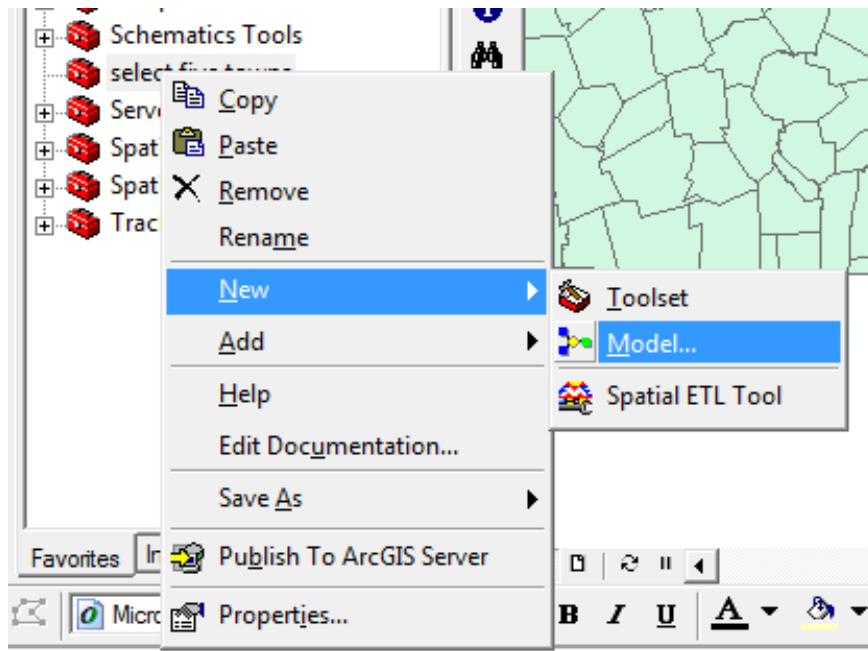
MODEL BUILDER ILLUSTRATION

This exercise illustrates the use of ArcGIS ‘Model Builder’ by constructing a model to select all Eastern Mass block groups whose centroids fall within the five cities and towns in and around Cambridge. In class, we demonstrated how to do this the long way (by generating block group centroids as a separate shapefile, then tagging the centroids with the town that contained them, and finally joining the centroid shapefile to the original block group shapefile). In this case, we begin by selecting the five towns (Cambridge, Arlington, Belmont, Somerville and Watertown) and then use the ‘select by location’ tool to join names of the five towns to the attribute table of any centroid that falls within the towns. The model building illustration may be helpful for Homework #3 and for your project.

Part A. Create a personal toolbox called “MyOwnToolbox.”

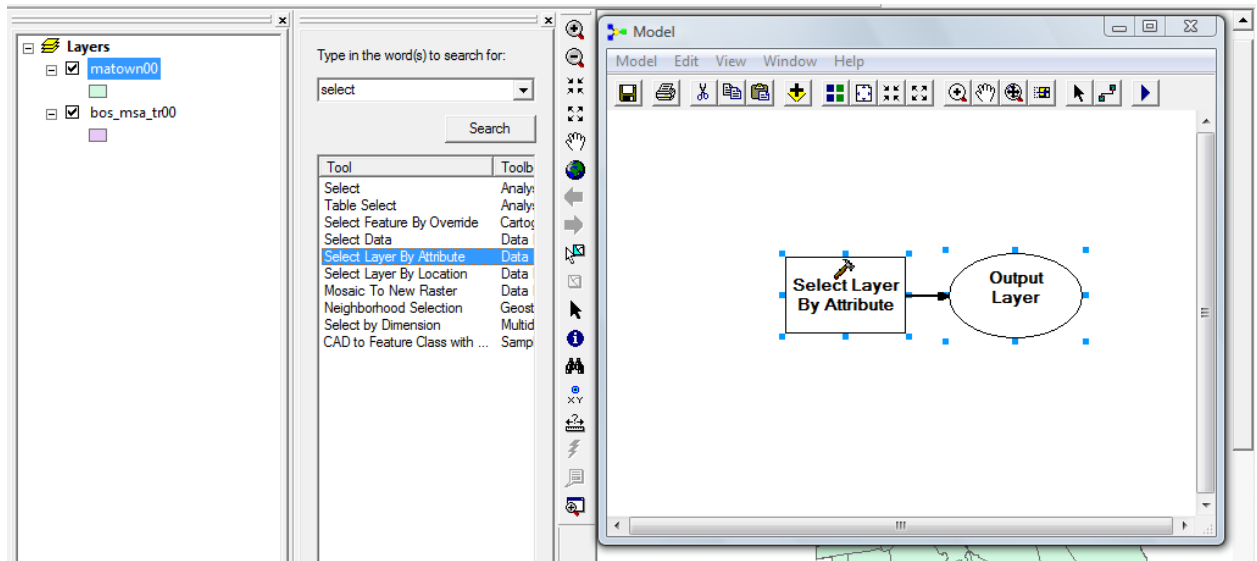


1. Right click on “ArcToolbox”, in the popped up menu, select “New Toolbox.” When the new entry appears, rename the new toolbox to something you will remember like “select five towns.”
2. Next, we will create an empty ‘model’ within our personal toolbox where we will build our tool. Right click on your new toolbox and choose New→Model. A new empty model window will open up with the label ‘Model’ (or Model 1, Model 2, etc. if you have done this before).



Part B: Select the five towns near Cambridge

1. To build a model, we need to identify 'toolbox' operations on data layers that we wish to chain together to get the desired final results. We start by selecting the five towns in and around Cambridge from the MassGIS shapefile with all Mass towns. Leave your new 'Model' window open and return to the ArcToolbox panel. Click the 'search' tab and try to locate the 'select layer by attribute' operation. You might try just the keyword 'select' at first and then pick "Select layer by attribute," from the list appears. Drag and drop this entry into the "Model" window. Do the same for the "matown00" layer in the Data Frame.

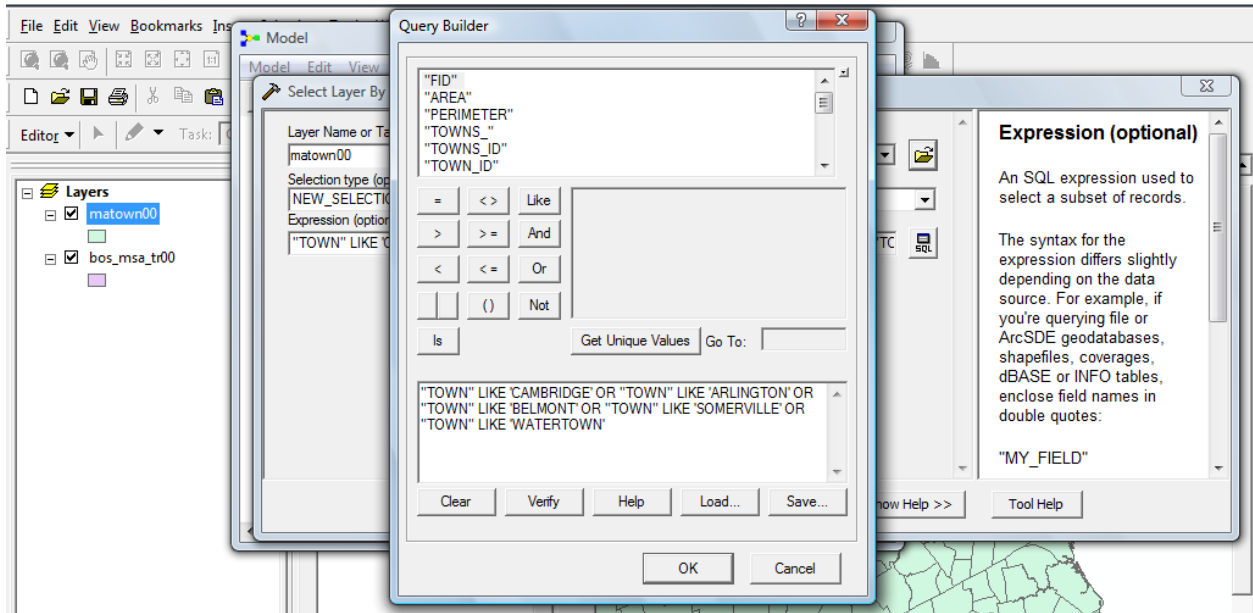


2.

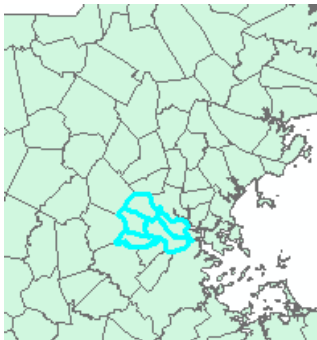
- Now let's connect the shapefile to the 'select' operation by clicking the "add Connection" button in the toolbar of the "Model" window. The cursor changes shape and you can connect the two by clicking on the matown00 icon in the "Model" window and dragging the cursor to the 'select layer by attribute' box. Once these two components of the model are connected, the box and circles will become colored.



- Double click on the yellow toolbox. Fill in the "expression" box with your query:
`["TOWN" = 'CAMBRIDGE' OR "TOWN" = 'SOMERVILLE' OR "TOWN" = 'WATERTOWN' OR "TOWN" = 'ARLINGTON' OR "TOWN" = 'BELMONT']` (Note: if you double click on the output layer "matown00 (2)," the textbox option is grayed out. Why? What happens if you double click on the input layer?)



5. After specifying the input, output and parameters for the model, click the triangular shaped “Run.” If the model is correct, after first running the model, the toolbox and output will be shaded in shadow. Now check the result, if the selected features are not highlighted in the map window, right click on the output layer, in the menu, and select “add display.”

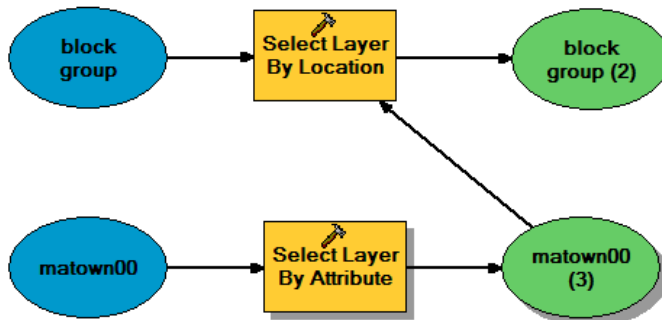


Part C: Find block groups with centroids in the five downs

1. Drag and drop your “block group” layer (e.g., this shapefile in the ‘hm2’ subdirectory of the class data locker: ./data/hm2/eastma2000bg_stateplane.shp) and add the “Select layer by location” tool to the Model builder



- Use the “add connection” to link the “block group” layer to the “Select layer by location” tool. Then link matown00(2) to the “Select layer by location.” Be sure to set the properties of the ‘Select layer by location’ operation to be “have their center in”. (See what happened if you flip the order) Alternatively, you could double click the tool of “select layer by location” to specify the input parameters. In the “select layer by location” window, specify the relationship as “have their center in.”



- When the model is ready, click “Run.” Note there is only one process executed instead of two because you have already obtained the result from “select layer by attribute.” Model builder won’t run it for the second time, unless you make changes to the parameters. NOTE that this model will only **select** the block groups that have their centers in the five towns. It will not add the town name to the block group attribute table. You will have to manually export the selected block groups if you want to work with them later. (You may want to add the ‘export shapefile’ step to your Model!). Also, model builder is not very forgiving and not very smart. For example, if you clear the selection of the five towns from the ArcMap menu, model builder will not realize this and will not redo the selection when you try to rerun the model.
- See what happened if you shrink the towns to four. What do you think is the advantage of model builder?