Geoprocessing with ModelBuilder

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What is Model Builder?

• Model builder is an application in which you can create, edit, and execute models.
• “Model” means ideal representation
• “Builder” means to create something
• Automated geoprocessing
• Visual programming
What are your career goals? Analyst? Developer?

• Analyst
  – Solves a problem with GIS
  – “Need to summarize this stuff by these polygons”

• Developer
  – Solves the software/system problems
  – “We need to run this model on a whole bunch of different data”
  – “We need a tool that does <x, y, and z>”

• You probably want to have the skills to do both
Why is Model Builder useful?

• Visual programming
• Reduces ambiguity and redundancy
• Increases efficiency
• Great for prototyping
• Repeat testing of a hypothesis with different input data
• Model can be coded as a tool, so all steps run automatically
Model Builder vs. Python

- MB is not a scripting language
- Python provides more flexibility in programming
- Python has better use of logicals
- Both now have iterator (for loops) functionality
- Export a model from Model Builder to python script!
Model Builder and Analyst/Developer

• Both analyst and developers need to know Model Builder
• Analyst – useful to automate workflows
• Developer – because your end user is the analyst
Macro vs. Tool

• A macro is tied to a specific set of data
  – A layer with a particular name (“Streets”), geometry type (lines), fields (“CFCC”, “Meters”)
  – In order to work on another dataset, either the macro code or the data set names must be altered

• A tool parameterizes data
  – It is not hard coded to a particular set of data
  – It must react accordingly, with any type of data
Macro vs. Tool

• You can create macros with
  – Model builder
  – Python

• You can create tools with
  – Model builder
  – Python
  – ArcObjects

• Tools you create are called *custom tools* and are found in the custom toolboxes that you create
Model Builder window
How it works

• Drag layers you want to use into the window
• Drag tools you want to use into the window
• Connect the layers and tools using a connection arrow to show the work flow process
• Order matters
How it works

• Ovals are “data” – noun-like
• Square are “actions” – verb-like
• Blue is input, green is output, yellow is tool
Running a Model

• Three types of execution
  – Run a single process
  – Run all ready-to-run processes
  – Run the entire model

• Action squares temporarily turn red as they are executing

• You receive a status message with each run
Edit an existing model

• Right-click on the model in ArcToolbox and select edit
• The Model Builder window will open and is ready for editing
• Do not double click to model to edit, this will only run the model
Save, export, create tool

• Geoprocessing package
  – Package all data, scripts, and tools for a particular model
  – Zip it up
  – Send it to another user

• Create tool
  – Fully parameterize model
  – Works with any input data
  – Save tool
Conclusions

• Model builder is a visual modeling tool
• Similar functionality as python scripting
• Drag and drop features, connectors, and visual display make it intuitive to use
• Best way to learn Model Builder is to use it – next two lab sessions