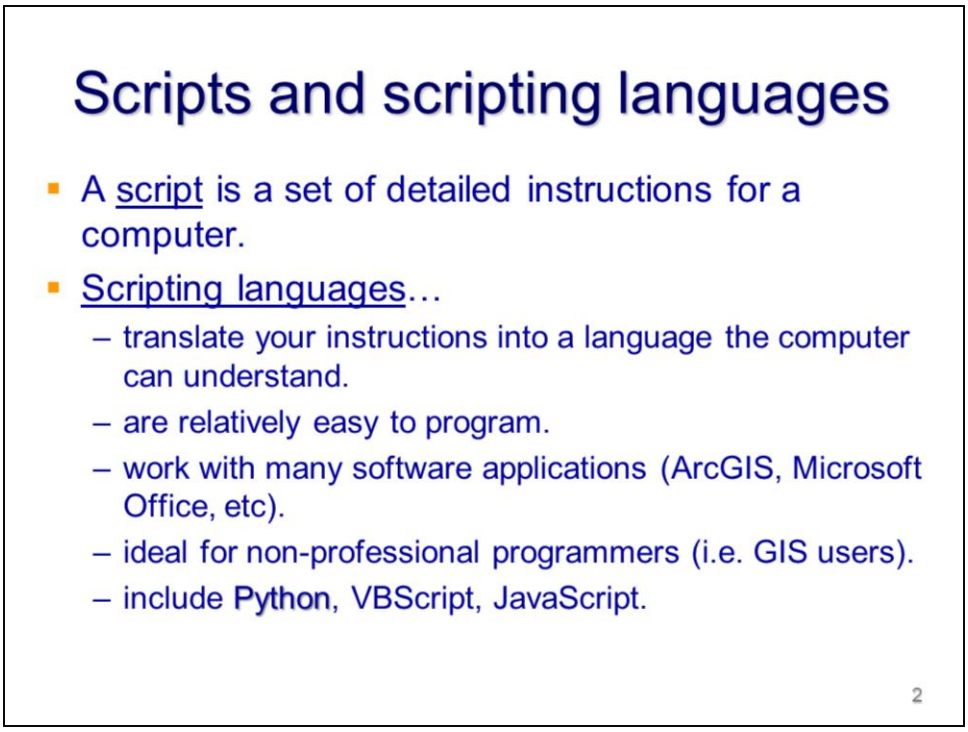
This video will present some of the benefits of using scripts in both geospatial and non-geospatial analyses.



A script is a series of instructions for a computer. A scripting language translates our instructions into a code that the computer can understand. Scripts are relatively easy to program and work with many software applications which makes them ideal for GIS users and other non-professional programmers.

Why write scripts?

Automation

- Much faster than manually performing operations.
- Reduce potential for human error in complex or repetitive tasks.
- Practical to accomplish very complex tasks.

Image from: http://www.cartoonstock.com/cartoonview.asp?catref=jman92

Writing scripts can take large investments of your time in both learning the scripting language and in developing scripts. The pay-off of writing scripts can be well worth your time. Perhaps the biggest pay-off is in automating your procedure. The computer can run the operations in your script much faster than you could do manually and without the potential for human error (assuming the script has no programming errors). A script can make it practical to do a very complicated analyses that would be too time consuming for us to do manually.

Why write scripts?

Documentation

- Workflow documented in minute detail
- In-script comments help explain processes

```
# this is a Python comment
```

- Help page and dialog window documentation can be provided for ArcScripts

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Another important benefit of a script is that it documents your procedure in every detail. You can make it easier to follow your script by adding comment lines in your script to describe the major steps. These comments are ignored by the computer - their purpose is simply to help explain the processes that occur in your script.

Why write scripts?

Turn into ArcScripts

- Easy to use and re-use
- Easily shared with other GIS users
- Can be run by non-programmers

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Scripts allow you to share your expertise with other people. Converting the script into an ArcGIS tool is an easy way to create a user-friendly interface that makes the script sharable with non-scripters. Making your script “sharable” can also be very helpful to you if there is a chance that you may want to reuse the script again in the future.

Models vs. Scripts

Models

- Visually appealing
- Easier to build and troubleshoot
- Excellent for exploratory analysis
- No programming skills required

Scripts

- Greater functionality and control – more complex tasks possible.
- Tend to be more robust
- Can use tools from Microsoft Office and other software
- Can automate map production (Arc 10.x)

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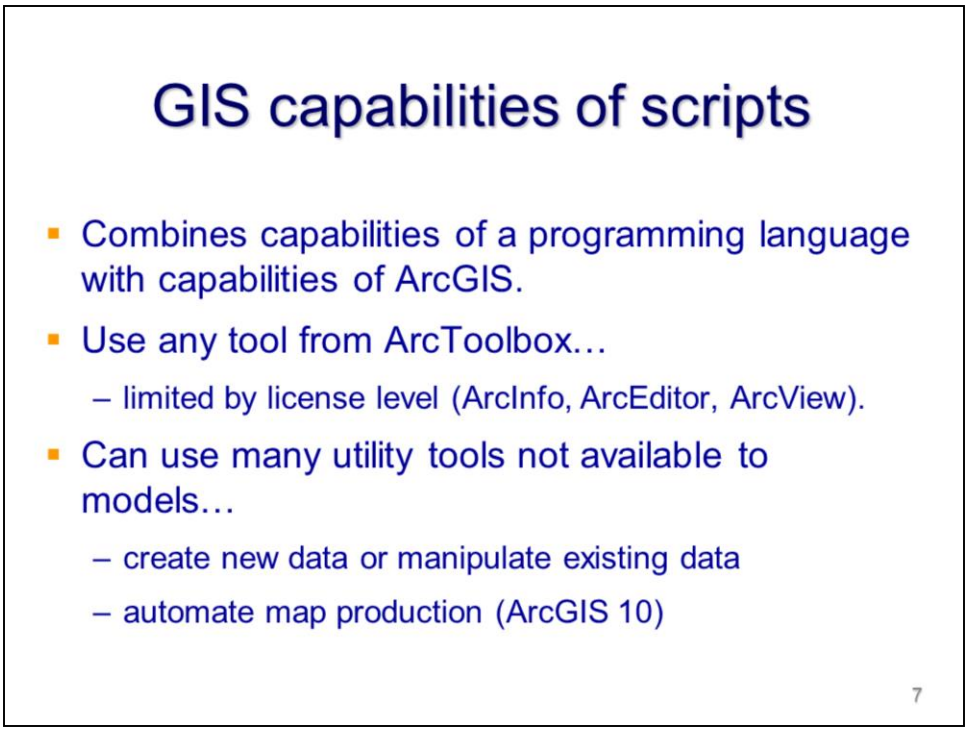
ArcGIS and other geospatial software programs have the capability to create models for automating your procedure. These models provide many of the same benefits as scripts but with the added advantages of having a small learning curve and being faster to develop. Scripts on the other hand offer much greater functionality than models including the capability of interacting with other software programs.



For ArcGIS users, scripts allow you to create powerful tools that use programming to enhance the capabilities of ArcGIS. Most of ArcGIS's functionality is contained within the tools of ArcToolbox (which I refer to as "ArcTools"). Scripts can access each of these ArcTools as well as many tools accessible only in the scripting environment.

Script Application Examples

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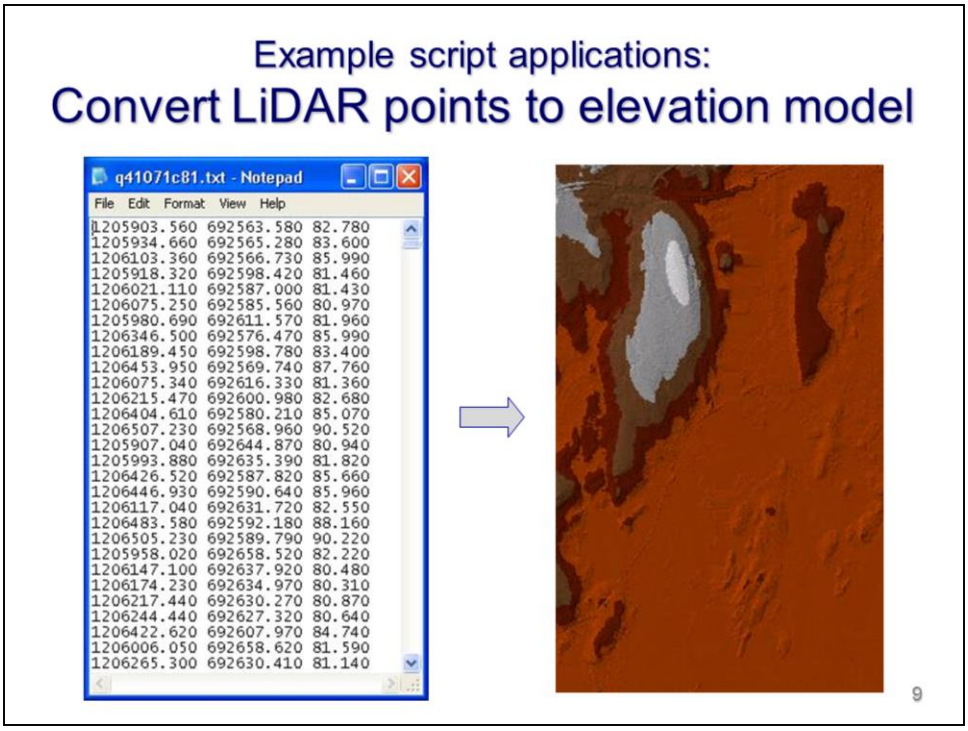
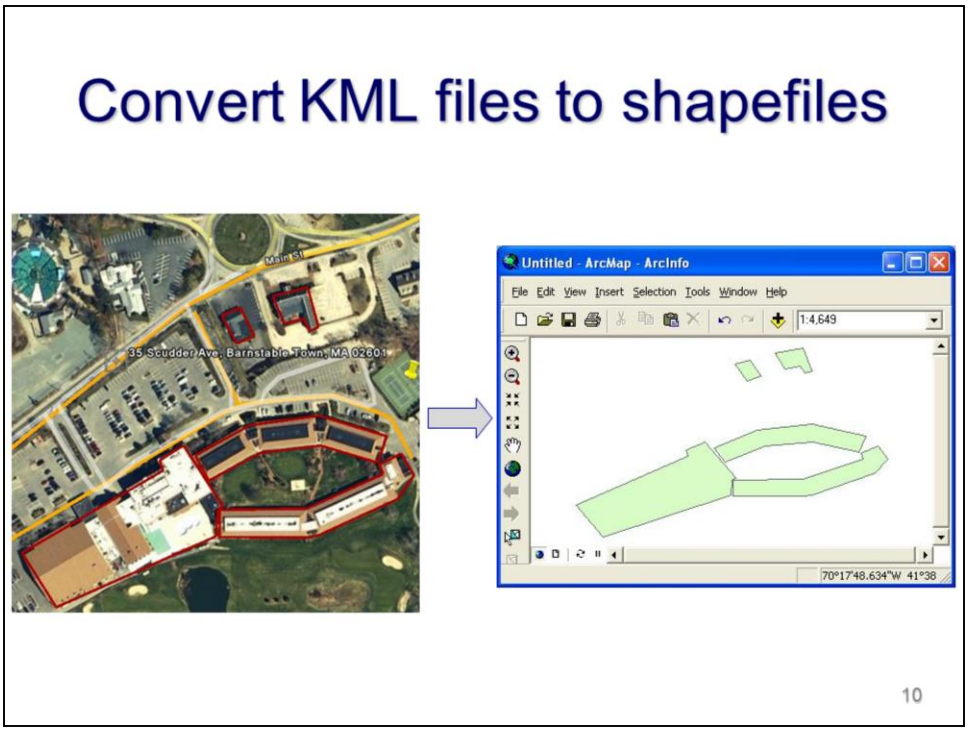
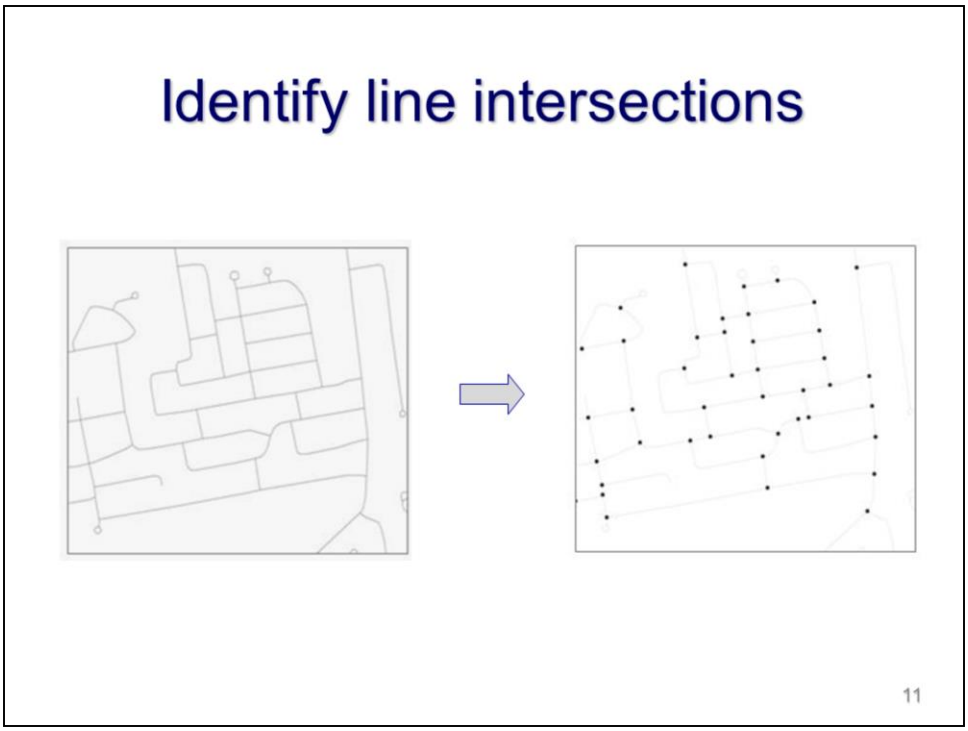
Throughout this course, we'll see many examples when scripts can provide major advantages in geospatial analyses. In the following slides, I'll give just a few examples of what you can do with a script that uses ArcGIS's capabilities.



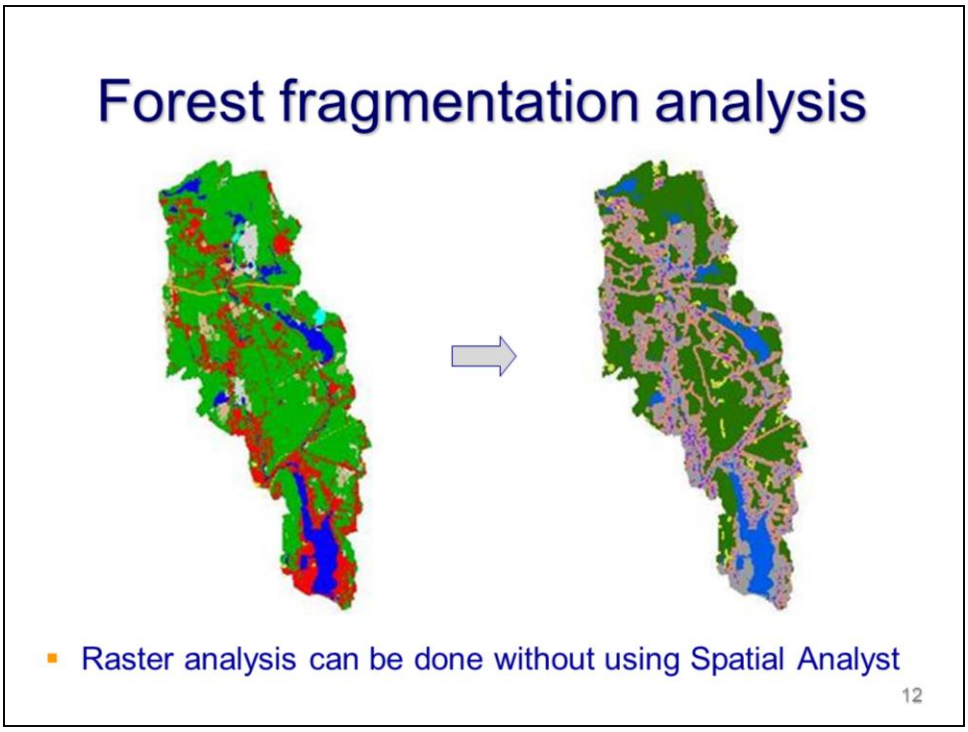
Scripts can convert data among different formats. In this case, the script uses point coordinate information in a text file to create a Digital Elevation Model. The advantage of the script in this case is that it can automatically process the hundreds or thousands of individual files that comprise certain high-resolution remote sensing datasets.



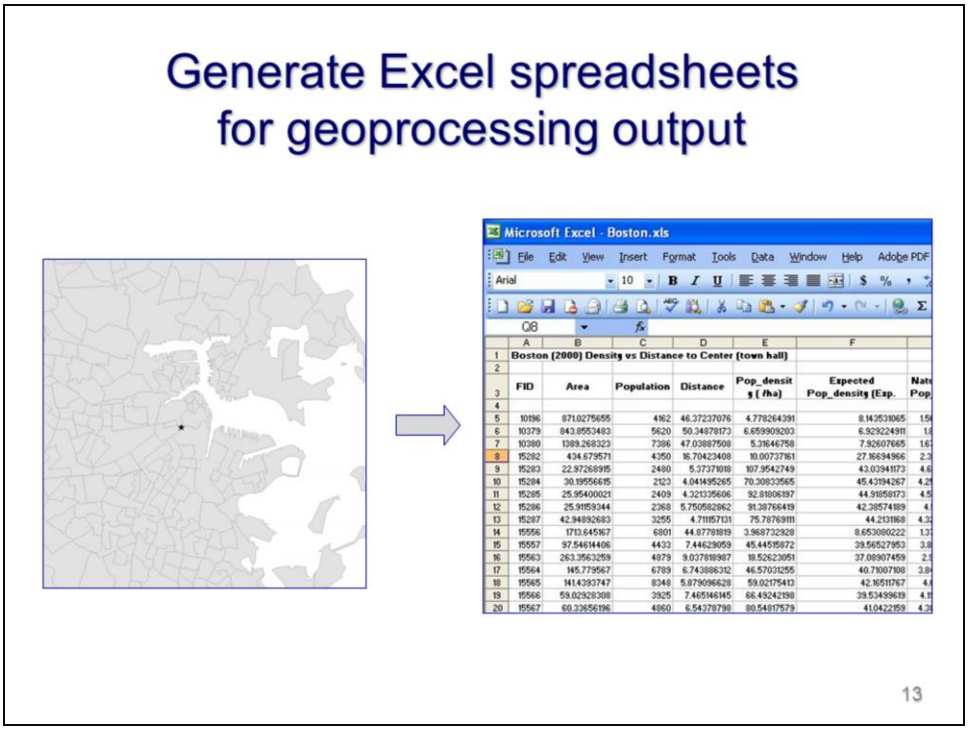
Google Earth provides free access to an incredible image database which you can use to map out features and save as a kml file. In this example, a script was used to convert the kml file, which ArcGIS cannot use, into a shapefile which ArcGIS can use.



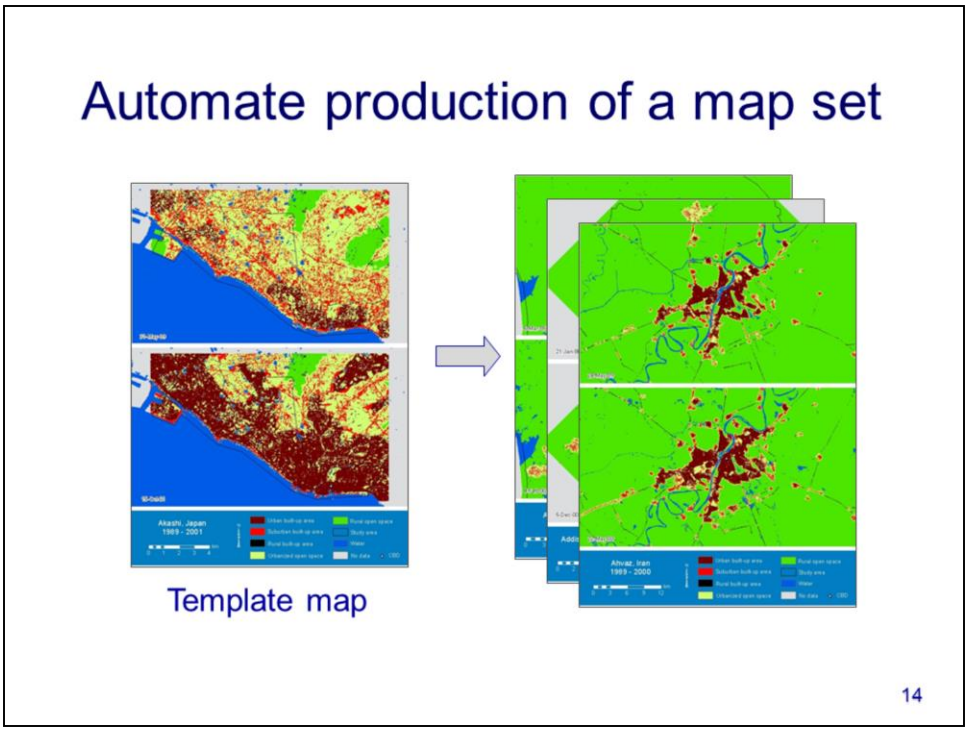
The script in this example identifies the intersections of a line network (e.g. a road centerline dataset)



Many of the tools in ArcGIS are included in specialized extension packages which can be very costly and will likely be unavailable if you work at smaller organizations. Scripts can offer a work-around to some of the limitations of the less expensive ArcGIS license levels. In this example, the script performs a raster-based operation without the use of Spatial or 3D analyst.



A spreadsheet often provides the input data for a geospatial analysis or it may be the desired format of the output of a geospatial analysis. A script can work with both GIS software as well as Microsoft Excel. In this example, the script performs an analysis using ArcGIS and creates a spreadsheet in Excel to present the results.



The results of geospatial analyses are often presented as series of maps. The script in this example was used to generate hundreds of maps based on a template created in ArcGIS. In addition to the initial map creation, a major advantage of the script in this case is that little time is lost when recreating the maps if a change is needed to the map template.