

Creating Educational Materials for Python and ArcGIS

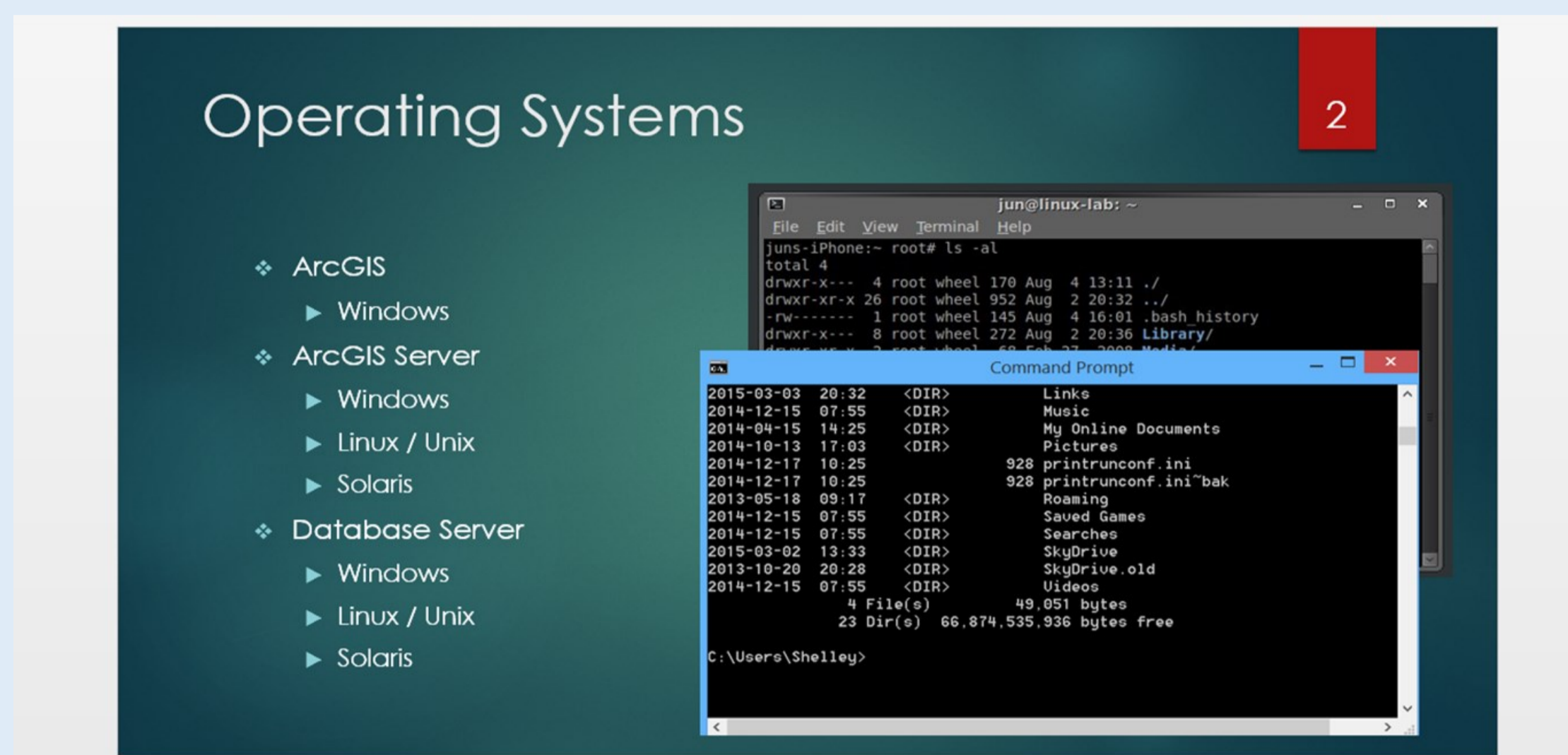
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Motivations

Geographic Information System (GIS) software has been around since the 1980s. Over the decades, Information Technology (IT) has improved allowing GIS to move from large corporate servers to laptops and hand held devices. As a technology becomes more mature, practitioners need to find ways to differentiate themselves to increase their chances of being hired or maintaining their position. This course has been designed to help students gain experience with technology and programming that could give them an advantage.



Solaris and Linux are Unix based Operating Systems (OS) and the command lines will look the same. Many of the commands you can use will be the same. You do want to take notice of the direction of the slashes. Windows uses a backslash (\) and Unix OS use a forward slash (/). It is important to know what OS your data, programs or scripts will be sitting on. If the slashes are going in the wrong direction you will get an error. When you write a script that will "call" another script, program, file, or database you will need to know the machine OS and the directory where the file or data you need is located.

Course Materials

Lectures:

Lectures will be in PowerPoint slides with slide concepts explained in the notes section of the slide. The instructor will add additional information rather than reading what is on the slide. The course PowerPoints are essentially a course book.

Labs:

Labs will guide students through the programming and modeling process. The first few labs familiarize students with the Python language and using scripts and/or program code to build tools in ArcGIS 10.3. The last two labs are real project based modeling exercises covering hydrologic and land use change.

Books:

The required book for this course is *'Python Scripting for ArcGIS'*, by Paul Zandbergen. E-books will be used for the Python programming reference materials to keep the costs down and to allow students to use the reference material that fits their learning style.

Objectives

To achieve the skills businesses are asking for, students in this course will:

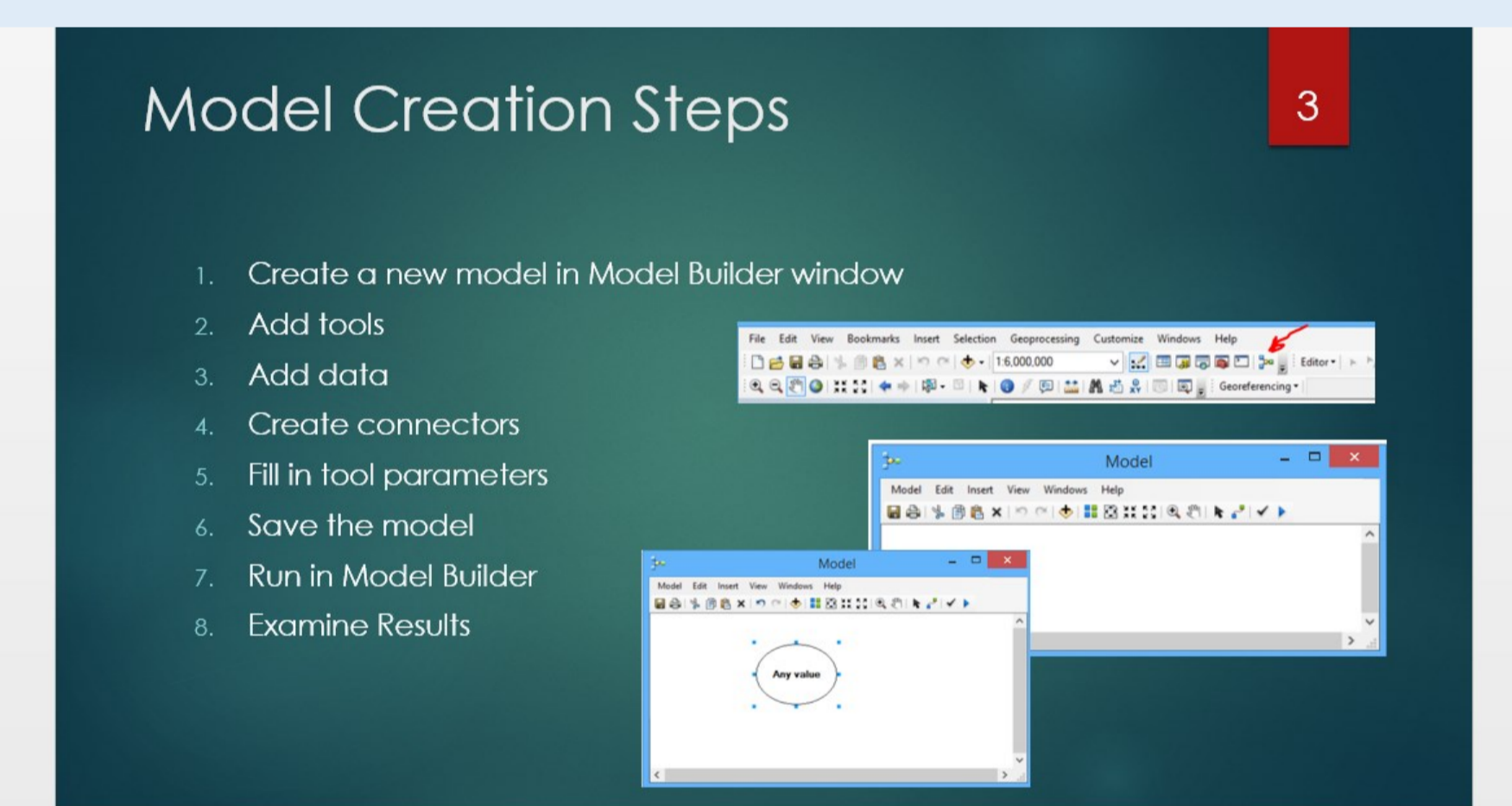
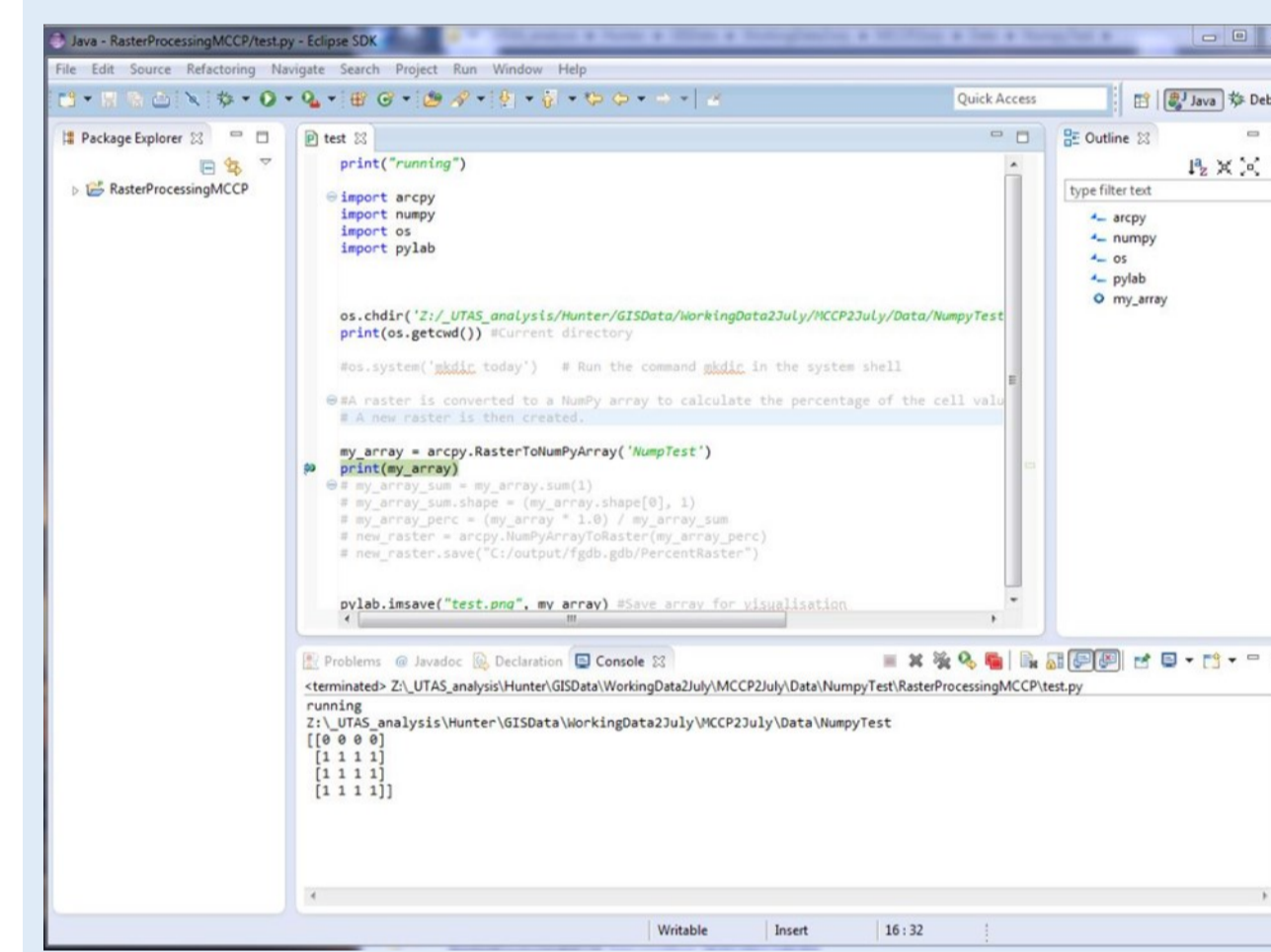
1. Become familiar with Python scripting and coding
2. Build process models
3. Create custom ArcGIS tools and gain experience using these tools
4. Analyse data using Python
5. Collaborate and share tools in global GIS user groups

Students will also learn the basics for:

- ◆ IT networks
- ◆ Software development processes
- ◆ Working with Integrated Development Environments



Lecture Slides



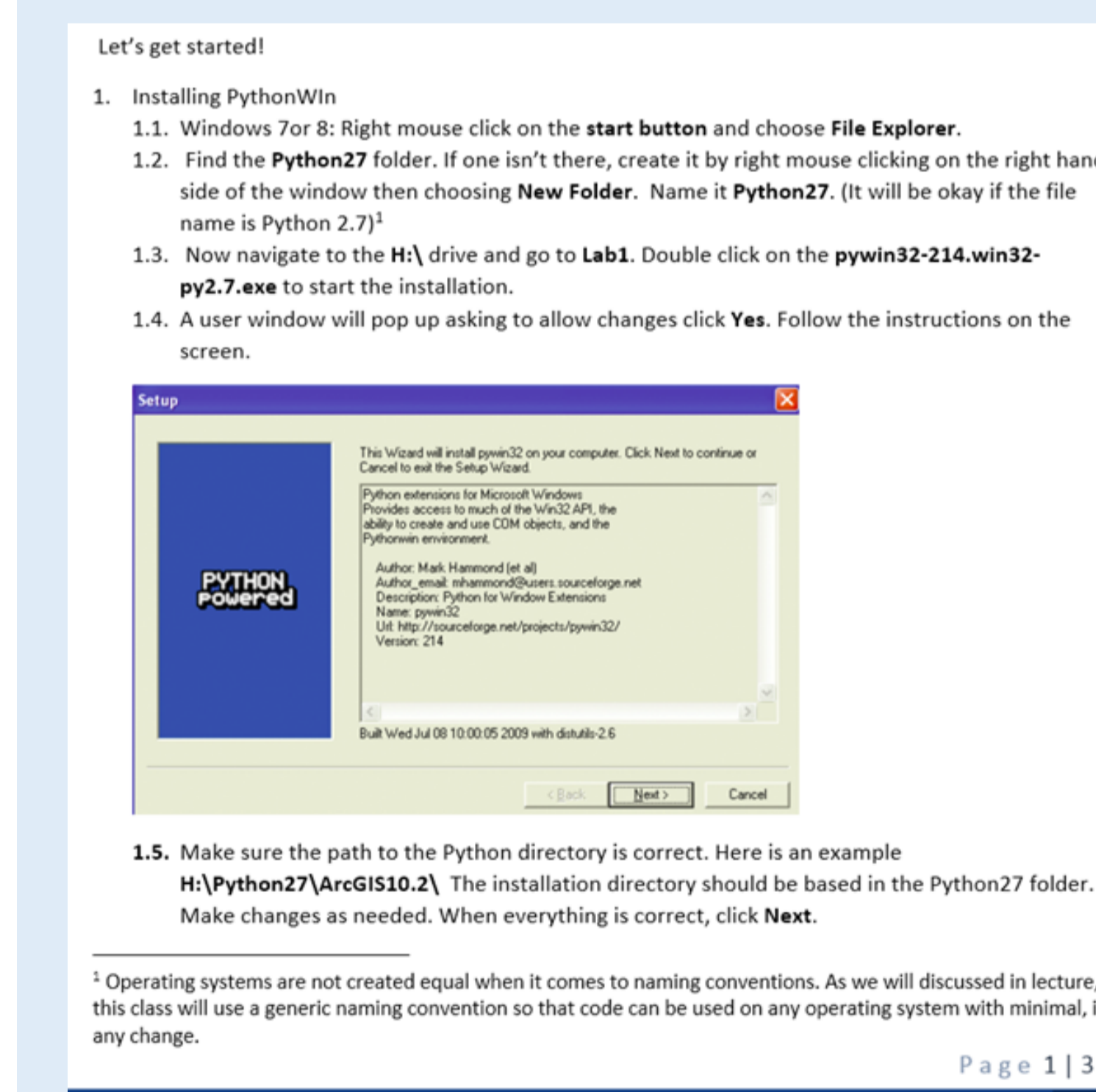
When you create models, you must decide what it is you want to accomplish. Then you need to see what data and tools you will need to do the job. What are the results supposed to look like. People can get really hung up on what your model looks like on paper and even what "language" you used to create the model.

Course Pedagogy

In the private sector, software and network training courses teach in a vocational education style focusing on teaching specific skills needed to do a particular job. This differs from some traditional pedagogy based classes that are often found at colleges where the students are presented history, theory, and technical skills for a "whole" educational experience.

Software and network training groups like IBM's Training Services, create customized courses that focus only on the information needed to do specific jobs. Students are expected to have core skills prior to the start of the course and courses are typically between 16 and 40 hours in duration. The class gives them extensive hands-on experience that prepares them for their new job duties. Students are encouraged to follow specific training paths that will lead to certification that will validate their skills and achievements.

Lab Slides

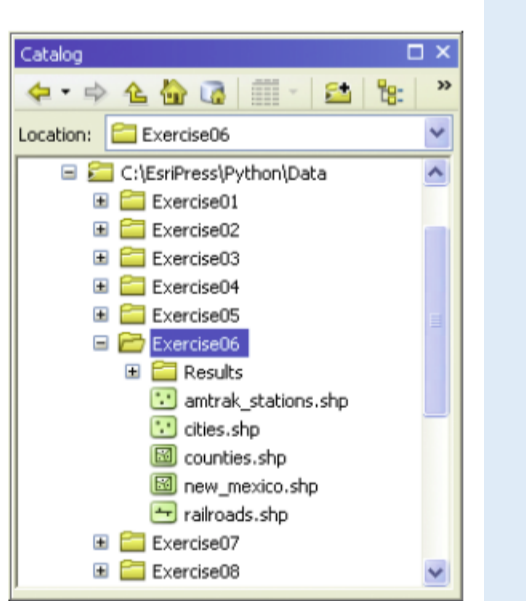


Exercise 6 Exploring spatial data

Check for the existence of data

Before starting to work with the exercise data, you will preview the data.

- 1 Start ArcMap with a new empty map document. On the Standard toolbar, click the Catalog button to open the Catalog window.
- 2 Browse to the C:\Esri\Press\Python\Data\Exercise06 folder.



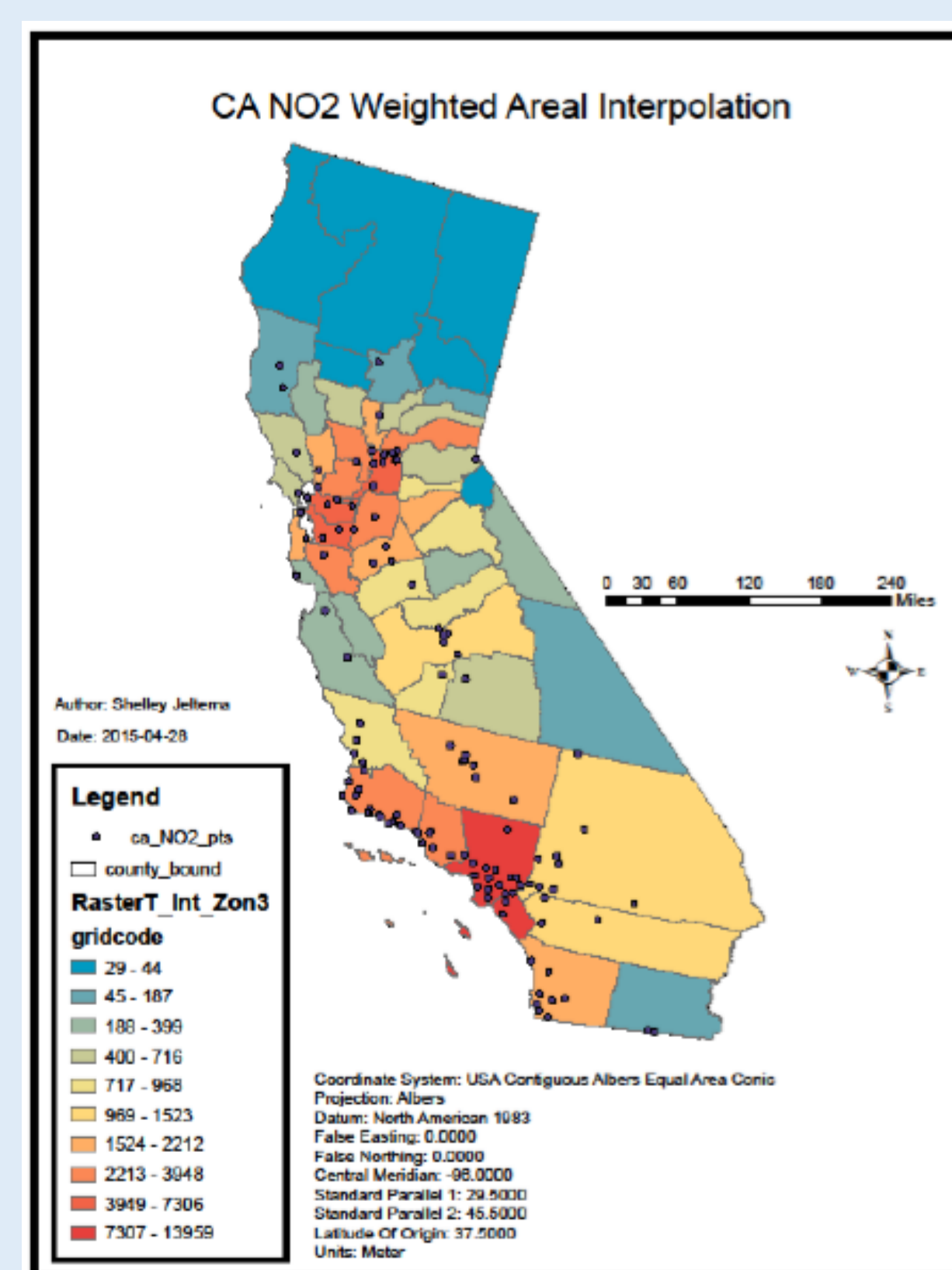
- 3 Start PythonWin. Create a new Python script and save as shape_exists.py to the C:\Esri\Press\Python\Data\Exercise06\Results folder.
- 4 Enter the following lines of code:

```
import arcpy
from arcpy import env
env.workspace = "C:/Esri/Press/Python/Data/Exercise06"
shape_exists = arcpy.Exists("cities.shp")
print shape_exists
```
- 5 Save and run the script. Running the script returns a value of True.
- 6 Modify the script by replacing "cities.shp" with "CITIES_SHP".

Exercise 6 from: 'Python Scripting for ArcGIS', by Paul Zandbergen.

Course Resources

- ◆ GIS computer lab with ArcGIS 10.3
- ◆ Online course management: Canvas
- ◆ Help:
 - ◇ Class help forum
 - ◇ Esri help forums
 - ◇ GIS user groups
- ◆ Collaboration:
 - ◇ GIT
 - ◇ Acropedia



Future Work

- ◆ Create an online version of this course
- ◆ Create customized modules for use in other departments such as:
 - ◇ Civil/Environmental Engineering
 - ◇ Surveying
 - ◇ Social Science/Humanities
 - ◇ Geological Sciences
- ◆ Create additional courses for the following topics:
 - ◇ Creating and managing Geodatabases
 - ◇ Using Python to preprocess data
- ◆ Follow up with students to see if this course helped them get a position