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# Intro

## Compiling and Interpreting

A compiler is a program that converts instructions into a machine-code or some lower-level format so that they can be read and executed by a computer.

An Interpreter is a program that directly executes instructions without requiring them to be first compiled.

Python uses an interpreter. This means that you can get on command prompt (by pressing ‘win+r’, typing “cmd”, and pressing enter) and run python code simply by telling cmd that you want to use the python interpreter. If you have installed python, you should be able to do this by simply typing “python” and then your python statement. When you hit the enter key, cmd will use the python interpreter to read your line of code and execute it accordingly.

In some programming languages, this is not possible. You must first *compile* the program so that a computer can understand and execute it. In python, you simply have to tell the computer to use the python interpreter and then it can read and execute your python commands.

The python interpreter is normally installed as /usr/local/bin/python3.7 but this can differ if you installed it differently or are using a different version of python. Just know that because you have an interpreter, you do not have to compile anything and can run python virtually anywhere. From cmd, ArcGIS python command lines, etc.

## The Examples

Dr. Zhang gives two examples of programming logic. The first example has to do with how *Booleans* work in programming and the second has to do with the step-by-step process in which you must tackle complex problems.

Booleans are logical “If” statements. The important thing to get from this example is simply that programming, although using English characters, is not logically like our English language. It is more formulaic and standardized than our normal talking English. “If” means a very specific thing in programming, and to get a certain desired result (like 6 apples AND 1 watermelon), you must very specifically state this. Programming is kind of like giving Amelia Bedelia instructions. She will do EXACTLY or LITERALLY what you tell her to do. She doesn’t catch things you imply. Only what you clearly state.

The second example is meant to get you to further see the specificity you must have when writing code. You cannot simply say “do this complex thing”. You must tell the computer step by step how to do that complex thing. With functions, however, once you tell the computer once, you can call that complex operation a name and have the computer do that complex thing again without spelling it all out, but we will get to that later.

## Programming Language Levels

A

## Visual Basic

A

## Examples of scripting usage

A

## Stick with it!

A

# Programming Basics

## Designing a project

A

## GIS Programming

#### In ESRI

a

##### Web Apps

a

#### Customizing Desktop GIS

A

#### Open Source

A

## Packages and arcpy

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