



Getting Started with Python

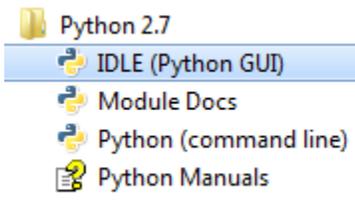
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Python - defined

- Free open source programming language
- First release in 1991 by Guido Van Rossum*
- Named after BBC comedy series *Monty Python's Flying Circus**
- Widespread use, versatile

Python

- Excellent beginner's language
- Can download from www.python.org
(is installed with ArcGIS Desktop/Server)
- Default IDE (integrated development environment) is IDLE {demonstrate IDLE}



Python – Procedural and Object Oriented

- Procedural – simple line-by-line sequence of commands

{demonstrate procedural programming}

- Object Oriented (OOP) –
 - Properties (characteristics)
 - Methods (actions)



{demonstrate object-oriented programming}

If-Else, Loops

```
if something evaluates to True:  
    Do this  
    Do this  
else (otherwise):  
    Do this  
    Do this
```

```
while something evaluates to True:  
    Do this  
    Do this  
    Do this  
    Do this
```

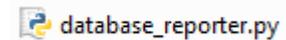
Modules

- Import module – like importing object (or object that contains objects)
- Car object – high-level properties/methods
 - Car object contains wheel object – wheel has properties/methods
- “arcpy” module – high level – the whole thing
 - Contains an “env” object, which has properties (geoprocessing environment settings)

```
|| >>> import arcpy  
|| >>> arcpy.env.overwriteOutput = False
```

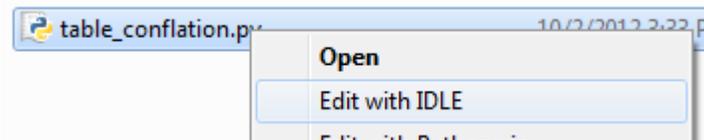
Saving and Running Scripts

- File extension of script is .py
(.pyc when script is a module)

A small icon representing a Python script file named 'database_reporter.py'.

- Right-click .py | Edit with IDLE

{demonstrate right-click | Edit with IDLE}



- Double-click .py → Command Prompt

{demonstrate double-click to Command Prompt}

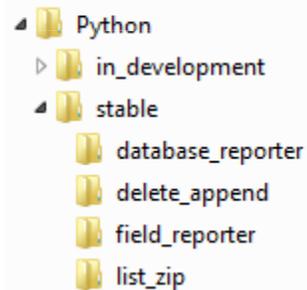
Python Coding – Best Practices

- Comments
- Pseudo Code
- Script Header

{Demonstrate comments, pseudo code, and script header}

Python Coding – Best Practices

- In-Development vs. Stable



Python – Best Practices

- try/except

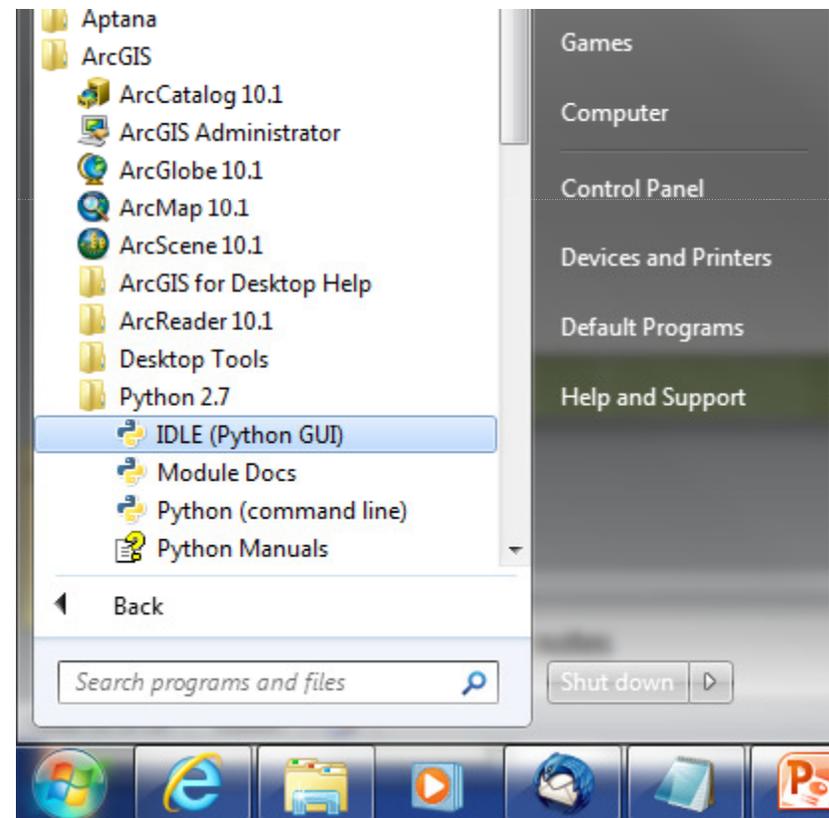
```
7% list_zip.py - G:\users\ivanb\scripts\Python\stable\list_zip\list_zip.py
File Edit Format Run Options Windows Help
try:
#MAKE A LIST OF ALL FILES OF THE CURRENT DIRECTORY
the_list1 = os.listdir(sys.path[0])
#PRINT LIST OF THE FILES TO THE SCREEN
the_string = ""
for a_line in the_list1:
    the_string += " " + a_line + "\n"
print "ALL FILES IN CURRENT DIRECTORY:\n" + the_string
#IF A list_of_zips.txt ALREADY EXISTS IN THE CURRENT DIRECTORY, INFORM USER A
for a_line in the_list1:
    if a_line.lower() == "list_of_zips.txt":
        print "list_of_zips.txt ALREADY EXISTS. SCRIPT WILL TERMINATE."
        sys.exit()
#START A SECOND LIST WHICH WILL ONLY CONTAIN THE .ZIP FILES
the_list2 = []
#POPULATE LIST OF .ZIP FILES
for a_line in the_list1:
    if a_line.lower()[len(a_line) - 4:len(a_line)] == ".zip":
        the_list2.append(a_line)
#PRINT LIST OF .ZIP FILES TO THE SCREEN
the_string = ""
for a_line in the_list2:
    the_string += " " + a_line + "\n"
print "ALL .ZIP FILES IN CURRENT DIRECTORY:\n" + the_string
#WRITE LIST OF .ZIP FILES INTO OUTPUT TEXT FILE
print "WRITING LIST OF .ZIP FILES INTO OUTPUT TEXT FILE..."
the_output_string = ""
for a_line in the_list2:
    the_output_string += a_line + "\n"
the_file = open(sys.path[0] + "\\list_of_zips.txt", "w")
the_file.write(the_output_string)
the_file.close()

#SCRIPT COMPLETE
raw_input("SCRIPT COMPLETED. PRESS ENTER TO EXIT.")

except:
print "THE SCRIPT FAILED (try/except CAUSED except TO RUN)."
raw_input("SCRIPT TERMINATED.")
Ln: 1 Col: 0
```

Python with ArcGIS

- Installs with ArcGIS for Desktop and ArcGIS for Server
 - Python 2.7.2 w/ ArcGIS 10.1



Python with ArcGIS - Geoprocessing

- Demonstration – Adding fields, calculating fields, and deleting fields

{Demonstrate schema_modifier.py}

Python with ArcGIS - Cursors

- SearchCursor – Script reads each row
- UpdateCursor – Script can update rows
- Insert Cursor – Script can add rows

	OBJECTID *	SEGMENTID	ESITEID	PSITEID	SITEADDRESSID
▶	107111	35215	198353	-999	198353
	54472	33433	54345	-999	54345
	225153	44066	211976	-999	211976
	100937	20127	215710	-999	215710
	252431	27417	38060	-999	38060
	86781	6580	209642	-999	209642

{Demonstrate SearchCursor script}

Python with ArcGIS – Scripted Map Production

- `arcpy.mapping`
- Example: `ExportToPDF()`
`{Demonstrate ExportToPDF() }`

Scripts in ArcToolbox

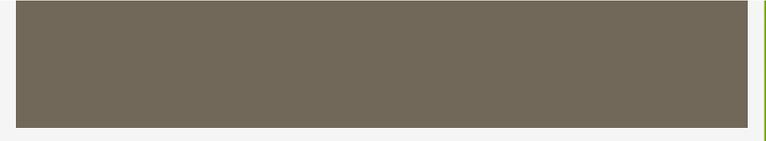
- Run a Python script as an ArcToolbox tool.
- Export a model to a script.

Some Uses of Python with ArcGIS

- Flat-file -to- geodatabase process
- ArcSDE geodatabase admin (compress, etc.)
- QC street centerlines (write error report)
- Automate copy from ArcSDE geodb to .gdb
- Reporting district analysis
- Automate read of server log file and email
- ArcGIS for Server cache rebuilds

Getting Started

- www.python.org
 - Python tutorials
 - Python documentation
- Esri
 - ArcGIS Resources | Python
 - Links to Python tutorials and other resources
 - www.esri.com | Training
 - <http://training.esri.com/gateway/index.cfm?fa=search.results&searchterm=python>



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