

Python Data Types - Storage Types

Integer	-100, 100
Float	-100.123, 100e-10
String	"Hello, World"
Boolean	True, False
List	[1,2,3, you, and, me]
Tuple	(peter, 1, paul, 2, and, mary, 3) ¹
Dictionary	{key, value, ...}

¹ Parenthesis optional in Python 2, required in 3

Data Types Questions

How do they function?

Do they operate in sequence? Lists, Tuples, and Strings are sequences. Can be combined, queried, indexed, and sliced.

Are they mutable? Strings, numbers, and tuples are immutable. Lists and dictionaries are mutable.

Operators

Modulus Remainder after division. Uses %.

Exponentiation Exponents. ** (5^3)

no parenthesis around asterisks

Rules

Variable Must start with a letter or an underscore (but can be empty 0, ""). Remainder can consist of letters, numbers, and underscores. They are CASE SENSITIVE.

String

Conditionals

How do they work? True/false statements

What is the syntax? IF/ELIF statement

Iterators

How do they work? Loops over a list

What is the syntax? FOR

Computational Thinking

Pseudo code

brain in slides

Concepts and Benefits of

flow charting

modelbuilder

Nature of Python

High Level Removed from actual code ran on computer. Use syntax to make it easier to read/write.

Object Oriented Each object has a value, an identity, and a type.

General Purpose Does not have a specific application, can be used for a range of applications like scripting or automating

Interpreted Processed through an interpreter into a low level machine language that can be executed

Dynamic Data can be manipulated into strings and numbers. An integer can be a float or vice versa.

Python Version Differences

Print: In Python 2, "print" is treated as a statement rather than a function. There is no need to wrap the text you want to print in parentheses, although you can if you want. In contrast, Python 3 explicitly treats "print" as a function, which means you have to pass the items you need to print to the function in parentheses in the standard way, or you will get a syntax error.

Integer Division: Python 2 treats numbers that you type without any digits after the decimal point as integers. For example, if you type the expression 3 / 2 in Python 2 code, the result of the evaluation will be 1, not 1.5 as you might expect. Python 3 evaluates 3 / 2 as 1.5 by default, which is more intuitive for new programmers.

Impact on ArcPY

Python Libraries

What are they? A Python Library is a collection of functions and methods that allow you to perform actions without writing code.

ArcPy Arcpy is a way to perform geographic data analysis, data conversion, data management, and map automation with Python.

Python Range Function

```
>>> # One parameter
>>> for i in range(5):
...     print(i)
...
0
1
2
3
```



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Not published yet.

Last updated 6th March, 2018.

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Python Range Function (cont)

```
4
>>> # Two parameters
>>> for i in range(3, 6):
... print(i)
...
3
4
5
>>> # Three parameters
>>> for i in range(4, 10, 2):
... print(i)
...
4
6
8
>>> # Going backwards
>>> for i in range(0, -10, -2):
... print(i)
...
0
-2
-4
-6
-8
```

Generates a list of numbers.

Structure of a FOR loop

```
for x in [1,2,3]:
print(x)
-
tacos = ["Fish Taco", "Brisket
Taco", "Carnitas Taco"]
for tacos in tacos:
print(tacos)
```

Structure of a WHILE loop

```
i=1
while i < 4:
print i
i+=1
-
ball = 10
while ball > 0:
print(ball)
print("The ball is dropping!")
break
i = 10
while i >= 6:
print(i)
i-=1
print("Keep going")
while i == 5:
print(i)
i-=1
print("Halfway there")
while i >= 0:
print(i)
i -= 10
print("almost there")
else:
print(i)
i-=1
print("finished")
```

Break/Continue/Pass

Break	Terminates the current loop and resumes at the next statement
Continue	Returns the control to the beginning of the while loop. Rejects all the remaining statements in the current iteration of the loop and moves control back to the top of the loop.

Break/Continue/Pass (cont)

Pass	Pass for command/codes not wanted to be executed.
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Structure of a IF/ELIF/ELSE code blocks

```
import random
p = random.randint (1, 6)
print p
if p == 6:
print "shante you stay!"
elif p == 5:
print "Shante you both stay"
else:
print "sashe away"
```



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Not published yet.
Last updated 6th March, 2018.
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