Instructor Notes:

Instructor Notes:

Lesson Objectives

- After completing this lesson, you will learn about:
  - Introduction to Python
  - Features of Python
  - Variables and Assignment

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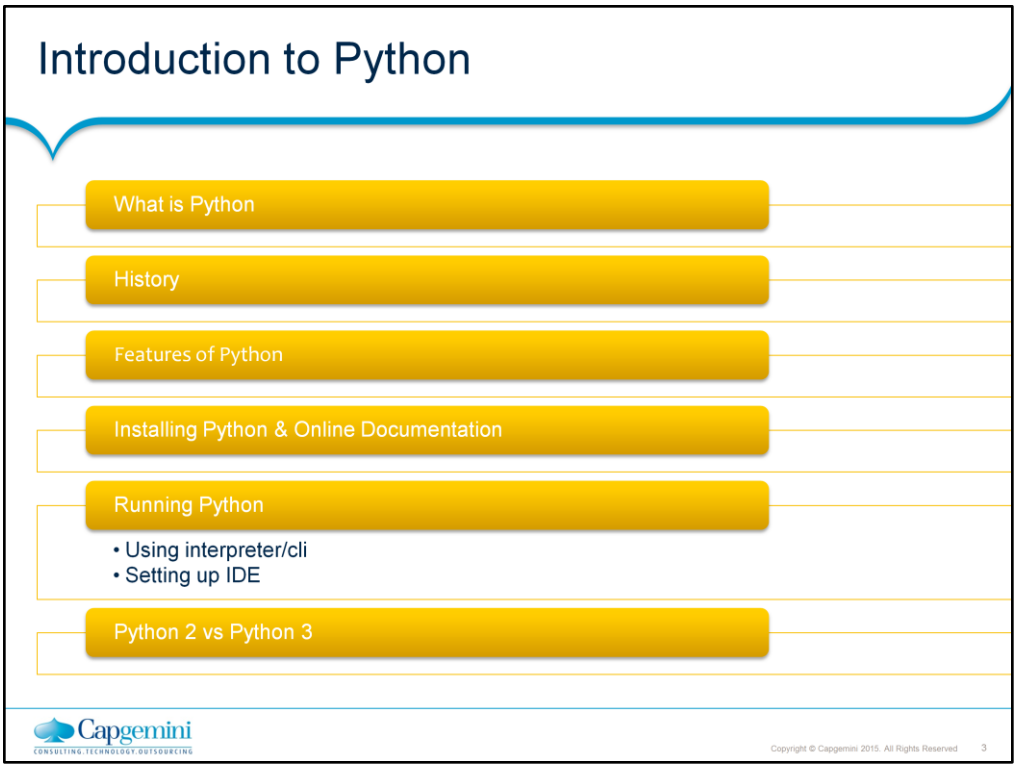

Instructor Notes:

What is Python?

- Python is a
  - **High level programming language**
  - **Interpreted**
  - **Interactive**
  - **Object Oriented**
- Python development started in December 1989. Designed by and principal author Guido van Rossum
- Influences from other languages
  - **ABC : Core syntax directly inherited**
  - **Bourne shell : Interactive Interpreter**
  - **Lisp & Haskell : Features such as list comprehensions, map functions**
  - **Perl : Regular expressions, shell script**

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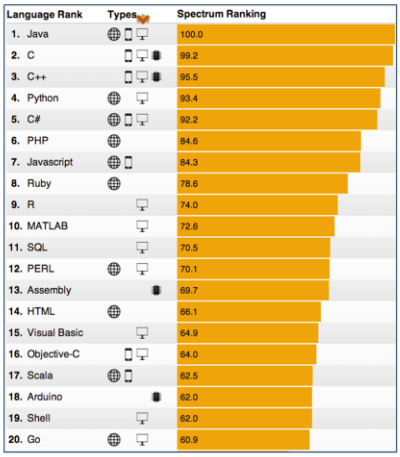
Instructor Notes:

Top programming languages 2014-15



IEEE Spectrum

Feb 2014	Feb 2015	Language	Ratings	Change
1	1	C	16.488%	-1.85%
2	2	Java	15.345%	-1.97%
3	4	C++	6.612%	-0.28%
4	3	Objective-C	6.024%	-5.32%
5	5	C#	5.738%	-0.71%
6	9	JavaScript	3.514%	+1.58%
7	6	PHP	3.170%	-1.05%
8	8	Python	2.882%	+0.72%
9	10	Visual Basic .NET	2.026%	+0.23%
10	-	Visual Basic	1.718%	+1.72%

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Instructor Notes:

Features of Python

- Feature highlights include:
  - **Easy-to-learn**: Python has relatively few keywords, simple structure, and a clearly defined syntax.
  - **Easy-to-read**: Python code is clearly defined and if well written visually simple to read and understand.
  - **Easy-to-maintain**: Python's success is that its source code is fairly easy-to-maintain.
  - **A broad standard library**: One of Python's greatest strengths is the bulk of the library is very portable and cross-platform compatible on UNIX, Windows, and Macintosh.
  - **Interactive Mode**: Support for an interactive mode in which you can enter results from a terminal right to the language, allowing interactive testing and debugging of snippets of code.

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Instructor Notes:

Features of Python

- Feature highlights include:
  - **Portable**: Python can run on a wide variety of hardware platforms and has the same interface on all platforms.
  - **Extendable**: You can add low-level modules to the Python interpreter. These modules enable programmers to add to or customize their tools to be more efficient.
  - **Database Aware**: Python provides interfaces to all major commercial databases.
  - **GUI Programming**: Python supports GUI applications that can be created and ported to many system calls, libraries, and windows systems, such as Windows MFC, Macintosh, and the X Window system of Unix.
  - **CGI Programming**: Supports server and client side scripting, many libraries and modules
  - **Scalable**: Python provides a better structure and support for large programs than shell scripting.

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Instructor Notes:

Features of Python

- Important structural features that make it an efficient programming tool:
  - Built-in high level data types: strings, lists, dictionaries, etc.
  - The usual control structures if, if-else, if-elif-else, while loop, (a very powerful) for loop.
  - It can be used as a scripting language or can be compiled to byte-code for building large applications. (Using third party tools such as Py2exe or Pyinstaller, Python code can be packaged into standalone executable programs)
  - Supports automatic garbage collection.
  - It can be easily integrated with Fortran, C, C++, CORBA, and Java, etc…

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Instructor Notes:

Installing Python and documentation

- Getting Python:
  - The most up-to-date and current source code, binaries, documentation, news, etc. is available at the official website of Python: http://www.python.org/
- Documentation
  - You can download the Python documentation from the following site. The documentation is available in HTML, PDF, and PostScript formats: http://docs.python.org/index.html
- Tutorial
  - You should definitely check out the tutorial on the Internet at: http://docs.python.org/tutorial/.

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Instructor Notes:

Installing/Running Python IDE

Demo

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Installation from a shared directory onto the audience systems to be given
If already installation is done then demo of IDE to be done

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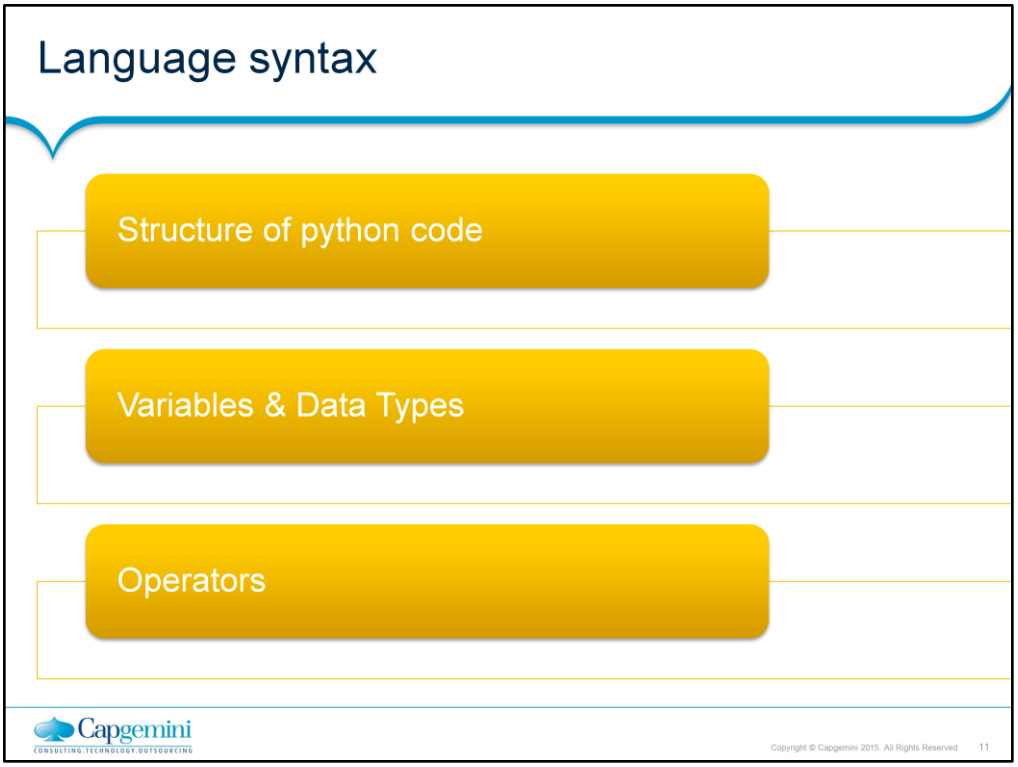

Instructor Notes:

Simple python code

- Below is a simple python program on a windows environment.
- Quick highlights of syntax
  - Comments begin with a hash sign (#)
  - semicolon not mandatory, only to combine multiple statements
  - Blocks of code called **suites** are denoted by line indentation (no curly braces!!)
  - Variables are auto typed, no need to be declared

```
# This is a comment
x='';
x=input('Enter your name:')
print ('Hello ',x)
x=input('Enter your age:')
y=float(x)
x=int(y)
if x < 0 or x > 150:
  print("invalid entry!")
else :
  if x > 17 :
    print("You are eligible to vote")
  else :
    print("you are not eligible to vote")
```

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Instructor Notes:

Variables

- No need to declare
- Need to assign (initialize)
  - use of uninitialized variable raises exception
- Auto typed

```
if friendly: greeting = "hello world"
else: greeting = 12**2
print greeting
```

- Variable names:
  - can contain both letters and digits, but they have to begin with a letter or an underscore.
  - Punctuation characters such as @, $, and % are not allowed.
  - Are case sensitive.
  - Cannot be any of the keywords

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Instructor Notes:

Assignment operator

- Simple assignments
  - Width = 15
  - Height = 7 * 6
- Multiple assignments

a = b = c = 1	An integer object is created with the value 1, and all three variables are assigned to the same memory location
a, b, c = 1, 2, "john"	two integer objects with values 1 and 2 are assigned to variables a and b, and one string object with the value "john" is assigned to the variable c

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Instructor Notes:

Reference Semantics

- There is difference in how python does assignment.
- Assignment manipulates reference.
  - x = y #makes x **reference** the object y references
  - x = y **#does not make a copy** of y

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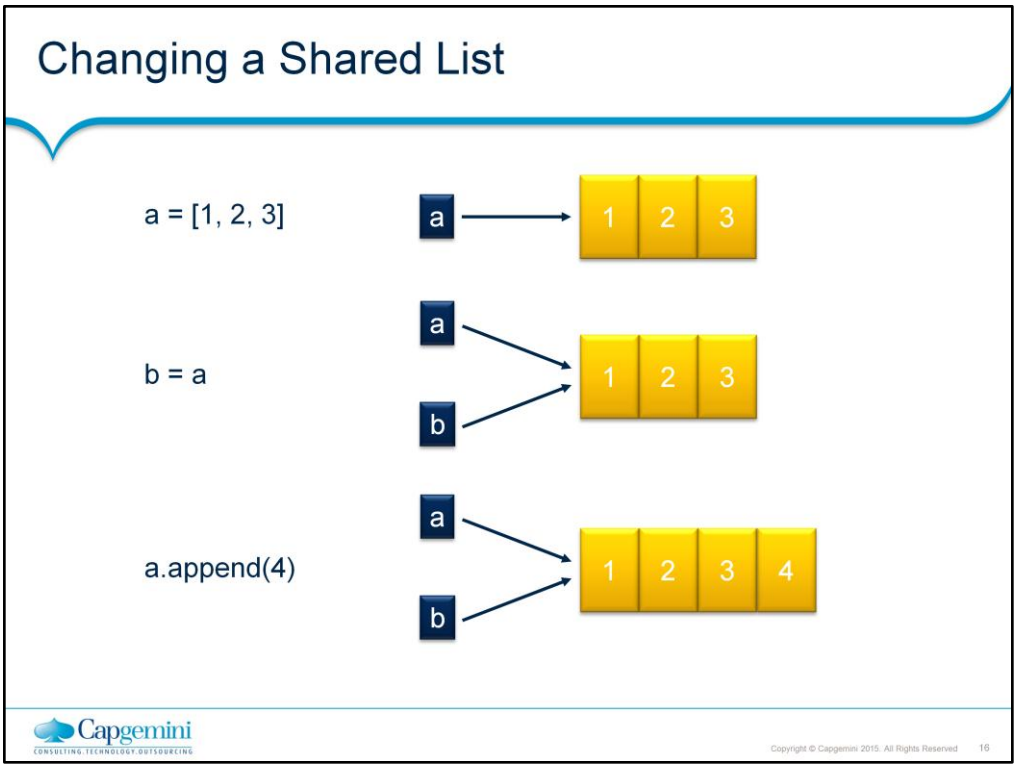

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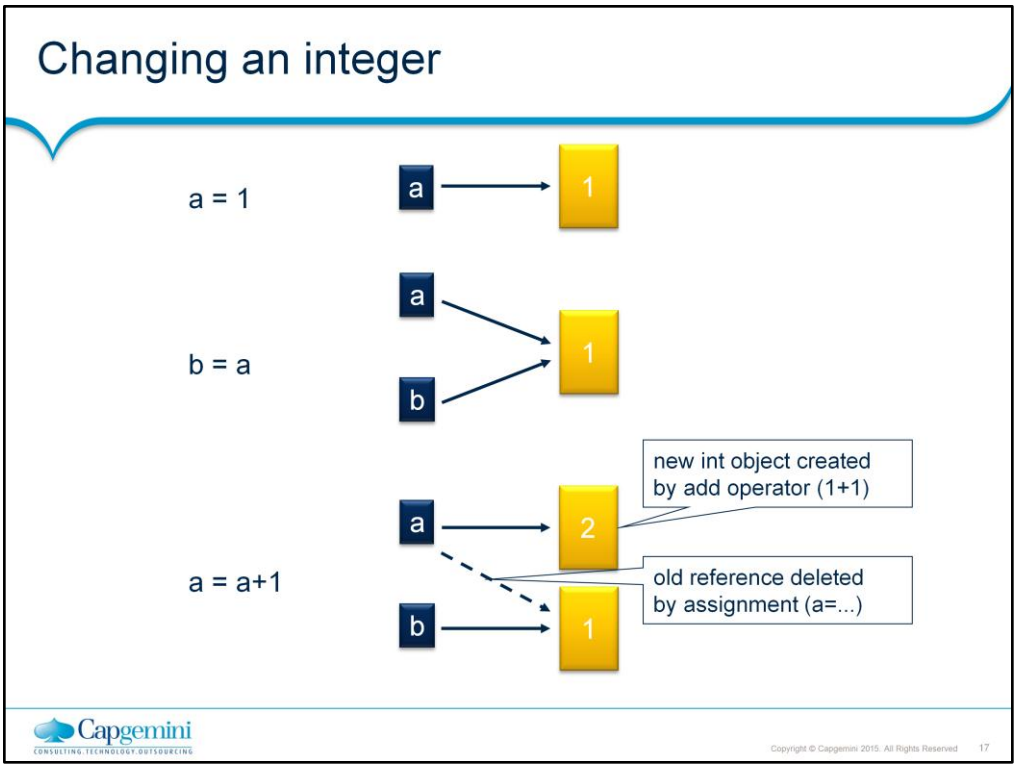

Instructor Notes:

Reserved words

- Python Reserved words:
  The following list shows the reserved words in Python. These reserved words not to be used as constant or variable or any other identifier names

and	exec	not	as
assert	finally	or	nonlocal
break	for	pass	True
class	from	print	False
continue	global	raise	None
def	if	return	
del	import	try	
elif	in	while	
else	is	with	
except	lambda	yield	

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Instructor Notes:

Summary

- In this lesson, you learnt:
  - Introduction to Python
  - Features of Python
  - Variables and Assignment

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