

# Lesson 2

## Python: Data Types, Variables & Expressions

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Computer Programming [6]

- 1.) Define programming.
  
- 2.) List at least three examples of how programs are used:
  
- 3.) How do programs affect your daily life?

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### Python: Variable Naming Conventions

1. Variable names can only contain numbers, letters and underscores.
2. Variable names cannot start with a number.
3. The case of a variable name matters.
4. Variables names cannot be a Python keyword.
5. When you reference the *value* of a string variable in Python interactive mode (or the shell), then you must enclose it in quotation marks.

### Helpful Tips for Naming Variables

1. Choose descriptive names.
2. Choose a naming method and stay consistent throughout the program.
3. It is common to use all lowercase for variable names, but it is not mandatory.
4. Avoid starting a variable name with an underscore. (Note: doing otherwise increases the likelihood of your program interfering with Python internal processes).
5. Avoid long variable names.

### Concept Check

Directions: Define the following list of words with a partner in the left side of the table. Use the right side of the table to include the presented definition after class discussion.

Variable (Your definition)

Variable (Class definition)

Variable Type (Your definition)

Variable Type (Class definition)

String Variable (Your definition)

String Variable (Class definition)

Keyword (Your Definition)

Keyword (Class Definition)

Python Shell (Your definition)

Python Shell (Class definition)

## Tables of Python Information

### Python: Keywords [7]

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

### Python: Operators

Name	Meaning	Name	Meaning
+	Addition	+=	Addition Assignment
-	Subtraction	-=	Subtraction Assignment
*	Multiplication	*=	Multiplication Assignment
/	Float Division	/=	Float Division Assignment
//	Integer Division	//=	Integer Division Assignment
**	Exponentiation	**=	Exponentiation Assignment
%	Remainder	%=	Remainder Assignment

### Python: Escape Sequences

Escape Sequence	Function
\'	Print the next character as a single quote, not as a string closer.
\"	Print the next character as a double quote, not as a string closer.
\n	Print a new line character.
\t	Print a tab character
\\	Print the next character as a backslash, not as an escape character.

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### Python: Valid and Invalid Variable Names

Directions: For each variable name listed, decide whether it is valid or invalid, and whether or not it follows the list of helpful conventions. If you answer “No” for either or both of these columns, then declare a suggested correction. Finally, explain your reasoning.

Variable Name	Valid? (Yes or No)	Best Convention? (Yes or No)	Suggested Correction	Reasoning
r	Yes	No	radius	More descriptive
1st_Score				
import				
LastName				
_piSquared				
No_1093827365780				
German_Shepherd				
My Variable				
nAmInG				

### Python: Variable Types

Directions: Determine the possible variable type for the following variables. (Choose from string, floating point or integer. Can be more than one).

Variable Name	Variable Type
firstName	
age	
temperature	
x	
shirt_size	

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### Python: Expressions and Assignments

Directions: Given the following variable assignments, what is the result of the expressions?

Code 1:

```
w = 2
y = 7
z = 12
```

Expression 1: `print( w * z )`

Answer: \_\_\_\_\_

Expression 2: `print( w * z + y )`

Answer: \_\_\_\_\_

Expression 3: `print( (w + z) * y )`

Answer: \_\_\_\_\_

Expression 4: `print( w / z )`

Answer: \_\_\_\_\_

Code 2:

```
a = "a"
b = "b"
s = "This is fun."
```

Expression 1: `print( "a = " + a )`

Answer: \_\_\_\_\_

Expression 2: `print( "a = " + 'a' )`

Answer: \_\_\_\_\_

Expression 3: `print( a + b )`

Answer: \_\_\_\_\_

Expression 4: `print( s )`

Answer: \_\_\_\_\_

### Python: Equations

Directions: Convert the following algebraic equations into Python equations. (Don't forget to declare all of your variables. You will need to use `math.pi` and `math.sqrt`).

$$V = \frac{4}{3}\pi r^3$$

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

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### Exit Ticket

Directions: Read the given code and its output carefully. Answer all associated questions below. (Hint: the symbol: # is known in Python as a token that begins a comment).

Code:

```
##Variable Assignment: Exit Ticket
##Python Lesson #2

##Title:      Hello, World!
##Description: Python program that prints a greeting

#Prompt the user for a value and assign the input into the variable First_name
First_name = input("What is your first name? ")
#Print a greeting
print("Hello, " + First_name + "!")
```

Output:

Hello, Prof. Johnson!

Analysis Questions:

1. What does the input( ) function do?
2. What is considered the assignment statement?
3. What does the assignment statement do?
4. What is the variable type of the assignment statement?
5. Explain in your own words how the print statement works.

Bonus:

What does the # do?