# Variables and Types

## Exercises

### Week 2

Which is the purpose of a *variable* within Python?

*Answer:*

The purpose of a variable within Python is to retrieve the data.

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Write a simple Python statement that creates and assigns a value of 3.142 to a variable called ‘pi’

*Answer:*

Pi = 3.142

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Which of the following is **NOT** a valid name for a variable within Python?

total

result

question?

name\_1

*Answer:*

question?

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Following the execution of the code below, what will be stored in the variable 'age'?

age = 10 + 20

age = age + 5

*Answer:*

The variable ‘age’ will store 35 after the execution of the code.

In the answer box below write the *exact* output that would be displayed if the following statement was executed (assuming age has been created as in the previous question):

print("The age value is",age)

*Answer:*

The age value is 35.

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Which of the following is an example of an **Augmented Assignment** in Python?

total = 20

total = total + 5

total \*= 100

total = max

*Answer:*

total \*= 100

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Which of the following is an example of an **integer** type variable?

result = "xyz"

result = 20

result = 20.5

result = False

*Answer:*

result = 20

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What are the only two legal values of a **boolean** type variable?

*Answer:*

The two legal values of a Boolean type variable are ‘True’ or ‘False’.

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Following the execution of the code below, what will be the *data-type* of the variable 'average'?

average = total / count

*Answer:*

The data-type of the variable ‘average’ will be float.

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Following the execution of the code below, what will be the *data-type* of the variable 'message'?

message = "hello there!"

*Answer:*

The data-type of the variable ‘message’ in the given code will be a string.

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What determines the current data-type of a variable?

*Answer:*

The value it contains determines the current data-type of a variable.

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What is the purpose of the built-in type() function?

*Answer:*

The purpose of the built-in type() function is to determine the data type of a given variable

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What would be the output following execution of the following code?

type(10.2)

*Answer:*

The output will be:

class ‘float’

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Does the Python language support *Dynamic Typing*, or *Static Typing*?

*Answer:*

Python language supports Dynamic Typing.

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Which of the following is an example of a *function call*?

answer = 10

print(answer)

total \*= 10

10 + 20

*Answer:*

print(answer)

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What is the name given to the values that are passed to a function within the parentheses?

*Answer:*

The name given to the values that are passed to a function within the parentheses are known as ‘Parameters’ or ‘Arguments’

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What is the purpose of the built-in input() function?

*Answer:*

The purpose of the built-in input() function is to take user input.

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What is the data-type of the value returned by the input() function?

*Answer:*

The data-type of the value returned by the input () function string (‘str’).

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Use the Python interpreter to input a small Python program that prints your name and address on the screen. Once this works type the program in the answer box below.

*Answer:*

name = input(“Enter your name: ”)

address = input(“Enter your address: ”)

print(“Name: ” , name)

print(“Address: ” , address)

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Within the answer box below write a small Python program, that when run, would print the following message including the double quotes -

Hello, is your name "Bwian"?

*Answer:*

print('Hello, is your name "Bwian"?')

Now write a second small Python program, that when run, would print the following message including the single quotes -

Or is your name 'Woger'?

*Answer:*

Or is your name 'Woger'?

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Within the answer box below write a small Python program, that when run, uses *escape sequences* to print the following text exactly.

This is a string containing a backslash (\),

a single quote ('), a double quote (")

and is split across multiple lines

*Answer:*

print("This is a string containing a backslash (\\),\n\t a single quote ('), a double quote (\")\n\t and is split across multiple lines")

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Within the answer box below write a small Python program, that when run, uses *triple quotes* to print the following text exactly.

This is a string containing a backslash (\),

a single quote ('), a double quote (")

and is split across multiple lines

*Answer:*

print('''This is a string containing a backslash (\),

a single quote ('), a double quote (")

and is split across multiple lines''')

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Use the Python interpreter to input a small Python program that asks the user to input a temperature in fahrenheit. Once the value has been input, display a message that shows the same temperature in celsius. You may have to do some research in order to find out the conversion method. Once this works, type the program in the answer box below.

*Answer:*

# Get temperature in Fahrenheit from the user

fahrenheit = float(input("Enter temperature in Fahrenheit: "))

# Convert Fahrenheit to Celsius

celsius = (fahrenheit - 32) \* 5.0 / 9.0

# Display the result

print(f"The temperature {fahrenheit:.2f}°F is equal to {celsius:.2f}°C.")

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Within the answer box below write a small Python program that asks the user to enter two values. Store these in variables called 'a' and 'b' respectively.

*Answer:*

# Get input from the user for the first value

a = input("Enter the first value (a): ")

# Get input from the user for the second value

b = input("Enter the second value (b): ")

# Display the entered values

print("You entered values: a = {a}, b = {b}")

Once the values have been input use three calls to the print() function to show output such as the following (in this example the user entered *10.2* and *18.3*) -

The value 'a' was 10.2 and the value 'b' was 18.3

The sum of 'a' and 'b' is 28.5

The product of 'a' and 'b' is 186.66

*Answer:*

# Get input from the user for the first value

a = float(input("Enter the first value (a): "))

# Get input from the user for the second value

b = float(input("Enter the second value (b): "))

# Display the entered values

print(f"You entered values: a = {a}, b = {b}")

print(f"The sum of 'a' and 'b' is {a + b}")

print(f"The product of 'a' and 'b' is {a \* b}")

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Python includes a built-in function called **max()**. When this is called with multiple argument values it returns the largest of the given arguments. e.g.

max(20, 50, 30) # this would return 50

Within the answer box below write a small program that asks the user to input three values. Store these in variables (the names are up to you) then use the **max()** function to display the largest of the input values.

*Answer:*

val1 = float(input("Enter the first value:"))

val2 = float(input("Enter the second value: "))

val3 = float(input("Enter the third value: "))

maximum\_value = max(val1, val2, val3)

print (f"The largest value is: , {maximum\_value}")

Using the Python interpreter execute your code, then examine the output generated when the input the values are 'hello', 'welcome', and 'bye'

Does the program still show the maximum value? If not, what does it show?

*Answer:*

No, the max() function does not determine the largest among the string values.

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Given the following definition:

name = "Black Knight"

What would each of the following Python statements display?

print( name[0] )

*Answer:*

B

print( name[4] )

*Answer:*

K

print( name[-1] )

*Answer:*

t

print( name[-2] )

*Answer:*

h

print( name[2:5] )

*Answer:*

ack

print( name[6:] )

*Answer:*

Knight

print( name[:5] )

*Answer:*

Black

print( name[:] )

*Answer:*

Black Knight

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Which of the following creates a variable containing a **List**?

names = "Terry"

names = 10

names = [ "Mark", "Jon", "Amanda", "Edward", "Sally" ]

names = "Mark", "Jon", "Amanda"

*Answer:*

names = [ "Mark", "Jon", "Amanda", "Edward", "Sally" ]

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Is the following a valid **List**, even though it contains values based on different data-types?

values = [10.2, "Jon", False, "Edward", True ]

*Answer:*

Yes, it is a valid list.

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If a value is **mutable**, can it be modified after it has been created?

*Answer:*

Yes, if a value is mutable, it can be modified after it has been created.

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What term is used to describe a value that cannot be changed once it has been created?

*Answer:*

Immutable is the term used to describe a value that cannot be changed once it has been created.

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Is a List **mutable** or **immutable**?

*Answer:*

A list is mutable.

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Is a String **mutable** or **immutable**?

*Answer:*

A string is immutable

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Given the following definition -

names = ["Terry", "John", "Michael", "Eric", "Terry", "Graham"]

What would each of the following Python statements display?

print( names[2] )

*Answer:*

Michael

print( names[-2] )

*Answer:*

Terry

print( names[0:3] )

*Answer:*

‘Terry’, ‘John’, ‘Michael’

names = names + "Brian"

print( names )

*Answer:*

Can’t concatenate a string with list.

names[0:1] = ["Mark", "Jon"]

print( names )

*Answer:*

['Mark', 'Jon', 'John', 'Michael', 'Eric', 'Terry', 'Graham']

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What built-in function within Python can be used to find out how many elements are contained within a string or list?

*Answer:*

len() function within Python can be used to find out how many elements are contained within a string or list.

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