# Variables and Types

## Exercises

### Week 2

Prior to attempting these exercises ensure you have read the lecture notes and/or viewed the video, and followed the practical. You may wish to use the Python interpreter in interactive mode to help work out the solutions to some of the questions.

Download and store this document within your own filespace, so the contents can be edited. You will be able to refer to it during the test in Week 6.

Enter your answers directly into the highlighted boxes.

For more information about the module delivery, assessment and feedback please refer to the module within the MyBeckett portal.

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

*Answer:*

We use variables to store values within a program, which are based on data-types such as integer, float, or string.

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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:*

35

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:*

Error. If the input value is to be used as something other than a string, then it needs to be converted.

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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:*

true

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:*

Int or float (depending on the value insert)

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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:*

str

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What determines the current data-type of a variable?

*Answer:*

Within Python a variable’s data-type depends on the last value assigned to the variable, i.e. it is dynamic in nature.

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

*Answer:*

A type() function exists which will tell you the type of a value or variable.

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

type(10.2)

*Answer:*

float

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

*Answer:*

Python language support 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 values that are passed to a function within the parentheses are called “argyments”.

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

*Answer:*

The input() function in Python is a built-in function that allows you to accept user input from the keyboard as a string.

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

*Answer:*

The input() function in Python always returns a string, regardless of what the user inputs.

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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 = "Saksham"

address = "New Road"

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:*

print("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\ta single quote ('), a double quote (\")\n\tand 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:*

# Ask the user to input temperature in Fahrenheit

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

# Convert Fahrenheit to Celsius using the formula (F - 32) \* 5/9

celsius = (fahrenheit - 32) \* 5/9

# Display the temperature in Celsius

print(f"The temperature in Celsius is: {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:*

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

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

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:*

# Ask the user to enter two values

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

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

# Display the values entered by the user

print(f"The value 'a' was {a} and the value 'b' was {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:*

# Ask the user to input three values

value1 = float(input("Enter the first value: "))

value2 = float(input("Enter the second value: "))

value3 = float(input("Enter the third value: "))

# Use the max() function to find the largest value among the inputs

largest\_value = max(value1, value2, value3)

# Display the largest value

print(f"The largest value entered is: {largest\_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:*

value1 = “welcome”

value2 = “hello”

value3 = “bye”

largest\_value = max(value1, value2, value3)

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

= the program shos the maximum value i.e. welcome

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Given the following definition:

name = "Black Knight"

What would each of the following Python statements display?

print( name[0] )

*Answer:*

The Python statement print(name[0]) would display the first character of the string stored in the variable name, which is "B" in this case

print( name[4] )

*Answer:*

The Python statement print(name[4]) would display the fourth character of the string stored in the variable name, which is "k" in this case

print( name[-1] )

*Answer:*

The Python statement print(name[-1]) would display the last character of the string stored in the variable name, which is "t" in this case

print( name[-2] )

*Answer:*

The Python statement print(name[-2]) would display the second last character of the string stored in the variable name, which is "h" in this case

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 = [ “Marks”, “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, the list you've provided is valid in Python. In Python, lists can contain values of different data types.

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

*Answer:*

Yes, in Python, 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:*

The term used to describe a value that cannot be changed once it has been created is "immutable."

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

*Answer:*

In Python, a List is mutable.

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

*Answer:*

In Python, strings are 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:*

This will concatenate the list names with another list ["Brian"], resulting in a new list:

["Terry", "John", "Michael", "Eric", "Terry", "Graham", "Brian"]

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

print( names )

*Answer:*

After this operation, the names list will be updated as follows:

["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:*

In Python, you can use the built-in function len() to find out the number of elements or characters contained within a string or a list.

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## **Exercises are complete**

Save this logbook with your answers. Then ask your tutor to check your responses to each question.