# 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:*

The purpose of a *variable* within Python is to store some value or results of expressions.

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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?*** is not a valid name for a variable withing Python.

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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:*

After the execution of the whole code, 35 will be stored finally in the variable ‘age’.

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 is an example of an Augmented Assignment in Python.

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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 is an example of an integer type variable?

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

*Answer:*

Two legal values of a boolean type variable are “True” and “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 because ‘/’ operator always returns a float value.

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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’ will be string.

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What determines the current data-type of a variable?

*Answer:*

The current data-type of a variable in Python depends on the last value assigned to that variable. It is dynamic in nature.

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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 check 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:*

It will be <class ‘float’>

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

*Answer:*

The 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) is an example of a function call.

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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 is ‘*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 input provided by the user to the python program.

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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 is integer.

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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 = “My name is Abhidan”

address = “I live at Tinkune”

print(name, “and”, 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 (\\),”)

print(“a single quote(\’), a double quote (\”)”)

print(“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 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:*

**Program:**

print("This is a program to convert fahrenheit to celsius. \n")

fahrenheit = int(input("Enter the temperature in fahrenheit: "))

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

print("The temperature is {:.2f} degrees celsius.".format(celsius))

**Ouput:**

This is a program to convert fahrenheit to celsius.

Enter the temperature in fahrenheit: 100

The temperature is 37.78 degrees celsius.

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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:*

**Program:**

a = int(input(“Enter the value of a: ”))

b = int(input(“Enter the value of b: “))

**Ouput:**

Enter the value of a:3

Enter the value of b:4

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:*

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

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

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' {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:*

first\_value = int(input("Enter first integer value: "))

second\_value = int(input("Enter second integer value: "))

third\_value = int(input("Enter third integer value: "))

print("The largest input is", max(first\_value,second\_value, third\_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 program does not show the maximum value.

**Error:**

Traceback (most recent call last):

File "/home/abhidan/Documents/British\_college/FOCP/Python\_Practice/max\_function.py", line 1, in <module>

first\_value = int(input("Enter first integer value: "))

ValueError: invalid literal for int() with base 10: 'hello'

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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 then 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 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:*

List is mutable.

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

*Answer:*

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:*

TypeError: can only concatenate list (not "str") to 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 can be used to find out how many elements are contained withing a string or 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.