# 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:*

A variable stores the values, expression for later access. A variable should be meaningful.

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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:*

The question? is not a variable name as only the underscore symbol is allowed.

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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 value stored will be 35 as the first age adds up to 30 and the second code has age, which is 30, adding 5.

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:*

The total \*= 100 is an augmented assignment as it is a shortened version of total = 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 is an example of an integer type variable as it is only a whole number.

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

*Answer:*

The only 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 average would be 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” would be a string type.

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What determines the current data-type of a variable?

*Answer:*

The data-type depends on the last value assigned to the variable.

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

*Answer:*

The purpose is to show the type of a variable or value.

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

type(10.2)

*Answer:*

The output of the code would show a float message as the number inside the type function is

In decimal.

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

*Answer:*

Python language supports Dynamic Typing as the variable types can be changed throughout the program.

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

answer = 10

print(answer)

total \*= 10

10 + 20

*Answer:*

An example of a function call is print(answer) as the function ‘answer’ is used and called

Inside the parenthesis.

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

*Answer:*

The values are called arguments or parameters.

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

*Answer:*

The purpose of the input function is to take in and read the input from the person typed.

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

*Answer:*

The data-type returned by input function is a string.

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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:*

print(Swastik Kunwar, Kathmandu)

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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 \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:*

Fahrenheit = int(input("Enter the Fahrenheit temperature: "))

Celsius = (Fahrenheit - 32) \* 5/9

print(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:*

a = float(input(“Enter the first value: ”))

b = float(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:*

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

print("The sum of 'a' and 'b' is ", a + b)

print("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:*

Num1 = (input("Enter the first value: ")

Num2 = (input("Enter the second value: ")

Num3 = (input("Enter the third value: ")

print(max(Num1,Num2,Num3))

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:*

The program will still show the maximum value of the strings as it will count the letters, therefore welcome is the maximum value.

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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 first character - ‘B’

print( name[4] )

*Answer:*

The fifth character - ‘k’

print( name[-1] )

*Answer:*

The last character - ‘t’

print( name[-2] )

*Answer:*

The second last character - ‘h’

print( name[2:5] )

*Answer:*

The index from the 2nd to the 4th - ‘ack’

print( name[6:] )

*Answer:*

The index from 6 and above – ‘Knight’

print( name[:5] )

*Answer:*

The index 0 to 5 – ‘Black’

print( name[:] )

*Answer:*

The value from the 1 value to the last value – ‘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:*

The third value creates a variable containing a list as a list has square brackets with comma separated values.

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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 is valid as lists can contain different values and type.

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

*Answer:*

Yes, a mutable value means that 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:*

An immutable value cannot be changed once it has been created.

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

*Answer:*

Lists are mutable and can be changed and modified after it has been made.

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

*Answer:*

A string is immutable as it cannot be modified after creation, so people can make a new string to change or add to it.

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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. Only lists can be concatenated not strings.

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:*

The len() function is used to find out the elements contained within 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.