# 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 acts as a data store, so it can be used in different processes later on.

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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? would not be a valid name for a variable.

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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 will be assigned to 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.

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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:*

True and False are the only legal values of the Boolean data type.

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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:*

Float or Integer would be the data-type of this, dependent on the value which is output.

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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:*

This would be a string.

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What determines the current data-type of a variable?

*Answer:*

Int – a whole number

Float – decimal value

Bool – true or false

Str – string of characters

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

*Answer:*

type() function will let you know what the data-type of a variable is.

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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:*

Dynamic typing as the variables data-type depends on the last value assigned to it, where as other languages only allow each variable to store one specific type of value.

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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:*

Argument or parameters is the name given to the values which are passed to function within the parenthesis.

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

*Answer:*

The role of the input() function is to take an input from the user.

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

*Answer:*

Everything inputted through the input() function would become a string, until it is converted otherwise.

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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("What is your name? ")  
address = input("What is 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:*

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 (\\),\n\t a single quote ('), a double quote (")\n\t and is split over 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 = input("Enter a temperature in farenheit: ")  
fahrenheit = int(fahrenheit)  
  
celsius = (fahrenheit - 32)\*(5/9)  
print(fahrenheit,"°F is equivalent to ", celsius,"°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 a number: ")  
b = input("Enter another number: ")

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 = input("Enter a number: ")  
a = int(a)  
b = input("Enter another number: ")  
b = int(b)  
  
print("Value A was", a, "and 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:*

num\_1 = input("Enter a value for A: ")  
num\_2 = input("Enter a value for B: ")  
num\_3 = input("Enter a value for C: ")  
print(max(num\_1, num\_2, num\_3))

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 does run correctly and it shows the longest word entered.

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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 as lists can contain lots of different data-types.

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

*Answer:*

Lists are mutable which means that they can be changed 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 – this could be used to describe a string.

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

*Answer:*

Mutable

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

*Answer:*

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 and Michael

names = names + "Brian"

print( names )

*Answer:*

TypeError: can only concatenate list (not "str") to list.

The new item for the list should be placed in square brackets.

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

print( names )

*Answer:*

['Mark', 'Jon', 'John', 'Michael', 'Eric', 'Terry', 'Graham'] - Mark and Jon have been added to the front of the list.

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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() can be used to find out how many elements are contained within 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.