# Functions

## Exercises

### Week 4

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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What must be done before a function that is not *built-in* to Python can be used in a program?

*Answer:*

Functions which are not built-in must be imported before they can be used within our programs. Functions are defined in modules

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Given the following import statement, how would a call to the sin() function be made?

import math

*Answer:*

To call the sin() function, you write math.sin() followed by the value (in radians) for which you want to find the sine

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Given the following import statement, how would a call to the sqrt() function be made?

from math import sqrt

*Answer:*

The sqrt() function is directly available after importing it specifically from the math module. So, you can use sqrt() directly without prefixing it with math. as you would if you imported the entire math module (import math) instead.

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What is the name of the common library that is available with all Python distributions?

*Answer:*

The common library that is available with all Python distributions is called the "Python Standard Library."

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What keyword is used in Python to define a new function?

*Answer:*

In Python, the keyword used to define a new function is def.

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Write some Python code that defines a function called print\_header(msg). This should output the value provided by the ‘msg’ parameter to the screen (prefixed by five asterisk ‘\*\*\*\*\*’) characters.

*Answer:*

def print\_header(msg):

header = '\*\*\*\*\* ' + str(msg) + ' \*\*\*\*\*'

print(header)

# Example usage:

message = "Welcome to Python Functions!"

print\_header(message)

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In the answer box below give an example of what the **docstring** may look like for the print\_header(msg) function.

*Answer:*

def print\_header(msg):

"""

Prints the provided message surrounded by five asterisks.

Parameters:

- msg (str): The message to be printed as a header.

"""

header = '\*\*\*\*\* ' + str(msg) + ' \*\*\*\*\*'

print(header)

# Example usage:

message = "Welcome to Python Functions!"

print\_header(message)

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Where within a function definition should a **docstring** appear?

*Answer:*

Within a function definition in Python, the docstring should appear as the first statement after the function header (the first line containing the def statement). It immediately follows the function header and is enclosed within triple quotes (""" """).

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What statement should appear within a function’s code block to cause a specific value to be passed back to the caller of the function?

*Answer:*

To pass a specific value back to the caller of a function in Python, you should use the return statement within the function's code block.

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Write some Python code that defines a function called find\_min(a,b) that returns the smallest of the two given parameter values.

*Answer:*

def find\_min(a, b):

"""

Returns the smallest value between two numbers.

Parameters:

- a (int or float): First number.

- b (int or float): Second number.

Returns:

int or float: The smallest value between a and b.

"""

return min(a, b)

# Example usage:

result = find\_min(10, 5)

print("The smallest value is:", result) # Output: The smallest value is: 5

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Given the following function definition, which of the *formal parameters* could be described as being a **default argument**?

def shouldContinue(prompt, answer=False):

# function body...

*Answer:*

In the function definition def shouldContinue(prompt, answer=False):, the parameter answer can be described as a default argument.

Provide two example calls to the above function, one which provides a value for the *default argument*, and one that does not.

*Answer:*

# Calling the function and providing a value for the default argument

shouldContinue("Continue? ", True)

# Here, "Continue? " is passed as the 'prompt' argument, and True is explicitly passed for the 'answer' argument.

# Calling the function without providing a value for the default argument

shouldContinue("Continue? ")

# Here, only the 'prompt' argument "Continue? " is passed, and since 'answer' is not provided, it defaults to False.

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State why following function definition would **not** be allowed.

def do\_something(prefix="Message", prompt, answer=False):

# function body...

*Answer:*

In Python, when defining functions, parameters without default values must come before parameters with default values. The reason the given function definition would not be allowed is due to the incorrect order of parameters.

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What single character is placed directly before the name of a *formal parameter*, to indicate that a variable number of actual parameters can be passed when the function is called?

*Answer:*

In Python, an asterisk \* placed directly before the name of a formal parameter in a function definition is used to indicate that a variable number of actual parameters can be passed when the function is called.

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What commonly used built-in function, which displays output on the screen, can take a **variable number** of arguments?

*Answer:*

The commonly used built-in function in Python that can take a variable number of arguments and displays output on the screen is print().

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Is it valid for a function’s parameter name to be prefixed by two asterisk characters ‘\*\*’ as shown below?

def send\_output(\*\*details):

# function body...

*Answer:*

Yes, it is valid for a function's parameter name to be prefixed by two asterisk characters (\*\*) in Python.

If present, what does this prefix indicate?

*Answer:*

It indicates that the function can accept an arbitrary number of keyword arguments and store them as a dictionary within the function.

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What is the name given to a small ‘anonymous’ function that must be defined using a single expression?

*Answer:*

In Python, a small 'anonymous' function that can be defined using a single expression is called a "lambda function."

Give an example of such a function that calculates the *cube* of a given number (i.e. the value of the number raised to the power of three) -

*Answer:*

# Define a lambda function to calculate the cube of a number

cube = lambda x: x \*\* 3

# Example usage of the lambda function

number = 5

result = cube(number)

print(f"The cube of {number} is: {result}")

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## **Exercises are complete**

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