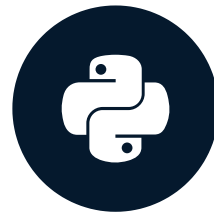


Defining a custom function

INTERMEDIATE PYTHON FOR DEVELOPERS



Jasmin Ludolf

Senior Data Science Content Developer

Calculating the average

```
# List of preparation times (minutes)
preparation_times = [19.23, 15.67, 48.57, 23.45, 12.06, 34.56, 45.67]

# Calculating average preparation time
average_time = sum(preparation_times) / len(preparation_times)

# Rounding the results
rounded_average_time = round(average_time, 2)
print(average_time)
```

28.46

When to make a custom function

Don't Repeat Yourself (DRY)

- Considerations for making a custom function:
 - Number of lines
 - Code complexity
 - Frequency of use



Creating a custom function

```
# Create a custom function to calculate the average value  
def
```

Creating a custom function

```
# Create a custom function to calculate the average value  
def average
```

Creating a custom function

```
# Create a custom function to calculate the average value  
def average(
```

Creating a custom function

```
# Create a custom function to calculate the average value  
def average(values)
```

- `values` (argument) - information the function needs to do its job

Creating a custom function

```
# Create a custom function to calculate the average value  
def average(values):
```


Creating a custom function

```
# Create a custom function to calculate the average value
def average(values):
    # Calculate the average
    average_value = sum(values) / len(values)
```

Creating a custom function

```
# Create a custom function to calculate the average value
def average(values):
    # Calculate the average
    average_value = sum(values) / len(values)

    # Round the results
    rounded_average = round(average_value, 2)
```

Creating a custom function

```
# Create a custom function to calculate the average value
def average(values):
    # Calculate the average
    average_value = sum(values) / len(values)

    # Round the results
    rounded_average = round(average_value, 2)

    # Return an output
    return
```

- `average_value` and `rounded_average` are only available within `average()`

Creating a custom function

```
# Create a custom function to calculate the average value
def average(values):
    # Calculate the average
    average_value = sum(values) / len(values)

    # Round the results
    rounded_average = round(average_value, 2)

    # Return rounded_average as an output
    return rounded_average
```

- Documentation is essential □

Using a custom function

```
# List of preparation times (minutes)
preparation_times = [19.23, 15.67, 48.57, 23.45, 12.06, 34.56, 45.67]

# Calculating the average
print(average(preparation_times))
```

28.46

```
# List of orders
orders = [12, 8, 10, 9, 15, 21, 16]
print(average(orders))
```

12.86

Storing a function's output

```
# Calculating the average  
print(average(preparation_times))
```

```
28.46
```

```
# Storing average_time  
average_time = average(preparation_times)  
print(average_time)
```

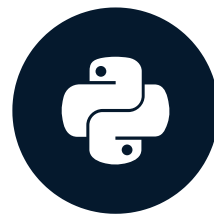
```
28.46
```

Let's practice!

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Default and keyword arguments

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Average

```
# Create a custom function
def average(values):
    # Calculate the average
    average_value = sum(values) / len(values)

    # Round the results
    rounded_average = round(average_value, 2)

    # Return rounded_average as an output
    return rounded_average
```

- `values` = Argument

Arguments

- Values provided to a function or method
 - **Positional**
 - **Keyword**

Positional arguments

- Provide arguments in order, separated by commas

```
# Round pi to 2 digits  
print(round(3.1415926535, 2))
```

```
3.14
```

Keyword arguments

- Provide arguments by assigning values to keywords
- Useful for interpretation and tracking arguments

```
# Round pi to 2 digits  
print(round(number=3.1415926535
```

Keyword arguments

- Provide arguments by assigning values to `keywords`
- Useful for interpretation and tracking arguments

```
# Round pi to 2 digits  
print(round(number=3.1415926535, ndigits=2))
```

```
3.14
```

Identifying keyword arguments

```
# Get more information about the help function  
print(help(round))
```

Help on built-in function round in module builtins:

```
round(number, ndigits=None)
```

Round a number to a given precision in decimal digits.

The return value is an integer if ndigits is omitted or None. Otherwise, the return value has the same type as the number. ndigits may be negative.

Keyword arguments

Help on built-in function round in module builtins:

```
round(number, ndigits=None)
```

Round a number to a given precision in decimal digits.

The return value is an integer if ndigits is omitted or None. Otherwise the return value has the same type as the number. ndigits may be negative.

- First argument: `number`
- Second argument: `ndigits`

Default arguments

Help on built-in function round in module builtins:

```
round(number, ndigits=None)
```

Round a number to a given precision in decimal digits.

The return value is an integer if ndigits is omitted or None. Otherwise, the return value has the same type as the number. ndigits may be negative.

- `None` = no value / empty
- Default argument: way of setting a `default` value for an `argument`
- We overwrite `None` to `2`
- Commonly used value - set it using a default argument

Adding an argument

```
# Create a custom function
def average(values):
    average_value = sum(values) / len(values)
    rounded_average = round(average_value, 2)
    return rounded_average
```

Adding an argument

```
# Create a custom function  
def average(values, rounded=False):
```

Adding an argument

```
# Create a custom function
def average(values, rounded=False):
    # Round average to two decimal places if rounded is True
    if rounded == True:
        average_value = sum(values) / len(values)
        rounded_average = round(average_value, 2)
    return rounded_average
```

Adding an argument

```
# Create a custom function
def average(values, rounded=False):
    # Round average to two decimal places if rounded is True
    if rounded == True:
        average_value = sum(values) / len(values)
        rounded_average = round(average_value, 2)
        return rounded_average
    # Otherwise, don't round
    else:
        average_value = sum(values) / len(values)
        return average_value
```

Using the modified `average()` function

```
# List of preparation times (minutes)
preparation_times = [19.23, 15.67, 48.57, 23.45, 12.06, 34.56, 45.67]
```

Using the modified average() function

```
# Get the average without rounding  
print(average(preparation_times, False))
```

28.4585714

```
# Get the average without rounding  
print(average(preparation_times))
```

28.4585714

Using the modified `average()` function

```
# Get the rounded average  
print(average(values=preparation_times, rounded=True))
```

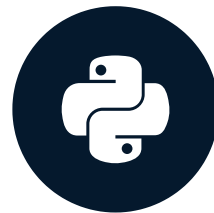
```
28.46
```

Let's practice!

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Docstrings

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Docstrings

- String (block of text) describing a function
- Help users understand how to use a function

```
Help on built-in function round in module builtins:
```

```
round(number, ndigits=None)
```

```
    Round a number to a given precision in decimal digits.
```

```
    The return value is an integer if ndigits is omitted or None. Otherwise  
    the return value has the same type as the number. ndigits may be negative.
```

Accessing a docstring

```
# Access information, including the docstring  
print(help(round))
```

Help on built-in function round in module builtins:

```
round(number, ndigits=None)
```

Round a number to a given precision in decimal digits.

The return value is an integer if ndigits is omitted or None. Otherwise the return value has the same type as the number. ndigits may be negative.

None

Accessing a docstring

```
# Access only the docstring  
print(round
```

Accessing a docstring

```
# Access only the docstring  
print(round.
```

Accessing a docstring

```
# Access only the docstring  
print(round.__doc__)
```

Accessing a docstring

```
# Access only the docstring  
print(round.__doc__)
```

Accessing a docstring

```
# Access only the docstring  
print(round.__doc__)
```

Round a number to a given precision in decimal digits.

The return value is an integer if ndigits is omitted or None. Otherwise the return value has the same type as the number. ndigits may be negative.

- `.__doc__` : "dunder-doc" attribute

Creating a docstring

```
def average(values):  
    # One-line docstring  
    """Find the mean in a sequence of values and round to two decimal places."""  
    average_value = sum(values) / len(values)  
    rounded_average = round(average_value, 2)  
    return rounded_average
```

Accessing the docstring

```
# Access our docstring  
print(average.__doc__)
```

Find the mean in a sequence of values and round to two decimal places.

Updating a docstring

```
# Update a function's docstring
average.__doc__ = "Calculate the mean of values in a data structure, rounding the results to 2 digits."

print(help(average))
```

```
Help on function average in module __main__:
```

```
average(values)
```

```
    Calculate the mean of values in a data structure, rounding the results to 2 digits.
```

Multi-line docstring

```
def average(values):  
    """  
    Find the mean in a sequence of values and round to two decimal places.  
  
    """  
    average_value = sum(values) / len(values)  
    rounded_average = round(average_value, 2)  
    return rounded_average
```

Multi-line docstring

```
def average(values):  
    """  
    Find the mean in a sequence of values and round to two decimal places.  
  
    Args:  
  
    """  
    average_value = sum(values) / len(values)  
    rounded_average = round(average_value, 2)  
    return rounded_average
```

Multi-line docstring

```
def average(values):  
    """  
    Find the mean in a sequence of values and round to two decimal places.  
  
    Args:  
        values (list): A list of numeric values.  
  
    """  
    average_value = sum(values) / len(values)  
    rounded_average = round(average_value, 2)  
    return rounded_average
```

Multi-line docstring

```
def average(values):  
    """  
    Find the mean in a sequence of values and round to two decimal places.  
  
    Args:  
        values (list): A list of numeric values.  
  
    Returns:  
        rounded_average (float): The mean of values, rounded to two decimal places.  
    """  
    average_value = sum(values) / len(values)  
    rounded_average = round(average_value, 2)  
    return rounded_average
```

Accessing the docstring

```
# Help  
print(help(average))
```

```
Help on function average in module __main__:
```

```
average(values)
```

```
    Find the mean in a sequence of values and round to two decimal places.
```

```
    Args:
```

```
        values (list): A list of numeric values.
```

```
    Returns:
```

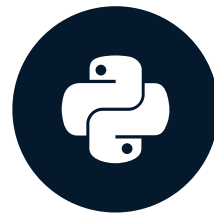
```
        rounded_average (float): The mean of values, rounded to two decimal places.
```


Let's practice!

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Arbitrary arguments

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Curriculum Manager

Limitations of defined arguments

```
def average(values):  
    """Find the mean in a sequence of values and round to two decimal places."""  
  
    average_value = sum(values) / len(values)  
    rounded_average = round(average_value, 2)  
    return rounded_average  
  
# Using six arguments  
print(average(15, 29, 4, 13, 11, 8))
```

`TypeError: average() takes 1 positional argument but 6 were given`

Arbitrary positional arguments

- Docstrings help clarify how to use custom functions
- Arbitrary arguments allow functions to accept **any number** of arguments

```
# Allow any number of positional, non-keyword arguments
def average(*args):
    # Function code remains the same
```

- Conventional naming: `*args`
- Allows a variety of uses while producing expected results!

Using arbitrary positional arguments

```
# Calling average with six positional arguments  
print(average(15, 29, 4, 13, 11, 8))
```

13.33

Args create a single iterable

- `*` : Convert arguments to a single iterable (tuple)

```
# Calculating across multiple lists  
print(average(*[15, 29], *[4, 13], *[11, 8]))
```

```
13.33
```

Arbitrary keyword arguments

```
# Use arbitrary keyword arguments
def average(**kwargs):
    average_value = sum(kwargs.values()) / len(kwargs.values())
    rounded_average = round(average_value, 2)
    return rounded_average
```

- Arbitrary keyword arguments: `**kwargs`
- `keyword=value`

Using arbitrary keyword arguments

```
# Calling average with six kwargs  
print(average(a=15, b=29, c=4, d=13, e=11, f=8))
```

13.33

```
# Calling average with one kwarg  
print(average(**{"a":15, "b":29, "c":4, "d":13, "e":11, "f":8}))
```

13.33

- Each key-value pair in the dictionary is mapped to a keyword argument and value!

Kwargs create a single iterable

```
# Calling average with three kwargs  
print(average(**{"a":15, "b":29}, **{"c":4, "d":13}, **{"e":11, "f":8}))
```

13.33

Let's practice!

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