


User-defined functions

PYTHON DATA SCIENCE TOOLBOX (PART 1)



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You'll learn:

- 
- Define functions without parameters
 - Define functions with one parameter
 - Define functions that return a value
 - Later: multiple arguments, multiple return values

Built-in functions

- `str()`

```
x = str(5)
```

```
print(x)
```

```
'5'
```

```
print(type(x))
```

```
<class 'str'>
```

Defining a function

→ FUNCTION NAME

```
def square():      # <- Function header    NO PARAMETERS
    {
        new_value = 4 ** 2      # <- Function body
        print(new_value)
    }
square()
```

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Function parameters

```
def square(value):  
    new_value = value ** 2  
    print(new_value)
```

PARAMETER

square(4) By giving a parameter we can different arguments

16

square(5)

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Return values from functions

- Return a value from a function using return

```
def square(value):  
    new_value = value ** 2  
    return new_value  
num = square(4)  
    ↳ VARIABLES  
print(num)
```

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Docstrings

- Docstrings describe what your function does
- Serve as documentation for your function
- Placed in the immediate line after the function header
- In between triple double quotes `"""`

```
def square(value):  
    """Return the square of a value.""" → DOCS TRINGS  
    new_value = value ** 2  
    return new_value
```

Let's practice!

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Multiple Parameters and Return Values

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Multiple function parameters

- Accept more than 1 parameter:

```
def raise_to_power(value1, value2): TWO PARAMETERS
    """Raise value1 to the power of value2."""
    new_value = value1 ** value2
    return new_value
```

- Call function: # of arguments = # of parameters

```
result = raise_to_power(2, 3) → THE ORDER HOW THE ARGUMENTS ARE PASSED  
                               CORRESPOND TO THE ORDER OF THE PARAMETERS  
                               IN THE FUNCTION HEADER  
print(result)                ↪ IN THIS CASE IS  $2^3 = 8$ 
```

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A quick jump into tuples

- Make functions return multiple values: Tuples!
- Tuples:
 - Like a list - can contain multiple values
 - Immutable - can't modify values!
 - Constructed using parentheses **()**

```
even_nums = (2, 4, 6)

print(type(even_nums))
```

```
<class 'tuple'>
```

Unpacking tuples

- Unpack a tuple into several variables:

```
even_nums = (2, 4, 6)
```

```
a, b, c = even_nums
```

```
print(a)
```

```
2
```

```
print(b)
```

```
4
```

```
print(c)
```

```
6
```

Accessing tuple elements

- Access tuple elements like you do with lists:

```
even_nums = (2, 4, 6)
```

```
print(even_nums[1])
```

```
4
```

```
second_num = even_nums[1]
```

```
print(second_num)
```

```
4
```

- Uses zero-indexing

Returning multiple values

```
def raise_both(value1, value2):  
    """Raise value1 to the power of value2  
    and vice versa."""  
  
    new_value1 = value1 ** value2  
    new_value2 = value2 ** value1  
  
    new_tuple = (new_value1, new_value2)  
  
    return new_tuple
```

```
result = raise_both(2, 3)  
  
print(result)
```

```
(8, 9)
```

Let's practice!

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Bringing it all together

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You've learned:

- How to write functions
 - Accept multiple parameters
 - Return multiple values
- Up next: Functions for analyzing Twitter data

Basic ingredients of a function

- Function Header

```
def raise_both(value1, value2):
```

- Function body

```
    """Raise value1 to the power of value2  
    and vice versa."""
```

```
    new_value1 = value1 ** value2
```

```
    new_value2 = value2 ** value1
```

```
    new_tuple = (new_value1, new_value2)
```

```
    return new_tuple
```

Let's practice!

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Congratulations!

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Next chapters:

- Functions with default arguments
- Functions that accept an arbitrary number of parameters
- Nested functions
- Error-handling within functions
- More function use in data science!

Let's practice!

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