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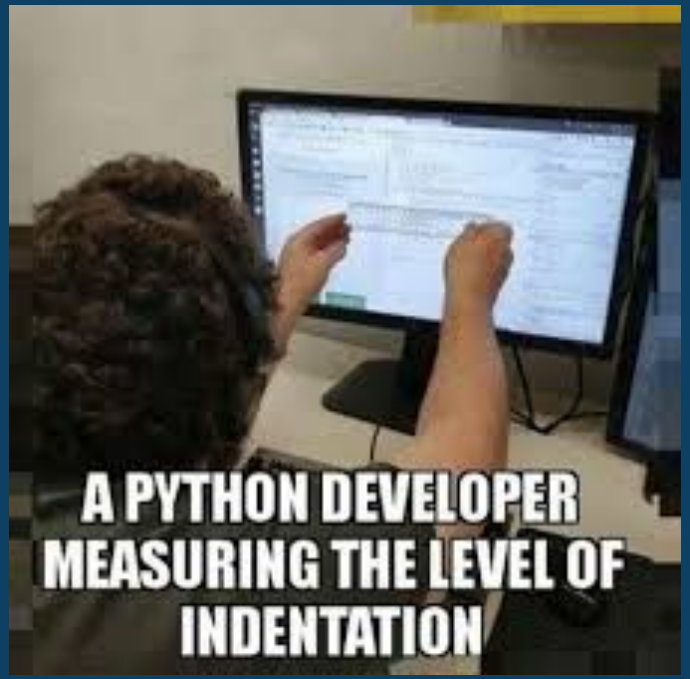
Refactoring

Composing Functions (2)

SPD 2.31


A PYTHON DEVELOPER
MEASURING THE LEVEL OF
INDENTATION

Warm Up

10 mins

Work on the following exercise in small groups:

1. Exercise **11**: 'Introducing Explaining Variable' Technique

Learning Outcomes

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By the end of today, you should be able to…

1. Compare and contrast different refactoring techniques for composing functions

2. Identify code smells and apply refactoring techniques to improve code quality.

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Split Temporary Variable

Split Temp Variable

What can be confusing for the reader of this code?

```
# Adapted from a Java code in the "Refactoring" book by Martin Fowler.
# split temporary variable
width = 5
height = 10
temp = 2 * (height + width)
print(temp)

temp = height * width
print(temp)
```

Split Temp Variable (Refactored)

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We split the ‘temp’ into two variables with meaningful names

```
# Adapted from a Java code in the "Refactoring" book by Martin Fowler.
# Refactored.
width = 5
height = 10
perimeter = 2 * (height + width)
print(perimeter)

area = height * width
print(area)
```

Split Temporary Variable

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You have a temporary variable used for two different purposes → very confusing for the reader.

Remedy: Make a separate temporary variable for each purpose.

Split Temporary Variable

15 min

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Work on the following exercises in small groups:

1. Exercise **7**: 'Split Temporary Variable' Technique
2. Exercise **10**: ‘Split Temporary Variable’ Technique

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Remove Function Parameter Assignments

Remove Assignment to function Parameter

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```
"""ORIGINAL: Remove assignment to function parameter."""
MAX_TEMPERATURE = 110 # [C]
MAX_PRESSURE = 15 # [PSI]

def cook(temperature, pressure):
    # Safety check
    if temperature > MAX_TEMPERATURE:
        temperature = MAX_TEMPERATURE
    if pressure > MAX_PRESSURE: # [psi]
        pressure = MAX_PRESSURE

    set_heater(temperature)
    pressure_regulator(pressure)

    log('pressure sensor reading:', pressure)
    log('temperature sensor reading:', temperature)
```

Assignment to function parameters

Remove Assignment to Parameter (refactored)

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```
"""REFACTORED: Remove assignment to function parameter."""
MAX_TEMPERATURE = 110 # [C]
MAX_PRESSURE = 15 # [PSI]

def cook(temperature, pressure):
    if temperature > MAX_TEMPERATURE:
        adjusted_temperature = MAX_TEMPERATURE # removed assignment to the
                                               # function parameter. Instead used
                                               # a new var.
    if pressure > MAX_PRESSURE: # [psi]
        adjusted_pressure = MAX_PRESSURE # removed assignment to the function
                                         # parameter. Instead used a new var

    set_heater(adjusted_temperature)
    pressure_regulator(adjusted_pressure)

    # Several months pass and another developer comes here to add a logging
    # feature.She writes the following code. Now (after refactoring), we can
    # say this code is right because it captures the real sensor values
    # instead of the adjusted values.
    log('pressure sensor reading:', pressure)
    log('temperature sensor reading:', temperature)
```

When to Remove Function Parameter Assignments

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IF: *A function parameter has been assigned a value*

THEN: *Use a temporary variable instead!*

Why is assigning to a parameter a bad practice?

Programmers expect a function's parameters to contain the original data as passed by the function's caller — **without modification**.

Re-assigning values to function parameters breaks this promise.

Remove Function Parameter Assignments

5 min

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Work on the following exercise in small groups:

1. Exercise **8**: 'Remove Assignment to Function Parameter' Technique

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Break for 10 mins

Get up, stretch, get some water, and relax your mind. ☁️

Rename Function

Rename Function

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```
"""Adapted from a Java code in the "Refactoring" book by Martin Fowler."""

def get_telephone_number():
    return office_area_code + "-" + office_number
```

Rename Function

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```
"""Adapted from a Java code in the "Refactoring" book by Martin Fowler.""".


def get_office_telephone_number():
    return office_area_code + "-" + office_number
```

When to Rename a Function

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IF: *The name of a function does not reveal its purpose*

THEN: *Change the name of the function!*

Rename Function

10 min

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Solve Exercise 9: 'Rename Function' Technique

References and Further Study

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1. "Refactoring: Improving the Design of Existing Code" (1st edition) by Martin Fowler
2. https://en.wikipedia.org/wiki/Code_refactoring