Mocking

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Goals

1. Introduce Mocking
2. Explore examples

Do *not* test

A testing unit should focus on one tiny bit of functionality and "prove it correct".

- Unit tests are simple and localized
- They should **NOT** involve
  - multi-threading
  - I/O
  - database connections
  - web services
  - these would be considered integration tests
- They should be fast
- They run in isolation
- Order shouldn't matter
- They should not depend on global state

Testing continued

After you've pulled out as much of that as you can, there may still be code which needs to be tested

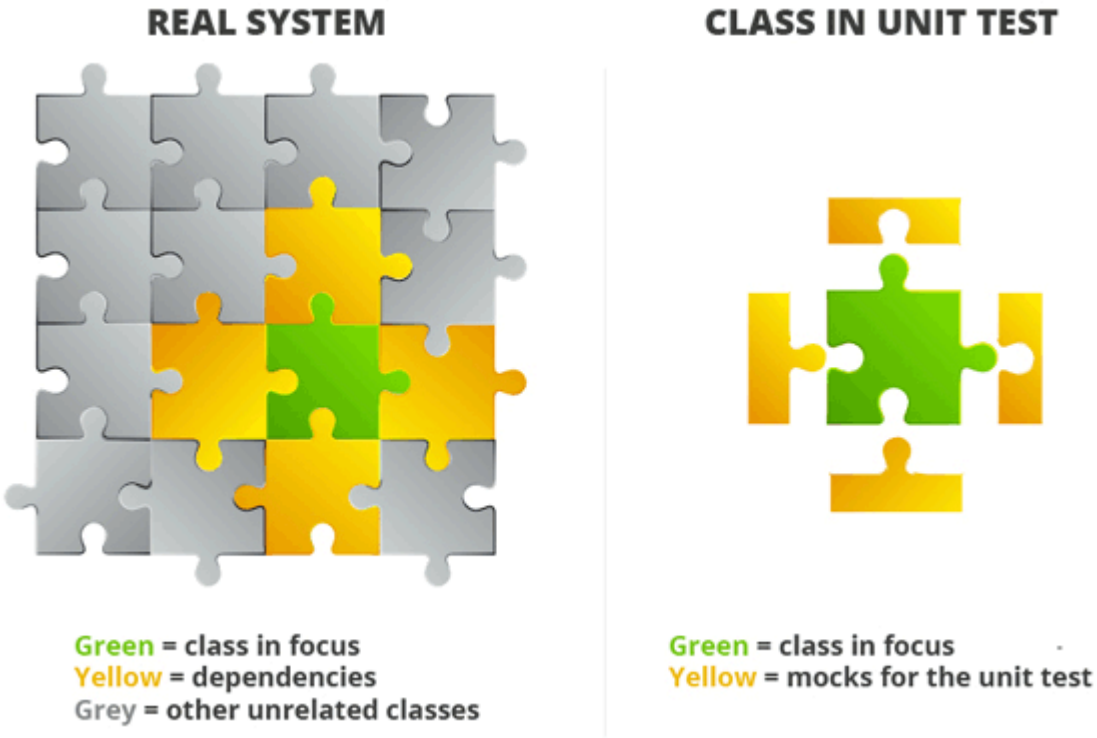
- but depends on libraries or modules from outside of your project
- and is therefore out of your control

Examples

- File IO
- API calls
- Database connections

Mocking

Allows us to “fake” the behavior of an object our code depends on.



Mocking

Allows us to “fake” the behavior of an object our code depends on.

- add fake object attributes and set their values
- add fake return values for object functions that are called
  - or exceptions
- verify that the mock object’s function(s) called

Mocking

Allows us to "fake" the behavior of an object our code depends on.

```
from datetime import datetime

def is_weekday():
    today = datetime.today()
    # Python's datetime library treats
Monday as 0 and Sunday as 6
    return (0 <= today.weekday() < 5)

# Test if today is a weekday
assert is_weekday()
```

Mocking

```
from datetime import datetime
from unittest.mock import Mock

# Save a couple of test days
wednesday = datetime(year=2025, month=1, day=1)
sunday = datetime(year=2025, month=1, day=5)

# Mock datetime to control today's date
datetime = Mock()

datetime.today.return_value = wednesday
# Test Wednesday is a weekday
assert is_weekday()

datetime.today.return_value = sunday
# Test Sunday is not a weekday
assert not is_weekday()
```

Patching

Allows us to "fake" the behavior of an module our code depends on.

- can be used as a decorator or context manager

Imagine we have a project that we want to test with the following structure:

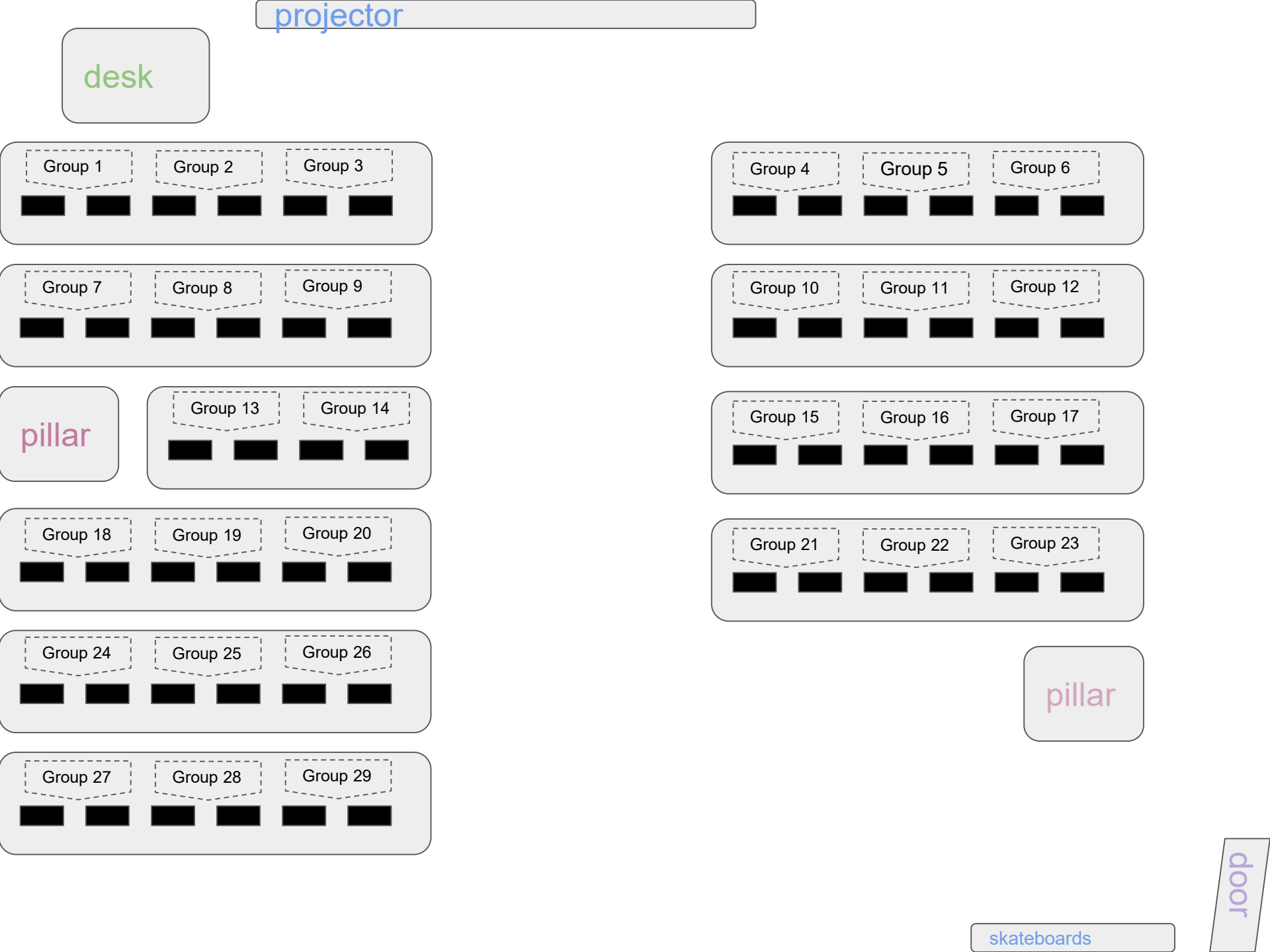
```
a.py
    -> Defines SomeClass

b.py
    -> from a import SomeClass
    -> some_function instantiates SomeClass
```

Now we want to test `some_function` but we want to mock out `SomeClass` using `patch()`. The problem is that when we import module b, which we will have to do when it imports `SomeClass` from module a. If we use `patch()` to mock out `a.SomeClass` then it will have no effect on our test; module b already has a reference to the *real* `SomeClass` and it looks like our patching had no effect.

The key is to patch out `SomeClass` where it is used (or where it is looked up). In this case `some_function` will actually look up `SomeClass` in module b, where we have imported it. The patching should look like:

```
@patch('b.SomeClass')
```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