# Test Doubles

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# What's a Test Double?

Any kind of pretend object that is used in place of a real object for testing purposes.

- Name coined by Gerard Meszaros.
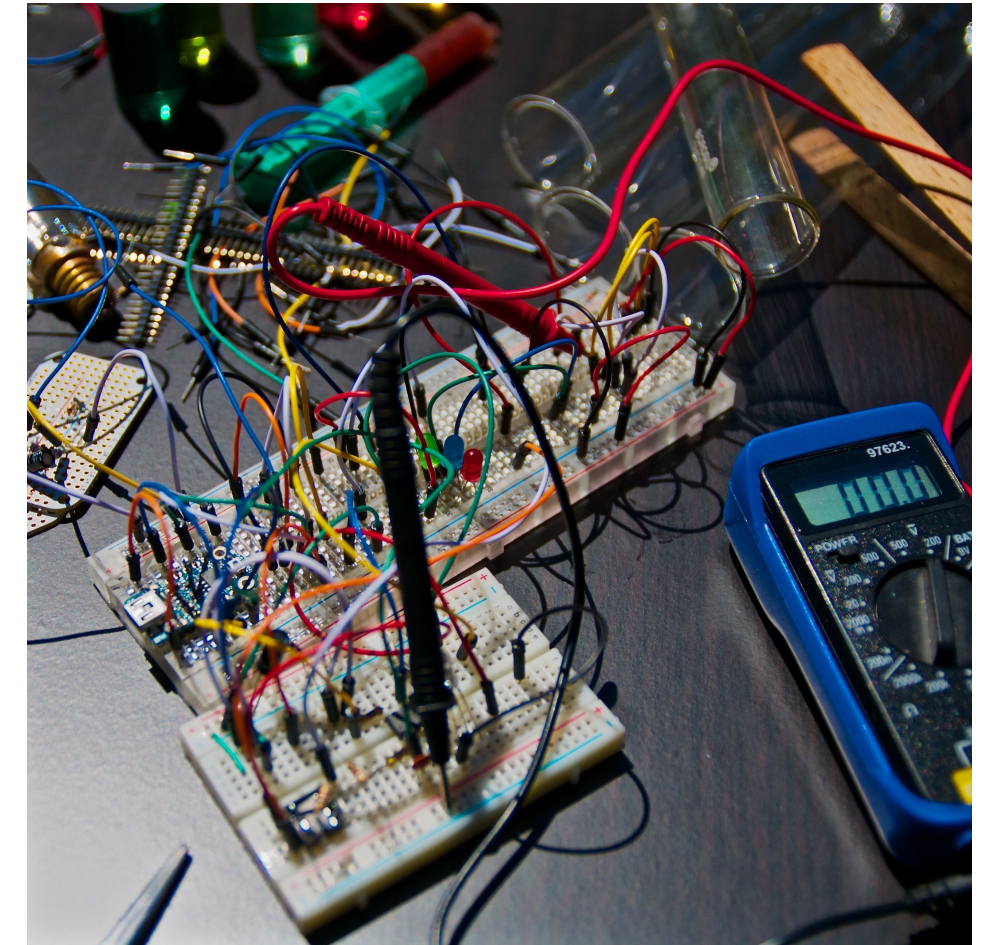- Comes from the notion of Stunt Doubles in movies.



Bobby Holland Hanton and Chris Hemsworth. Instagram/@bobbydazzler84

# Tests in TDD

Should be fast, isolated, specific, deterministic.

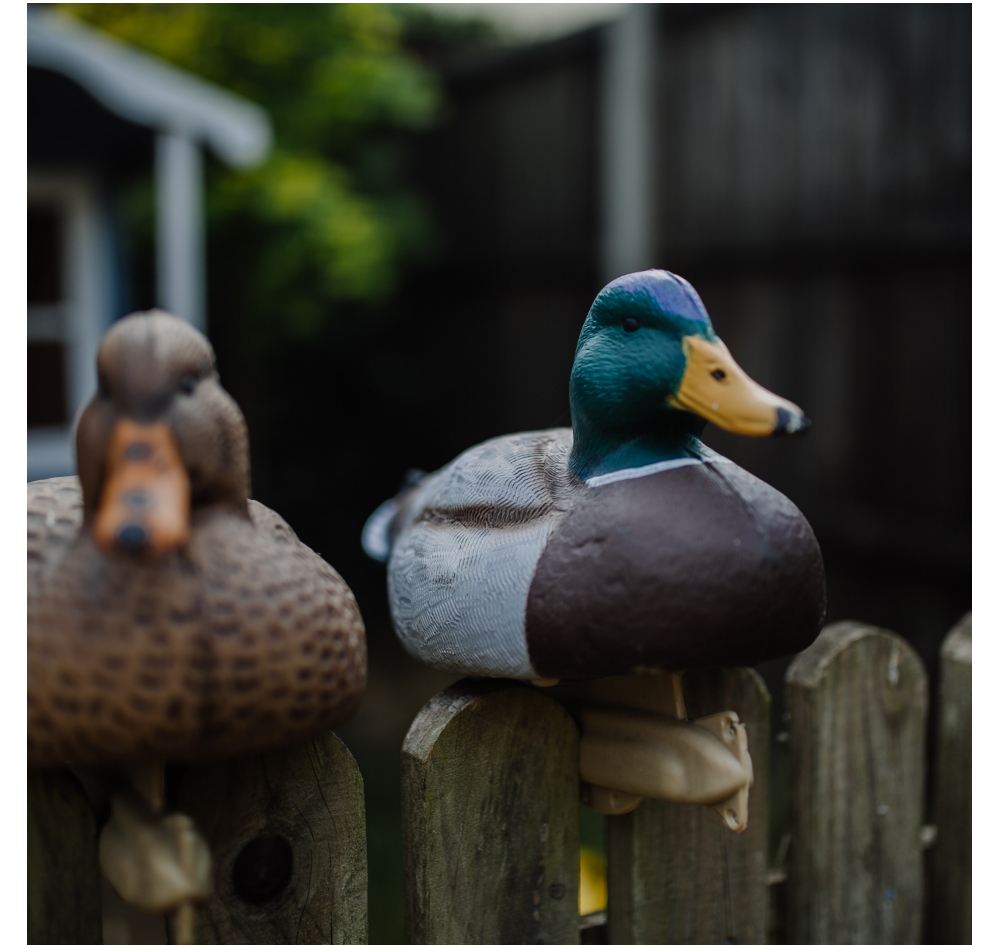Shouldn't depend on data or other fixtures outside the control of each test case.

- File system
- Databases
- Network communications
- Hardware systems
- ...

# Types of test double

Meszaros defined five particular kinds of double.



- Dummy
- Fake (example)
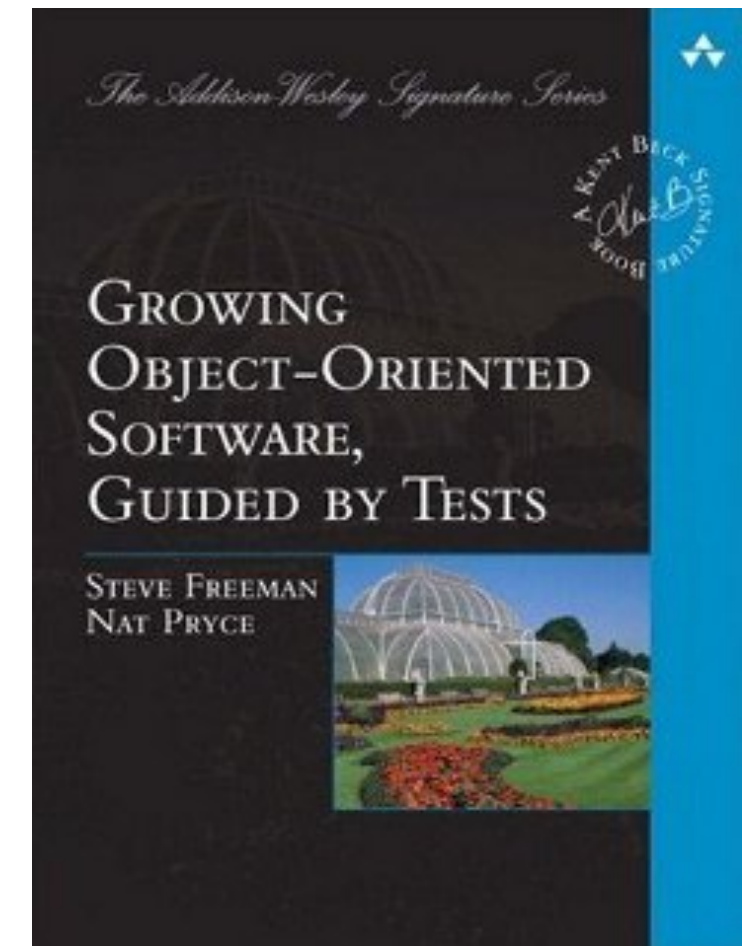- Stubs (example)
- Spies
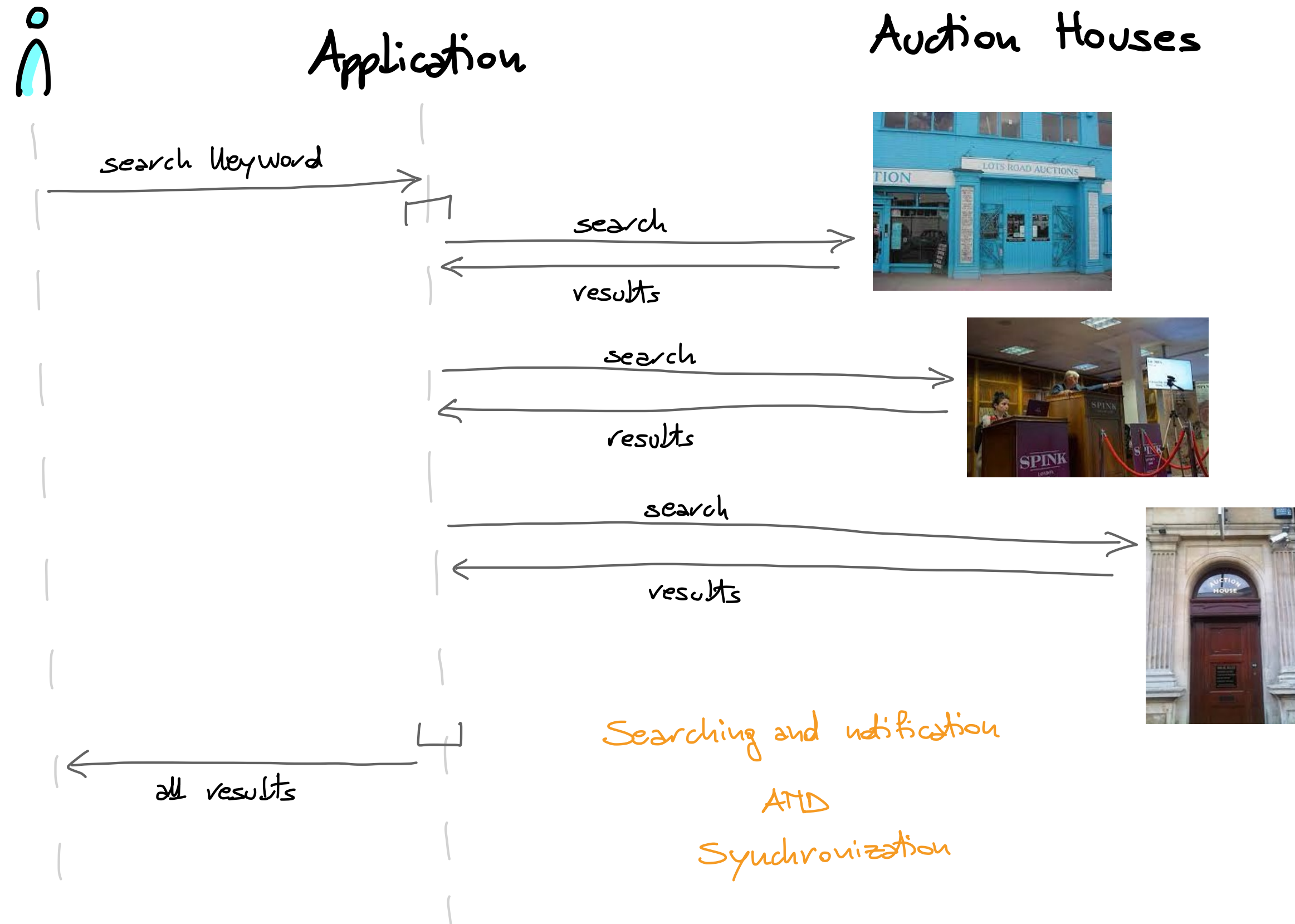- Mocks

# What about concurrency?

# Separate the functional and synchronization concerns

Separate the logic that splits a request into multiple tasks from the technical details of how those tasks are executed concurrently.

- We can test-drive the functional behavior in isolation.
- We can test-drive the synchronization via stress-tests.
- We can use end-to-end tests to check that unit-level synchronization policies integrate across the entire system.
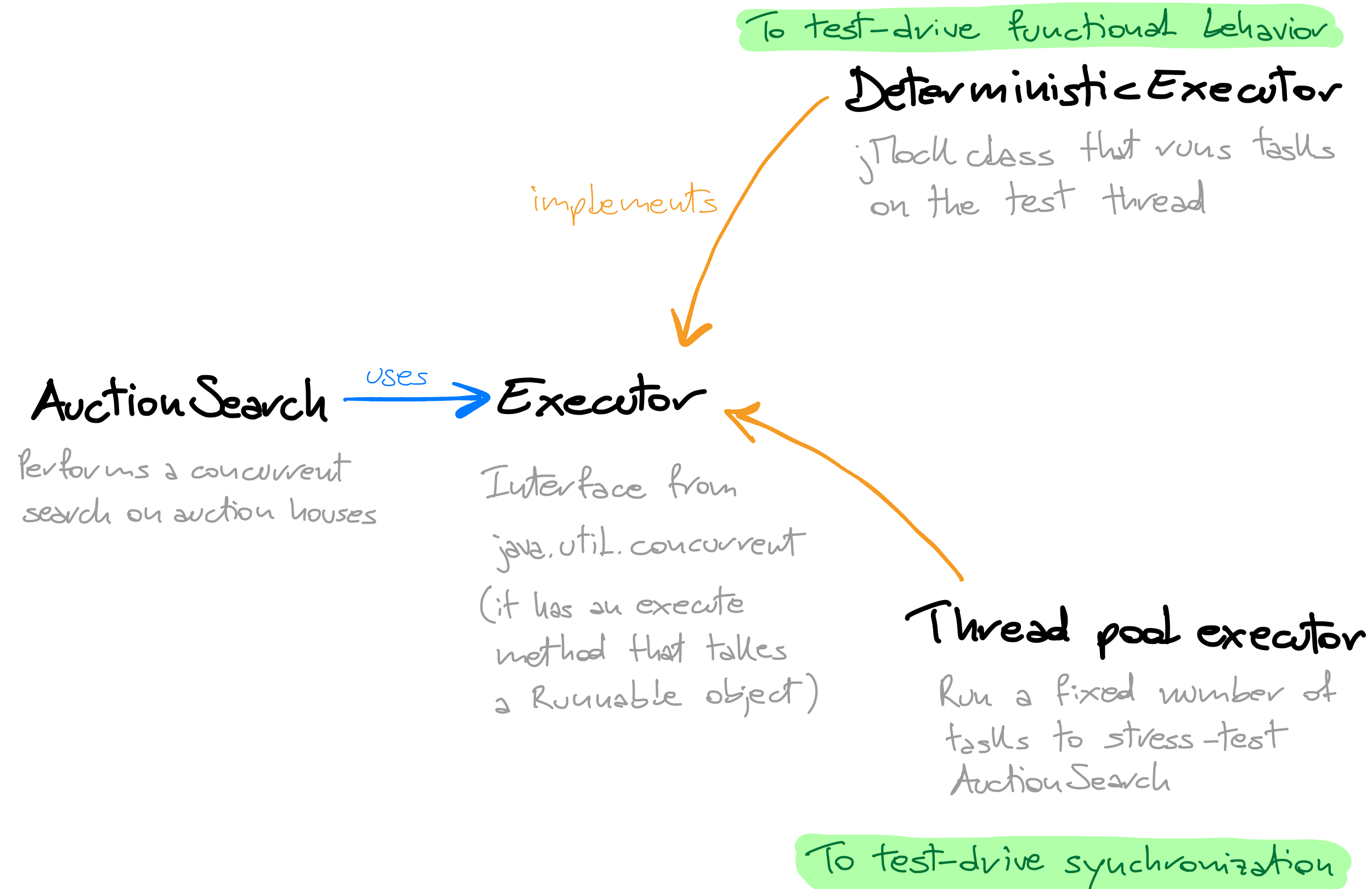- Static analysis can catch further errors.

# Example from "Growing Object Oriented Software"



Application    Auction Houses

search keyword

search
results

search
results

search
results

all results

Searching and notification

ATD

Synchronization

# Example from "Growing Object Oriented Software"

To test-drive functional behavior

**Deterministic Executor**

jMock class that runs tasks on the test thread

implements

**AuctionSearch**

Performs a concurrent search on auction houses

uses

**Executor**

Interface from java.util.concurrent

(it has an execute method that takes a Runnable object)

**Thread pool executor**

Run a fixed number of tasks to stress-test AuctionSearch

To test-drive synchronization

# References

## Mocks Aren't Stubs

https://martinfowler.com/articles/mocksArentStubs.html

## Growing Object Oriented Software

Steve Freeman and Nat Pryce

http://www.growing-object-oriented-software.com