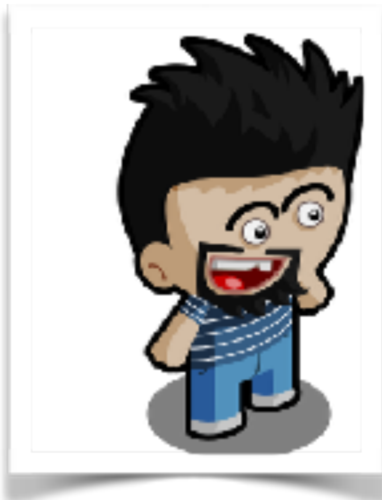
UI Testing with Spec

The future is here… hace rato!

Pablo Tesone

Pharo Consortium Engineer

Who I am!



Pablo Tesone

Pharo Consortium
Engineer

- 20 years trying to code
- 10 years of experience in industrial applications
- PhD in Dynamic Software Update
- Interested in improving development tools and the daily development process.
- Enthusiast of the object oriented programming and their tools.

Also, playing with me:

Guille Polito
CNRS Engineer
RMod Team

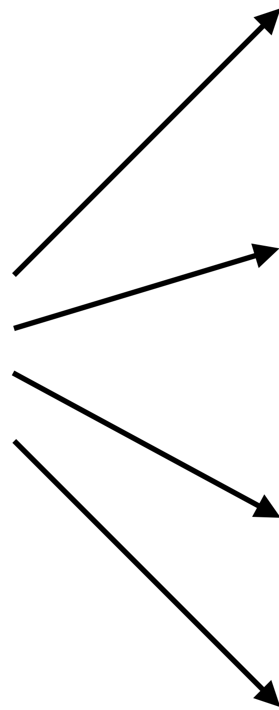
Esteban Lorenzano
Pharo Consortium
Engineer

If it has no tests…
it does not exist.

Dr. Test (1987 - …)

A little strong… but…

Missing Tests



Fear of Changes

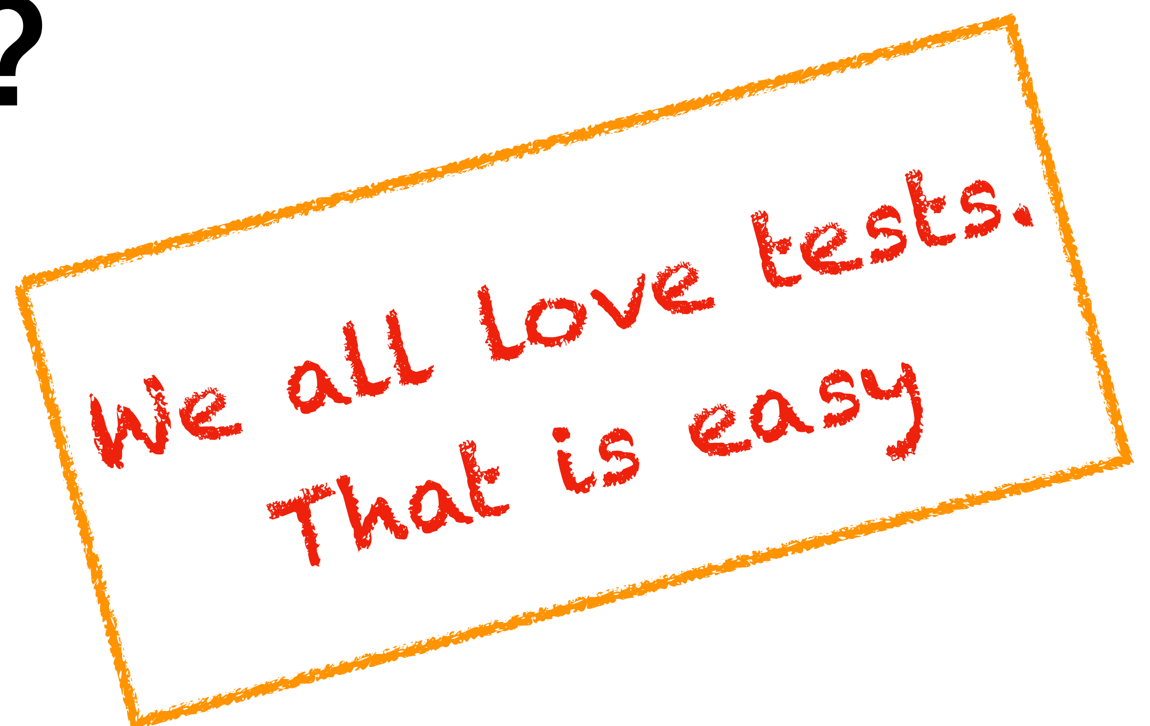
Unknown Impact

Bad Surprises

Pain… lots of pain…

Really…
If I delete something or break it…

How long it will take to detect the error?



Testing UI is difficult

We need special tools

Selenium,
Watir,
Cypress,
or Cucumber

Es al pedo!

j'ai la flemme!

We need to test the UI

with just Objects & Polymorphism

2 similar but different problems.

- **Testing Spec implementation itself** (Adapters, Presenters, Widgets, Layouts, Backends, etc)
- **Testing Applications written in Spec** (display, interactions, update, navigations)

Testing Spec

- Spec is a big monster, maybe not so big… but scary… maybe not so scary:

- Spec has a nice modular implementation, different objects with different responsibilities

Presenters | Layouts | Widgets | Adapters

Testing Spec

Presenters

- Interaction with the Model
- Events
- Public API
- Default Values

Adapters

- Interaction Presenters / Widget
- Creating Widgets
- Events
- Same Behaviour in each backend

Widgets

- Backend API
- Widgets themselves
- Events

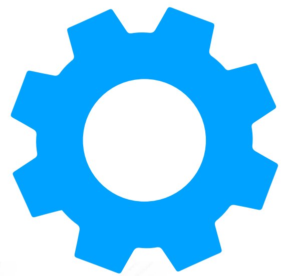
Layouts

- How to create widgets
- Where to put them

Lots of small tests!!

Stop Complaining, there are not so many.

Common Scenarios



Different Backends → GTK, Morphic, Other

We want it for all tests

When Test Is Executed

Before Opening

Modify Presenter

Open Widget

Asserts

After Opening

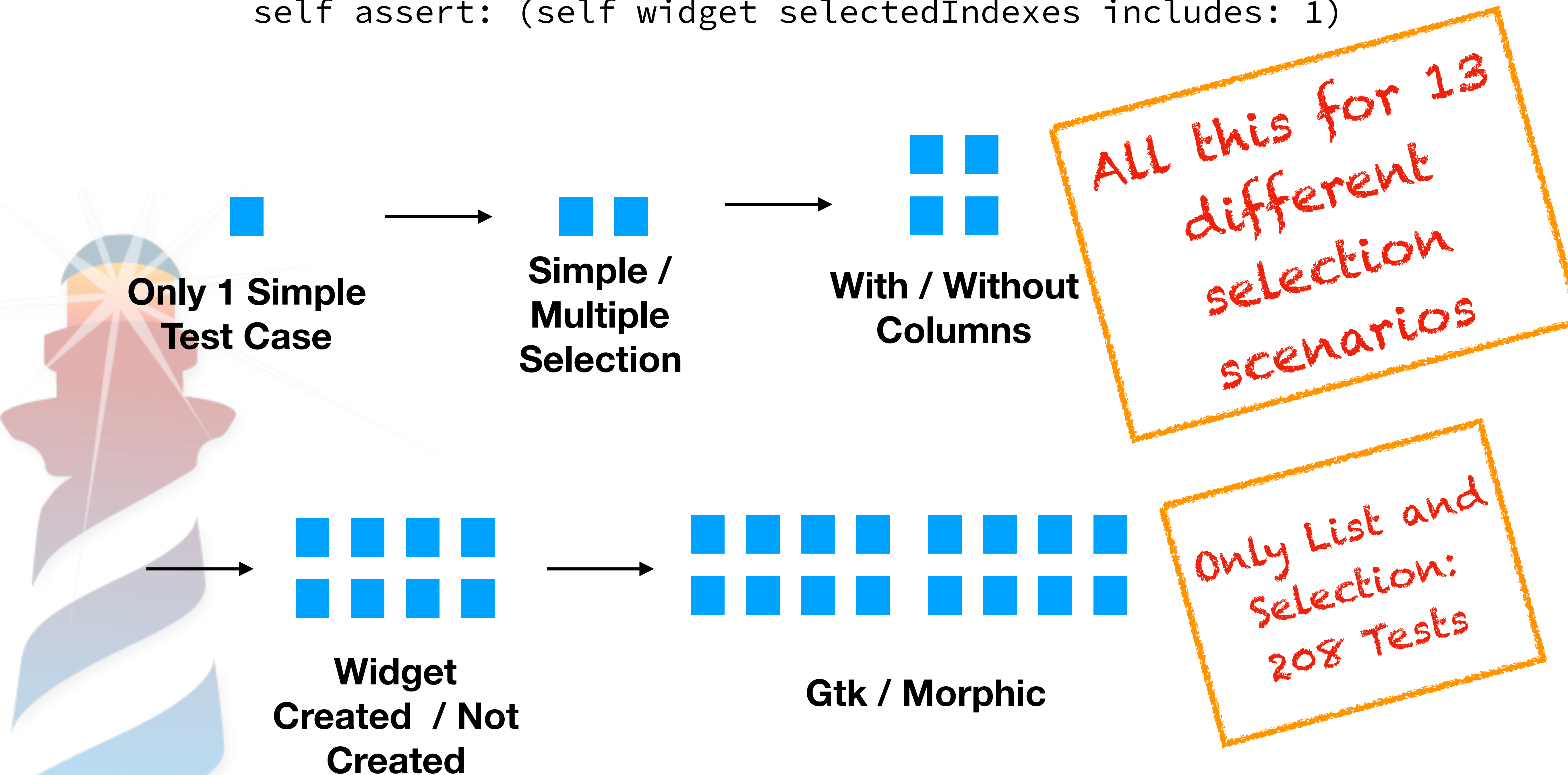
Open Widget

Modify Presenter

Asserts

Testing List Adapter: When I select something in the presenter it is propagated to the widget

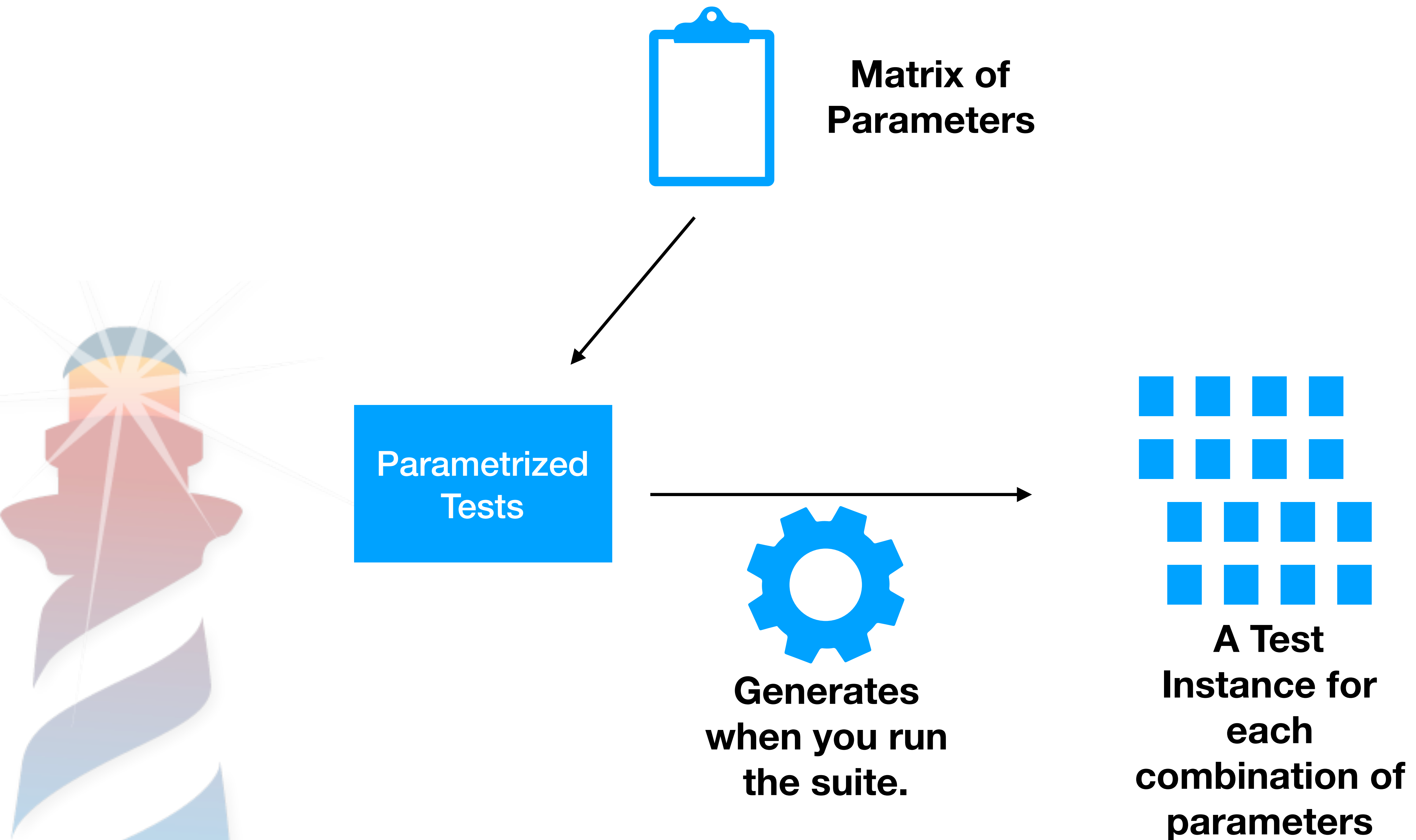
```
testSelectPresenterIndexSetsSelectedIndexInWidget
    presenter selectIndex: 1.
    self assert: (self widget selectedIndexes includes: 1)
```



Proposed Solution: Coding Monkeys

Just Kidding,
we are lazy...
you should be
lazy also.

Implementing it with “Style”



Our Matrix

AbstractAdapterTest class >> #***testParameters***

```
^ ParametrizedTestMatrix new
    forSelector: #specInitializationStrategy
        addOptions: { [ SpecOpenStrategy openBefore ].
         [ SpecOpenStrategy openAfter ] };
    forSelector: #backendForTest
        addOptions: AbstractBackendForTest allSubclasses;
    yourself
```

When

Backend

We want simple tests!

```
testSelectItemSelectsTheGivenElement

	self presenter selection selectedPath: #(2).
	self assert: self adapter selectedItem equals: 2.
```

```
testSettingAnImageSetsTheImage

	self presenter image: self imageForm.
	backendForTest assertImage: self adapter image equals: self imageForm.
```

Something else required…

- Putting in the test backend backend depending code

Example:
Asserting if two images are the same
#assertImage:equalsForm:

Clicking / Selecting of a widget / etc.

- Adding Testing methods to the adapters & presenters

Example:
- Emulating Events.
- Getting State
- Accessing real widget

Common API for all backends

Results

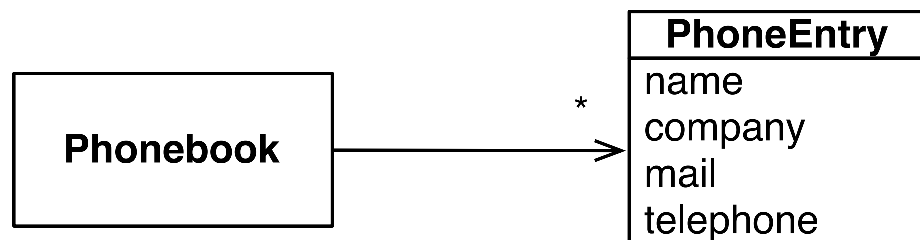
- Lots of Tests: 1400+ and growing
- Easy To develop new ones / Easy to maintain.
- Validation of Public API
- Validation of Backend API => Easy to implement new Backends.

Second Problem: Testing Applications

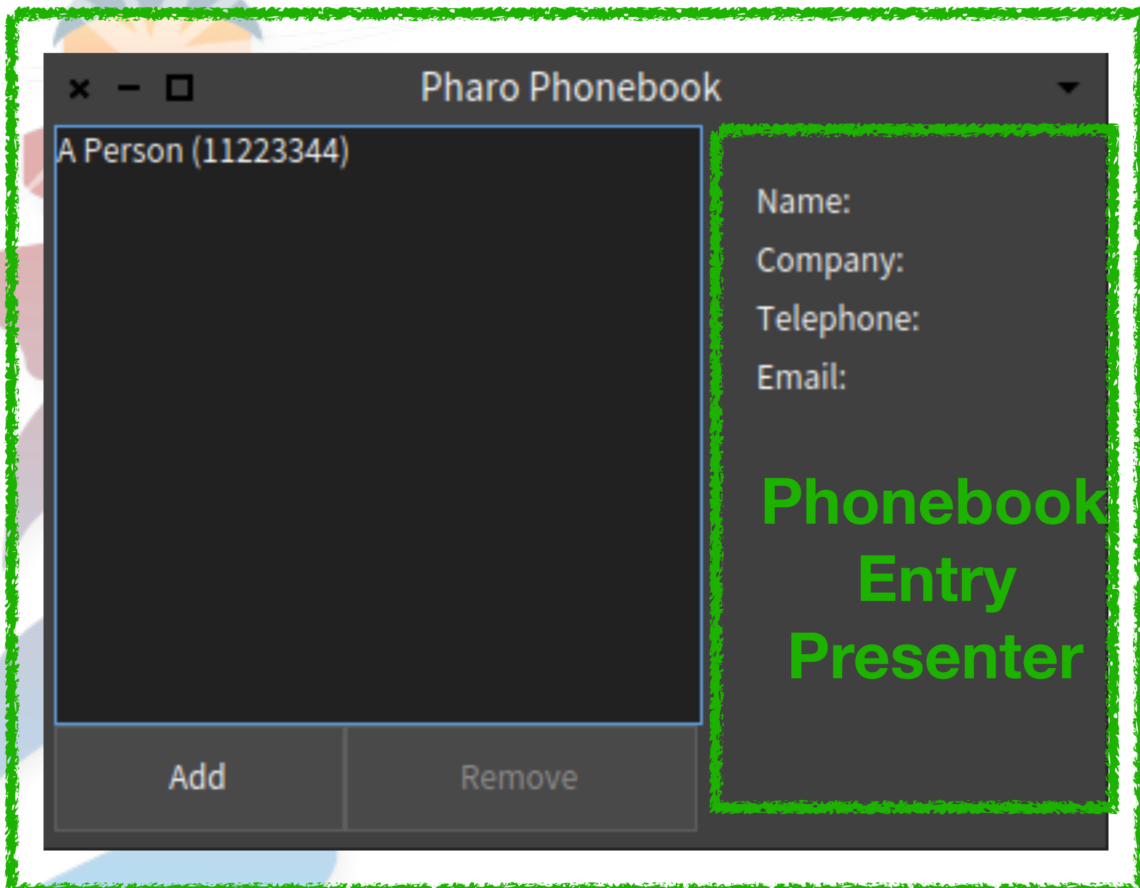
- Easy, let's create Tests.
- In Spec we believe, let's test the application

Maybe Spec has problems.
But let's create tests
where they should be.

Example Application



Phonebook Presenter



initializePresenters

```
entriesList := self newList
    whenSelectionChangedDo: [ :sel |
        detailsPanel model: sel selectedItem.
        removeButton enabled: sel isEmpty not ];
    yourself.
```

List

```
addButton := self newButton
    label: 'Add';
    yourself.
removeButton := self newButton
    label: 'Remove';
    action: [ self removeEntry ]
    yourself.
```

Buttons

```
detailsPanel := self
    instantiate: PhonebookEntryPresenter
    on: nil.
```

Details panel

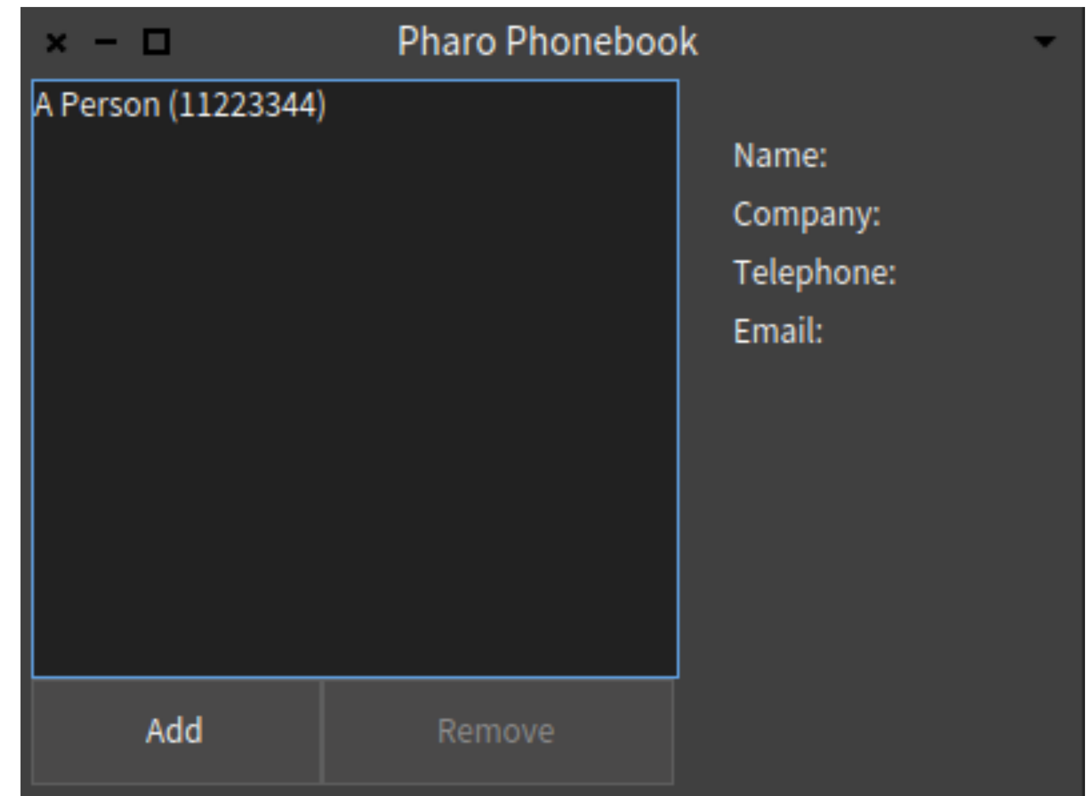
pharo-spec/phonebook-example

Testing Widgets

- Testing that a widget is shown

testWindowHasAddButton

```
self assert: (window hasPresenter:
        presenter addButton)
```



- Testing that a widget is correctly initialised

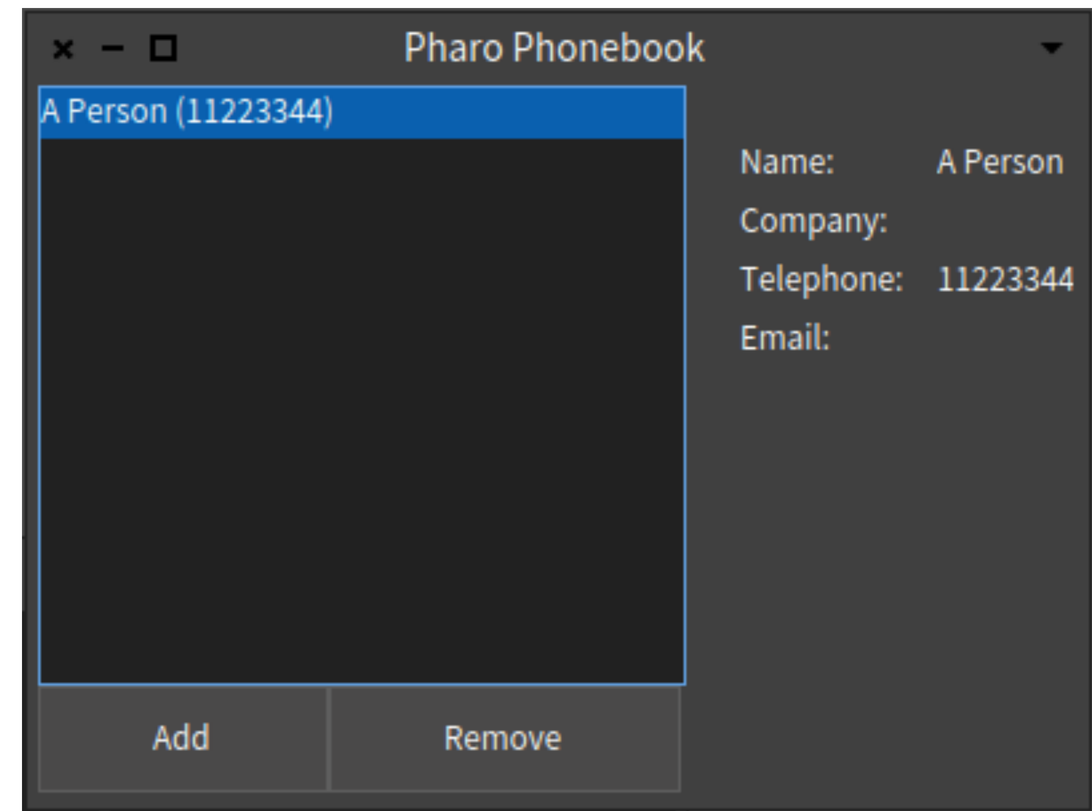
testAddButtonHasLabel

```
self assert: presenter addButton label equals: 'Add'
```

Seems stupid, but we can test i18N here!

Testing UI State Update

- Selecting an element update the UI



testSelectingAnElementEnablesRemoveButton

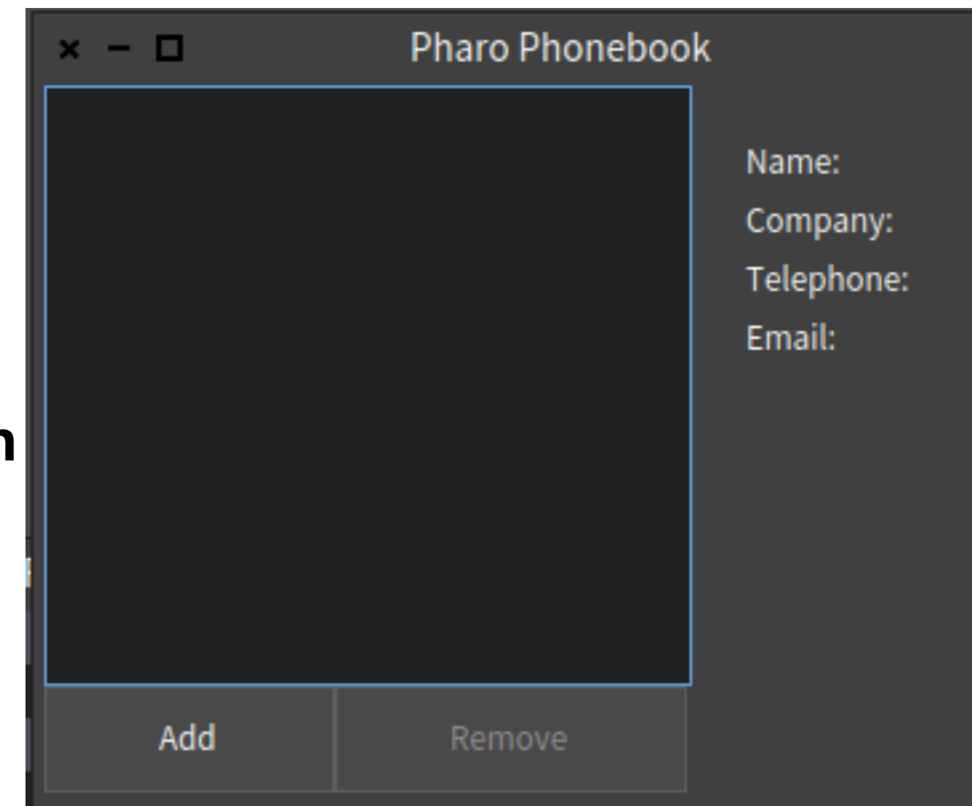
```
presenter entriesList selectIndex: 1.
self assert: presenter removeButton isEnabled
```

testSelectingAnElementUpdatesDetailName

```
presenter entriesList selectIndex: 1.
self assert: presenter detailsPanel nameLabel label equals: 'A Person'.
```

Testing UI Interactions

- Clicking in Remove




```
testClickingRemoveButtonRemovesDisablesRemoveButton

    presenter entriesList selectIndex: 1.
    presenter removeButton click.

    self deny: presenter removeButton isEnabled
```

```
testClickingRemoveButtonRemovesAnElementFromTheList

    presenter entriesList selectIndex: 1.
    presenter removeButton click.

    self assert: presenter entriesList items size equals: 0
```

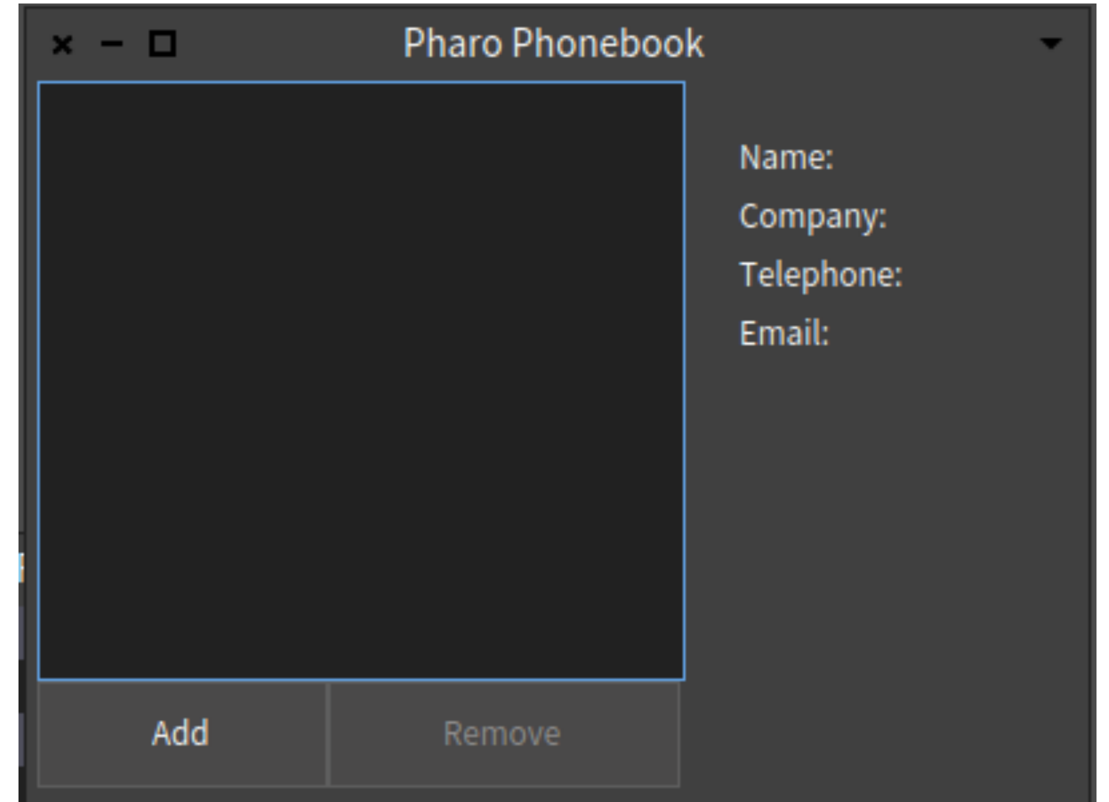
Testing UI Layout

testAddButtonIsBelowEntryList

```
self assert: (presenter addButton
                isBelowOf: presenter entriesList)
```

testAddButtonIsLeftOfRemoveButton

```
self assert: (presenter addButton
                isLeftOf: presenter removeButton)
```



Also we are able to test dynamic things!

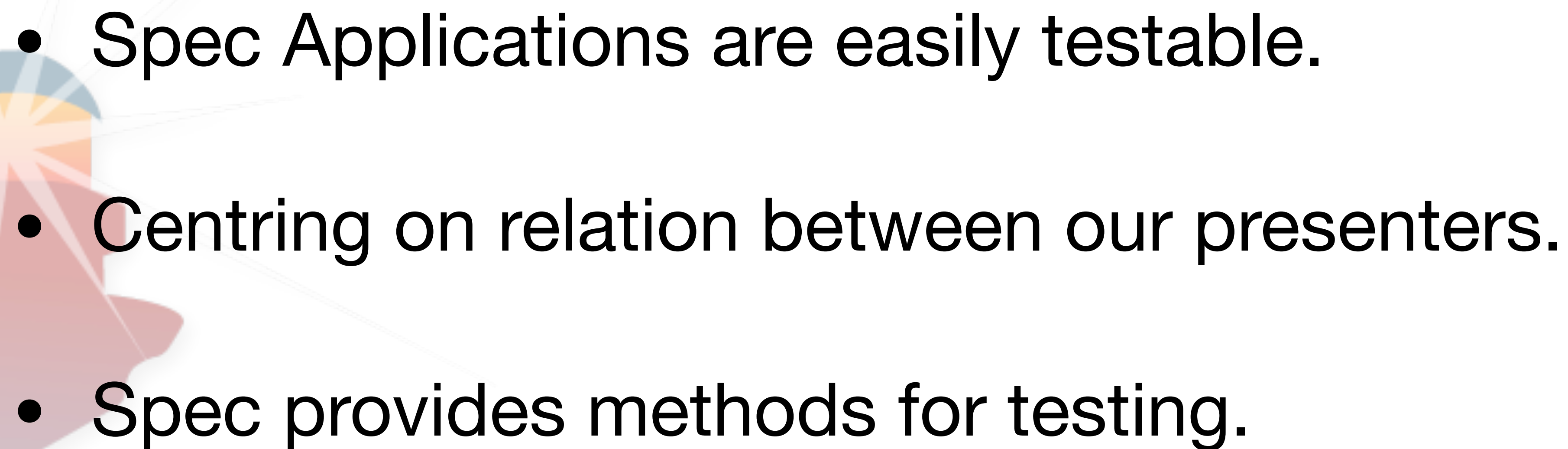
Testing UI Navigation

- Testing Navigation

```
testClickingAddButtonOpenANewWindow

    presenter addButton click.
    self assert: presenter application windows size equals: 2

testClickingAddButtonOpenCorrectWindow

    presenter addButton click.
    self
        assert: presenter application focusedPresenter class
        equals: PhonebookAddEntryPresenter
```

Once open… it is responsibility of other test to test it

Testing UI



- Spec Applications are easily testable.
- Centring on relation between our presenters.
- Spec provides methods for testing.

Thanks!

- Adding Testing infrastructure to Spec2.
- Testing implementation and backends.
- Expressing the contracts with backend as tests.
- Open to new backend implementations.
- Support for Application Testing.
- Writing UI Tests as another easy test.

pharo-spec/phonebook-example

Now... without excuses.

May the tests be with you!