Developer experience to Testing

A talk by Claudia Roșu

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5 topics

- How I deliver a feature
- Analyze with acceptance tests
- Software design with unit tests
- Check definition of done with acceptance tests
- Demo with tests report and manual testing

About me

- Software crafter
- Experience with Groovy, Grails, Spock, Java
- Active in communities

1. How I deliver a feature

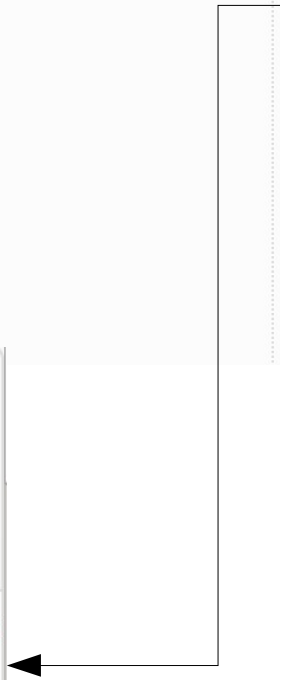
Background

- Innovative eHealth application for a general practitioner doctors association
- Client is not a product owner, nor a business analyst
- Development life cycle evolved over time

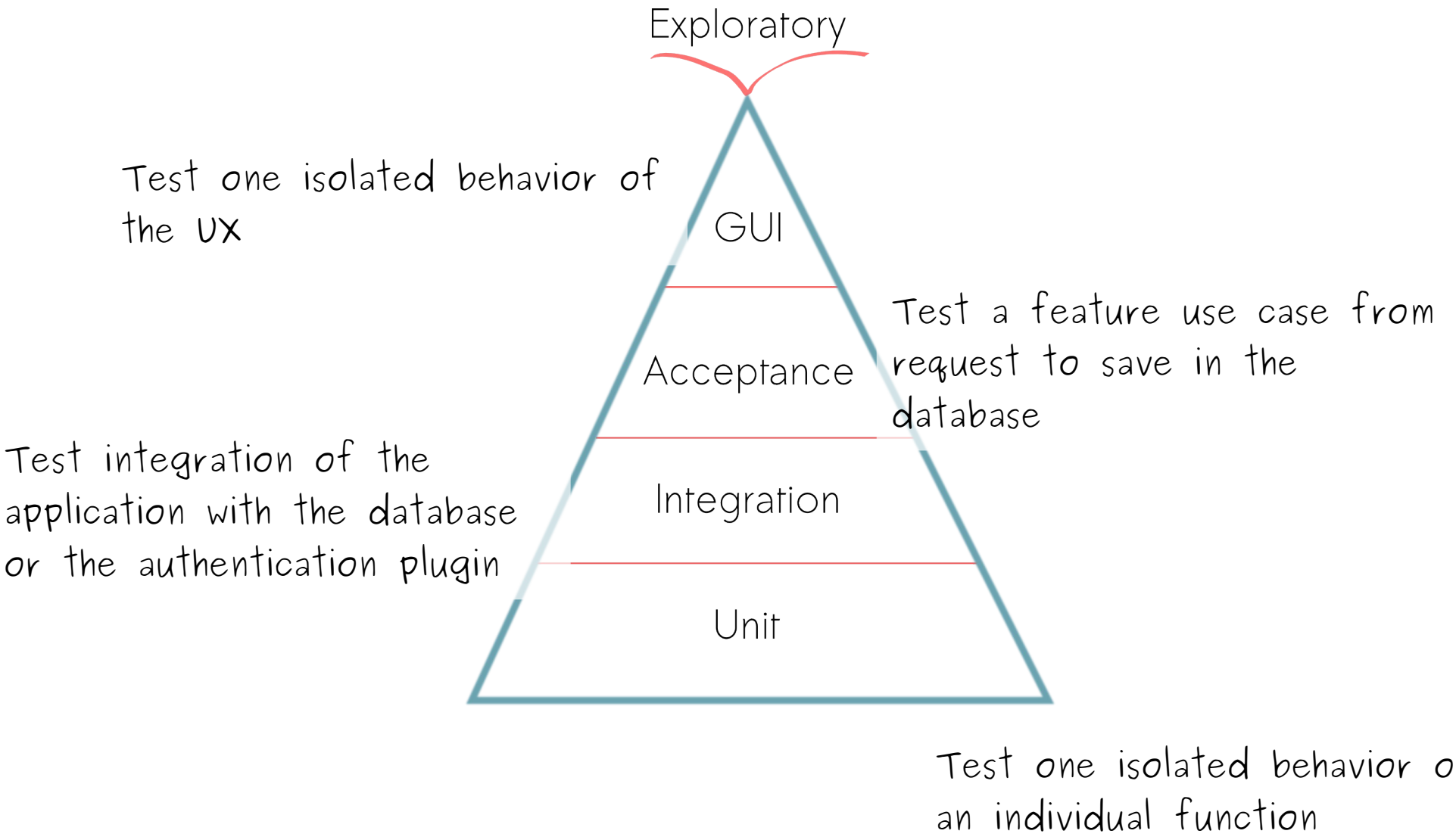
Development life cycle

Next	Analysis	In progress 4 / 4	
		UX	Backend services
+ add task	+ add task	+ add task	+ add task
#820 days ago Doctor can see which patient analysis results are out of range in patient file	#10 20 days ago Index patient analysis document when uploading it automatically in inbox	#7 20 days ago Display patient analysis content in a readable format in patient file	
a month ago c Display patient analysis content in a readable format in inbox			

In review 2 / 4	In testing 2 / 4	Done
+ add task	+ add task	+ add task
#9 20 days ago Index patient analysis document when uploading it manually in inbox	a month ago c Doctor can see which patient analysis results are out of range in inbox	#1519 days ago Parse mexi laboratory analysis files when uploading it (manually and automatically) in inbox



Testing strategy



How we started

Building tests with Grails, Groovy and JUnit

Using tests for learning Grails framework faster

Using tests for preventing regression bugs

Groovy and Grails

Groovy is a powerful, optionally typed and dynamic language for the Java platform. - http://www.groovy-lang.org/

Grails is a powerful web framework, for the Java platform aimed at multiplying developers' productivity thanks to a Convention-over-Configuration - https://grails.org/

Spock

Spock is a testing and specification framework for Java and Groovy applications. What makes it stand out from the crowd is its beautiful and highly expressive specification language.

http://spockframework.github.io/

Spock

```groovy
class StringToNumberConverterSpec extends Specification {

    void "1 converts to 1"() {
        expect:
        1 == StringToNumberConverter.convertToDouble("1")
    }

    void "0.5 converts to 0.5"() {
        expect:
        0.5 == StringToNumberConverter.convertToDouble("0.5")
    }
```

```groovy
void "item is parsed correctly"() {
    given:
    def item = [ParameterName: "hémoglobine", ValueChar: "13,6", Unit: "g/100ml", Range: "12-16g/100ml",
                LRange: "12", URange: "16"]

    when:
    def parsedItem = parser.parse(item)

    then:
    item.ParameterName == parsedItem.analysisName
    item.ValueChar == parsedItem.analysisValue
}
```

Where we are now

Building tests with Grails, Groovy and Spock

Using tests for analysis

Using tests for software design

Using tests for checking definition of done

1. The feature

Search patients

2. Analysis

Initial UI

PATIENTS

Sélection par MT

NOM	PRÉNOM	NE(É)	ADRESSE		TEL

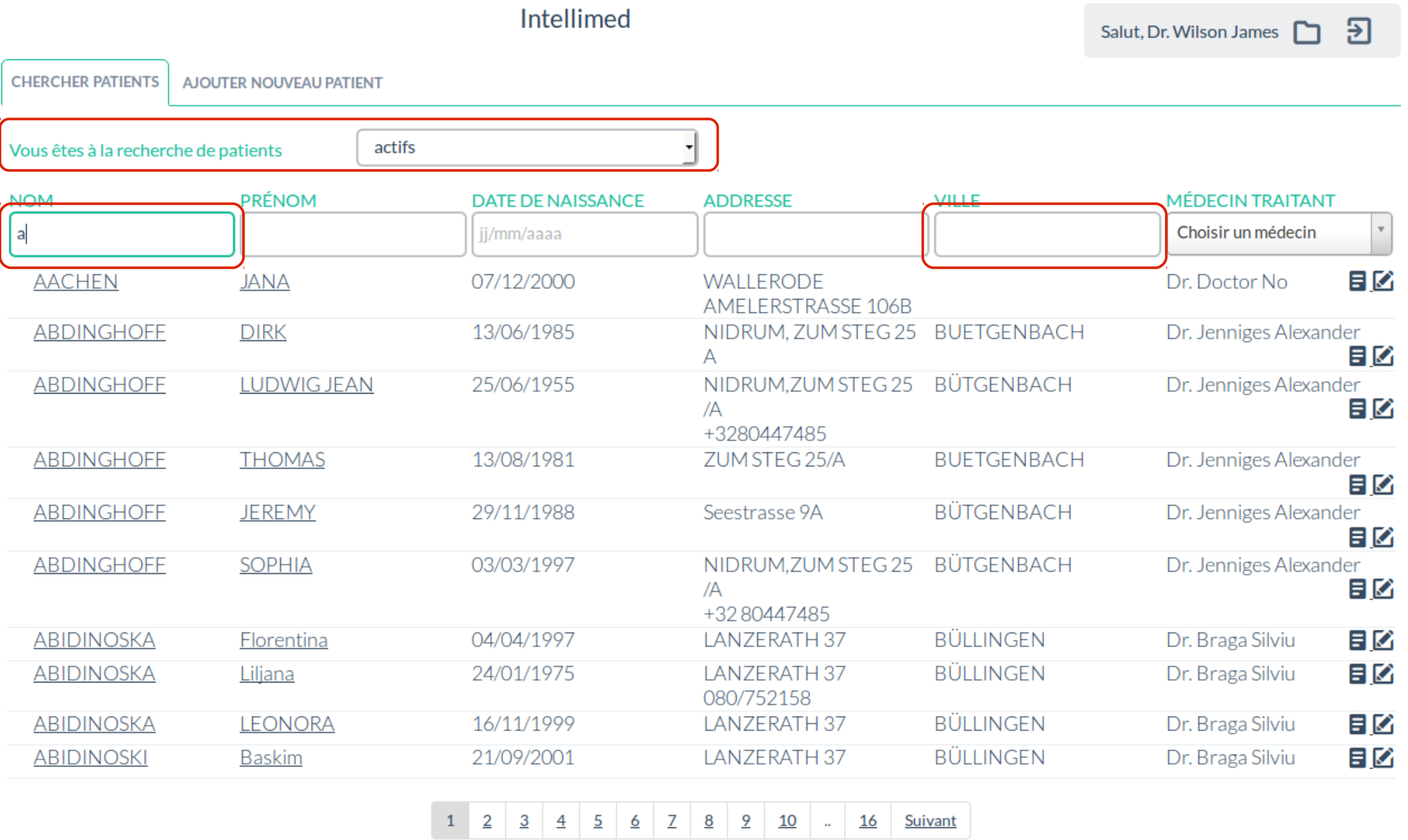
Front-end unit tests

```
describe("select patient is initialized when ", function(){
    it("searching patient by name or address is possible by just typing the search terms", function(){
        spyOn(searchAsYouTypeInput, "activate")

        selectPatient.init()

        expect(searchAsYouTypeInput.activate).
            toHaveBeenCalledWith(selectPatientUIElements.searchPatientByNameBirthDateAndAddress,
            selectPatientUIElements.searchTerm, searchPatientForSelectUrl)
    })

    it("searching the patient by birth date is possible on change date submit", function(){
        spyOn(submitOnChangeControl, "activate")

        selectPatient.init()

        expect(submitOnChangeControl.activate).
            toHaveBeenCalledWith(selectPatientUIElements.searchPatientByNameBirthDateAndAddress,
            selectPatientUIElements.birthDateSearchTerm, searchPatientForSelectUrl)
    })

    it("searching the patient by doctor is possible on change doctor submit", function(){
        spyOn(submitOnChangeControl, "activate")

        selectPatient.init()

        expect(submitOnChangeControl.activate).
            toHaveBeenCalledWith(selectPatientUIElements.searchPatientByNameBirthDateAndAddress,
            selectPatientUIElements.doctorSelect, searchPatientForSelectUrl)
    })
```

Acceptance tests

```
void "doctor sees matching patients by partial last name among all active and internal patients created inside his association"() {
    given:
    def lastNameSearchTerm = "d"

    when:
    doctorEntersTextInPatientLastNameSearchInput(lastNameSearchTerm)

    then:
    assertAllPatientsHaveMatchingLastName()
    assertAllPatientsHaveBeenCreatedInsideCurrentAssociation()
    assertAllPatientsAreActiveAndInternal()
}

void "doctor sees matching patients by partial first name among all active and internal patients created inside his association"() {
    given:
    def firstNameSearchTerm = "j"

    when:
    doctorEntersTextInPatientFirstNameSearchInput(firstNameSearchTerm)

    then:
    assertAllPatientsHaveMatchingFirstName()
    assertAllPatientsHaveBeenCreatedInsideCurrentAssociation()
    assertAllPatientsAreActiveAndInternal()
}

void "doctor sees matching patients by birthDate among all active and internal patients created inside his association"() {
    given:
    def doctorMatchingPatient = firstPatientFromDoctorPatientsList()
    def birthDate = doctorMatchingPatient.birthDate

    when:
    doctorSelectsBirthDateForSearchPatient(birthDate)

    then:
    assertAllPatientsHaveMatchingBirthDate(birthDate)
    assertAllPatientsHaveBeenCreatedInsideCurrentAssociation()
    assertAllPatientsAreActiveAndInternal()
}
```

Final UI


Intellimed
Salut, Dr. Wilson James
CHERCHER PATIENTS
AJOUTER NOUVEAU PATIENT
Vous êtes à la recherche de patients
actifs
NOM
PRÉNOM
DATE DE NAISSANCE
ADDRESSE
VILLE
MÉDECIN TRAITANT
a
jj/mm/aaaa
Choisir un médecin
AACHEN JANA 07/12/2000 WALLERODE AMELERSTRASSE 106B Dr. Doctor No
ABDINGHOFF DIRK 13/06/1985 NIDRUM, ZUM STEG 25 A BUETGENBACH Dr. Jenniges Alexander
ABDINGHOFF LUDWIG JEAN 25/06/1955 NIDRUM,ZUM STEG 25 /A +3280447485 BÜTGENBACH Dr. Jenniges Alexander
ABDINGHOFF THOMAS 13/08/1981 ZUM STEG 25/A BUETGENBACH Dr. Jenniges Alexander
ABDINGHOFF JEREMY 29/11/1988 Seestrasse 9A BÜTGENBACH Dr. Jenniges Alexander
ABDINGHOFF SOPHIA 03/03/1997 NIDRUM,ZUM STEG 25 /A +32 80447485 BÜTGENBACH Dr. Jenniges Alexander
ABIDINOSKA Florentina 04/04/1997 LANZERATH 37 BÜLLINGEN Dr. Braga Silviu
ABIDINOSKA Liljana 24/01/1975 LANZERATH 37 080/752158 BÜLLINGEN Dr. Braga Silviu
ABIDINOSKA LEONORA 16/11/1999 LANZERATH 37 BÜLLINGEN Dr. Braga Silviu
ABIDINOSKI Baskim 21/09/2001 LANZERATH 37 BÜLLINGEN Dr. Braga Silviu
1 2 3 4 5 6 7 8 9 10 .. 16 Suivant

3. Software Design

Front-end unit tests

```
describe("select patient is initialized when ", function(){
    it("searching patient by name or address is possible by just typing the search terms", function(){
        spyOn(searchAsYouTypeInput, "activate")

        selectPatient.init()

        expect(searchAsYouTypeInput.activate).
            toHaveBeenCalledWith(selectPatientUIElements.searchPatientByNameBirthDateAndAddress,
            selectPatientUIElements.searchTerm, searchPatientForSelectUrl)
    })

    it("searching the patient by birth date is possible on change date submit", function(){
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        selectPatient.init()

        expect(submitOnChangeControl.activate).
            toHaveBeenCalledWith(selectPatientUIElements.searchPatientByNameBirthDateAndAddress,
            selectPatientUIElements.birthDateSearchTerm, searchPatientForSelectUrl)
    })

    it("searching the patient by doctor is possible on change doctor submit", function(){
        spyOn(submitOnChangeControl, "activate")

        selectPatient.init()

        expect(submitOnChangeControl.activate).
            toHaveBeenCalledWith(selectPatientUIElements.searchPatientByNameBirthDateAndAddress,
            selectPatientUIElements.doctorSelect, searchPatientForSelectUrl)
    })
```

Controller Unit tests

```
void "test listMatchingPatientsPage calls searchPatients service with correct search params and pageParams when patients"() {
    given: "params for searching patients received"
    def expectedSearchParams = searchPatientParamsReceived()
    def expectedPageParams = [max: 2, offset: 0]
    controller.paramsConverter.toPageParams(_ ) >> expectedPageParams

    when: "user searches among all active and internal patients"
    controller.listMatchingPatientsPage()

    then: "searchPatients services is called with received search params for active and internal patients"
    1 * controller.searchPatientService.searchPatients(_ ) >>  { args ->
        assert expectedSearchParams == args[0]
        assert expectedPageParams == args[1]
        return []
    }

    when: "user searches among all archived patients"
    receiveSearchPatientTypeRequestParam(PatientType.archived, expectedSearchParams)
    controller.listMatchingPatientsPage()

    then: "searchPatients services is called with received search params for archived patients"
    1 * controller.searchPatientService.searchPatients(_ ) >>  { args ->
        assert expectedSearchParams == args[0]
        assert expectedPageParams == args[1]
        return []
    }

    when: "user searches among all deceased patients"
    receiveSearchPatientTypeRequestParam(PatientType.deceased, expectedSearchParams)
    controller.listMatchingPatientsPage()

    then: "searchPatients services is called with received search params for deceased patients"
    1 * controller.searchPatientService.searchPatients(_ ) >>  { args ->
        assert expectedSearchParams == args[0]
        assert expectedPageParams == args[1]
        return []
    }
```

Back-end Unit tests

```
void "test searchPatients searches patients by received search params"() {
    given:
    def searchParams = searchPatientsParams()
    def currentAssociation = stubGetCurrentAssociation()
    def patientQueryBuilderInstance = stubPatientQueryBuilder()
    def expectedPatientQuery = Mock(DetachedCriteria)
    def pageParams = pageParams()

    when:
    service.searchPatients(searchParams, pageParams)

    then:
    1 * patientQueryBuilderInstance.addFilterByActivityStatus(searchParams.activityStatus) >> patientQueryBuilderInstance
    1 * patientQueryBuilderInstance.addFilterByRegisteredToGPStatus(searchParams.registeredToGPStatus) >> patientQueryBuilderInstance
    1 * patientQueryBuilderInstance.addFilterByPartialLastName(searchParams.lastName) >> patientQueryBuilderInstance
    1 * patientQueryBuilderInstance.addFilterByPartialFirstName(searchParams.firstName) >> patientQueryBuilderInstance
    1 * patientQueryBuilderInstance.addFilterByBirthDate(searchParams.birthDate) >> patientQueryBuilderInstance
    1 * patientQueryBuilderInstance.addFilterByPartialStreetAddress(searchParams.streetAddress) >> patientQueryBuilderInstance
    1 * patientQueryBuilderInstance.addFilterByPartialCityAddress(searchParams.cityAddress) >> patientQueryBuilderInstance
    1 * patientQueryBuilderInstance.addFilterByCreatedInAssociation(currentAssociation) >> patientQueryBuilderInstance
    1 * patientQueryBuilderInstance.addFilterByPersonalGP(searchParams.doctor) >> patientQueryBuilderInstance
    1 * patientQueryBuilderInstance.build() >> expectedPatientQuery
    1 * expectedPatientQuery.list(*_) >> {args ->
        assert pageParams.max == args[0].max
        assert pageParams.offset == args[0].offset
        assert "lastName" == args[0].sort
    }
}
```

4. Checking definition of done

Running all the tests

Grails test-app unit: → running all unit tests

Grails test-app integration: → running all integration tests

Grails test-app acceptance: → running all acceptance tests

Karma start → running all jasmine unit tests

Running all the tests

DoctorSearchesPatientBeforeOpeningHisFileSpec

Executed 12 tests without a single error or failure!

✔ **doctor sees matching patients by partial last name among all active and internal patients created inside his association**

Executed in 3.615 seconds.

System output

```
    - Doctor 'gaaron' logged in
    - Doctor is on home page
    - Doctor enters 'd' as search term for patient last name
    => Doctor sees patient 'John Doe, M, 09/07/1977' which has lastName starting with 'd'
    => Doctor sees patient 'JohnFromDrGary Doe, M, 09/07/1977' which has lastName starting with
'd'
    => Doctor sees patient 'John DoeNoDoctor, M, 09/07/1978' which has lastName starting with 'd'
    => Doctor sees patient 'John Doe, M, 09/07/1977' which has been created for his association
'EifelArzt'
    => Doctor sees patient 'JohnFromDrGary Doe, M, 09/07/1977' which has been created for his
association 'EifelArzt'
    => Doctor sees patient 'John DoeNoDoctor, M, 09/07/1978' which has been created for his
association 'EifelArzt'
    => Doctor sees only internal and active patients
(Doctor 'gaaron' logged out)
```

✔ **doctor sees matching patients by partial first name among all active and internal patients created inside his association**

Executed in 0.197 seconds.

System output

```
    - Doctor 'gaaron' logged in
    - Doctor is on home page
    - Doctor enters 'j' as search term for patient first name
    => Doctor sees patient 'John Doe, M, 09/07/1977' which has firstName starting with 'j'
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association 'EifelArzt'
    => Doctor sees only internal and active patients
(Doctor 'gaaron' logged out)
```

5. Demo

Acceptance tests report

DoctorSearchesPatientBeforeOpeningHisFileSpec

Executed 12 tests without a single error or failure!

✔ doctor sees matching patients by partial last name among all active and internal patients created inside his association

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System output

```
    - Doctor 'gaaron' logged in
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    => Doctor sees patient 'John Doe, M, 09/07/1977' which has lastName starting with 'd'
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System output

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    - Doctor 'gaaron' logged in
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'j'
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association 'EifelArzt'
    => Doctor sees patient 'John DoeNoDoctor, M, 09/07/1978' which has been created for his
association 'EifelArzt'
    => Doctor sees only internal and active patients
(Doctor 'gaaron' logged out)
```

And some manual tests

Next – using functional tests for acceptance

Functional test tends to answer the questions like “can the user do this” or “does this particular feature work”. The feature is testing from the browser to the database persistence.

GEB

Browser automation tool.

It brings together the power of WebDriver, the elegance of jQuery content selection, the robustness of Page Object modelling and the expressiveness of the Groovy language.

http://www.gebish.org/

Next – functional tests

```
def setup() {
    given:"doctor is on home page after login"
    to LoginPage
    username = correctUsername
    password = correctPassword

    when: signin.click()

    then: at HomePage
}

def "doctor searches patient by first letter of last name"() {
    when:"doctor enters 'd' as first letter of the last name"
    searchPatientByNameBirthDateAndAddress.find("input", name: "lastName") << 'd'
    println("Search patients started at ${DateUtils.currentTime()}")

    then:"all patients with last name starting with 'd' letter are displayed"
    patientRow.size() > 0
    println("Search patients ended at ${DateUtils.currentTime()}")
}

def "doctor searches patient by first letter of first name"() {
    when:"doctor enters 'd' as first letter of the first name"
    searchPatientByNameBirthDateAndAddress.find("input", name: "firstName") << 'd'
    println("Search patients started at ${DateUtils.currentTime()}")

    then:"all patients with last name starting with 'd' letter are displayed"
    patientRow.size() > 0
    println("Search patients ended at ${DateUtils.currentTime()}")
}
```

6. Results and Core ideas

Results

- Happy customer
- Improved collaboration
- Maximize the work not done
- Faster development life cycle
- Happy me

4 Core Ideas

1. Best prevention of undesired side effects
2. Best analysis tool I have ever used
3. Best and fastest feedback I have received
4. Best upfront risk identification tool

I believe this is how a developer can enjoy the friendship with the tests

Your Questions?

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Resources

http://www.groovy-lang.org/

https://grails.org/

http://spockframework.github.io/spock/docs/1.0/index.html

http://www.gebish.org/

http://mozaicworks.com/category/blog/testing/