Documentation: Rationale and Reflection

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Requirements

- User stories

Purpose of a user story is to get a clear and high-level understanding of the requirement from the given task. This makes it easier for the user to give a specific requirement and for the developer to meet this requirement without having to “guess” various parts which can end up in misunderstanding from both parts.

For user and for us as business User Stories will solve the problem of wasting time on developing something that isn't required, but was miscommunicated and unclear. When a user story is precise and clear, it reduces the chance of misunderstanding therefore time and money is saved and work is done faster. As well as products developed can be presented and approved faster, making the whole development process smoother.

- User Story 1

As a user
I want to be able to search for city mentioned in the book,
So that I can find all book titles and authors with the given city name mentioned in the book.

- User Story 2

As a user,
I want to be able to get all the cities from a given book
So that I can plot it onto a map

- User Story 3

As a user
I want to search for an author
So that I get a map with all cities mentioned in the authors books

- User Story 4

As a user
I want to to search for a geolocation
So that I can get all the books in the vicinity of the given geolocation

Before releasing feature, it needs to go through Acceptance Testing. Acceptance Tests goes under the Behaviour Test Development as the developers need to know what tests have to pass in order to call development to be done. Acceptance tests are tests that describes the system behaviour and / or functionality that needs to be passed in order to determine the system or functionality to be finished. These tests focuses more individually on the app, as in our case we have acceptance tests for the User Story 1 as see below.

1. Acceptance Criteria:
As a user, I expect to get back a list with all book titles with corresponding authors that mention this city.

2. Acceptance Test Case:
When searching for London, I get back Charles Dickens book list containing ‘Oliver Twist’.

3. Scenario: A user searches for a city, which returns all book titles and corresponding authors that mentions the cities

    Arrange
        Given: Opening the project page
    Act
        When: Entering a <city>
    Assert
        Then: I should get a book related to that city in result

★ *Note: see the User Stories 2,3 and 4 Acceptance Criteria in Appendix.*

During the Sprint iterations we can measure how far have we come with the given requirements of a User Story. Therefore we have created a Product Backlog as seen below.

	Story	Estimation	Priority
1.	As a user I want to be able to search a book by its title	10h	1
2.	As a user I want to search books by author	6h	2
3.	As a user I want to search for books with certain cities	6h	3
4.	As a user I want to see all cities mentioned by author (In his books)	6h	4
5.	As a user I want to get all the locations in a book in a map	5h	5

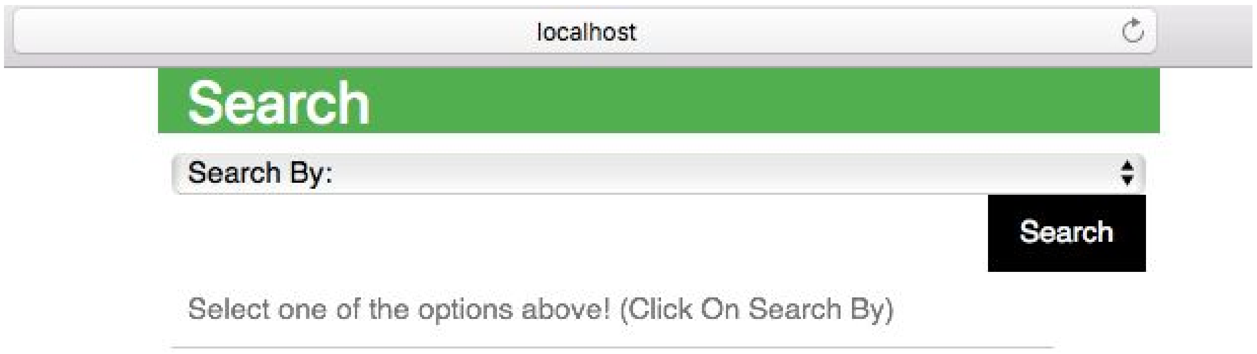
Product Backlog of User Stories

System Design

- Functional requirements

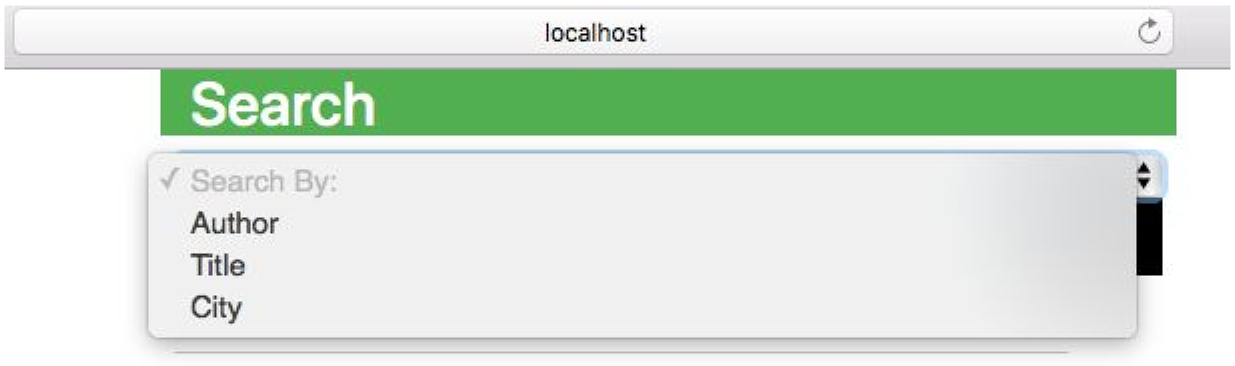
During the first Sprint, we defined specific behaviours and functions of our system:

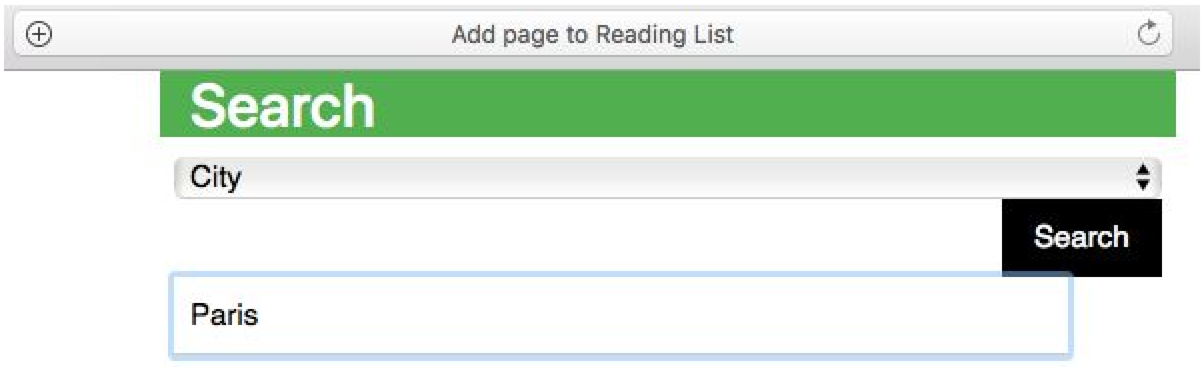
- Simple web interface



Select one of the options above! (Click On Search By)

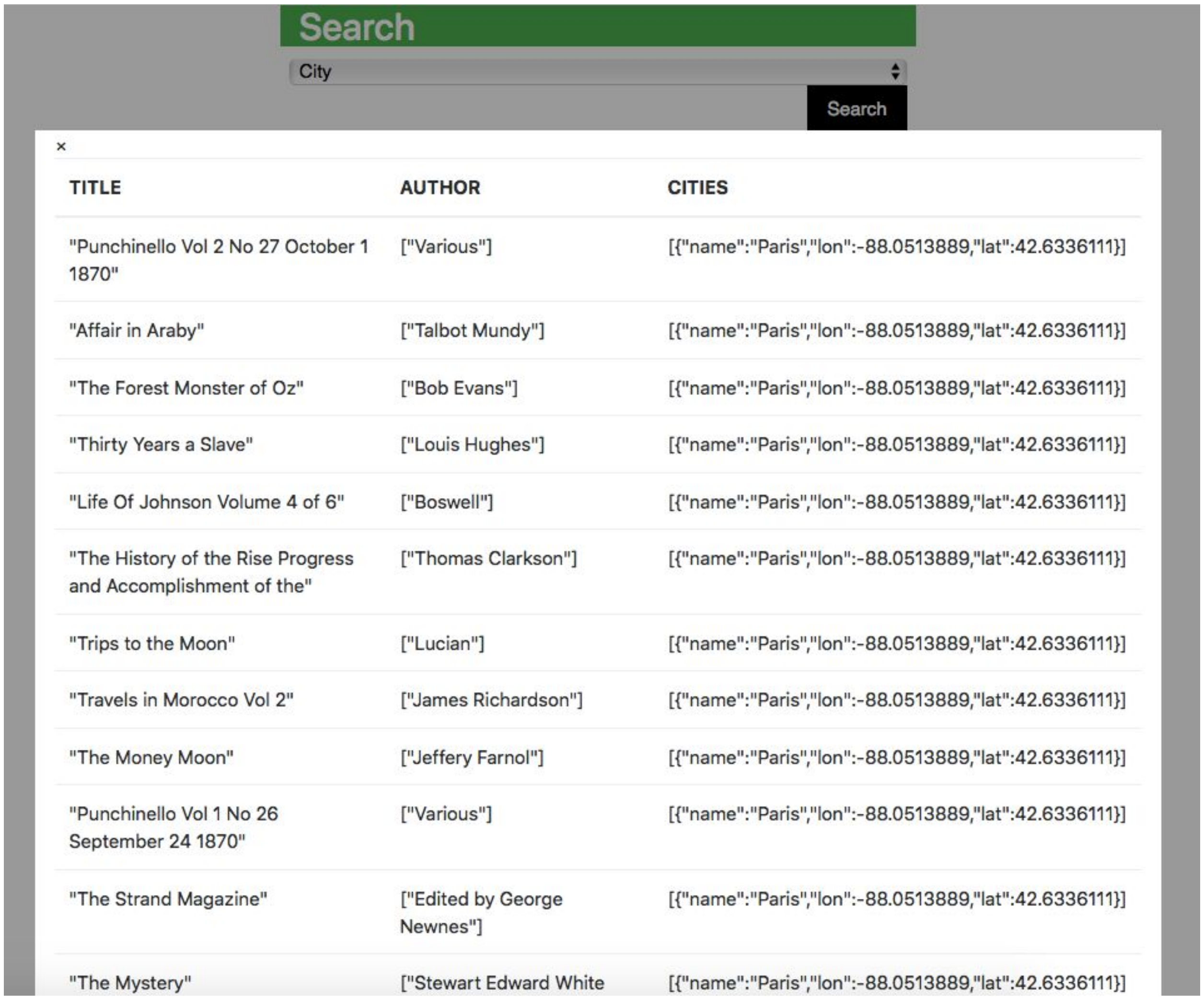
- Search tab with search button





Paris

- Results displayed in a list



TITLE	AUTHOR	CITIES
"Punchinello Vol 2 No 27 October 1 1870"	["Various"]	[{"name":"Paris","lon":-88.0513889,"lat":42.6336111}]
"Affair in Araby"	["Talbot Mundy"]	[{"name":"Paris","lon":-88.0513889,"lat":42.6336111}]
"The Forest Monster of Oz"	["Bob Evans"]	[{"name":"Paris","lon":-88.0513889,"lat":42.6336111}]
"Thirty Years a Slave"	["Louis Hughes"]	[{"name":"Paris","lon":-88.0513889,"lat":42.6336111}]
"Life Of Johnson Volume 4 of 6"	["Boswell"]	[{"name":"Paris","lon":-88.0513889,"lat":42.6336111}]
"The History of the Rise Progress and Accomplishment of the"	["Thomas Clarkson"]	[{"name":"Paris","lon":-88.0513889,"lat":42.6336111}]
"Trips to the Moon"	["Lucian"]	[{"name":"Paris","lon":-88.0513889,"lat":42.6336111}]
"Travels in Morocco Vol 2"	["James Richardson"]	[{"name":"Paris","lon":-88.0513889,"lat":42.6336111}]
"The Money Moon"	["Jeffery Farnol"]	[{"name":"Paris","lon":-88.0513889,"lat":42.6336111}]
"Punchinello Vol 1 No 26 September 24 1870"	["Various"]	[{"name":"Paris","lon":-88.0513889,"lat":42.6336111}]
"The Strand Magazine"	["Edited by George Newnes"]	[{"name":"Paris","lon":-88.0513889,"lat":42.6336111}]
"The Mystery"	["Stewart Edward White	[{"name":"Paris","lon":-88.0513889,"lat":42.6336111}]

Behavior:

- What are the business rules?

A user must be able to pick what to search by: title, author or city.
The user must be able to give input on his picked category.

- What will users do before and after using this feature?

Users do not need to login or have any prerequisites to use the system. They can simply enter the page, get information and close it.

- What’s the worst thing that could happen when someone uses it? (exposes risks)

Worst thing would probably be that someone drops the table and we would have to recreate the database.

- What is the best thing that can happen?

That everything works perfectly. All queries are executed quickly.

- Is the story / feature / epic too big?

We think the story and feature are rather short.

Architecture and Design of Code Metrics

- Non-functional requirements

These requirement specifies criteria that can be used to judge the operation of a system, rather than specific behaviors.

Such as: the project is coded in Java, the query speed is fast, the project runs on any browser, etc.

- Quality Attributes

Quality Attributes are realized non-functional requirements, used to evaluate the performance of a system. To define if the software has good quality, we need to look at systems architecture, ease of use, efficiency, extensibility and reusability.

Architecture is a key property of a software system, it describes an internal structure of the system. A good and simple system structure makes it easy to understand the system as well as it is easier to make changes, test, implement and maintain.
Ease of use is also an important aspect as it should be friendly, and therefore will become more popular to use. To help making usage easier is documentation, if the software contains explanatory documentation, the users might not even need the training on how to operate the system.
Efficiency is ability to produce a high performance software with use of available hardware and software resources.
Extensibility allows to accommodate changes to design or technical constraints with minimum effect to the system.
Reusability is important so that the software can be reused in others parts, and therefore save time, money and hardware use.
.

- Could this affect performance?
    - How will we test for that?

We are using Jmeter for checking performance.

- Could the story introduce any accessibility issues?

No, we do not have any other roles, except for the user.

- What quality attributes are important for this feature, for the context?

For queries, we value mainly efficiency and reusability - coding-wise.

Testing

- ### Testable code

Behaviour Driven Development (BDD) is based on Test Driven Development (TDD) and it helps product owners and developers to narrow the gap between production. One of the most famous tools that supports BDD is Cucumber, which we will discuss later on.

Test strategies:

- JUnit for Automated Testing
- White box Testing with Cucumber and Selenium
- Performance Tests for “fast enough” queries
- Test with small dataset to check functionality

- Do we need a lot of exploratory testing?
    - Should we write a high level exploratory testing charter for where to focus testing for this feature/epic?

  No , we have rather used a simple dataset to test the actual functionality that does not differ respectively to larger data.
    - Do we have the right data to test this?

  Yes, we have tested it in both development and actual database.
    - Does it require updating existing tests, or adding new ones?

  No, we have not had the experience of adding tests because of datasets.
- Is there any learning curve for a new technology?

Cucumber was new to us, some of Selenium’s properties as well. We have tried Jmeter with dubious success. The learning curve for Cucumber was not steep.

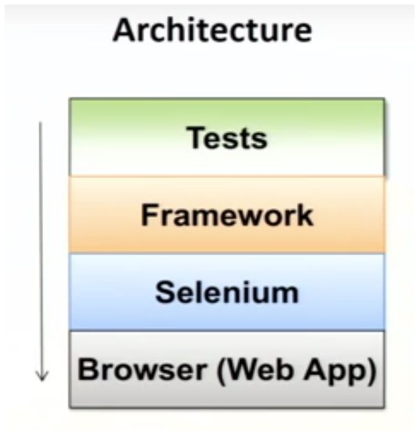
- ### Automated tests

Using automated tests helps us to execute test case suite, save time and enter test data into the system under the test to compare expected and actual results. This helps us to reduce test cases to be run manually. Automated testing is valuable for the development, containing Unit Testing, Integration Testing and User Acceptance tests. These belong to black box automation tests. In Black box we test everything as a User would use it without knowing the code.

As we are working in Agile environment with sprints. Automated testing is very grateful instead of using manual testing. Therefore as the project continues to build, automating tests is time saving and makes sure that the system keeps working as expected.

- Selenium tests

Selenium software allows us to do operations on websites, so we can test the interactions happening on the web application over and over automatically. The architecture of using Selenium is, that we have tests that utilizes the Framework which uses Selenium and then the Selenium will touch the browser. Below figure displays the interaction between the layers.



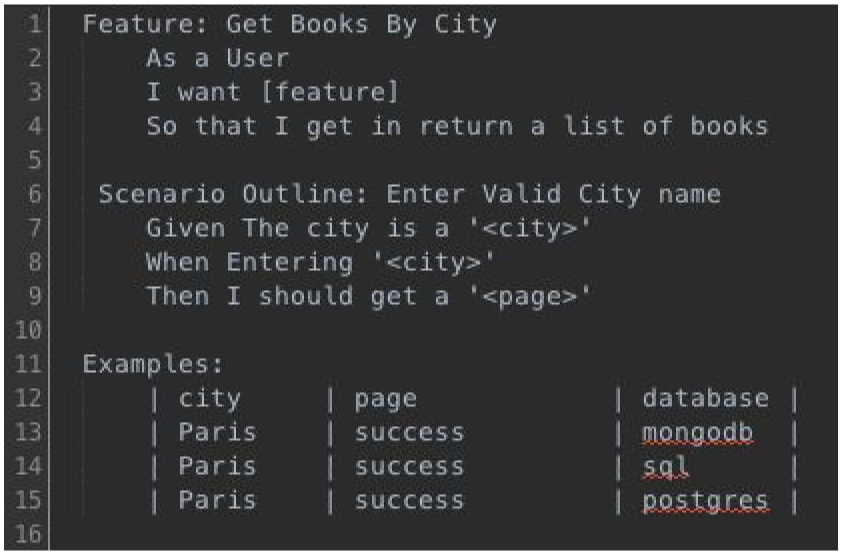
Architecture of automated testing with Selenium

- Cucumber tests

For defining our test cases, we use Cucumber tool, which is between Behaviour Driven Development and Acceptance Driven Development.
As cucumber is an open source tool framework for test automation, we have used this tool to test our test cases.

> Example of Acceptance Test Case from User Story 1:
> When searching for London, I get back Charles Dickens book list containing ‘Oliver Twist’.

Cucumber uses a language called Gherkin, which is a plain language to describe a test case. It can be written in any coding language as it isn't technical, Gherkin is just a language that Cucumber uses to define its test cases in a human readable way and helps to enforce firm requirements.

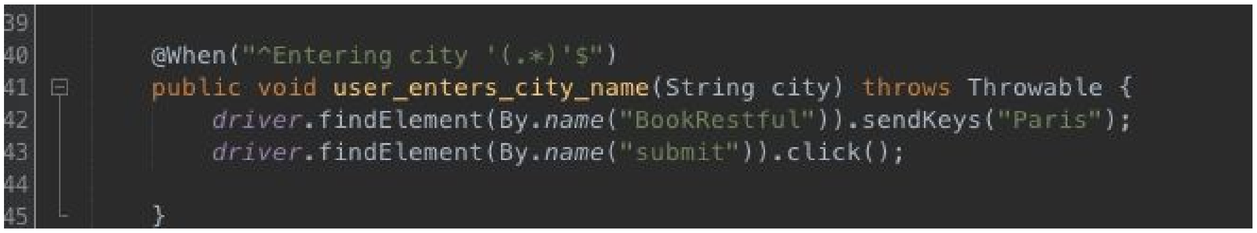


```
Feature: Get Books By City
    As a User
    I want [feature]
    So that I get in return a list of books

 Scenario Outline: Enter Valid City name
    Given The city is a '<city>'
    When Entering '<city>'
    Then I should get a '<page>'

Examples:
    | city     | page             | database |
    | Paris    | success          | mongodb  |
    | Paris    | success          | sql      |
    | Paris    | success          | postgres |
```

Figure 1
Feature file of Cucumber test for User Story 1.



```
    @When("^Entering city '(.*)'$")
    public void user_enters_city_name(String city) throws Throwable {
        driver.findElement(By.name("BookRestful")).sendKeys("Paris");
        driver.findElement(By.name("submit")).click();

    }
```

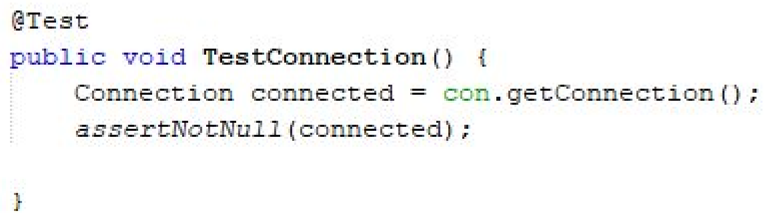
Figure 2
Step Definition for User Story 1.

As seen in Figure 1, Gherkin uses step keywords as a standard format to define test cases: Given, When and Then. This file is located in plain text feature file, extended with `.feature` and can contain multiple scenarios. Each scenario and feature has to be able to execute independently. After defining our test case with the step keywords, we need to hook it up with the code steps to do the automated tests.

- Unit tests

In Unit tests we isolate a specific function for testing.

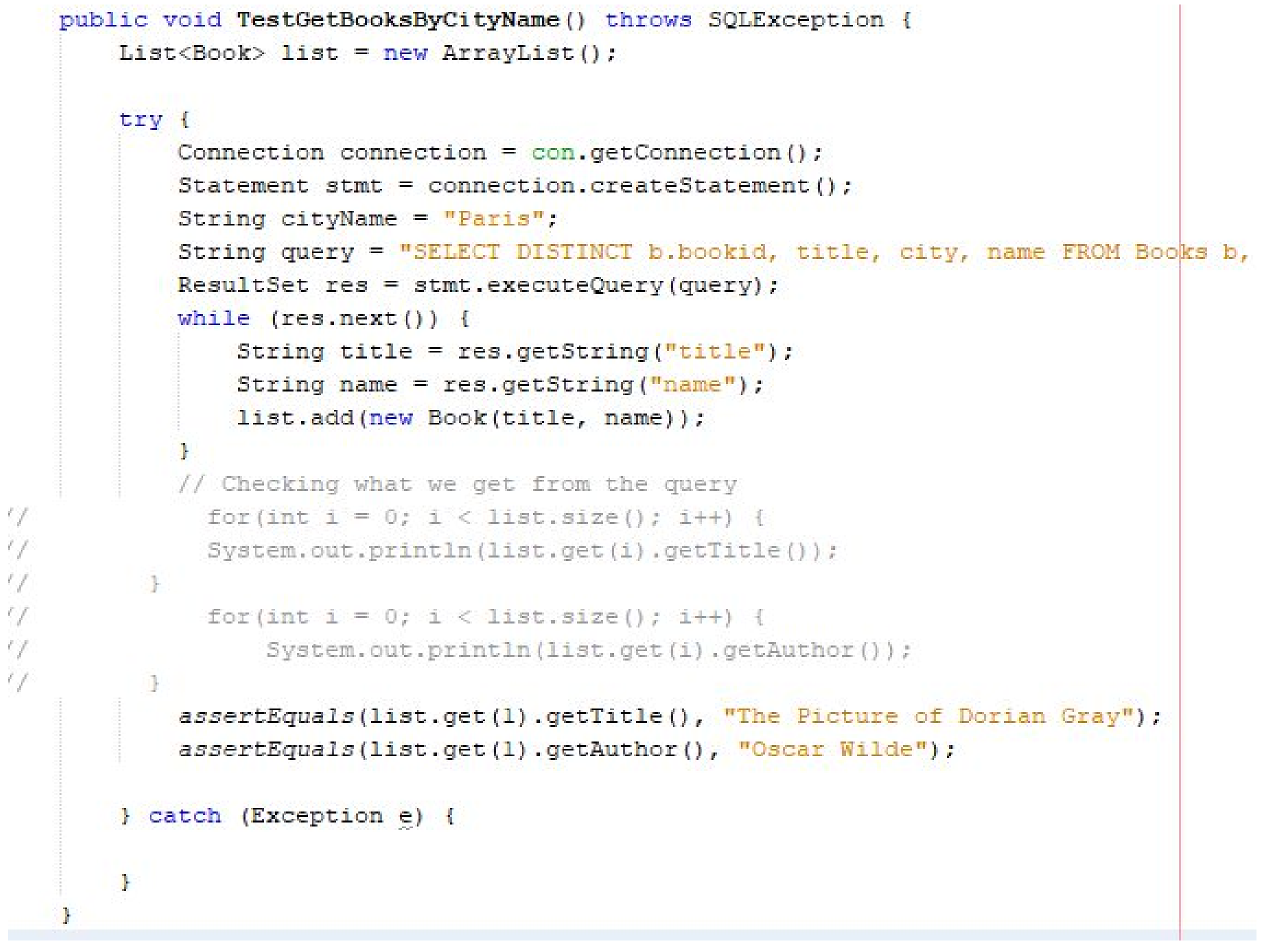
#Testing connection to the development database.



```java
@Test
public void TestConnection() {
    Connection connected = con.getConnection();
    assertNotNull(connected);

}
```

#Testing our first query and comparing to known results.



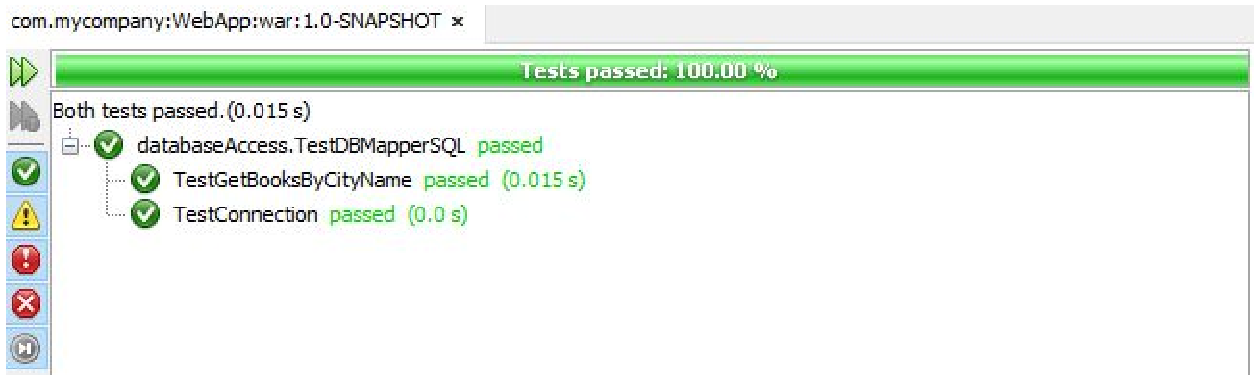
```java
public void TestGetBooksByCityName() throws SQLException {
    List<Book> list = new ArrayList();

    try {
        Connection connection = con.getConnection();
        Statement stmt = connection.createStatement();
        String cityName = "Paris";
        String query = "SELECT DISTINCT b.bookid, title, city, name FROM Books b,
        ResultSet res = stmt.executeQuery(query);
        while (res.next()) {
            String title = res.getString("title");
            String name = res.getString("name");
            list.add(new Book(title, name));
        }
        // Checking what we get from the query
//          for(int i = 0; i < list.size(); i++) {
//          System.out.println(list.get(i).getTitle());
//      }
//          for(int i = 0; i < list.size(); i++) {
//              System.out.println(list.get(i).getAuthor());
//      }
        assertEquals(list.get(1).getTitle(), "The Picture of Dorian Gray");
        assertEquals(list.get(1).getAuthor(), "Oscar Wilde");

    } catch (Exception e) {

    }
}
```

#Results



```
com.mycompany:WebApp:war:1.0-SNAPSHOT ×
Tests passed: 100.00 %
Both tests passed.(0.015 s)
databaseAccess.TestDBMapperSQL passed
    TestGetBooksByCityName passed (0.015 s)
    TestConnection passed (0.0 s)
```

Examples of elements you could include in your report:

- *If you are a Java team, you might have used Selenium for your UI tests, Cucumber for your API tests and JUnit for your unit tests. Why/rationale: they are standard tools that gives team autonomy, but allows consistency for the maintenance team and other teams working on the same product. Are there better alternatives you should have used instead (argumentation and reflection).*

Organization

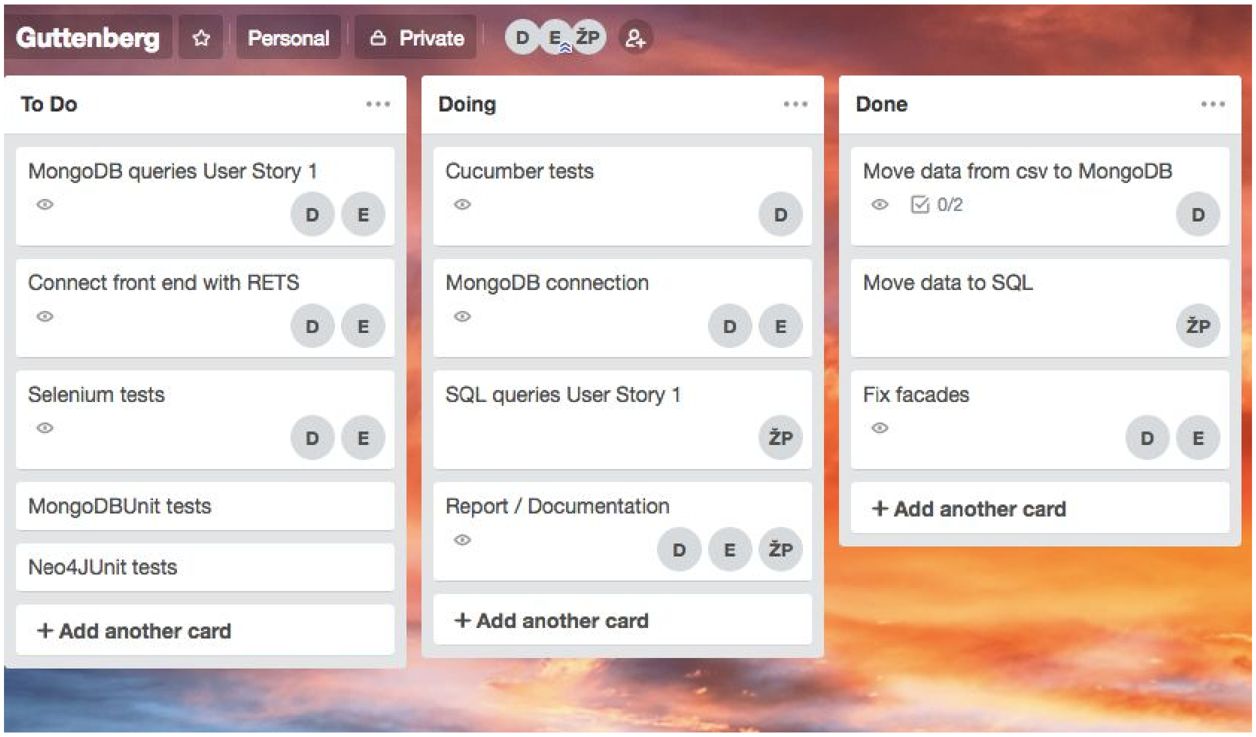
- ### Team work

Coding standards:

- Write with camelcase function names.
- Write with capital class names.
- Variables with lowercase.
- Package organisation according to functionality/layers
- Written in Java

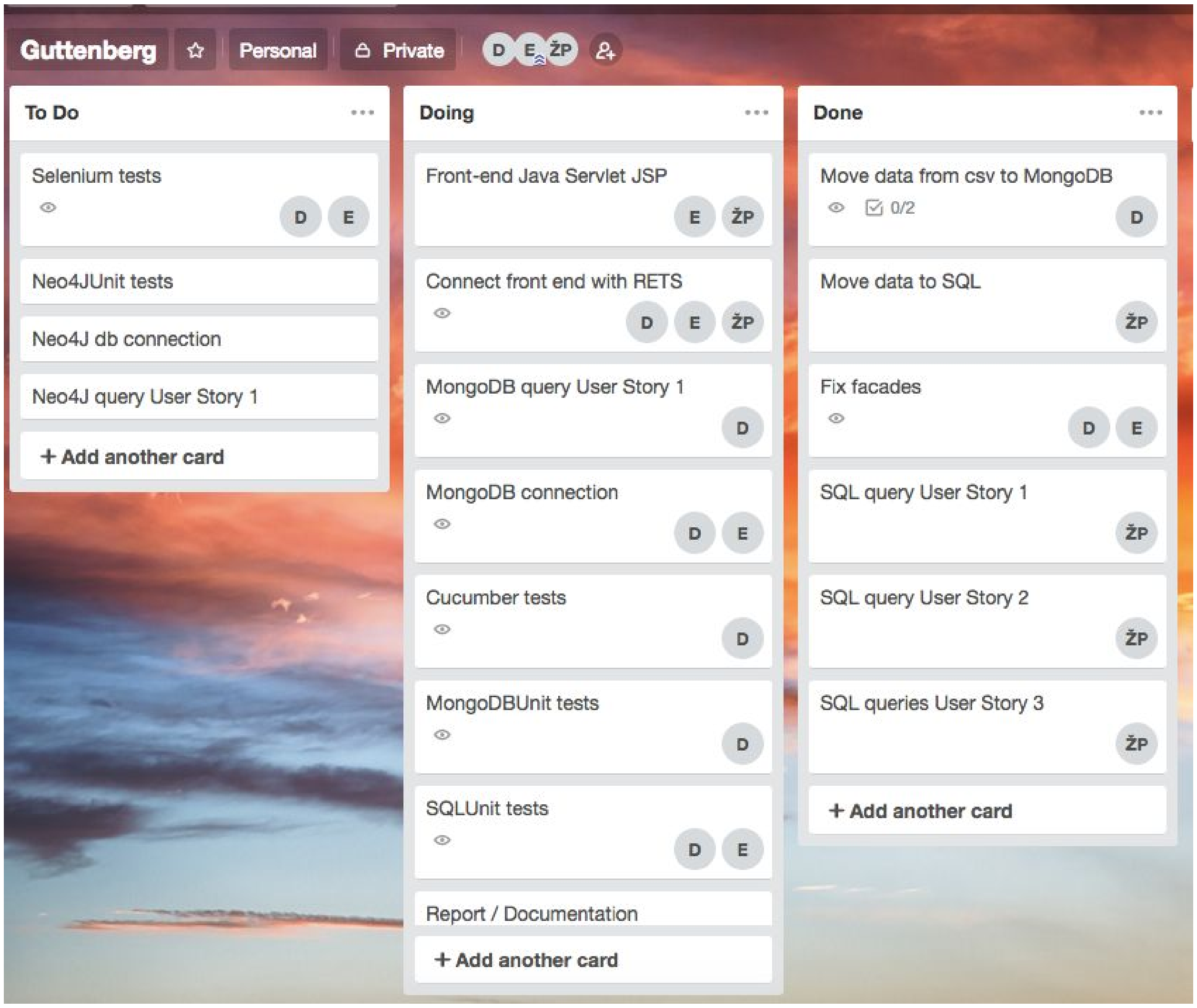
- ### Agile process

Use Trello for keeping track of the tasks



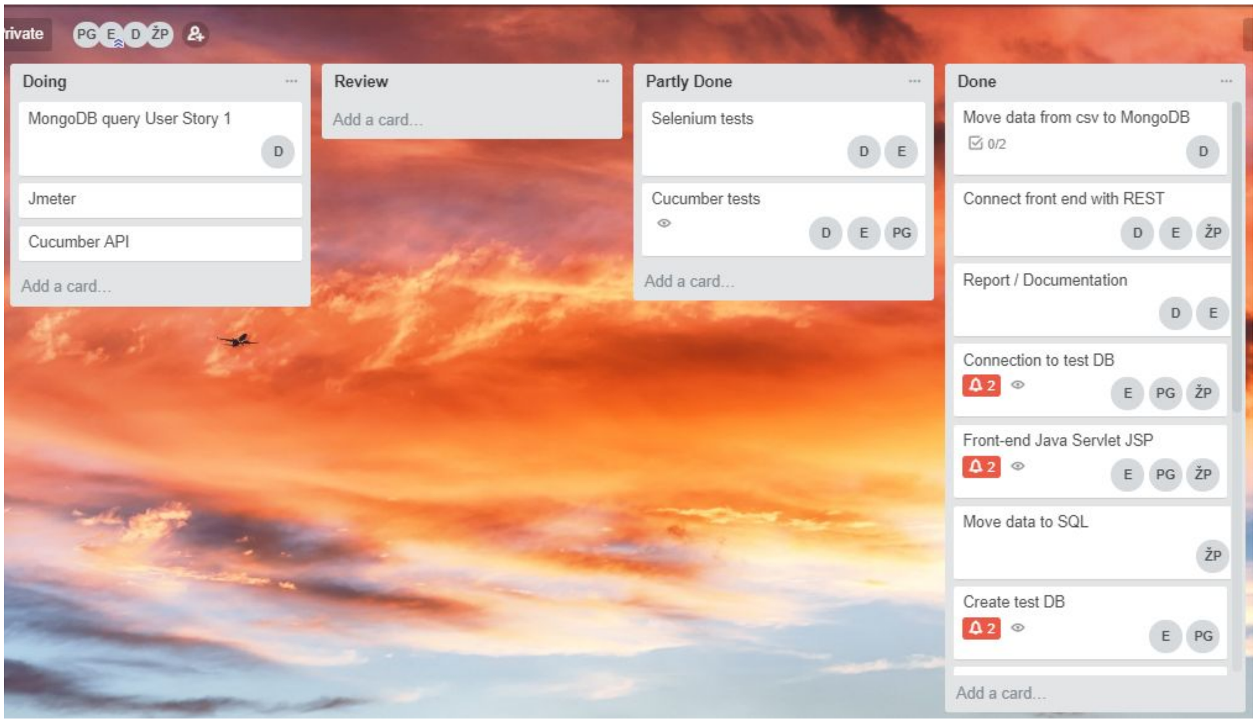
To Do	Doing	Done
MongoDB queries User Story 1 (D, E)	Cucumber tests (D)	Move data from csv to MongoDB 0/2 (D)
Connect front end with RETS (D, E)	MongoDB connection (D, E)	Move data to SQL (ŽP)
Selenium tests (D, E)	SQL queries User Story 1 (ŽP)	Fix facades (D, E)
MongoDBUnit tests	Report / Documentation (D, E, ŽP)	
Neo4JUnit tests		

Sprint 2 Trello board


Guttenberg Personal Private D E ŽP

To Do	Doing	Done
Selenium tests (D, E)	Front-end Java Servlet JSP (E, ŽP)	Move data from csv to MongoDB 0/2 (D)
Neo4JUnit tests	Connect front end with RETS (D, E, ŽP)	Move data to SQL (ŽP)
Neo4J db connection	MongoDB query User Story 1 (D)	Fix facades (D, E)
Neo4J query User Story 1	MongoDB connection (D, E)	SQL query User Story 1 (ŽP)
+ Add another card	Cucumber tests (D)	SQL query User Story 2 (ŽP)
	MongoDBUnit tests (D)	SQL queries User Story 3 (ŽP)
	SQLUnit tests (D, E)	+ Add another card
	Report / Documentation	
	+ Add another card	

Sprint 3 Trello board


rivate PG E D ŽP

Doing
- MongoDB query User Story 1 — D
- Jmeter
- Cucumber API
- Add a card...

Review
- Add a card...

Partly Done
- Selenium tests — D E
- Cucumber tests — D E PG
- Add a card...

Done
- Move data from csv to MongoDB — 0/2 — D
- Connect front end with REST — D E ŽP
- Report / Documentation — D E
- Connection to test DB — 2 — E PG ŽP
- Front-end Java Servlet JSP — 2 — E PG ŽP
- Move data to SQL — ŽP
- Create test DB — 2 — E PG
- Add a card...

Final Trello result

Examples of elements you could include in your report:

- *If you have chosen to use retrospectives or have a refactoring iteration during the project where you did not deliver any business value – why/rationale: tried reduced the technical debt of the project – did it work out well – if not, why not (reflection).*

Appendix

User Story 2:
Given a book title, application plots all cities mentioned in this book onto a map.

1. Acceptance criteria:

As a user, I expect to get back a plot with all cities mentioned in the given book onto a map.

2. Acceptance Test Case:

When searching for ‘Oliver Twist’ it displays all cities mentioned in the book on the map.

3. Scenario Outline:

```
        Arrange
                Given:  There are cities in the book
        Act
                When: The user searches
        Assert
                Then: plot all the cities on a map
```

User Story 3:
Given an author name, application lists all books written by that author and plots all cities mentioned in any of the books onto a map.

1. Acceptance criteria:

As a user I expect to get back a plot with all cities mentioned in all of a specific authors books.

2. Acceptance Test Case:

When searching for Stephen King, It will display a map of all of the cities mentioned in his books.

3. Scenario Outline:

```
        Arrange
                Given:  The author exists
        Act
                When:  The user searches
        Assert
                Then: return a map of all cities mentioned in given authors books
```

User Story 4:
Given a geolocation, application lists all books mentioning a city in a vicinity of the given geolocation.

1. Acceptance Criteria

As a user i expect to get all cities within a certain area of a given geolocation

2. Acceptance test case

Plotting in “48.8566° N, 2.3522° E” I expect to get Paris and the surrounding cities.

3. Scenario Outline:
    - Arrange
        - Given: the coordinates exist
    - Act
        - When: user searches for geolocation
    - Assert
        - Then: return nearby cities of geolocation