Metrici software și ingineria calității

Raport 2 – Refactorizarea Codului si Restabilirea metricilor

**Student: Drăghici Andreea-Maria**

**Grupa: IS1.B**

**Anul de studiu: I**

**Specializarea: Inginerie Software**

**Student Management**

**Plugins and tools used into Intellij IDEA:**

* **Plugin to calculate the metrics: MetricsReloaded and MetricsTree**
* **Tool tofind and fix coding issues: SonarLint**
* **Plugin to provides static byte code analysis to look for bugs:** **SpotBugs**

**Compliance with the following SOLID principles:**

* ***Separation of Concerns (SoC):*** Separated the classes and interfaces into disting packages to isolate different aspects of the application.

**Target:**

* Model classes are separated in one package, and parsers/mappers/adapters have their own separate packages.
* ***Dependency Inversion Principle (DIP):*** By creating interfaces for parsers, mappers, and adapters, have created the necessary abstractions to invert dependencies. Classes that use them now depend on interfaces, not concrete implementations.

**Target:**

* + This makes the code more modular and easier.

**Compliance with the following design patterns:**

* ***Model-View-Controller (MVC) arhitectural pattern:***

**Target:**

* + ***Model:*** This includes my data model and the business logic associated with them.
  + ***View:*** My fxml files and UI components it is responible for presenting the data to the user and receiving the inputs from user.
  + ***Controller:*** MainViewController acts as a controller. It handles user inputs, updates the model and manipulates the view. It connects the model and the view, ensuring they stay separate.
* ***Factory method creational pattern:*** In the ApplicationFactory class,through the applicationRunner method, this class decides which type of instance of the IApplication interface to create based on the criteria provided.

**Target:**

* It is decided whether to create a GUIApplication instance or throw an exception.

**I used the next metrics:**

1. **LOC ( lines of code )**
2. **CLOC ( lines of comment )**
3. **NCLOC ( lines of non-comment )**
4. **NOM ( number of methods )**
5. **C ( number of classes in each package )**
6. **NOI ( number of interfaces )**
7. **NOC ( number of direct subclasses of each class that occur in the project )**
8. **NOSC ( number of static classes )**
9. **WMC ( weighted method complexity )**
10. **BUGS ( average bugs per class )**
11. **VIOLATIONS ( problems per class / errors or warnings )**

**The following values ​​were obtained:**

**1. LOC ( lines of code )**

**Old:**

* *1020 lines of code in project*
* *174 lines per class (max)*
* *60 lines per method (max)*

**! TARGET ! <24 lines per method => seems ok**

**Now:**

* 3478 lines of code in project
* 366 lines per class (max)
* 23 lines per method (max)

**! TARGET ! <24 lines per method => seems ok - Done**

**2.** **CLOC ( lines of comment )**

**Old:**

* *19 lines of comment in project*
* *6 lines per class (max)*
* *2 lines per method (max*

**! TARGET ! >1 lines per method => seems ok**

**Now:**

* *1381 lines of comment in project*
* *66 lines per class (max)*
* *6 lines per method (max)*

**! TARGET ! >1 lines per method => seems ok - Done**

**3. NCLOC ( lines of non-comment )**

**Old:**

* *930 lines of non-comment in project*
* *60 lines of non-comment per method (max)*

**! TARGET ! not sure if is ok**

**Now:**

* *1675 lines of non-comment in project*
* *22 lines of non-comment per method (max)*

**! TARGET ! not sure what is the normal score / range**

**4. NOM ( number of methods )**

**Old:**

* *85 methods in project*
* *10 methods per class (max)*

**! TARGET ! <20 methods per class => seems ok**

**Now:**

* *208 methods in project*
* *23 methods per class (max)*

**! TARGET ! >=12 methods per class => seems ok – Done**

**5. C ( number of classes and interfaces in each package )**

**Old:**

* *24 classes in project*
* *6 classes per package (max)*

**! TARGET ! not sure if is ok**

**Now:**

* *53 classes and 9 interfaces in project*
* *14 classes per package (max) and 7 interface per package (max)*

**! TARGET ! >= 8 classes / interfaces in each package => seems ok – Done**

**6. NOI ( number of interfaces )**

**Old:**

* *0 in project*

**! TARGET ! not sure if is ok**

**Now:**

* 9interfaces in project

**! TARGET ! >= 6 interfaces => seems ok – Done**

**7. NOC ( number of direct subclasses of each class that occur in the project )**

**Old:**

* *0 in project*

**! TARGET ! <10 subclasses of each class => seems ok**

**Now:**

* *0 in project*

**! TARGET ! <10 subclasses of each class => seems ok – Done**

**8. NOSC ( number of static classes )**

**Old:**

* *0 in project*

**! TARGET ! not sure if is ok**

**Now:**

* *0 in project*

**! TARGET ! not sure what is the normal score / range**

**9. WMC ( weighted method complexity )**

**Old:**

* 234 in project
* *38 per class (max)*

**! TARGET ! <100 per class => seems ok**

**Now:**

* 318 in project
* *40 per class (max)*

**! TARGET ! <100 per class => seems ok – Done**

**10. BUGS ( average bugs per class )**

**Old:**

* *2 bugs in project*
* *0.08 per class*

**! TARGET ! will have to fix it**

**Now:**

* *0 bugs in project*
* *0 per class*

**! TARGET ! Bugs was fixed**

**11. VIOLATIONS ( problems per class / errors or warnings )**

**Old:**

* *Warnings = 25 issues with low impact in project*
* *Errors = 15 issues with medium impact in project*
* *Critical Errors = 29 issues with high impact*
* *Total Issues = 69 issues in 13 classes*

**! TARGET ! will have to fix it**

**Now:**

* Warnings = 0
* Errors = 0
* Critical Errors = 0
* Total Issues = 0

**! TARGET ! Violations was fixed – Done**

**References:**

**1. MetricsReloaded:**

* <https://blog.jetbrains.com/idea/2014/09/touring-plugins-issue-1/>
* <https://plugins.jetbrains.com/plugin/93-metricsreloaded>

**2. SonarLint:**

* <https://plugins.jetbrains.com/plugin/7973-sonarlint>

**3. MetricsTree:**

* <https://plugins.jetbrains.com/plugin/13959-metricstree>
* <https://github.com/b333vv/metricstree>

**4. SpotBugs:**

* <https://plugins.jetbrains.com/plugin/14014-spotbugs>
* <https://spotbugs.readthedocs.io/en/stable/links.html>
* <https://spotbugs.github.io/>