CSCI 5308

Advance Topics in Software Development

ASSIGNMENT – 2

Banner ID: B00948977

Git Assignment Link : [balajisukumaran/cosmo at refractor (github.com)](https://github.com/balajisukumaran/cosmo/tree/refractor)

Pull Request Link: [Refractored some design and implementation code smells by balajisukumaran · Pull Request #72 · 1and1/cosmo · GitHub](https://github.com/1and1/cosmo/pull/72)

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| **Table of contents** |

|  |  |
| --- | --- |
| **Task 1:** Identify the code smells……………………………………………………….…………………………………………….. | **1** |
| **Task 1 -** **Set I:** Identify implementation smell…………………………………… ……………………………………………… | **1** |
| **Task 1 - Set II:** Identify design smell……………………………………………………..………………………………………. | **4** |
| **Task 2:** refactor the project.………………………………………………………………………………………………………….. | **8** |
| **Task 2 - Set I:** Refractor implementation smell…………………………………………………………………………………. | **8** |

**Task 2 - Set II:** Refractor design smell…………………………………………………………………………………………… **11**

**Pull Request Link:** [**https://github.com/1and1/cosmo/pull/72**](https://github.com/1and1/cosmo/pull/72)

**Task #1:** Identify the code smells.

**Set I:** Identify implementation smells that are true positive, false positive, and false negative. Back up your answer with your rationale and code example (or URL).

* True positive:

The below method has been detected as a Complex Condition. The detected smell is true as the condition has three logical operators. The conditions can be separated into single lines and not cramped into a single conditional statement.

A computer screen with text on it

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Figure 1: True positive, implementation code smell.

* False Positive:

The smell detected here on line 148 is a complex condition. However, this is a false positive as the condition doesn't appear to be complex. There is only one type of logical operator '==' used, and the sub-conditions are easy to understand and read.

Moreover, this condition is not used elsewhere in the codebase, so creating a separate method for evaluating this condition does not offer a reusability advantage.

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Figure 2: False Positive, implementation code smell

* False Negative

The method 'copyItem' exhibits a complex method code smell due to its multiple 'if' statements. Additionally, it uses exceptions for control flow, such as throwing 'IllegalArgumentException', which further adds complexity to the method.

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Figure 3: False negative, Implementation code smell.

**Set II:** Identify design smells that are true positive, false positive, and false negative. Support your answer with your rationale and code example (or URL).

* True Positive

Cyclically dependent modularization has been detected in these classes. It is true positive because there is a clear bi-directional dependency. DavUserPrincipalCollection knows about PrincipalPropertySearchReport and vice versa.

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Figure 4: True positive, Design code smell.

* False Positive

Designite detected a cyclically-dependent modularization. But there is no visible cyclic dependency Between “Attribute” and “AuditableObject”. Hence it is False Positive.

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Figure 5: False positive, Design smell.

* False Negative

The 'Unexploited Encapsulation' code smell exists between 'ContentItemComparator' and 'AuditableComparator' because the 'ContentItemComparator' class does not seem to override or extend any functionality of 'AuditableComparator' beyond its constructor. This may suggest that inheritance is not the best choice here.

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Figure 6: False Negative, Design code smell

**Task #2:** Refactor the project.

**Set I:** Implementation Refactoring

1. Refactoring name: Decomposition Condition

Location:

Refactoring is done in the file “HCalendarParser.java”.

It can be found in org.unitedinternet.cosmo.calendar.hcalendar.

The method refactored is “icalDate” on line 606.

* Link of the files(s) of the previous commit (before refactoring)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/calendar/hcalendar/HCalendarParser.java at 3a47dc90b0960fbef5e9a1afeecc4e9da618b55e · balajisukumaran/cosmo (github.com)](https://github.com/balajisukumaran/cosmo/blob/3a47dc90b0960fbef5e9a1afeecc4e9da618b55e/cosmo-core/src/main/java/org/unitedinternet/cosmo/calendar/hcalendar/HCalendarParser.java)

* Link of the files(s) of the commit with refactoring changes (after refactoring)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/calendar/hcalendar/HCalendarParser.java at 933f67de48c8037563aae398104e23fb762507f3 · balajisukumaran/cosmo (github.com)](https://github.com/balajisukumaran/cosmo/blob/933f67de48c8037563aae398104e23fb762507f3/cosmo-core/src/main/java/org/unitedinternet/cosmo/calendar/hcalendar/HCalendarParser.java)

2. Refactoring name: Extract Method

Location:

Refactoring is done in the file “StandardCalendarQueryProcessor.java”.

It can be found in org.unitedinternet.cosmo.calendar.query.impl.

The method refactored is “addBusyPeriods” on line 343.

● Link of the files(s) of the previous commit (before refactoring)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/calendar/query/impl/StandardCalendarQueryProcessor.java at 63d257a32ef4b5ed5d0204f8df6400da22ee32c8 · balajisukumaran/cosmo (github.com)](https://github.com/balajisukumaran/cosmo/blob/63d257a32ef4b5ed5d0204f8df6400da22ee32c8/cosmo-core/src/main/java/org/unitedinternet/cosmo/calendar/query/impl/StandardCalendarQueryProcessor.java)

● Link of the files(s) of the commit with refactoring changes (after refactoring

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/calendar/query/impl/StandardCalendarQueryProcessor.java at ccc7311af304947983d6b1a166754ef4aadc79f7 · balajisukumaran/cosmo (github.com)](https://github.com/balajisukumaran/cosmo/blob/ccc7311af304947983d6b1a166754ef4aadc79f7/cosmo-core/src/main/java/org/unitedinternet/cosmo/calendar/query/impl/StandardCalendarQueryProcessor.java)

3. Refactoring name: Rename Method

Location:

Refactoring is done in the file “CalendarFilterEvaluater.java”.

It can be found in org.unitedinternet.cosmo.calendar.query.

The method refactored is “evaluate” on lines 75, 103 and 124.

● Link of the files(s) of the previous commit (before refactoring)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/calendar/query/CalendarFilterEvaluater.java at dd3bdf3e3dac895a6e85a93a701717efa6836285 · balajisukumaran/cosmo (github.com)](https://github.com/balajisukumaran/cosmo/blob/dd3bdf3e3dac895a6e85a93a701717efa6836285/cosmo-core/src/main/java/org/unitedinternet/cosmo/calendar/query/CalendarFilterEvaluater.java)

● Link of the files(s) of the commit with refactoring changes (after refactoring)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/calendar/query/CalendarFilterEvaluater.java at ed85b827e9d6580276f75881dc318e3eb9e67517 · balajisukumaran/cosmo (github.com)](https://github.com/balajisukumaran/cosmo/blob/ed85b827e9d6580276f75881dc318e3eb9e67517/cosmo-core/src/main/java/org/unitedinternet/cosmo/calendar/query/CalendarFilterEvaluater.java)

**Set II:** Design Refactoring

1. Refactoring name: Extract class

Location:

Refactoring is done in the file “StandardTriageStatusQueryProcessor.java”.

It can be found in org.unitedinternet.cosmo.service.impl.

Created a helper class which contains methods like getAll, getDone, and getLater. Which will be used by StandardTriageStatusQueryProcessor class

● Link of the files(s) of the previous commit (before refactoring)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/service/impl/StandardTriageStatusQueryProcessor.java at 3a47dc90b0960fbef5e9a1afeecc4e9da618b55e · balajisukumaran/cosmo (github.com)](https://github.com/balajisukumaran/cosmo/blob/3a47dc90b0960fbef5e9a1afeecc4e9da618b55e/cosmo-core/src/main/java/org/unitedinternet/cosmo/service/impl/StandardTriageStatusQueryProcessor.java)

● Link of the files(s) of the commit with refactoring changes (after refactoring)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/service/impl/StandardTriageStatusQueryProcessor.java at 09a83f78fd5f7f3c75049d748ee434f67ee805e9 · balajisukumaran/cosmo (github.com)](https://github.com/balajisukumaran/cosmo/blob/09a83f78fd5f7f3c75049d748ee434f67ee805e9/cosmo-core/src/main/java/org/unitedinternet/cosmo/service/impl/StandardTriageStatusQueryProcessor.java)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/service/impl/NoteTriageStatusHelper.java at 09a83f78fd5f7f3c75049d748ee434f67ee805e9 · balajisukumaran/cosmo (github.com)](https://github.com/balajisukumaran/cosmo/blob/09a83f78fd5f7f3c75049d748ee434f67ee805e9/cosmo-core/src/main/java/org/unitedinternet/cosmo/service/impl/NoteTriageStatusHelper.java)

1. Refactoring name: Pull Up Method

Location:

Refactoring is done in the following files:

* CaldavMultiStatusReport
* MultigetReport
* QueryReport

It can be found in org.unitedinternet.cosmo.dav.caldav.report.

Found the common logic within parsing report and moved to the parent class.

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Figure 7: Common logic within report parsing

● Link of the files(s) of the previous commit (before refactoring)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/dav/caldav/report/CaldavMultiStatusReport.java at 63d257a32ef4b5ed5d0204f8df6400da22ee32c8 · balajisukumaran/cosmo (github.com)](https://github.com/balajisukumaran/cosmo/blob/63d257a32ef4b5ed5d0204f8df6400da22ee32c8/cosmo-core/src/main/java/org/unitedinternet/cosmo/dav/caldav/report/CaldavMultiStatusReport.java)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/dav/caldav/report/MultigetReport.java at 63d257a32ef4b5ed5d0204f8df6400da22ee32c8 · balajisukumaran/cosmo (github.com)](https://github.com/balajisukumaran/cosmo/blob/63d257a32ef4b5ed5d0204f8df6400da22ee32c8/cosmo-core/src/main/java/org/unitedinternet/cosmo/dav/caldav/report/MultigetReport.java)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/dav/caldav/report/QueryReport.java at 63d257a32ef4b5ed5d0204f8df6400da22ee32c8 · balajisukumaran/cosmo (github.com)](https://github.com/balajisukumaran/cosmo/blob/63d257a32ef4b5ed5d0204f8df6400da22ee32c8/cosmo-core/src/main/java/org/unitedinternet/cosmo/dav/caldav/report/QueryReport.java)

● Link of the files(s) of the commit with refactoring changes (after refactoring)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/dav/caldav/report/CaldavMultiStatusReport.java at 9a48488077e8ee72e7794815928216826f55c67f · balajisukumaran/cosmo · GitHub](https://github.com/balajisukumaran/cosmo/blob/9a48488077e8ee72e7794815928216826f55c67f/cosmo-core/src/main/java/org/unitedinternet/cosmo/dav/caldav/report/CaldavMultiStatusReport.java)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/dav/caldav/report/QueryReport.java at 9a48488077e8ee72e7794815928216826f55c67f · balajisukumaran/cosmo · GitHub](https://github.com/balajisukumaran/cosmo/blob/9a48488077e8ee72e7794815928216826f55c67f/cosmo-core/src/main/java/org/unitedinternet/cosmo/dav/caldav/report/QueryReport.java)

[cosmo/cosmo-core/src/main/java/org/unitedinternet/cosmo/dav/caldav/report/MultigetReport.java at 9a48488077e8ee72e7794815928216826f55c67f · balajisukumaran/cosmo · GitHub](https://github.com/balajisukumaran/cosmo/blob/9a48488077e8ee72e7794815928216826f55c67f/cosmo-core/src/main/java/org/unitedinternet/cosmo/dav/caldav/report/MultigetReport.java)

1. Refactoring name: Move method

Location:

Refactoring is done in the following files:

* ItemFilterEvaluater
* ItemFilter

The logic below is depend on itemFilter object so moved the conditional statement to the ItemFilter class.

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Figure 8: method dependent on another class

● Link of the files(s) of the previous commit (before refactoring)

[cosmo/cosmo-api/src/main/java/org/unitedinternet/cosmo/model/filter/ItemFilter.java at 2c69ad80c724645abf5db564a5bf25a61886bc48 · balajisukumaran/cosmo · GitHub](https://github.com/balajisukumaran/cosmo/blob/2c69ad80c724645abf5db564a5bf25a61886bc48/cosmo-api/src/main/java/org/unitedinternet/cosmo/model/filter/ItemFilter.java)

[cosmo/cosmo-core/src/test/unit/java/org/unitedinternet/cosmo/model/filter/ItemFilterEvaluater.java at f402c6bfd221a88c6d34e3db854d27081ed814ca · balajisukumaran/cosmo · GitHub](https://github.com/balajisukumaran/cosmo/blob/f402c6bfd221a88c6d34e3db854d27081ed814ca/cosmo-core/src/test/unit/java/org/unitedinternet/cosmo/model/filter/ItemFilterEvaluater.java)

● Link of the files(s) of the commit with refactoring changes (after refactoring)

[cosmo/cosmo-api/src/main/java/org/unitedinternet/cosmo/model/filter/FilterEval.java at 1550446cac3730d43db0e337401d82b40f3478d8 · balajisukumaran/cosmo · GitHub](https://github.com/balajisukumaran/cosmo/blob/1550446cac3730d43db0e337401d82b40f3478d8/cosmo-api/src/main/java/org/unitedinternet/cosmo/model/filter/FilterEval.java)

[cosmo/cosmo-api/src/main/java/org/unitedinternet/cosmo/model/filter/ItemFilter.java at 1550446cac3730d43db0e337401d82b40f3478d8 · balajisukumaran/cosmo · GitHub](https://github.com/balajisukumaran/cosmo/blob/1550446cac3730d43db0e337401d82b40f3478d8/cosmo-api/src/main/java/org/unitedinternet/cosmo/model/filter/ItemFilter.java)

[cosmo/cosmo-core/src/test/unit/java/org/unitedinternet/cosmo/model/filter/ItemFilterEvaluater.java at 1550446cac3730d43db0e337401d82b40f3478d8 · balajisukumaran/cosmo · GitHub](https://github.com/balajisukumaran/cosmo/blob/1550446cac3730d43db0e337401d82b40f3478d8/cosmo-core/src/test/unit/java/org/unitedinternet/cosmo/model/filter/ItemFilterEvaluater.java)