PROTOCOL

A Systematic Literature Review on the Effect of Code Smells on Non-Functional Attributes of Source Code

1. Background

a) Motivation

- We are interested about how big is the impact of code smells in a project, for understanding if is really worth to work for individuate and refactor code smells or this operation can be neglected.
- During the review of the literature, it was found that there is no systematic review of the influence of the code smells on the NFA of source code. Therefore, we study research using an existing database to reduce research gaps.

b) Goals

- Conduct a systematic analysis of academic articles on "The Effect of Code Smells on Non-Functional Attributes of Source Code".
- Analyze what type of code smells impact the NFA of Source Code.

c) The research questions

- In which way a Code Smell Impact on NFA?
- Which tools, resources and techniques were used to find evidence of the influence of code smells on NFA?
- Are all code smells impactful on NFA?

2. Search Strategy

a) basic strategy: automated search, snowballing;

b) key words: ("Non-functional attributes" OR "NFA" OR "Non-functional requirements") AND ("code-smell" OR "bad smell" OR "code anomalies") AND ("effect" OR "impact" OR "influence");

c) resources: IEEE Xplore Digital Library, ACM Digital Library, and SCOPUS, Google Scholar, Science Direct;

3. Selection Criteria

a) Inclusion criteria:

1/ Publications should be “journal” or “conference”;
2/ Should be published from 2010-2020
3/ Works that involve some empirical study or present “lessons learned”;
4/ If several journal articles report the same study, the most recent article should be included.

b) Exclusion criteria:

1/ Studies that do not answer the research question;
2/ Publications which are previous versions of work also presented in later publications;
3/ Publications published before 2010;
4/ Studies that are focused only on code smells or on NFA of source code without any discussion regarding the relationship and/or influence that the first exert on the second.

4. Study Quality Assessment

a) Is the document based on empirical evidence or just based on expert opinion?
b) Is there a clear statement of the research objectives?
c) Is there an adequate description of the context in which the research was carried out?
d) Was the research project suitable to address the research objectives?
e) Was data collected to address the research question?
f) Is there a clear statement of the findings?

5. Data Extraction

a) a design data extraction form in the form of a table, which includes the following information:

- identification number;
- year;
- title;
- objectives or aims;
- code smells;
- analysed projects;
- research questions and respective answers;
- code smells that have influence on NFA;
- software projects or method that illustrate this influence.

6. Synthesis

a) the form of analysis to be used: narrative, tabulation, meta-analysis

7. Result

The final phase of a systematic review involves writing up the results of the review and circulating the results to potentially interested parties. Results will include answers to research questions.

8. Timetable

Stages	*Completion date*
1. Specify Research Questions	10.04.2020
2. Develop Review Protocol	15.04.2020
3. Identify Relevant Research	20.04.2020
4. Select Primary Studies	25.04.2020
5. Asses Study Quality	30.04.2020
6. Extract Required Data	04.05.2020
7. Synthesize Data	11.05.2020
8. Write Review Report	18.05.2020
9. Validate Report	25.05.2020