

# Assignment 3: Refactoring the Design of an Existing Project

## Software Design & Modeling

Due date: 2022-11-25 at 23:00

### 1 The assignment

Your assignment in a nutshell:

1. Pick a software **project** that you have access to. This can be written in any language, and it can be:
  - an open-source project available on GitHub or other public repositories,
  - a project you developed in the past (for example an assignment or course project),  
or
  - any other project whose source code is available and that you can share.
2. Identify a **part of the project** whose design can be improved. For example, the implementation of a certain *feature* is scattered over many classes; or a group of *classes* are poorly organized and hard to change. The project part that you target should have significant size (no toy example) but also be *feasible* given the amount of time you have for the assignment (no huge code bases).
3. **Refactor** the project part to improve its design without changing its behavior.
4. Document your refactoring work, and its motivation, in a **report**.  
Maximum length of the report: 7 pages (A4 with readable formatting) including any pictures and code snippets.

The assignment must be done in *pairs* of students; student pairs must be different in each assignment; in other words, you should not work on this assignment with the same person you

worked with for Assignment 1 or 2. Every group member should contribute equally to the work; the individual grading will also reflect this.

Once you have identified your partner for the assignment, write it in [this spreadsheet](#) **within 3 days** after this assignment is published. If you cannot find another student to work with within 3 days, the instructors will pair you up with some other available students.

This assignment contributes to **20%** of your overall grade in the course.

## 2 Resources and references

You can browse opens-source projects that are not too large and look for **issues** that mention *refactoring* or *anti-patterns*. A few examples:

- <https://github.com/opendatakit/collect/issues/507>
- <https://github.com/Dissem/Jabit/issues/26>
- <https://github.com/Ben-Wolf/IBEIS-web/issues/24>

The following *exercises* on refactoring can provide inspiration for the kinds of refactoring tasks you may want to undertake:

**Legacy code retreat trivia game:** <https://github.com/jbrains/trivia>

**Refactoring katas:** <https://github.com/marcoemrich/Refactoring-Katas>

Note these exercises are only suitable as preparatory work, not as projects for the actual assignment – which should target more realistic code.

## 3 What to discuss in the report

The structure of the report is free; it should include all the significant findings emerged during your work.

Things to include in the report's discussion:

- a brief discussion of what project you chose and why you chose it
- the goals of your refactoring: what aspects of design you want to improve, and why they need improving
- a few concrete examples of refactoring (showing *before* and *after*)
- a presentation of what you did to ensure that your refactoring did not change program behavior (such as running tests, code inspection, ...)
- a discussion of what was harder and what was simpler to refactor
- an assessment of what else could be improved in the project's design (if anything)

## 4 How and what to turn in

Turn in:

- Your **report** as a single PDF file in *iCorsi* under *Assignment 3*
- The **source code** of your project *before* and *after* refactoring it in the Git repository at <https://gitlab.com/usi-si-teaching/msde/2022-2023/software-design-and-modeling/assignment3-refactoring/groupN>, where N is your group number in the group assignment spreadsheet.

Use *branches* to store the *before* and *after* versions:

1. add the project code *before* refactoring to the main branch
2. create a new branch called *refactored*
3. apply your refactorings to the content of the *refactored* branch

We will grade the most recent commit in the *refactored* branch before the project deadline.