

Problem Statement and Goals

Software Engineering

Team 6, EcoOptimizers

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Table 1: Revision History

Date	Developer(s)	Change
Date1	Name(s)	Description of changes
Date2	Name(s)	Description of changes
...

1 Problem Statement

[You should check your problem statement with the problem statement checklist. —SS]

[You can change the section headings, as long as you include the required information. —SS]

1.1 Problem

1.2 Inputs and Outputs

[Characterize the problem in terms of “high level” inputs and outputs. Use abstraction so that you can avoid details. —SS]

1.3 Stakeholders

Direct Stakeholders

[Software Developers]: They will be the primary users of the refactoring library as they will be the ones to integrate the library into their code for better refactoring.

[Business Sustainability Teams]: These teams are responsible for considering how a company's practices affect the environment. They will especially be interested in viewing the metrics provided by the library on how it improves the energy efficiency of software over time, therefore decreasing the burden on hardware and minimizing the company's environmental footprint.

Indirect Stakeholders

[Business Leaders]: They focus on reducing operational costs associated with energy consumption, especially in large-scale or cloud-hosted applications. Use of the library in their products allows them to better achieve those goals.

[End Users]: While not directly affected by this refactoring library, end users of technology that use the library will benefit from more responsive and efficient software that consumes less power, especially in mobile, embedded, or battery-dependent applications.

[Regulatory Bodies]: They enforce energy consumption and sustainability standards, and ensure that software adheres to environmental regulations and may certify tools that meet efficiency requirements. Their oversight promotes the adoption of energy-efficient software practices.

1.4 Environment

[\[Hardware and software environment —SS\]](#)

2 Goals

3 Stretch Goals

4 Challenge Level and Extras

The expected challenge level of our project is general. This is due to the relatively straightforward technical knowledge required for its completion. The project primarily involves applying known software optimization and refactoring techniques, which are well-documented and accessible. Additionally, the required programming knowledge is in Python which is known by all of the team members and was taught in our undergraduate courses. Although the project

does involve substantial development and research components, we anticipate the overall scope and depth of work to be manageable within the given time-frame.

To further enhance the project and address any potential gaps in the challenge level, we propose two additional activities: User Documentation and Usability Testing. These extras will allow us to provide support for future users of the tool and ensure that the tool meets user expectations and accessibility standards.

Approval of the challenge level and extras will be discussed with the instructor, and adjustments may be made as needed throughout the term.

Appendix — Reflection

[Not required for CAS 741 —SS]

The purpose of reflection questions is to give you a chance to assess your own learning and that of your group as a whole, and to find ways to improve in the future. Reflection is an important part of the learning process. Reflection is also an essential component of a successful software development process.

Reflections are most interesting and useful when they're honest, even if the stories they tell are imperfect. You will be marked based on your depth of thought and analysis, and not based on the content of the reflections themselves. Thus, for full marks we encourage you to answer openly and honestly and to avoid simply writing "what you think the evaluator wants to hear."

Please answer the following questions. Some questions can be answered on the team level, but where appropriate, each team member should write their own response:

1. What went well while writing this deliverable?
2. What pain points did you experience during this deliverable, and how did you resolve them?
3. How did you and your team adjust the scope of your goals to ensure they are suitable for a Capstone project (not overly ambitious but also of appropriate complexity for a senior design project)?