

Problem Statement

Making use of the techniques we've discussed throughout the course, it's time to begin the journey of creating a final software product. This application may be any piece of software serving any specific group and need; it should solve a concrete problem. Some potential topics I can present which will serve as a jumping off point could be: software to improve the security of a system, software to address privacy concerns when engaging with technology, or software which assumes some of the intellectual overhead associated with some form of work.

If this sounds vague, it is so on purpose. The intention of this assignment is to allow you to pursue an application that makes sense in your world, while employing the principles of secure design. Therefore, you will primarily be assessed on the design within your identified problem domain. If you would benefit from more specific topics or instruction, please come in to office hours or schedule an extra meeting with me outside of office hour times. I will be happy to help in the brainstorming process.

Scope

The scope of this project is as a small to medium sized project. It should be larger than the deaddrop utility we examined and worked with at the beginning of the semester, but should not rise to the level of a major undertaking like [servo]. Scoping will be an important part of successful projects, so please don't hesitate to confirm the scoping of your project before beginning.

Technology

I will be happy to provide technical support and advice regarding any of the languages we have made use of in this course (namely Typescript, Javascript (including ES6), Go, or Rust). You may make use of other technologies (i.e. Lisp, Coq, Java, HTML, K8s, etc.) but I may not be able to provide technical support if you do so.

Please make use of appropriate libraries, frameworks, and paradigms. Do not reinvent the wheel, and instead double-check the wheels you use before moving on to the more important tasks of building a metaphorical car. Properly identify and work within the appropriate licenses concerning the tools and dependencies used.

Security Considerations

Proper consideration should be given to ensure that your design is secure. The threat vectors we've explicitly discussed in class should be considered as well as potential threats as modeled by you during the design phase. These will largely be discussed in subsequent/intermediary assignments on threat modeling and project planning.

Groups

Working in groups is encouraged, and the people responsible for each section of code should be clearly communicated (I suggest using the CODEOWNERS features present in most Git backed systems, though any means of identifying who is ultimately responsible for a section of code is sufficient). The scope of a project completed as a single person compared with the scope of a project completed by a team of three should be appropriately scaled. When in doubt, bring your team to office hours and we will discuss the appropriate demarcation of scope.

Presentation

In addition to the code artifacts submitted, you will be assessed on your ability to clearly communicate information about your software design. Your presentation should clearly articulate the problem you are solving with your software, how your software addresses the problem, and what security considerations using your software raises. Furthermore, it should clearly articulate the steps taken to mitigate these threats and assure users of the security of your tool from a design level. Finally, showcase a roadblock you encountered during development and discuss what went in to fixing said roadblock.

Grading

The following rubric will be used for evaluation.

Section	Task	Points
Documentation	Up to Date Design Documentation	2 pts.
	Usage Documentation	2 pts.
	Comprehensive README	1 pt.
Code	Secure Design Patterns	4 pts.
	Clean Code	3 pts.
	Test Coverage	3 pts.
Presentation	Pitch the Problem and Software	1 pts.
	Security Discussion	3 pts.
	Roadblock Discussion	1 pt.
Total Points		20 pts.

5010 Extension

The extension for graduate students will be worth an additional five points, making this assignment out of 25 points instead of 20. Students in the undergraduate section may complete these tasks for extra credit.

Using the techniques of type first design that we've discussed in supplemental material, provide a high-level proof sketch that demonstrates your software is secure. Consider both external threats such as attackers and the system your application runs on as well as threats created by interfacing with your system. Complete an addendum to the design document which contains this information and provide it in the repository you submit.