Thesis Outline

Part I: Opening

1. Introduction
    a) Motivation for verifying systems
    b) Era of scale---enter proof engineering (first survey paper mention)
    c) Looking back (Social Processes), development has come a long way, but maintenance is still hard! And this is a problem in practice!
    d) But missed opportunity: automation doesn't understand that proofs evolve
    e) So we build automation that does, and we call this *proof repair*. Proof repair shows that there *is* reason to believe that verifying a modified system should often, in practical use cases, be easier than verifying the original the first time around.
    f) Or, in other words (thesis statement): Changes in programs, specifications, and proofs carry information that a tool can extract, generalize, and apply to fix other proofs broken by the same change. A tool that automates this can save work for proof engineers relative to reference manual repairs in practical use cases.
    g) We implement this in a tool for Coq, get some sweet results.
    h) Pave path to the next era of verification
2. Reading Guide
    a) How to read this thesis
    b) Mapping of papers to chapters
    c) Authorship statements for included paper materials, to credit coauthors
    d) Expected reader background & where to find more info

Part II: Proof Engineering

3. Proof Development
    a)
4. Proof Maintenance

Part III: Tools for a New Era

5. Proof Repair
    a) In every relation between proofs is a proof of a relation
6. Often, in Practical Use Cases

Part IV: Closing

7. Conclusion
8. The Next Era