Walking Through My Thesis

Necessary Liberal Preconditions: A Proof System

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Agenda

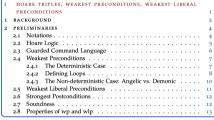
- 1 Thesis Structure
- 2 Contribution
- 3 Current TODOs

Link to repository:

https://github.com/AnranW/wlp/blob/main/thesis/main-anran-ma.pdf

Overview: 3 Parts, 30 Pages, N Images

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Currently divided into three parts:

Part I Definitions, explanations, illustrations.

Part II Proposals, proofs, examples.

Part III Tables, figures, acronyms.

Part I: Hoare Triples, Weakest Preconditions, Weakest Liberal Preconditions

[HO	ARE TRIPLES, WEAKEST PRECONDITIONS, WEAKEST LIBERAL	
	PR	ECONDITIONS	
1	BAC	KGROUND	
2	PRE	LIMINARIES	
	2.1	Notations	
	2.2	Hoare Logic	
	2.3	Guarded Command Language	
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		2.4.1 The Deterministic Case	
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	2.8	Properties of wp and wlp	1

Chapter 1: Background

- Convince that proof systems are important
- Show the structure of the thesis

Chapter 2: Preliminaries

- Table of Notations
- Definitions of Hoare Triples, GCL, wp, wlp, sp
 - Explain the use of Ifp and gfp
- Soundness: semantics of wp, wlp, sp
- Properties of wp and wlp that will be used in part II

Part II: Necessary Liberal Preconditions

Ι	NECESSARY LIBERAL PRECONDITIONS	1.
,	A PROOF SYSTEM	1
	3.1 Literature Review	1
	3.2 A Precondition Weaker Than the Weakest Liberal Precondition	1
	3.3 A Proof System	2
	CONCLUSIONS	2
	4.1 Conclusions	2
	4.2 Future Work	2

Chapter 3: A Proof System

- Literature review: the similar triples that have been studied
- Studying a special G such that $wlp.C.F \implies G$: establish wlp with angelic non-determinism using G and sp.
- Studying G in general: proving things negatively

Chapter 4: Conclusion

- Conclusion
- Future work

Thesis Structure

Part III: Appendix

III	Α	PP	EN	DI	X

- A SYMBOLS AND ACRONYMS
- B GRAPHICAL ILLUSTRATION OF PREDICATE TRANSFORMERS

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 - Graphical illustration of predicate

Symbols and Acronyms

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- transformers (all combinations)

Contribution of My Thesis

- (Re-)Explanation of the use of least and greatest fixed points while defining predicate transformers, might be of pedagogic value.
- **E**stablish wlp in angelic setting using wlp_d and sp, which might shed light on angelic and demonic views on non-determinism.
- A proof system that proves programs when negation is hard or impossible.

Current TODOs

Tons of refining and correcting, plus:

(Code: @-happy for now, @-halfway there, @-to be continued)

1	HOARE TRIPLES, WEAKEST PRECONDITIONS,	WEAKEST LIBERAL	
	PRECONDITIONS		
1	BACKGROUND		:
2	PRELIMINARIES		
00	2.1 Notations		
00	2.2 Hoare Logic		
0.0	2.3 Guarded Command Language		
	2.4 Weakest Preconditions		
	2.4.1 The Deterministic Case		
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	2.7 Soundness		1:
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Thank you!