

School of Computer Science  
MS Thesis  
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## PROOF PAD: AN INTEGRATED DEVELOPMENT ENVIRONMENT FOR THE ACL2 THEOREM PROVER

### ABSTRACT

Integrated Development Environments (IDEs) are an increasingly important part of how students and professionals write code. The availability of free, high quality, industry-grade IDEs for popular imperative languages has led to a high expectation of quality in programming tool sets that is often difficult for less mainstream languages to meet. ACL2 (A Computational Logic for Applicative Common Lisp) is a Lisp dialect and theorem prover that suffers from this problem. ACL2 is a powerful system with potential for classroom use in a way that encourages and develops the ability to write code which can be tested and reasoned about in a rigorous way. In this thesis, I discuss Proof Pad, a new IDE for ACL2. Proof Pad is not the only attempt to provide ACL2 IDEs catering to students and beginning programmers. The ACL2 Sedan and DrACuLa systems arose from similar motivations. Proof Pad builds on the work of those systems and on pedagogic IDEs such as DrScheme and BlueJ. It also takes into account the unique workflow of the ACL2 theorem proving system.

The design of Proof Pad incorporated user feedback from the outset, and that process continued through all stages of development. Feedback took the form of direct observation of users interacting with the IDE as well as questionnaires completed by users of Proof Pad and other ACL2 IDEs. The result is a streamlined interface and fast, responsive system that supports using ACL2 as a programming language and a theorem proving system. Proof Pad also provides a property-based testing environment with random data generation and automated interpretation of properties as ACL2 theorem definitions.

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Time: **5:00 PM**

Place: Devon Hall room **220**

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