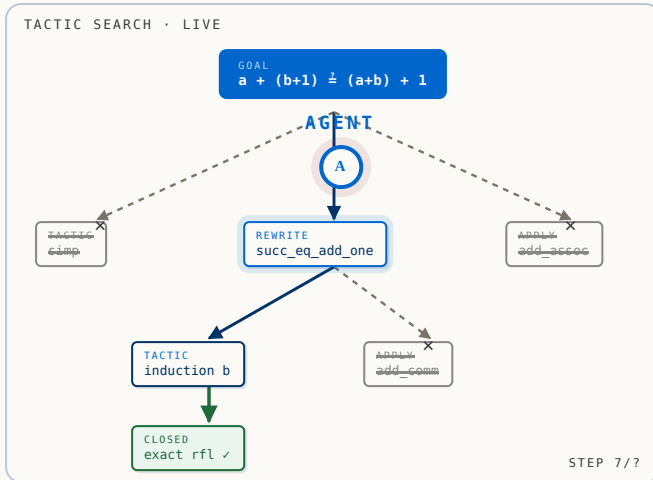


The Lemma Hunter.

An autonomous agent that wanders a library of math, and comes back with proofs.

The Idea



Give it a goal. Let it loose.

Closing a Lean 4 proof is a small expedition: read the goal, look up a lemma, try a tactic, look at the new goal, try again. We're building an **agent** that runs that loop on its own. It chooses tools, backtracks when stuck, and decides for itself when the proof is actually done.

TOOLS THE AGENT CAN REACH FOR

- search_lemma
- apply_tactic
- read_goal
- check_proof
- + whatever you invent

Why it matters: a good prover doesn't just predict the next token. It plans, looks things up, and knows when to give up and try again. We want to study how far that takes us.

What You'll Do

- Build an agent loop that **plans, calls tools** against a live Lean 4 environment, and recovers from dead ends.
- Design the agent's "scratchpad". What it remembers, what it forgets, and how it decides what to do next.
- Stress-test it on real Lean 4 proof tasks and figure out where it breaks (and why).
- Co-author the write-up. Your thesis and a paper, in one.

You'll come away knowing

- How modern LLM agents are actually built, beyond the demo.
- How to evaluate an agent in a domain that *can't* be faked.
- Enough Lean 4 to read someone else's proof and not panic.

Skills we're looking for

PYTHON	■ ■ ■ ■ □
PYTORCH	■ ■ ■ □ □
NLP / LLMS	■ ■ ■ □ □
MATH (A +)	■ ■ □ □ □
LEAN	□ □ □ □ □

filled = required ·
empty = we'll teach you

References

- [1] Yang et al., *LeanDojo: Theorem Proving with Retrieval-Augmented LMs*, NeurIPS 2023.
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- [3] Uluşan, Akbudak, Erer, Şahin, *FormalRewardBench: A Benchmark for Formal Theorem Proving Reward Models*, arXiv 2605.10141, 2026.

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Interested?

Send us an email! CV, transcript, and a **brief** note on why this excites you.

"Thesis – Lemma Hunter"