HanoiVM Project Profile Report

Date: 2025-03-23

Project Overview

HanoiVM is a recursive ternary virtual machine designed to operate on symbolic logic using base-81 (T81), base-243 (T243), and base-729 (T729) precision layers. It includes AI-enhanced runtime optimization, GPU dispatch via CUDA and ROCm, and a literate programming design using `.cweb` files for full transparency.

Current Completion Summary

- Ternary Arithmetic: 95%
- VM Execution Engine: 90%
- Disassembler: 70%
- Assembler: 60-70%
- GPU Dispatch (CUDA & ROCm): 90%
- AI Hook Integration: 65%
- CLI & Loader: 80%
- Documentation: 85-90%
- Testing: 50-60%

Total Completion Estimate: ~78-80%

Roadmap & Remaining Priorities

1. Complete assembler backend in `t81asm.cweb`
2. Automate `.hvm` macro output from `.cweb` programs
3. Expand test coverage in `hanoivm_tests.cweb`
4. Finalize Axion-AI feedback and entropy learning loop
5. Add `/sys/axion_debug/gpu_result` reader/writer
6. Enable stack graph visualization for debugging symbolic recursion

Integration Highlights

- Full GPU dispatch integration with CUDA (cuda_handle_request.cweb) and ROCm

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(gaia_handle_request.cweb)

- Userspace IOCTL bridge via /sys/axion_debug/gpu_request
- Literate programming for full transparency in all modules
- Forward-compatible with TISC (Ternary Instruction Set Compiler)