

UV SIM Future Roadmap

The UVSim software simulator, initially designed to execute BasicML programs, is poised for significant expansion to support assembly language programming and an interactive tutorial mode. This roadmap outlines a phased approach to transform UVSim into a comprehensive educational tool while maintaining backward compatibility. The first phase focuses on stabilizing the existing system, addressing critical bugs, and refining the GUI to improve user experience. Following this, Phase 2 introduces assembly language support, enabling users to write programs using mnemonics (e.g., ADD 15) and labels, which are then translated into BasicML for execution. This phase also includes an assembler component and enhanced debugging tools, such as a memory viewer and register status panel, to facilitate deeper understanding of low-level operations. By the end of Phase 2, UVSim will serve as a bridge between high-level educational concepts and practical assembly programming, laying the groundwork for more advanced features.

The subsequent phases prioritize educational accessibility and advanced functionality. Phase 3 integrates a tutorial mode with step-by-step lessons, quizzes, and debugging tools, allowing users to learn at their own pace while receiving immediate feedback. A library of sample programs and a community portal will further enrich the learning experience. Finally, Phase 4 extends UVSim's capabilities for advanced users and educators, introducing multi-file project support, hardware simulation visuals, and classroom management tools. This progression ensures UVSim evolves from a simple simulator into a versatile platform for teaching fundamental computing concepts. The roadmap emphasizes iterative development, with each phase building on user feedback to ensure the tool remains aligned with educational needs while fostering engagement and long-term adoption.

Following the successful implementation of assembly language support and tutorial features, the next strategic phase for UVSim involves mobile platform integration to enhance accessibility and flexibility for students and educators. A dedicated UVSim Mobile App will be developed for iOS and Android, offering core functionality such as BasicML and assembly program editing, execution, and debugging in a touch-optimized interface. The mobile version will sync seamlessly with the desktop application via cloud storage, enabling users to start a project on one device and continue on another. Key mobile-specific features will include offline mode for uninterrupted learning, gesture-based debugging (e.g., swipe to step through code), and push notifications for tutorial reminders or assignment deadlines. Additionally, the app will incorporate augmented reality (AR) components, allowing users to visualize memory operations or CPU workflows in an interactive 3D space—ideal for reinforcing abstract concepts.

To ensure a smooth transition to mobile, development will prioritize performance optimization for low-power devices and adaptive UI design for varying screen sizes. A beta testing program will gather feedback from educational institutions to refine the user experience

before full release. By extending UVSim to mobile platforms, the project not only broadens its accessibility but also aligns with modern pedagogical trends favoring blended and mobile-first learning. This expansion will position UVSim as a leader in portable computer science education tools, complementing its existing desktop capabilities while reaching a wider audience of learners and instructors. Future updates may explore cross-platform multiplayer coding challenges or AI-assisted tutoring, further solidifying UVSim's role in next-generation computing education.