Program Input – Users must be able to input a UVSim program manually.

Program File Handling – Load and save UVSim programs to/from a `.txt` file.

Execution Control – Start, pause, stop, and reset program execution.

Step Execution – Execute instructions one at a time for debugging.

Breakpoints – Set breakpoints where execution will automatically pause.

Memory Management – Display memory and allow users to inspect/modify values.

Register Display – Show accumulator and instruction counter in real time.

Error Handling & Reporting – Detect and display errors like invalid instructions, memory overflows, and divide-by-zero.

Input/Output Simulation – Support simulated input/output in a console area.

Instruction Validation – Validate instructions before execution to prevent invalid commands.

Logging Execution History – Provide a history log of executed instructions.

Undo Last Action – Allow undoing the last executed instruction.

Code Editing Support – Let users edit their UVSim code before execution.

Dark Mode / Light Mode – Support a theme toggle for accessibility.

Help & Documentation – Include help sections/tooltips explaining commands and GUI functions.

Non-Functional Requirements (NFRs) - Keep

Performance Efficiency – Execute an instruction in under **100 ms** for smooth interaction.

Cross-Platform Compatibility – Must run on **Windows, macOS, and Linux** without major modifications.

Accessibility Compliance – Fully navigable via **keyboard shortcuts** and support for **screen readers**.