1. Functional Requirements

UVSim should be able to:

* Let users enter programs into memory using a set of predefined instructions.
* Load and store values in memory locations.
* Perform arithmetic operations like addition, subtraction, multiplication, and division.
* Handle input operations so users can enter values to be stored in memory.
* Handle output operations to display stored values.
* Execute programs step by step, with debugging options.
* Detect and handle errors for invalid instructions.
* Initialize memory with default values or user-defined data.
* Show the current state of memory and the accumulator when requested.
* Keep a log of executed instructions for debugging.
* Support branching operations like conditional and unconditional jumps.
* Provide an interactive interface for running and testing programs.
* Save and load programs for future use.
* Reset memory and the accumulator when needed.
* Allow users to define and modify custom instruction sets for extra functionality.

2. Non-Functional Requirements

* Performance: UVSim should run instructions quickly and smoothly.
* Usability: The interface should be easy to use, whether you’re a beginner or an experienced user.
* Scalability: The system should be built in a way that makes it easy to expand, like adding more instructions or increasing memory size without major changes.