**Final SRS Merged Document**

**Functional Requirements**

**Program Loading**

* + The system shall operate on windows devices running windows11
  + The system shall allow the user to load a program by browsing windows file explorer.
  + The system shall display a message when a program is successfully loaded.
  + The system shall handle errors if the selected file is not a valid program file.

**Program Execution**

* + The system shall execute the loaded program when the "Run" button is clicked.
  + The system shall execute instructions sequentially unless directed by a branch instruction.
  + The system shall handle and display errors for invalid instructions.
  + The system shall halt execution if a halt instruction (opcode 43) is encountered.

**Input and Output Handling**

* + The system shall prompt the user for input when a read instruction (opcode 10) is executed.
  + The system shall display the output of a write instruction (opcode 11) in the output area.
  + The system shall log and display all executed read and write instructions.

**Memory Management**

* + The system shall initialize memory to a default size of 100 locations.
  + The system shall allow reading from and writing to specific memory locations.
  + The system shall reset memory to its initial state upon test file load.

**User Interface**

* + The system shall provide a labeled button to load a program file.
  + The system shall provide a labeled button to run the loaded program.
  + The system shall provide a labeled button to quit the application.
  + The system shall display all output and messages in a dedicated output area beneath labeled buttons.

**Error Handling**

* + The system shall display error messages for invalid file selections.
  + The system shall display error messages for invalid instructions during execution.
  + The system shall handle division by zero errors gracefully.

**Non-functional Requirements**

**Usability**

* + The system shall provide clear error messages to the user when test files not found
  + The system shall throw an error message if user input unsuitable data type
  + Three easy buttons labeled: Load, Run, and Quit
  + Easy to follow User instructions found within readme.txt

**Performance**

* + The system shall execute programs efficiently, with delay < 3 seconds.
  + The system shall handle large programs without 10 percent performance degradation.

**Maintainability**

* + The system shall be modular and follow object-oriented design principles.
  + The system shall be documented with comments and a user manual.