**Cairo University**

**Faculty of Computers and Information**

# CS322

## Computer Architecture and Organization

# Assignment 4

**2019**



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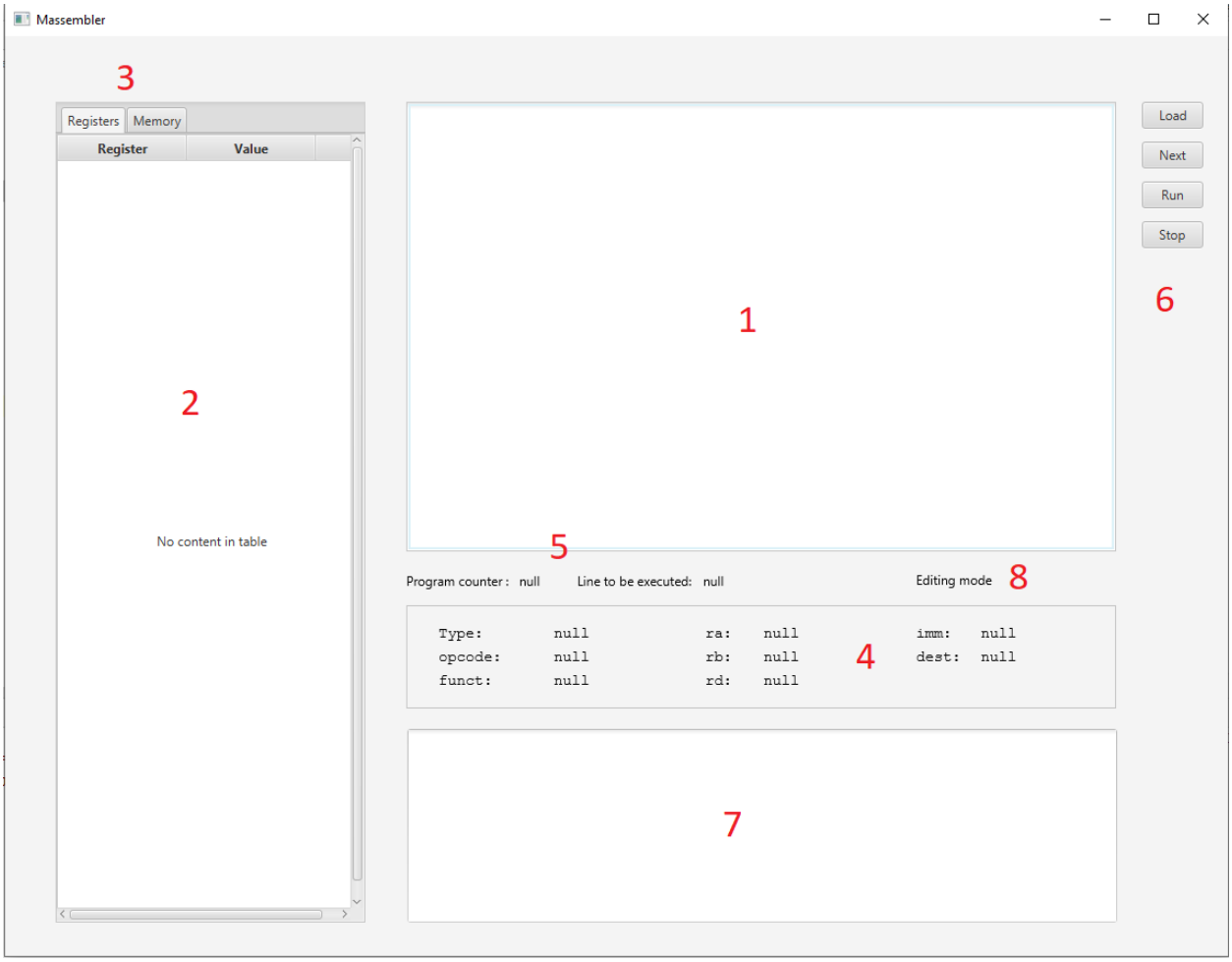
# Welcome to Massembler!

You will see this screen when you first open the program.

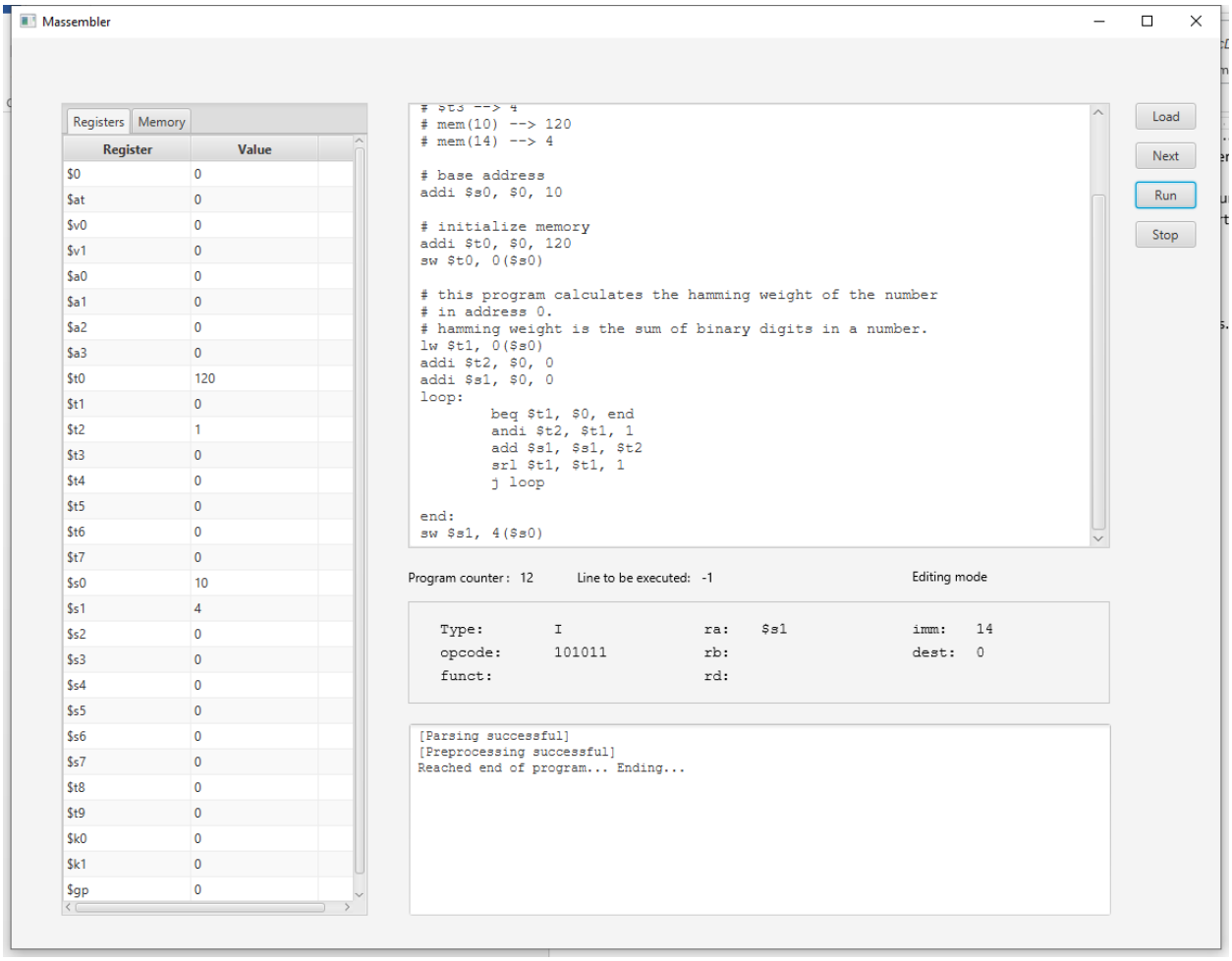



We will describe the main elements of the user interface below:

1. **Program code section:** Text area displaying the code that will be run on the virtual machine. When in Editing Mode, the user may edit the code in the text view.
2. **Register and Memory tables:** Table displaying the values stored in the virtual machine's registers and memory. In the register view, all registers will be displayed (even with their default values of zero). In the memory view, all memory addresses that were read or written to will be displayed (in order of accessing).
3. **Register and Memory table selector:** Use this tab to select from viewing the virtual machine's register table and memory.
4. **Instruction information:** Here will be displayed some values relating to the most recently executed instruction such as the type of instruction, the opcode, the registers involved, and so on.

5. **Program counter:** Simple label displaying the virtual machine's program counter.
6. **Load and execution control:** Buttons which allow the user to control the virtual machine:
    a. **Load:** Loads an assembly code file from the user's computer.
    b. **Next:** Executes the next instruction (line by line).
    c. **Run:** Executes all instructions till the end of the program.
    d. **Stop:** Stops execution and reenters Editing Mode.
7. **Output terminal:** Terminal containing virtual machine output and error logs.
8. **Mode indicator:** Indicator showing the state of the program.

## Example usage:




In this example, the user first clicked **Load** and loaded an assembly file located on the machine. Then, the user clicked **Run** to run the code all at once. At the left of the screen, the user can inspect the final state of the registers in the virtual machine, as well as the memory. In the middle of the interface the user can see the information pertaining to the last instruction executed in the program.