# User Guide for Part IV:

## Steps to RUN the Project:

Step 1: Open the terminal

Step 2: Open the .jar file using the terminal.

- Open the terminal and go to the file location using “cd” command. (In our case, it was in Desktop
- Run the program using “java -jar Simulator.jar”

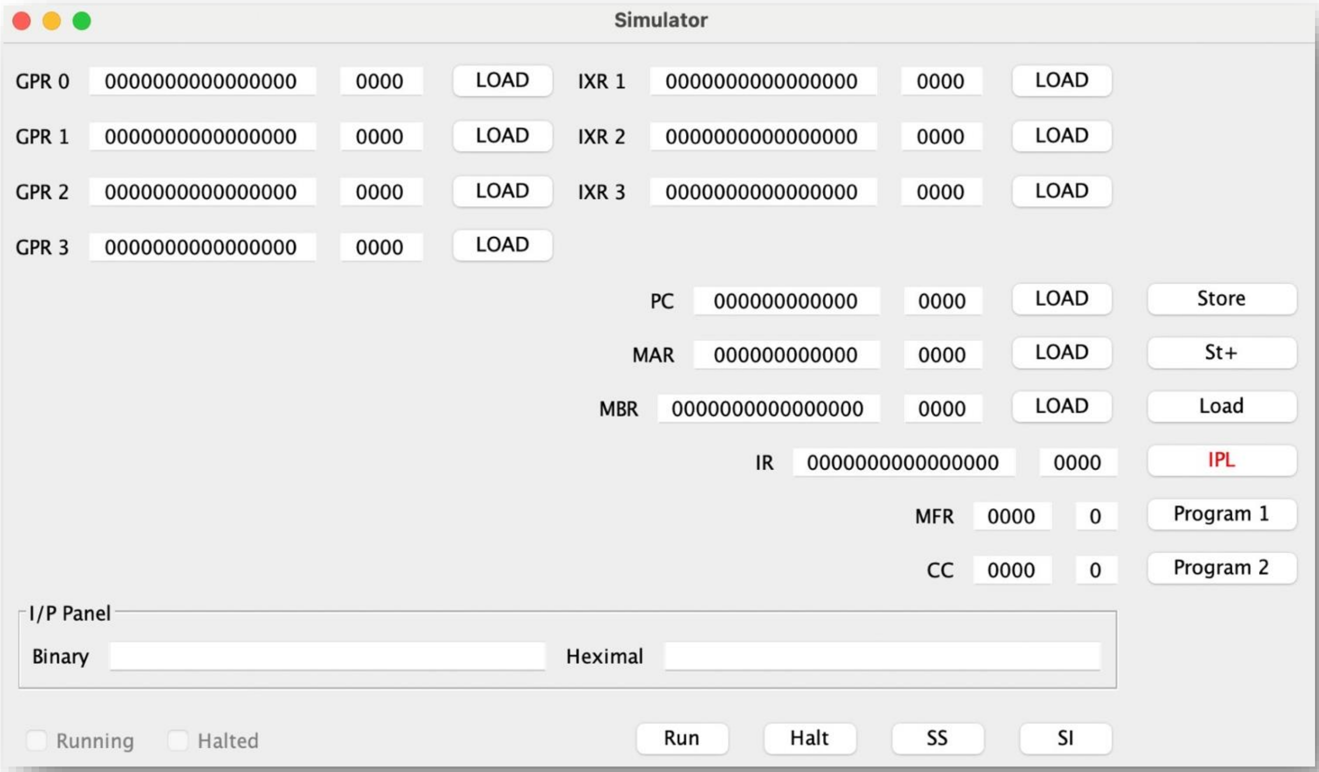
Then the program will start with three different interfaces: Simulator GUI, Debug GUI, and  Input/Output GUI.

## Simulator GUI

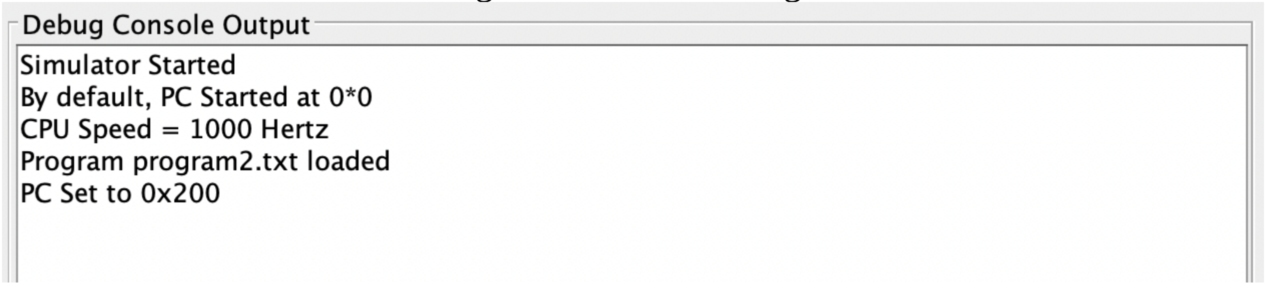
In the input panel, the user can enter either a hexadecimal or binary number. If the input is binary, the hexadecimal label will display the input in hexadecimal form. If the number is in hexadecimal format, the binary label will display the number in binary.

How to run Program 2:

- Click on the “Program 2” button as shown below, it will load “program2.txt” which contains content to execute the program.


Simulator
GPR 0 0000000000000000 0000 LOAD
GPR 1 0000000000000000 0000 LOAD
GPR 2 0000000000000000 0000 LOAD
GPR 3 0000000000000000 0000 LOAD
IXR 1 0000000000000000 0000 LOAD
IXR 2 0000000000000000 0000 LOAD
IXR 3 0000000000000000 0000 LOAD
PC 000000000000 0000 LOAD
MAR 000000000000 0000 LOAD
MBR 0000000000000000 0000 LOAD
IR 0000000000000000 0000
MFR 0000 0
CC 0000 0
Store
St+
Load
IPL
Program 1
Program 2
I/P Panel
Binary
Heximal
Running
Halted
Run
Halt
SS
SI

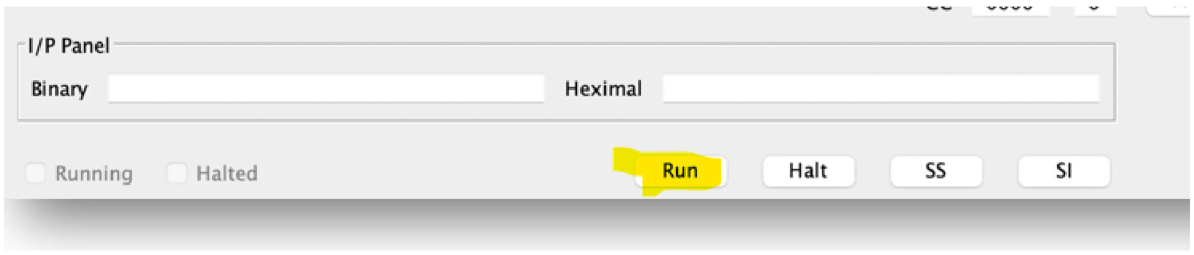
- After “progam2.txt” is loaded, the progam will set to 0x200. As you can see in the image below from Debug GUI.



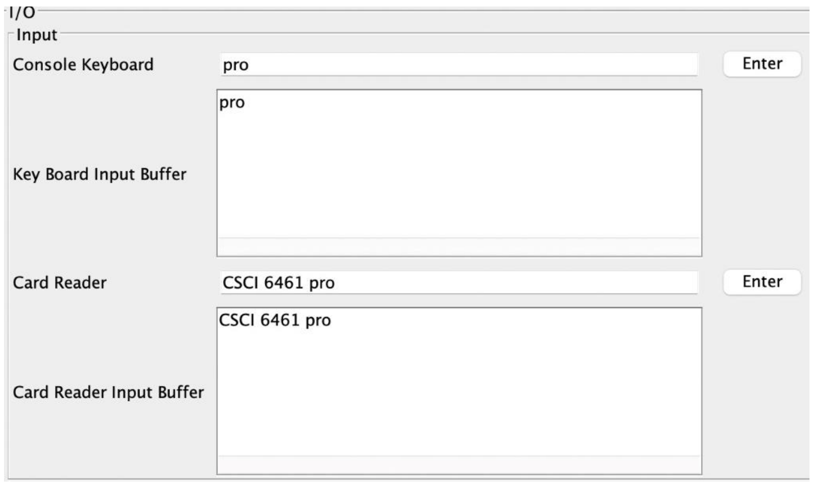
Debug Console Output

```
Simulator Started
By default, PC Started at 0*0
CPU Speed = 1000 Hertz
Program program2.txt loaded
PC Set to 0x200
```

- Now we will press the “run” button from Simulator GUI and program will be launch.



- It will request for input, provide the sentence adjacent to card reader and the word next to Console Keyboard from the Input/Output GUI. The, press Enter.



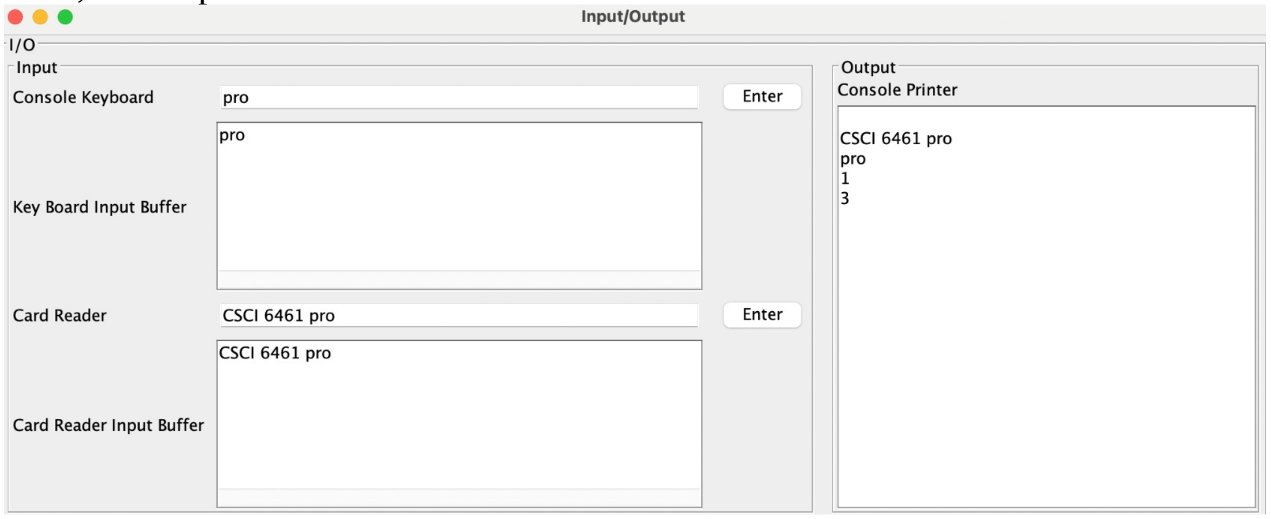
Console Keyboard: pro

pro

Card Reader: CSCI 6461 pro

CSCI 6461 pro

- Now, the output will



Console Keyboard: pro

Key Board Input Buffer: pro

Card Reader: CSCI 6461 pro

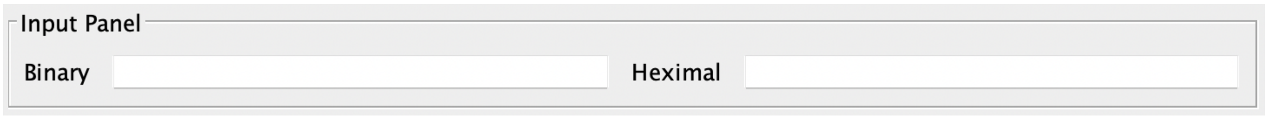
Card Reader Input Buffer: CSCI 6461 pro

Console Printer:

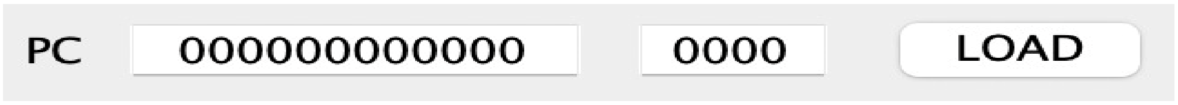
```
CSCI 6461 pro
pro
1
3
```

be the sentence, word and its number in the sentence

If you want to change the content of register, you have to do it manually by using "LD" button which is combined with input panel.

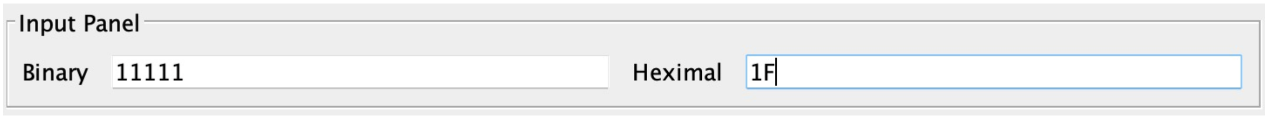


- This is how LD looks like



- If you want to change PC to 1F, this is how you can do it.

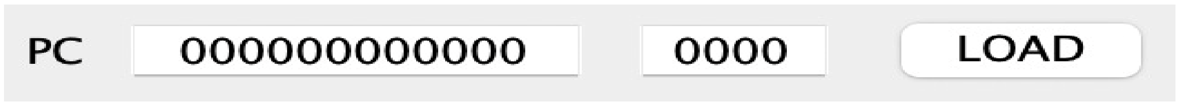
1. Input "1F" in the both Binary and Hexadecimal format.



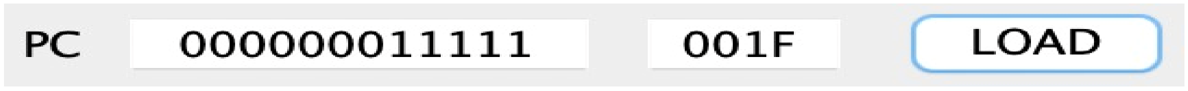
Binary: 11111

Heximal: 1F

2. Press the "LOAD" button and it will set to "1F"



3. The PC is now set to "1F"



This is how youy will able to manually change the content using the "LOAD"

## Buttons

- IPL:

  Load the program inside "IPL.txt" into the memory. "IPL.txt" should be right next to the JAR file
- Load:
  - Load the memory content at the address specified by the content of the MAR register to the MBR register
    - c(MBR) = c(mem(c(MAR))))
- Store:
  - Store the content of the MBR register to memory at the address specified by the content of the MAR register.
- Store+:
  - c(mem(c(MAR)))) = c(MBR)
  - Do what "Store" does and increment the MAR register by one
- Single Instruction:
  - Run one single instruction
    - In our current implementation, this will decode and execute what's inside the IR register.
- Single Step:

    - Run a single stage (fetch / decode / execute)
        - Don’t have SS multiple times while the machine is still running (there is an indicator showing the machine is still running)
- Stop:
    - Halt the machine by executing “halt” instruction
        - Used for debugging
        - Should never click this button when the machine is running normally

- Run:
    - Run the emulator
        - In Part II, our emulator doesn’t have any reserved memory and PC starts at 0x100

- Program 2
    - This will load the contents of program1.txt for it to execute, the PC starts at 0x200 when it is loaded.

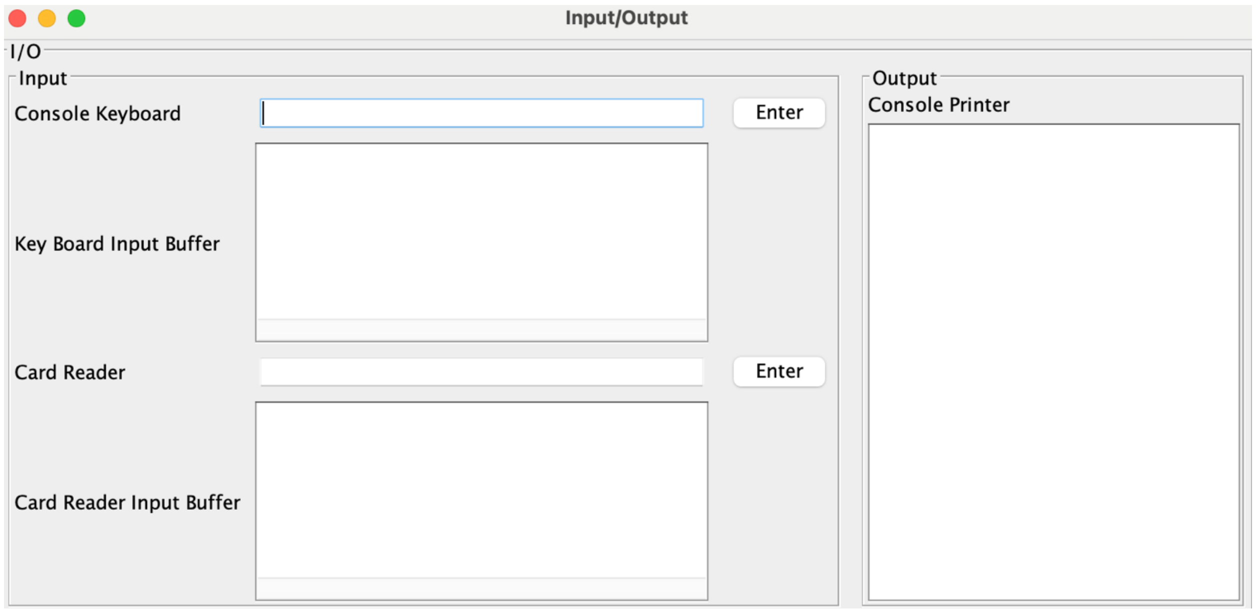
If you wish to change the content of a register manually, you have to use "LOAD" button right next to that register combined with the input panel.

For example, if you wish to set PC to 1F, here is how you can do it:

1. Input 1F in the input panel where it says heximal
2. Click the "LOAD" button right next to PC
3. Now the PC should be set to 1F

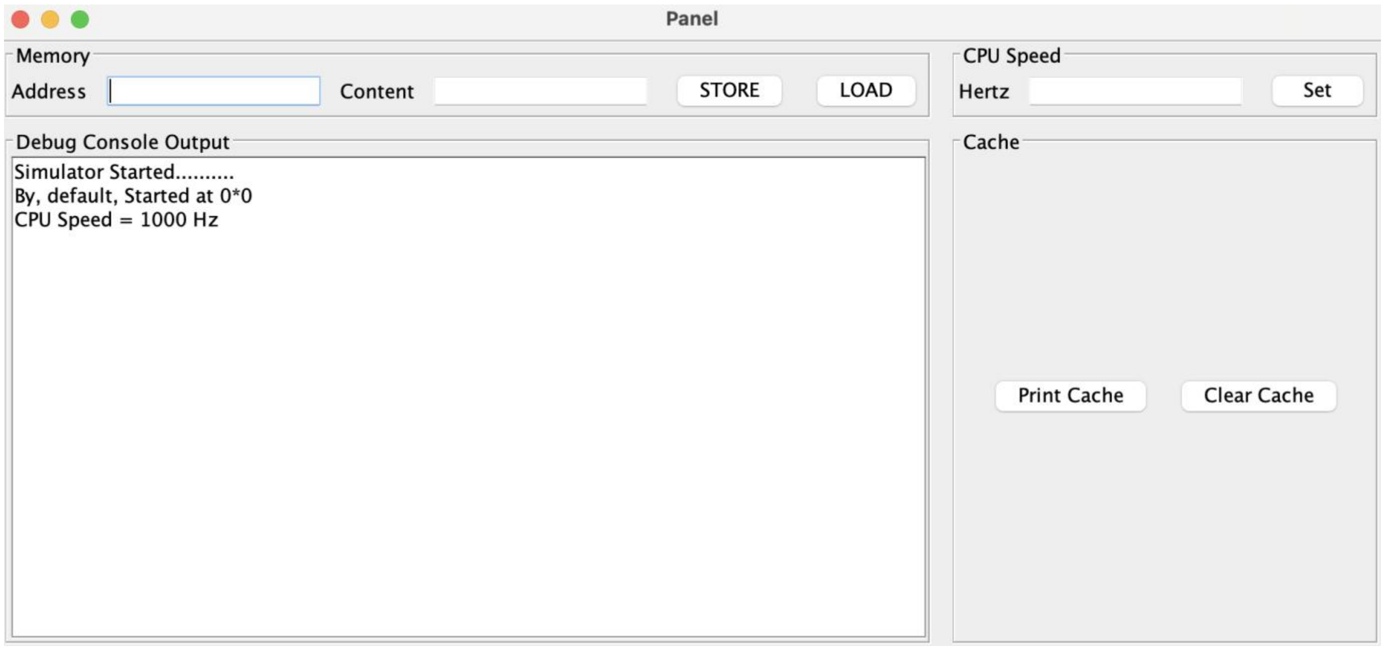
You can use this way to modify the content of any register which has a "LOAD" button right next to it.

## I/O GUI



On the console keyboard label, the user must enter a number between 0 and 65,535 on the number pad. They can then press enter or click the Input button after they've entered the number. The number will print beneath the Console Printer label, one digit at a time.

## Debug GUI



```
Simulator Started..........
By, default, Started at 0*0
CPU Speed = 1000 Hz
```

The user can print the entire contents of the cache by clicking the print cache button. They click the flush cache button if they want to clear the cache. The CPU Speed can be modified with any number and the user inputs under the CPU HZ label so that they can read the instructions being executed from program1.txt at their own leisure.