USER GUIDE TO OPERATE SIMULATOR

First, Program Counter (PC) value is inputted using the toggle buttons at the top labeled from 0-15 where each button represents a bit and then click **Load** button beside PC so that PC points to the instruction in memory to be executed.

Then the address of the PC is transferred to the Memory Address Register (MAR), this completes one cycle. On next cycle Memory Control Unit fetches the word from memory using the address of MAR and places it in Memory Buffer Register (MBR). The contents of the Memory Buffer Register are then moved to the Instruction Register (IR). Based on the opcode, the instruction is executed.

STEPS to operate Simulator:

1. Install Java SE 17 version to run the Jar file.
   CSCI6461Project.jar - this jar file is attached in the blackboard assignment local file.

2. Store the boot.txt file in the same directory as the Jar file. (The input file name boot.txt is attached in the blackboard assignment local file).

3. Execute the Jar file which opens a simulator window.

4. Click the IPL button and it loads the text file boot.txt in the memory.

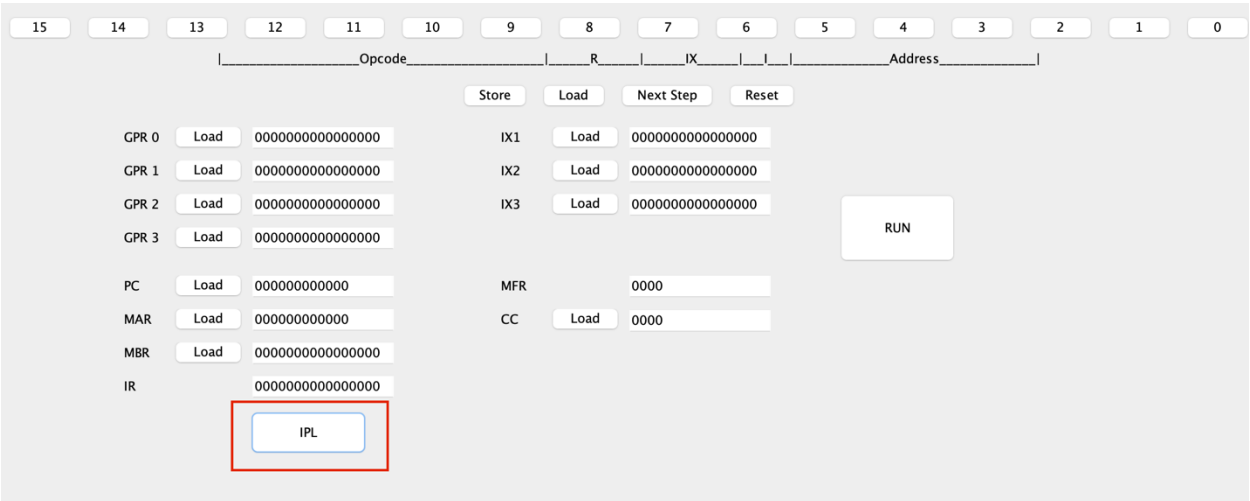


Fig 1: IPL Button

5. Input Binary 000000010111 value using the toggle buttons (0-15) in Simulator and click on the load button near PC to load the first address in Program counter.

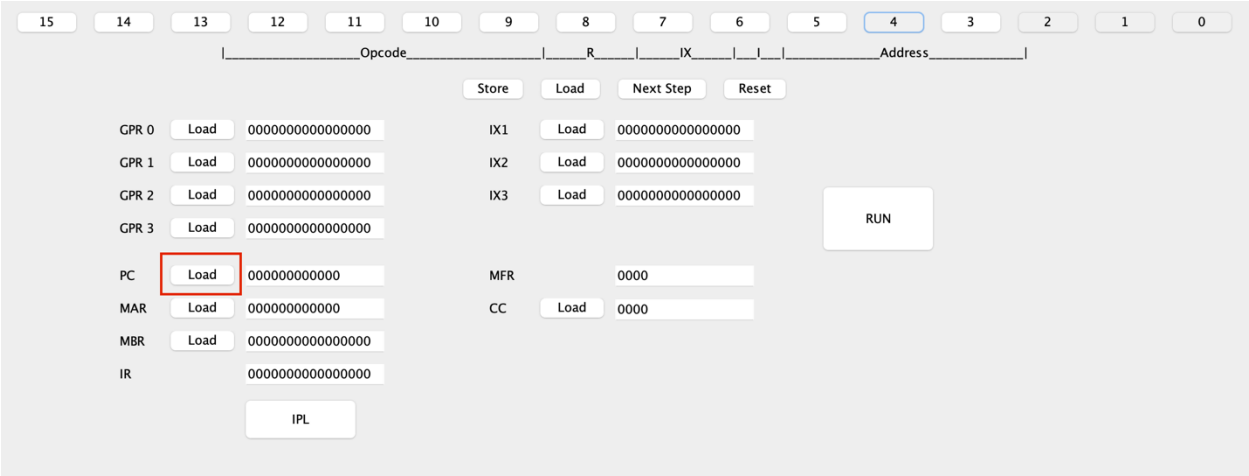


Fig 2: showing 0000000010111 entered in bus.

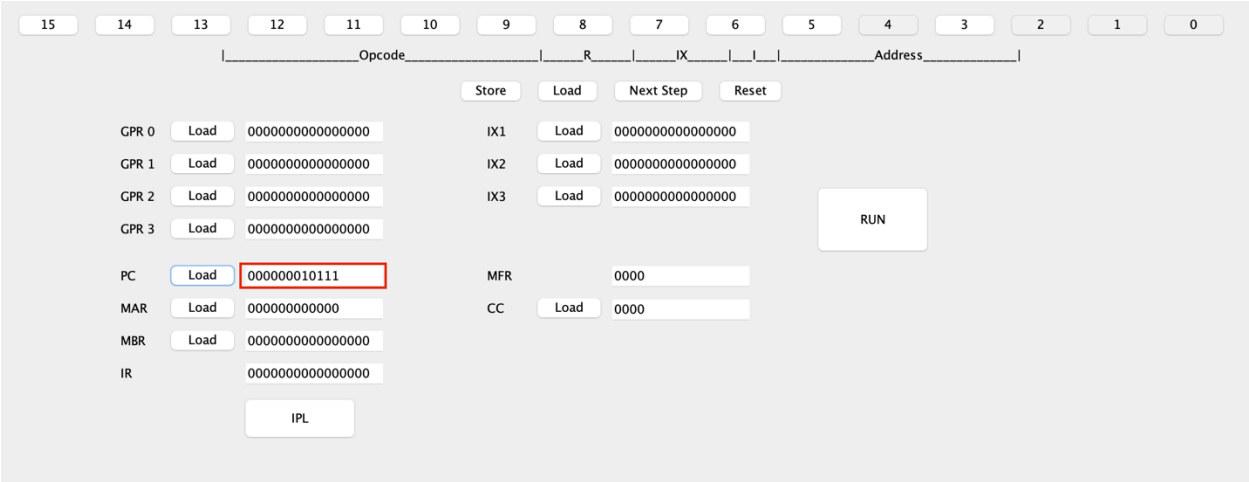


Fig 3: Displaying the value loaded in the PC.

6. In the same way, click the load button beside MAR.

7. Click the **Next Step** button for the Load and Store instructions to execute one by one and display in the MBR and IR.

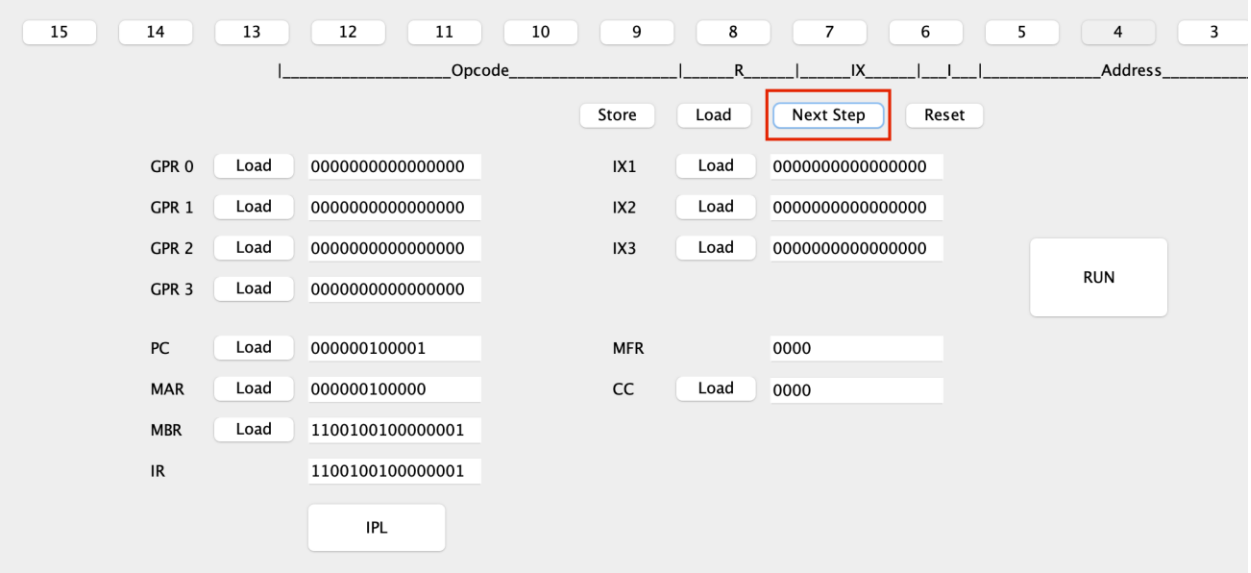


Fig 4: Next Step Button

8. Click on the run button to execute the remaining instructions in the memory.

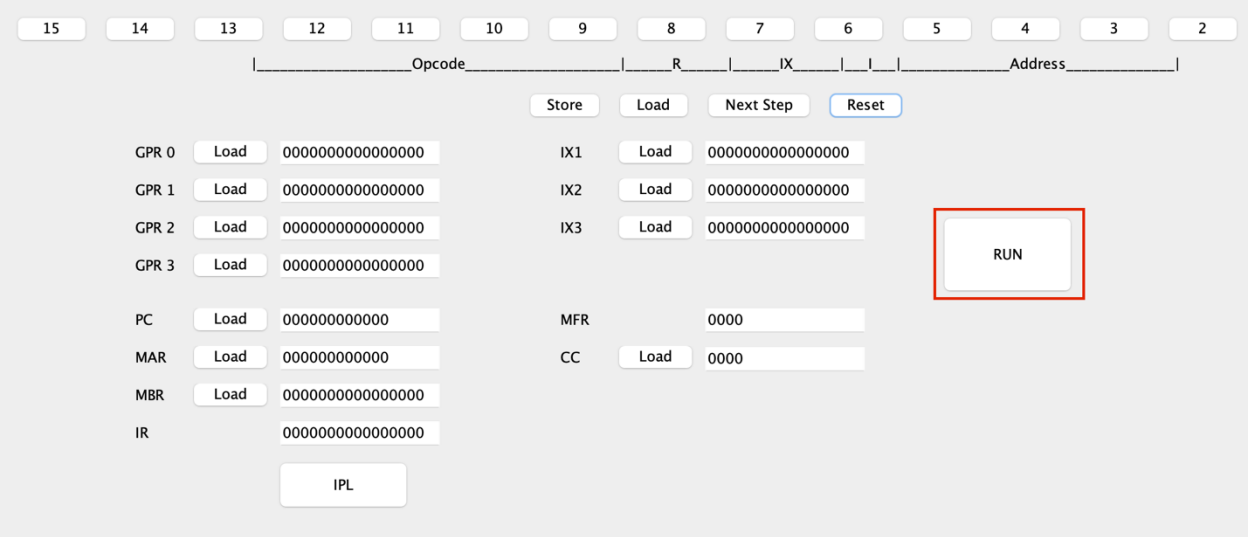
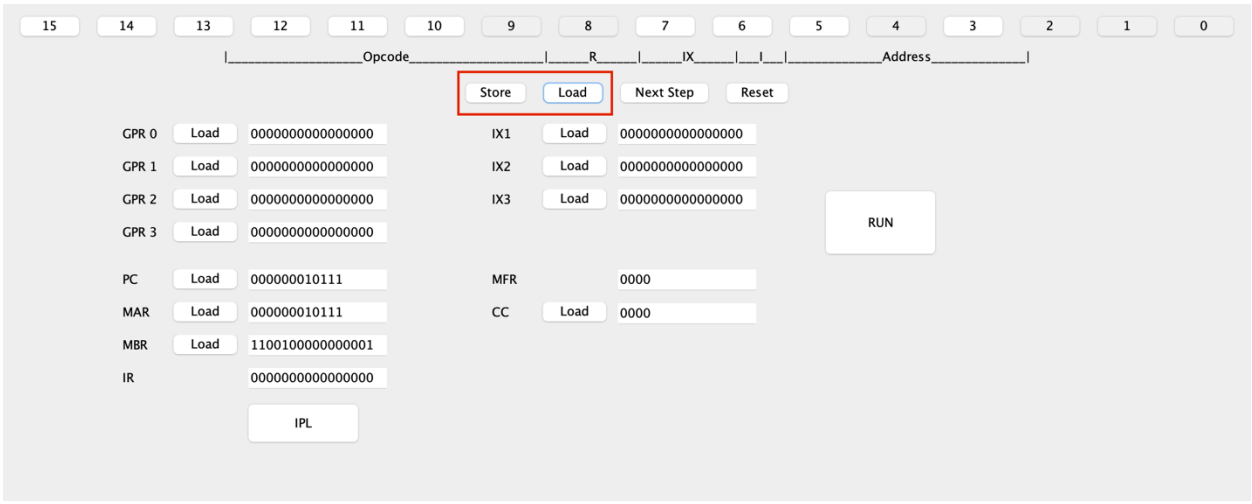


Fig 5: Run button to execute all the instructions.

We can also input the values in PC and MAR using the toggle buttons and click on Load and Store buttons for these operations.


15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
|_____Opcode_____|_____R_____|_____IX_____|___I___|_____Address_____|
Store
Load
Next Step
Reset
GPR 0 Load 0000000000000000
GPR 1 Load 0000000000000000
GPR 2 Load 0000000000000000
GPR 3 Load 0000000000000000
IX1 Load 0000000000000000
IX2 Load 0000000000000000
IX3 Load 0000000000000000
RUN
PC Load 000000010111
MAR Load 000000010111
MBR Load 1100100000000001
IR 0000000000000000
MFR 0000
CC Load 0000
IPL