N2EMU

Software Design Document: Test Plan

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INTRODUCTION

This program sets out to fulfill the listed functional and nonfunctional requirements.

FUNCTIONAL REQUIREMENTS

F1. Mimic subset of externally observable behavior of the processor as specified.

F2. Read a text file that contains labels and assembly instructions, one per line.

F3. Memory is to be represented as a 64 kilobyte byte-addressable block of memory. (An array of 65,536 bytes). The four contiguous bytes stored at up to 16 memory addresses at any given time should be viewable as addressed by the user.

F4. The processor is a 32-bit little-endian processor. Memory addresses only require 16 bits. The program counter and the return address indicate the line of the file that contained the assembly instructions. (For example, branch and jump commands)

F5. The contents of the program counter and the 32 general-purpose registers are to be displayed to the user. (In Hexadecimal)

F6. The program should indicate that the processor is "NOT READY", "PAUSED", or "RUNNING". NOT READY specifies that no file; has been loaded. When a file is loaded, the processor is PAUSED and a "RUN" button can be pressed to begin program execution. At any point, a "PAUSE" button can be pressed to put the program back into the PAUSE state.

F7. Breakpoints can be specified per line by the user, and when program execution reaches a breakpoint, the processor is placed automatically into the PAUSE state.

F8. A reset button can set the program counter back to 1.

F9. Error handling for incorrect assembly code shall be implemented.

Nonfunctional Requirements

N1. I/O devices need not be emulated.

N2. We do not need to implement backstepping outside of that naturally contained in reset functionality.

N3. Only the behavior of the processor needs to be emulated.

System Overview

Our program roughly matches the MVC architecture.

Our program revolves around three main systems, the Processor, GUI, and Behavioral systems. The processor does the meat of the computation, executing assembly instructions, storing registry/memory values, and having processor state control functionality. The Behavioral system largely exists to feed the processor instructions loaded from a file as well as relevant information from command line input. At its base, it gives the processor a line by line reinterpretation of assembly code to execute. However, it also takes command line inputs from the user, and accepts a program file as loaded in by the user. The GUI has two parts, Input and Output. The Input is made up of buttons and a command prompt. The buttons allow for the access of processor state control functionality by the user in GUI, for pausing, running, stepping, resetting, and for loading text files into the behavioral core. When the processor needs to be paused, resumed, or stepped, it takes input from the a button on the GUI. The command prompt allows for the input of commands which are passed to the Behavioral system. The Output allows the viewing values through a register box, memory viewing box, and miscellaneous box, which are updated by the processor as instructions are performed.

See general class descriptions below:

USER - The user will upload the assembly file to the main system, start and pause the emulator, and use the command line to set breakpoints and set points in memory to view.

BEHAVIORAL CORE- The behavioral core is the "brain" of the program, which determines how the different subsystems interact to scenarios. The behavioral core will take the assembly code and break it down to individual instructions. Will not work with incorrect syntax, but will accept any .txt file. The main component of the "model" portion of the MVC architecture.

INSTRUCTION INTERPRETER- The instruction Interpreter takes in instructions from the behavioral core, identifies the instruction, as well as input and output values.

PROCESSOR - The processor will run the identified instructions, updating the registry, memory values, and other relevant processor values, as long as it is in the "running" state. The main component of the "controller" portion of the MVC architecture.

THREADS - Threads are a class within the program which provide multithreading functionality. When the program is run, two main threads start, for the processor and for the GUI.

LOADFILE- This class exists purely to break an input text file into individual lines for use by the other classes.

GUI://

COMMAND PROMPT- The command prompt accepts user input from keyboard, and allows for setting up to 16 memory locations to view in the memory box viewing window, In addition, breakpoints can be set per line so that the system pauses when desired. Breakpoints can also be removed per line.

BUTTONS:

Load File: Brings up a file select prompt, accepts .txt files, and sends them to the behavioral core.

Run: The run button will run the program only once the processor is no longer in the NOT READY state (the file has been input). The run button also starts the program again after a break or pause-induced pause.

Pause: The pause button stops the running of the program.

Reset: The reset button returns the program counter to zero, resets registers and memory.

Step Up: The step-up button is used to increment the program counter to the next instruction, for debugging purposes.

Browse: This button opens a file navigation window, where you can manually select the file to load into the program.

Execute: This button executes command line commands.

Write .txt : Creates subfolder logs/ if it doesnt exist, writes relevant logging information to a .txt file, of which an unlimited number can be made. You can clear all of the log files with rmLogs command line command.

BOX VIEWING WINDOWS:

Memory: This window will keep track of up to sixteen memory addresses and show the hexadecimal value contained at each memory address.

Registry: The registry box window lists each register and its corresponding hexadecimal value.

Text File: This window shows the code which has been loaded as a text file within the emulator.

Misc.: Includes viewing for the Program Counter, Return Address, Processor State, and Breakpoint Lines.

File Path:This box shows the path to the file we will load. Can be edited to specify path via keyboard input.

Message Box: Contains errors and Messages that will pop up during program execution, defined within the programs. Can be cleared via the command line cmes command.

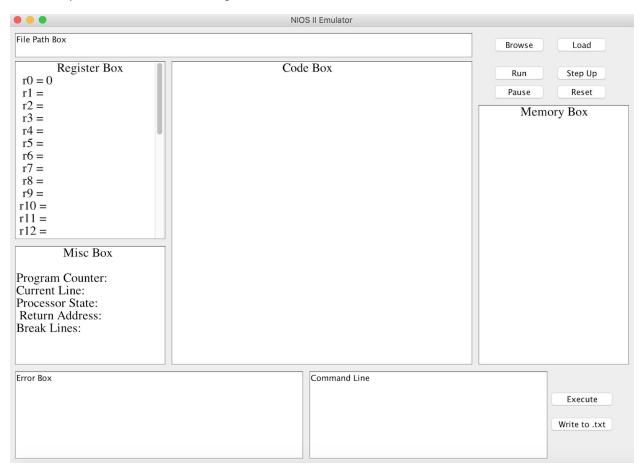///

FEATURES TO BE TESTED

Testing Requirement	System Requirement(s)	Short Description
Instructions	Yes	
GUI Functionality	Yes	Proper display of boxes, usage of buttons, messages
Command Line	Yes	The command line has a variety of input commands which can effect

TEST ENVIRONMENT

Through manual input, we use the program's GUI functionalities to load and run test files for each scenario, utilizing the command line. This simple method of testing is utilitarian and provides a consistent testing environment.

TEST CASES

The image below is what the user interface looks like. From now on, the test cases will refer to parts of the interface by the names listed in the image below.

The registers r24-r31 also have specific names. r24 is et, r25 is bt, r26 is gp, r27 is sp, r28 is fp, r29 is ea, r30 is sstatus, and r31 is ra.

TEST CASE

TEST CASE NUMBER

1

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

movi, add

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 3

movi r2, 4

add r3, r1, r2

OUTPUT

GUI should display the following:

In register box:

r0 = 0

r1 = 0x00000003

r2 = 0x00000004

r3 = 0x00000007

r4 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

2

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

addi

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 3

addi r2, r1, 52

GUI should display the following:

In register box:

r0 = 0

r1 = 0x00000003

r2 = 0x00000007

r3 to r31 = 0

In the misc box:

Program Counter = 0x00000004

Current Line = 1

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

3

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

sub

GUI is running, File is loaded, Program is Running

movi r2, 3

movi r4, 5

sub r5, r4, r2

GUI should display the following:

In register box:

r0 to r1= 0

r2 = 0x00000003

r3 = 0

r4 = 0x00000005

r5 = 0x00000002

r6 to r31 = 0

In the misc box:

Program Counter = 00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

4

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

subi

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 3

subi r5, r2, 5

OUTPUT

GUI should display the following:

In register box:

r0 to r1= 0

r2 = 0x00000003

r3 to r4 = 0

r5 = 0xFFFFFFFE

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000004

Current Line = 1

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

5

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

and

INITIAL CONDITIONS

GUI is running, File is Loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0b0110

movi r4, 0b1110

and r5, r4, r2

GUI should display the following:

In register box:

r0 to r1 = 0

r2 = 0x00000006

r3 = 0

r4 = 0x0000000e

r5 = 0x00000006

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

Test Case

Test Case Number

6

Component Under Test

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

andi

INITIAL CONDITIONS

GUI is running, File is Loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0b1010

andi r5, r4, 0b1101

OUTPUT

GUI should display the following:

> In register box:

> > r0 to r3 = 0

> > r4 = 0x0000000a

> > r5 = 0x00000008

> > r6 to r31 = 0

> In the misc box:

> > Program Counter = 0x00000004

> > Current Line = 1

> > Processor State = 0

> > Return Address = 0

> > Break Lines should stay blank

> The input should be displayed in the code box.

> The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE NUMBER

7

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

andhi

INITIAL CONDITIONS

GUI is running, File is Loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0x5000000

andhi r5, r4, 0x4000

OUTPUT

GUI should display the following:

In register box:

r0 to r3 = 0

r4 = 0x5000000

r5 = 0x4000000

r6 to r31 = 0

In the misc box:

Program Counter =0x00000004

Current Line = 1

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

8

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

or

INITIAL CONDITIONS

GUI is running, File is Loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0b0110

movi r3, 0b1010

or r5, r4, r3

GUI should display the following:

In register box:

r0 to r2 = 0

r3 = 0x0000000a

r4 = 0x00000006

r5 = 0x0000000e

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

9

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

ori

INITIAL CONDITIONS

GUI is running, File is Loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0b0110

ori r5, r4, 0b1110

OUTPUT

GUI should display the following:

    In register box:

        r0 to r3 = 0

        r4 = 0x00000006

        r5 = 0x0000000e

        r6 to r31 = 0

    In the misc box:

        Program Counter = 0x00000004

        Current Line = 1

        Processor State = 0

        Return Address = 0

        Break Lines should stay blank

    The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE NUMBER

10

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

orhi

INITIAL CONDITIONS

GUI is running, File is Loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0xA0000000

orhi r5, r4, 0x2000

OUTPUT

GUI should display the following:

In register box:

r0 to r3 = 0

r4 = 0xA0000000

r5 = 0xE0000000

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000004

Current Line = 1

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

11

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

xor

INITIAL CONDITIONS

GUI is running, File is Loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0b0110

movi r3, 0b1100

xor r5, r4, r3

GUI should display the following:

In register box:

r0 to r2 = 0

r3 = 0x0000000c

r4 = 0x00000006

r5 = 0x0000000a

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

12

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

xori

INITIAL CONDITIONS

GUI is running, File is Loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0b0110

xori r5, r4, 0b1100

OUTPUT

GUI should display the following:

> In register box:
>
>> r0 to r3 = 0
>>
>> r4 = 0x00000006
>>
>> r5 = 0x0000000a
>>
>> r6 to r31 = 0
>
> In the misc box:
>
>> Program Counter = 0x00000004
>>
>> Current Line = 1
>>
>> Processor State = 0
>>
>> Return Address = 0
>>
>> Break Lines should stay blank
>
> The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

13

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

xorhi

INITIAL CONDITIONS

GUI is running, File is Loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0x10000000

xorhi r5, r4, 0xF000

OUTPUT

GUI should display the following:

In register box:

r0 to r3 = 0

r4 = 0x10000000

r5 = 0xE0000000

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000004

Current Line = 1

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

TEST CASE

TEST CASE NUMBER

14

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

beq

INITIAL CONDITIONS

GUI is running, File is Loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 3

movi r3, 3

beq r2, r3, YES

NO: movi r4, 8

YES: movi r5, 8

OUTPUT

GUI should display the following:

In register box:

r0 to r1 = 0

r2 = 0x00000003

r3 = 0x00000003

r4 = 0

r5 = 0x00000008

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000010

Current Line = 4

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

TEST CASE

TEST CASE NUMBER

15

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

bge

GUI is running, File is Loaded, Program is Running

movi r2, 0xF

movi r3, 0x1

bge r2, r3, YES

NO: movi r4, 8

YES: movi r5, 8

GUI should display the following:

In register box:

r0 to r1 = 0

r2 = 0x0000000f

r3 = 0x00000001

r4 = 0

r5 = 0x00000008

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000010

Current Line = 4

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

TEST CASE

TEST CASE NUMBER

16

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

bgeu Command

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0xF

movi r4, 0x1

movi r5, 1

bgeu r2, r4, YES

NO: movi r5, 8

YES: movi r6, 9

r5 = 8

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x0000000f

r4 = 0x00000001

r5 = 0x00000001

r6 = 0x00000009

r7 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

TEST CASE

TEST CASE NUMBER

Component Under Test

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

Feature(s) to be Tested

bgt

Initial Conditions

GUI is running, File is loaded, Program is Running

Expected Behavior

Input

movi r2, 5

movi r4, 5

movi r5, 1

bgt r2, r4, YES

NO: movi r5, 8

YES: add r0, r0, r0

Output

r5 = 1

GUI should display the following:

      In register box:

            r0, r1, r3 = 0

            r2 = 0x00000005

            r4 = 0x00000005

            r5 = 0x00000008

            r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

18

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

bgtu

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0x1

movi r4, 15

movi r5, 1

bgtu r2, r4, YES

NO: movi r5, 8

YES: add r6, r2, r4

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000001

r4 = 0x0000000f

r5 = 0x00000001

r6 = 0x00000010

r7 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

19

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

ble

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0x1

movi r4, 0x1

movi r5, 1

ble r2, r4, YES

NO: movi r5, 8

YES:

OUTPUT

GUI should display the following:

    In register box:

        r0, r1, r3 = 0

        r2 = 0x00000001

        r4 = 0x00000001

        r5 = 0x00000001

        r6 to r31 = 0

    In the misc box:

        Program Counter = 0x00000014

        Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

20

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

bleu

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0x1

movi r4, 0x99

movi r5, 1

bleu r2, r4, YES

NO: movi r5, 8

YES:

OUTPUT

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000001

r4 = 0x00000099

r5 = 0x00000001

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

21

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

blt

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

INPUT

movi r2, 0xF

movi r4, 0xF

movi r5, 1

blt r2, r4, YES

NO: movi r5, 8

YES:

OUTPUT

GUI should display the following:

    In register box:

        r0, r1, r3 = 0

        r2 = 0x0000000f

        r4 = 0x000000f

        r5 = 0x00000008

        r6 to r31 = 0

    In the misc box:

        Program Counter = 0x00000014

        Current Line = 5

        Processor State = 0

        Return Address = 0

        Break Lines should stay blank

    The input should be displayed in the code box.

    The error box should be empty.

Command line should be empty.

TEST CASE NUMBER

22

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

bltu

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0x1

movi r4, 0xf

movi r5, 1

bltu r2, r4, YES

NO: movi r5, 8

YES:

OUTPUT

GUI should display the following:

 In register box:

  r0, r1, r3 = 0

  r2 = 0x00000001

r4 = 0x000000f

r5 = 0x00000001

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

23

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

bne

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0xF

movi r4, 0xE

movi r5, 1

bne r2, r4, YES

NO: movi r5, 8

YES:

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x0000000F

r4 = 0x0000000E

r5 = 0x00000001

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

24

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

br

GUI is running, File is loaded, Program is Running

INPUT

movi r2, 0xF

movi r4, 0xF

movi r5, 1

br YES

movi r5, 8

YES:

OUTPUT

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x0000000f

r4 = 0x0000000f

r5 = 0x00000001

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

25

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpeq

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0xF

movi r4, 0xF

movi r5, 3

cmpeq r5, r4, r2

OUTPUT

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x0000000f

r4 = 0x0000000f

r5 = 0x00000001

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

26

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpeqi

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

movi r2, 0xA

movi r5, 3

cmpeqi r5, r2, 0xA

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x0000000a

r4 = 0

r5 = 0x00000001

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

27

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

cmpge

GUI is running, File is loaded, Program is Running

movi r2, 0xF

movi r4, 0xE

movi r5, 3

cmpge r5, r4, r2

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x0000000f

r4 = 0x0000000e

r5 = 0

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

28

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpgei

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0xF

movi r5, 3

cmpgei r5, r2, 0x1

OUTPUT

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x0000000f

r4 = 0

r5 = 0x00000001

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE NUMBER

29

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpgeu

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0x1

movi r4, 0xF

movi r5, 3

cmpgeu r5, r4, r2

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000001

r4 = 0x0000000f

r5 = 0x00000001

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

30

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

cmpgt

GUI is running, File is loaded, Program is Running

movi r2, 0xF

movi r4, 0xF

movi r5, 3

cmpgt r5, r4, r2

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x0000000f

r4 = 0x0000000f

r5 = 0x00000000

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE NUMBER

31

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpgti

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0x1

movi r5, 3

cmpgti r5, r2, 0x2

OUTPUT

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000001

r4 = 0x00000000

r5 = 0x00000000

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

32

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpgtu

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0x1

movi r4, 0xF

movi r5, 3

cmpgtu r5, r4, r2

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000001

r4 = 0x0000000f

r5 = 0x00000001

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

33

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

cmpgtui

GUI is running, File is loaded, Program is Running

movi r4, 0xF

movi r5, 3

cmpgtui r5, r4, 0xF

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000000

r4 = 0x0000000f

r5 = 0x00000000

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

34

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmple

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0x1

movi r4, 0x2

movi r5, 3

cmple r5, r4, r2

OUTPUT

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000001

r4 = 0x00000002

r5 = 0x00000000

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

35

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmplei

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0x2

movi r5, 3

cmplei r5, r4, 0x3

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000000

r4 = 0x00000002

r5 = 0x00000001

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

36

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpleu

GUI is running, File is loaded, Program is Running

movi r2, 0x1

movi r4, 0xF

movi r5, 3

cmpleu r5, r4, r2

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000001

r4 = 0x0000000f

r5 = 0x00000000

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE NUMBER

37

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpleui

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0xF

movi r5, 3

cmpleui r5, r4, 0xFF

OUTPUT

GUI should display the following:

    In register box:

        r0, r1, r3 = 0

        r2 = 0x00000000

        r4 = 0x0000000f

        r5 = 0x00000000

        r6 to r31 = 0

    In the misc box:

        Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

38

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmplt

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0xF

movi r4, 0xF

movi r5, 3

cmpleu r5, r4, r2

OUTPUT

GUI should display the following:

In register box:

> r0, r1, r3 = 0

> r2 = 0x0000000f

> r4 = 0x0000000f

> r5 = 0x00000001

> r6 to r31 = 0

In the misc box:

> Program Counter = 0x00000014

> Current Line = 5

> Processor State = 0

> Return Address = 0
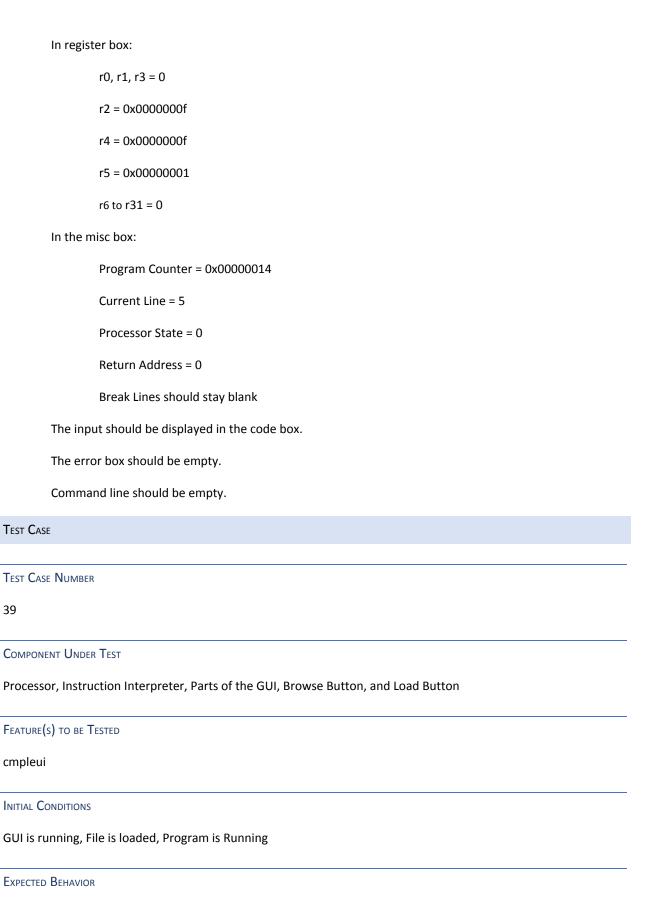
> Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE NUMBER

39

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpleui

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

movi r4, 0xFFF

movi r5, 3

cmpleui r5, r4, 0xFF

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000001

r4 = 0x00000fff

r5 = 0x00000000

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

40

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

cmplt

GUI is running, File is loaded, Program is Running

movi r2, 0xF

movi r4, 0xF

movi r5, 3

cmplt r5, r4, r2

GUI should display the following:

      In register box:

            r0, r1, r3 = 0

            r2 = 0x0000000f

            r4 = 0x0000000f

            r5 = 0x00000000

            r6 to r31 = 0

      In the misc box:

            Program Counter = 0x00000014

            Current Line = 5

            Processor State = 0

            Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

41

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpltu

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0xF

movi r5, 3

movi r2, 0x1

cmpltu r5, r4, r2

OUTPUT

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000001

r4 = 0x0000000f

r5 = 0x00000000

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

42

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmplti

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0xF

movi r5, 3

cmplti r5, r4, 0xF

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000000

r4 = 0x0000000f

r5 = 0x00000000

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000014

Current Line = 5

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

43

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpltui

GUI is running, File is loaded, Program is Running

movi r4, 0xF

movi r5, 3

cmpleui r5, r4, 0xFF

GUI should display the following:

>In register box:

>>r0, r1, r3 = 0

>>r2 = 0x00000000

>>r4 = 0x0000000f

>>r5 = 0x00000001

>>r6 to r31 = 0

>In the misc box:

>>Program Counter = 0x00000008

>>Current Line = 2

>>Processor State = 0

>>Return Address = 0

>>Break Lines should stay blank

>The input should be displayed in the code box.

>The error box should be empty.

>Command line should be empty.

TEST CASE NUMBER

44

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpne

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0xF

movi r5, 3

movi r2, 0x1

cmpne r5, r4, r2

OUTPUT

GUI should display the following:

In register box:

r0, r1, r3 = 0

r2 = 0x00000001

r4 = 0x0000000f

r5 = 0x00000001

r6 to r31 = 0

In the misc box:

Program Counter = 0x0000000c

Current Line = 3

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

45

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

cmpnei

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r4, 0xF

movi r5, 3

cmpnei r5, r4, 0xF

OUTPUT

GUI should display the following:

    In register box:

        r0, r1, r3 = 0

        r2 = 0x00000000

        r4 = 0x0000000f

        r5 = 0x00000000

        r6 to r31 = 0

    In the misc box:

        Program Counter = 0x00000014

        Current Line = 5

        Processor State = 0

        Return Address = 0

        Break Lines should stay blank

    The input should be displayed in the code box.

    The error box should be empty.

    Command line should be empty.

TEST CASE

TEST CASE NUMBER

46

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

call

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

INPUT

movi r2, 1

call SKIP

END: br END

SKIP: addi r2, r2, 1

ret

OUTPUT

GUI should display the following:

      In register box:

            r0, r1, r3 = 0

            r2 = 0x00000002

            r4 to r30 = 0

            r31 (ra) = 0x8

      In the misc box:

            Program Counter = 0x00000008

            Current Line = 2

            Processor State = 0

            Return Address = 0

            Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

47

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

callr

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 1

movi r3, 0x14

callr r3

END: br END

SKIP: addi r2, r2, 1

ret

OUTPUT

GUI should display the following:

In register box:

r0, r1 = 0

r2 = 0x1

r3 = 0x14

r4 to r30 = 0

r31 (ra) = 0xc

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

48

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

div

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

INPUT

movi r2, 0b1110

movi r3, 0b0111

movi r4, 0

div r4, r2, r3

OUTPUT

GUI should display the following:

In register box:

r0, r1 = 0

r2 = 0xa

r3 = 0xe

r4 = 0x2

r5 to r31 = 0

In the misc box:

Program Counter = 0x0000000c

Current Line = 3

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

49

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

divu

GUI is running, File is loaded, Program is Running

movi r2, 0b1110

movi r3, 0b0111

movi r4, 0

divu r4, r2, r3

GUI should display the following:

      In register box:

            r0, r1 = 0

            r2 = 0xa

            r3 = 0xe

            r4 = 0x2

            r5 to r31 = 0

In the misc box:

Program Counter = 0x0000000c

Current Line = 3

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE NUMBER

50

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

jmpi

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 1

jmpi SKIP

movi r3, 2

SKIP: addi r2, r2, 1

GUI should display the following:

In register box:

r0, r1 = 0

r2 = 0x2

r3 = 0x0

r4 to r31 = 0

In the misc box:

Program Counter = 0x0000000c

Current Line = 3

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

51

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

jmp

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

INPUT

movi r2, 1

movi r4, 0x11

jmp r4

movi r3, 2

 addi r2, r2, 1

OUTPUT

GUI should display the following:

  In register box:

    r0, r1 = 0

    r2 = 0x2

    r3 = 0x0

    r4 = 0x10

    r5 to r31 = 0

  In the misc box:

    Program Counter = 0x00000010

    Current Line = 4

    Processor State = 0

    Return Address = 0

    Break Lines should stay blank

  The input should be displayed in the code box.

  The error box should be empty.

  Command line should be empty.

TEST CASE NUMBER

52

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

jmp

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 1

jmp SKIP

movi r3, 2

SKIP: addi r2, r2, 1

OUTPUT

GUI should display the following:

    In register box:

        r0, r1 = 0

        r2 = 0x2

        r3 = 0x0

        r4 = 0x10

        r5 to r31 = 0

In the misc box:

Program Counter = 0x000000c

Current Line = 3

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE NUMBER

53

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button, Command Line

FEATURE(S) TO BE TESTED

ldb, stb, ldbu, vm

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 1

movi r3, 0x400

stb r2, 0(r3)

movi r4, 0

ldb r4, 0(r3)

movi r5, 0

ldbu r5, 0(r3)

IN THE COMMAND LINE:

vm 0 0x400

GUI should display the following:

In register box:

r0 to r1 = 0

r2 = 0x00000001

r3 = 0x00000400

r4 = 0x00000001

r5 = 0x00000001

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000018

Current Line = 6

Processor State = 0

Return Address = 0

Break Lines should stay blank

Memory box:

0: Line: 1024 Value: 1

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE NUMBER

54

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

ldh, sth, ldhu

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r2, 0x4321

movi r3, 0x400

sth r2, 0(r3)

movi r4, 0

ldh r4, 0(r3)

movi r5, 0

ldhu r5, 0(r3)

OUTPUT

r2 = 0x4321, r3 = 0x400, r4 = 0x4321, r5 = 0x4321

GUI should display the following:

      In register box:

            r0, r1 = 0

r2 = 0x4321

r3 = 0x400

r4 = 0x4321

r5 = 0x4321

r6 to r31 = 0

In the misc box:

Program Counter = 0x00000018

Current Line = 6

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE

TEST CASE NUMBER

55

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

ldw, stw

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

movi r2, 0x87654321

movi r3, 0x400

stw r2, 0(r3)

movi r4, 0

ldw r4, 0(r3)

r2 = 0x77654321, r3 = 0x400, r4 = 0x77654321

GUI should display the following:

In register box:

r0, r1 = 0

r2 = 0x77654321

r3 = 0x400

r4 = 0x77654321

r5 to r31 = 0

In the misc box:

Program Counter = 0x00000010

Current Line = 4
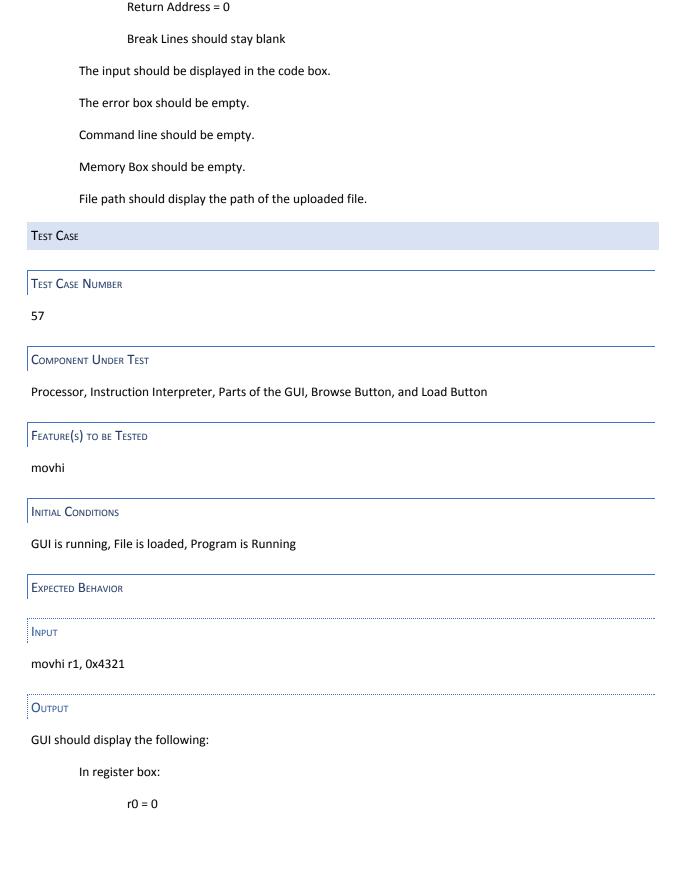
Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

TEST CASE NUMBER

56

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

mov

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 3

movi r2, 4

mov r1, r2

OUTPUT

GUI should display the following:

In register box:

r0 = 0

r1 = 0x00000004

r2 = 0x00000004

r3 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

57

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

movhi

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movhi r1, 0x4321

OUTPUT

GUI should display the following:

In register box:

r0 = 0

r1 = 0x43210000

r2 to r31 = 0

In the misc box:

Program Counter = 0x00000000

Current Line = 0

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

58

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

movia

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 3

LABEL: movia r1, LABEL

GUI should display the following:

In register box:

r0 = 0

r1 = 0x00000004

r2 to r31 = 0

In the misc box:

Program Counter = 0x00000004

Current Line = 1

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

59

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

movui

GUI is running, File is loaded, Program is Running

moviu r1, 0x8000

GUI should display the following:

In register box:

r0 = 0

r1 = 0x00008000

r2 to r31 = 0

In the misc box:

Program Counter = 0x00000000

Current Line = 0

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

60

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

mul

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 3

movi r2, 4

mul r2, r2, r1

OUTPUT

GUI should display the following:

In register box:

r0 = 0

r1 = 0x00000003

r2 = 0x0000000C

r3 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

61

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

muli

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

movi r1, 3

muli r1, r1, 0x4

GUI should display the following:

In register box:

r0 = 0

r1 = 0x0000000C

r3 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

62

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

mulxss

GUI is running, File is loaded, Program is Running

movi r1, 5

movi r2, 5

mulxss r1, r1, r2

GUI should display the following:

In register box:

r0 = 0

r1 = 0x00000000

r2 = 0x00000005

r3 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE NUMBER

63

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

mulxsu

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 5

movi r2, 5

mulxsu r1, r1, r2

OUTPUT

GUI should display the following:

In register box:

r0 = 0

r1 = 0x00000000

r2 = 0x00000005

r3 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

Test Case

Test Case Number

64

Component Under Test

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

Feature(s) to be Tested

mulxuu

Initial Conditions

GUI is running, File is loaded, Program is Running

Expected Behavior

movi r1, 5

movi r2, 5

mulxuu r1, r1, r2

GUI should display the following:

In register box:

r0 = 0

r1 = 0x00000000

r2 = 0x00000005

r3 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

nextpc

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

        movi r1, 5

        nextpc r1

        movi r2, 5

OUTPUT

GUI should display the following:

    In register box:

        r0 = 0

        r1 = 0x00000008

        r2 = 0x00000005

        r3 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

Test Case

Test Case Number

66

Component Under Test

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

Feature(s) to be Tested

nop

Initial Conditions

GUI is running, File is loaded, Program is Running

Expected Behavior

Input

nop
nop
nop

GUI should display the following:

In register box:

r0 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

67

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

ret

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

movi r1, 5

call SKIP

movi r1, 6

END: br END

SKIP: ret

GUI should display the following:

In register box:

r0 = 0

r1 = 0x00000006

r2 to r31 = 0

In the misc box:

Program Counter = 0x0000000C

Current Line = 3

Processor State = 0

Return Address = 0x0000000008

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE NUMBER

68

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

rol

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 0b0110

movi r2, 0b0001

rol r1, r1, r2

OUTPUT

GUI should display the following:

In register box:

r0 = 0

r1 = 0x0000000c

r2 = 0x00000001

r3 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

69

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

roli

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 0b0110

roli r1, r1, 1

GUI should display the following:

In register box:

r0 = 0

r1 = 0x0000000c

r2 to r31 = 0

In the misc box:

Program Counter = 0x00000004

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

70

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

ror

GUI is running, File is loaded, Program is Running

movi r1, 0b0110

movi r2, 0b0001

ror r1, r1, r2

GUI should display the following:

In register box:

r0 = 0

r1 = 0x00000003

r2 = 0x00000001

r3 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE NUMBER

71

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

rori

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

    movi r1, 0b0110

    roli r1, r1, 1

OUTPUT

GUI should display the following:

    In register box:

        r0 = 0

        r1 = 0x00000003

        r2 = 0x1

        r3 to r31 = 0

    In the misc box:

        Program Counter = 0x00000004

        Current Line = 1

        Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

72

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

sll

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 0xA

movi r2, 4

sll r1, r1, r2

GUI should display the following:

In register box:

r0 = 0

r1 = 0x0000000A0

r2 = 0x000000004

r3 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

73

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

slli

GUI is running, File is loaded, Program is Running

movi r1, 0xA

slli r1, r1, 4

GUI should display the following:

In register box:

r0 = 0

r1 = 0x000000A0

r2 to r31 = 0

In the misc box:

Program Counter = 0x00000004

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE NUMBER

74

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

sra

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 0xA0

movi r2, 4

sra r1, r1, r2

OUTPUT

GUI should display the following:

In register box:

r0 = 0

r1 = 0xFFFFFFFFFA

r2 = 0x000000004

r3 to r31 = 0

In the misc box:

Program Counter = 0x00000008

Current Line = 2

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

75

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

srai

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 0xA0

srai r1, r1, 4

GUI should display the following:

In register box:

r0 = 0

r1 = 0xFFFFFFFA

r2 to r31 = 0

In the misc box:

Program Counter = 0x00000004

Current Line = 1

Processor State = 0

Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

76

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

srl

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

....

INPUT

     movi r1, 0xA0

     movi r2, 4

     srl r1, r1, r2

....

OUTPUT

GUI should display the following:

     In register box:

          r0 = 0

          r1 = 0x00000000A

          r2 = 0x000000004

          r3 to r31 = 0

     In the misc box:

          Program Counter = 0x00000008

          Current Line = 2

          Processor State = 0

          Return Address = 0

          Break Lines should stay blank

     The input should be displayed in the code box.

     The error box should be empty.

     Command line should be empty.

     Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE NUMBER

77

COMPONENT UNDER TEST

Processor, Instruction Interpreter, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

srli

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 0xA0

srli r1, r1, 4

OUTPUT

GUI should display the following:

In register box:

r0 = 0

r1 = 0x0000000A

r2 to r31 = 0

In the misc box:

Program Counter = 0x00000004

Current Line = 1

Processor State = 0
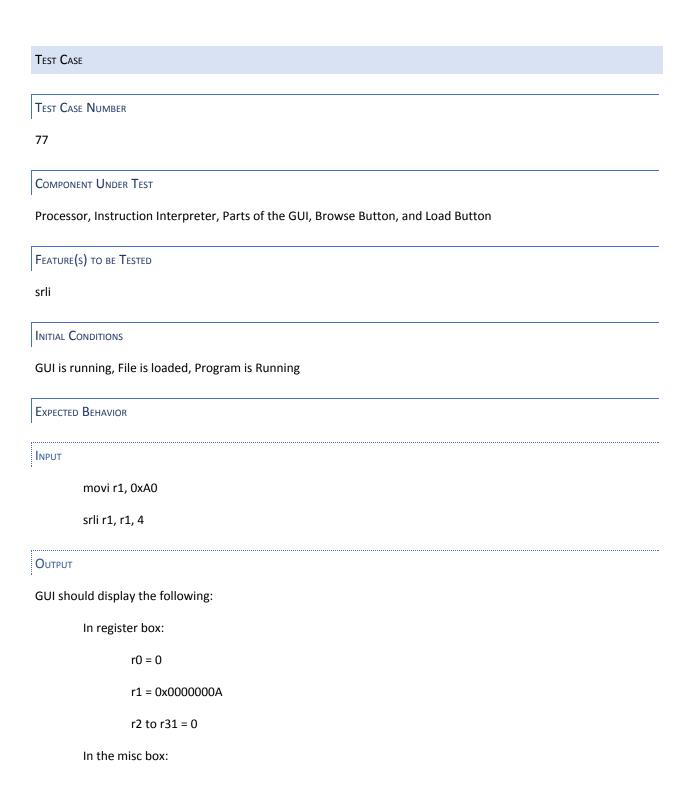
Return Address = 0

Break Lines should stay blank

The input should be displayed in the code box.

The error box should be empty.

Command line should be empty.

Memory Box should be empty.

File path should display the path of the uploaded file.

TEST CASE

TEST CASE NUMBER

78

COMPONENT UNDER TEST

Command Line, Parts of the GUI, Browse Button, and Load Button

FEATURE(S) TO BE TESTED

rb, ab, rab

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

EXPECTED BEHAVIOR

INPUT

movi r1, 0xA0

srai r1, r1, 4

In Command Line:

ab 0 (adds breakpoint at line 0 in the code above)

In Command Line:

rb 0 (removes breakpoint at line 0 in the code above)

In Command Line:

ab 0

ab 1

rab (removes all breakpoints)

OUTPUT

GUI should display the following:

In register box:

All 0's

In the misc box:

All 0's

TEST CASE

TEST CASE NUMBER

79

COMPONENT UNDER TEST

Command Line, Write .txt button, GUI, Message Box

FEATURE(S) TO BE TESTED

vm, rm, ram, veryslow, slow, normal, fast, extreme, rmLogs, cmes

INITIAL CONDITIONS

GUI is running, File is loaded, Program is Running

INPUT

movi r1, 0xA0

srai r1, r1, 4

In Command Line:

vm 0x0 0x1

vm 0x1 0x2

In GUI:

Presses write.txt button. Writes logFile0.txt to logs/ directory in program directory

----

In Command Line:

rm 0

ram

rmLogs

In Command Line:

cmes

veryslow

In Command LIne

slow

In Command LIne

normal

In Command LIne

fast

In Command LIne

extreme

GUI should display the following:

In register box:

All 0's

In the misc box:

All 0's

In Message Box:

Error box is clear, Message box has a few lines containing messages about changing the processor speed

In logs/ folder:

logs0.txt contains all relevant program information at time of creation, but is deleted with running of rmLogs