

CMPT350: Lab Demo1

Learning about the SPIM environment

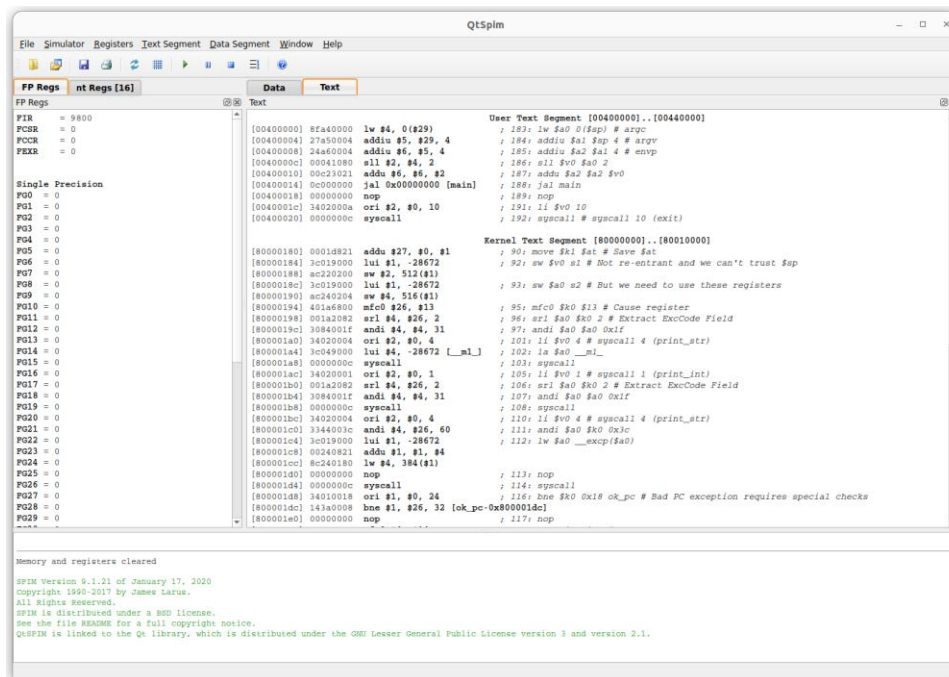
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Due: September 14, 16:50, End of Lab period

This Lab Demo will introduce you to the SPIM environment we will be using for all labs and demos, using both a GUI development interface (QtSpim) and the command line equivalent, spim. In this demo, you will run two MIPS programs (.s files) provided for you by the laboratory instructor and answer a few questions about the MIPS programs and their behavior. **NO PROGRAMMING IS REQUIRED FOR THIS DEMO.**

Laboratory Procedure:

On the course Moodle, look for the Lab Demo 1 assignment in the Lab Demonstration section. Inside are 2 premade MIPS files, demo1_1.s and demo1_2.s. Save these somewhere handy on your machine. As mentioned above, we will be using both the command line version, spim, and the GUI version, QtSpim. Gedit comes preinstalled on the lab machines and is a suitable editor. You can start QtSpim by pressing Super (Windows key) and searching for it, or by typing qtspim in the command line. Below is an image of QtSpim.



To run a SPIM file in QtSpim, go to File > Reinitialize and Load File, and navigate to the location of your .s file. Once you've run your program, reload it by the same process.

Assignment Requirements:

Run the provided MIPS programs a few times, inspect their source code, and think about the following questions. Conferring with your peers is permitted, provided you can demonstrate an independent understanding of the material

- **Basics:**
 - Load and run both `.s` files provided to you by the laboratory instructor in the `spim` command line utility, and `QtSpim`
 - Describe the difference between the `.data` and `.text` portions of a MIPS program source
 - Explain what the `main:` portion of a MIPS program is for
- **Syscalls**
 - Describe what a syscall is and why they are useful
 - Explain at least two different types of syscalls
 - Explain how to use different types of syscalls
 - Explain how to provide arguments to a syscall.
 - Explain what “syscall 10” does and why it’s important.
- **Demo1_2.s**
 - Explain the difference between `user_input` and `str1`
 - Explain what the `j print_chars` line does

Creating a trace file

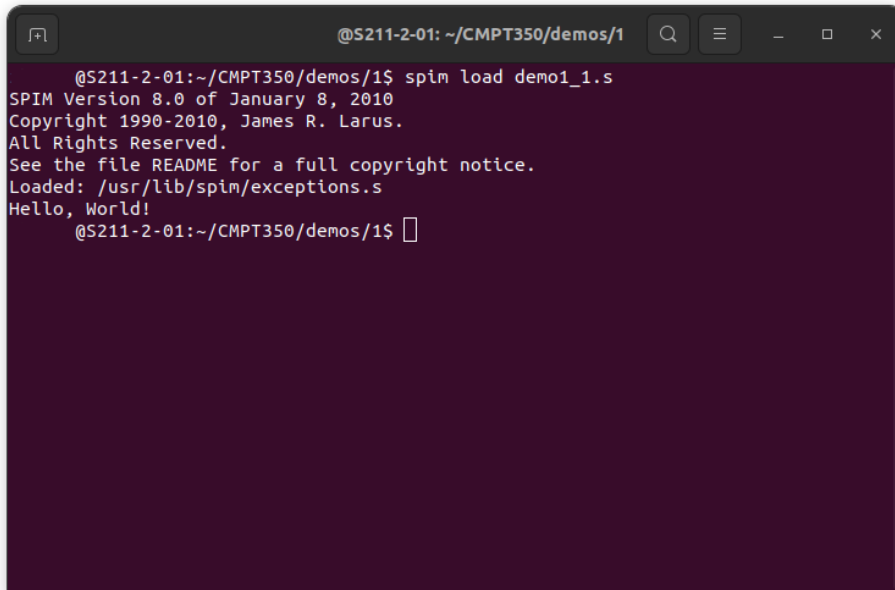
As part of all demo and laboratory submissions, you must submit what’s called a trace file. This is a text file you’ll create that in essence replicates what your terminal looks like when you demonstrate your programs. To assist with this, a tool called `script2` has been provided for you. To create a trace file, simply run `script2` in your terminal, and then proceed to use the terminal as normal to navigate to and run your programs. When you have demonstrated everything, press `CTRL+D` to signal that you are done, and `script2` will exit, creating a file called **typescript** in the directory you ran `script2` from. This is your trace file. **Please rename your tracefile to include your name, e.g. baker_typescript**

Submission

When you feel you can correctly answer all the above questions, call the lab instructor over and they will review them with you. Please wait until you can answer every question from every section. (Feel free to ask for clarification on anything at any time though!) Afterwards, **submit your trace files to Moodle**. You don’t need to change `demo1_1.s` and `demo1_2.s` for this lab, so please don’t resubmit those.

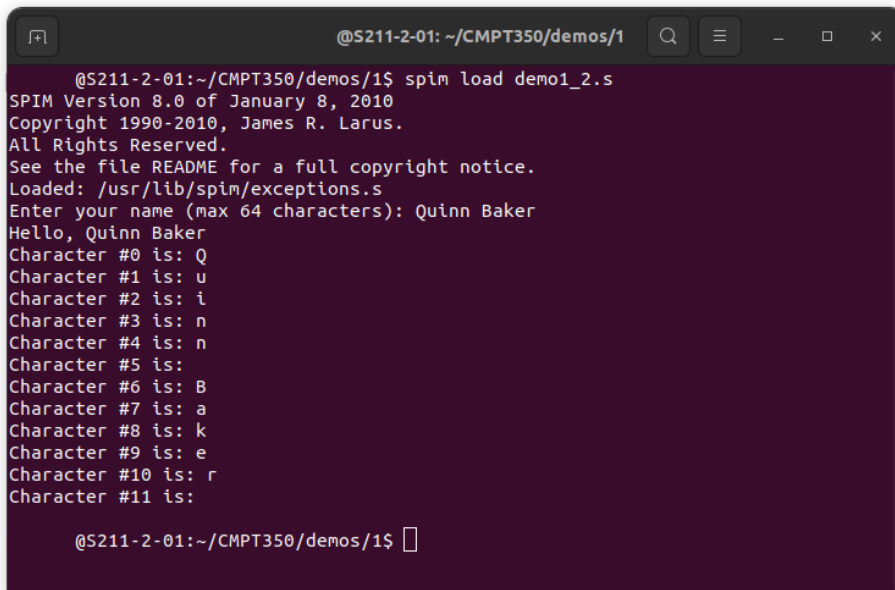
Example Output:

This is one example of what your program outputs will look like

A terminal window with a dark purple background and white text. The title bar shows the path '@S211-2-01: ~/CMPT350/demos/1'. The command '@S211-2-01:~/CMPT350/demos/1\$ spim load demo1_1.s' has been executed. The output displays the SPIM version (8.0), copyright information (1990-2010, James R. Larus), and a 'Hello, World!' message. The prompt '@S211-2-01:~/CMPT350/demos/1\$' is visible at the bottom.

```
@S211-2-01:~/CMPT350/demos/1$ spim load demo1_1.s
SPIM Version 8.0 of January 8, 2010
Copyright 1990-2010, James R. Larus.
All Rights Reserved.
See the file README for a full copyright notice.
Loaded: /usr/lib/spim/exceptions.s
Hello, World!
@S211-2-01:~/CMPT350/demos/1$
```

Demo1_1.s sample run

A terminal window with a dark purple background and white text. The title bar shows the path '@S211-2-01: ~/CMPT350/demos/1'. The command '@S211-2-01:~/CMPT350/demos/1\$ spim load demo1_2.s' has been executed. The output displays the SPIM version (8.0), copyright information (1990-2010, James R. Larus), and a prompt for the user's name. The user has entered 'Quinn Baker', and the program outputs 'Hello, Quinn Baker' followed by a list of characters and their indices. The prompt '@S211-2-01:~/CMPT350/demos/1\$' is visible at the bottom.

```
@S211-2-01:~/CMPT350/demos/1$ spim load demo1_2.s
SPIM Version 8.0 of January 8, 2010
Copyright 1990-2010, James R. Larus.
All Rights Reserved.
See the file README for a full copyright notice.
Loaded: /usr/lib/spim/exceptions.s
Enter your name (max 64 characters): Quinn Baker
Hello, Quinn Baker
Character #0 is: Q
Character #1 is: u
Character #2 is: i
Character #3 is: n
Character #4 is: n
Character #5 is:
Character #6 is: B
Character #7 is: a
Character #8 is: k
Character #9 is: e
Character #10 is: r
Character #11 is:
@S211-2-01:~/CMPT350/demos/1$
```

Demo1_2.s sample run