ECE/CS 250 – Recitation #4 – Prof. Sorin
Assembly Programming with SPIM

Objective: In this recitation, you will learn how to write MIPS assembly programs that run on the SPIM emulator of a MIPS system.

Complete as much of this as you can during recitation. If you run out of time, please complete the rest at home.

1. Task 1: Download SPIM

For the MIPS programming you do in this class, you will use the QtSpim simulator (a newer version of the venerable SPIM simulator) to run and test your assembly programs. QtSpim is a program that simulates the behavior of MIPS32 computers and can run MIPS32 assembly language programs. You can run QtSpim from the pulldown menu in the top left of your Unix container (under "Other").

2. Task 2: Run a Short Sample Program on SPIM

A helpful reference is a simple program that I've provided for you on Sakai under Resources/Recitation Materials (called simple.s). This simple program sums the entries in a list of 9 integers. Download and run this program on SPIM. Try running it to completion first and then run it again using the single-step feature to walk through each instruction one at a time. Look at how the PC, register values, and memory values change as a result of each instruction. You're going to want to get good at stepping through programs, because this is largely how you'll debug your own programs.

Tip: Refer to "Guide to Debugging MIPS" posted on Sakai (under Resources > Guides and Additional Resources). This guide goes over what every bit of the QtSPIM interface means in great detail, and explains how to read every line of both the text and data tabs. You will need this for Homework 2!

3. Task 3: Write a Very Simple MIPS Program

Write a MIPS program that prints out the integers from 0 to 10. Write this program as a loop (i.e., don't just declare a string "0, 1, 2, etc." and print that string).

4. Task 4: Write a Somewhat Less Simple MIPS Program

Write a MIPS program that reads in the user's name and the user's age (from the QtSPIM console) and then prints out the year in which that person will turn 50 years old. For example, if the user types in "Dan 48", then the program should print out "Dan will turn 50 years old in 2024." You may assume that the user has already celebrated their birthday this year, and you may assume the person isn't already 50 years old.