# OREGON STATE UNIVERSITY

## CS 472 - COMPUTER ARCHITECTURE

### SPRING 2014

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# Lab 3

*Arm Assembly Book Exercises*

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For this lab, you will be implementing some exercises from the book in ARM assembly.

All requested exercises should be tested from a main body of the code, and should comprise a single, testable program in ARM assembly.

**3.57** We need to swap the following registers. Do this using block moves.

| Before | After |
|:------:|:-----:|
| r1 | r3 |
| r2 | r4 |
| r3 | r5 |
| r4 | r6 |
| r5 | r7 |
| r6 | r1 |
| r7 | r2 |

**3.59** Write a function (subroutine) that inputs a data value in register r0 and returns value in r0. The function returns $y = a + bx + cx^2$, where a, b, and c are parameters built into the function (i.e., they are not passed to it). The subroutine also performs clipping. If the output is greater than the value d, it is constrained to d (clipped). The input in r0 is a positive binary value in hte range 0 to 0xFF. Apart from r0, no other registers may be modified by this subroutine.

**3.60** A computer has three eight-element vectors in memory, Va, Vb, and Vc. Each element of a vector is a 32-bit word. Write the code to calculate all elements of Vc if the ith element is given by

$$Vc_i = \tfrac{1}{2}(Va_i + Vb_i)$$

**Endianness Test/Flip** A function which tests the endianness of the system, and flips it as requested. This will be expanded upon in a later lab to examine the concept of endian neutral programming.