Lab 4: Data Memory

This week’s lab will cover the concept of addressability and how it is used to access data. Applicable references for exploring these topics are listed below.

Purpose/Scope: This lab will introduce you to the process for accessing data in the memory portion of the processor’s address space. This lab covers the concept of addressability and how it is used to access data. Since data can be located any place within the memory, labels will be used to reference that data.

This lab includes:

1. Labels and addressability
2. Establishing addressability and accessing data
3. Addressing multiple values with single point of addressability

Concepts: Data relocation
Addressability to data using labels
Accessing data in memory

Answers to pre-lab questions are to be completed before coming to your scheduled lab period, for submittal at the beginning of the lab. Use the guidelines for homework. Also keep a record of your answers to use in the lab.

References:

- 2016 Microprocessors Course Reference Chapters 5, 6, 7, 8, 9 & 10
- [https://sourceware.org/binutils/docs/as/index.html](https://sourceware.org/binutils/docs/as/index.html)
Pre-Lab 4

Deliverables

**Part A:** Using the references above, re-familiarize yourself with the concepts and answer the following questions:

1. What symbol contains the current location counter value?

2. What are the 3 different types of information that are applicable to a label?

3. What value is assigned to a label?

4. What is the address referenced by a label?

5. What assigns the address for a label?

6. What is dereferencing?

7. In no more than 5 lines total for each instruction, provide Description, Syntax, and Operation for each of the following instructions:
   a. ldrb
   b. ldrh
   c. strb
   d. strh
   e. push
   f. pop

8. Indicate what the following objdump switches do (hint: use --help):
   a. -s
   b. -j
   c. --section
   d. -r
   e. -t