The University of Alabama in Huntsville
ECE Department
CPE 221 01
Homework #1 Solution
Fall 2019

This assignment requires you to take an ARM assembly language program and simulate it. The program is available in the file array_plus_scalar.asm.

Part A

1. Install uVision on your computer using the Getting Started with Keil uVision document or go to the lab in ENG 228.
2. Start uVision.
3. Create a new project using Project -> New uVision Project.
4. Navigate to the desired directory (I suggest the same directory as the .asm file) and give the project a name.
5. Add the source file to the project by using Project -> Manage -> Project Items.
6. In the Manage Project Items popup, click on Add Files and select array_plus_scalar.asm (you may need to change the filter to All Files to see it). After you select the file, click on Add and then on Close. You should now be back in the Manage Project Items window and see array_plus_scalar.asm under Files. Click OK.
7. Use Project -> Build Target to run the Assembler.
8. Debug the program using Debug -> Start/Stop Debug Session
9. You'll see a popup window that says you are using the evaluation version and have a code limit of 32 K. Click OK.
10. Set up the memory map using Debug -> Memory Map
11. In the memory map popup window, enter a map range equal to the current mapped region, with the beginning and ending address separated by a comma. Click on Read, Write, and Execute. Then, click on Map Range. You should see write added to the current mapped range. Click Close.
12. Run the program and answer the following questions:

Part B

1. What is the value of the PC (decimal and hexadecimal) when the program ends execution?
   56, 0x0000 0038
2. What are the memory addresses associated with x?
   0x0000 0044 – 0x0000 0063
3. What are the memory addresses associated with y?
   0x0000 0064 – 0x0000 0083
4. What values are stored in y (decimal and hexadecimal)?
   y[0] 13239, 0x0000 33B7
   y[1] 537, 0x0000 0219
   y[2] -4490, 0xFFFF EE76
   y[3] 937, 0x0000 03A9
   y[4] -2461, 0xFFFF F663
   y[5] 5506, 0x 0000 1582
   y[6] 238, 0x0000 00EE
   y[7] 32880, 0x0000 8070
5. Are they correct?
   Yes, in all cases, the element of y is the corresponding element of x plus the value of a(239).