

Homework #4 Computer Organization

Due: March 7, 2013 (Th) by 5 PM

Write a ARM assembly language program to solve the following problem.

For a set of numbers stored in an array, calculate the sum of the positive numbers and the sum of the negative numbers. The program should calculate both sums and store them to memory. Numbers in the array with have a zero value (0) being used to signal the end of data (the zero value is acting as a "sentinel" value).

For example, your .data section for the array values: 10_{10} -5_{10} -30_{10} 15_{10} 20_{10} -1_{10} 0_{10} will be:

```
AREA SUM_POS_NEG, CODE, READONLY
ENTRY
```

```
; add your code here
```

```
STOP      B STOP
```

```

                AREA SUM_POS_NEG, DATA, READWRITE
                ALIGN
NUMBERS        DCD 10, -5, -30, 15, 20, -1, 0
POS_SUM        DCD 0
NEG_SUM        DCD 0
                END
```

Before you start writing ARM assembly language, write a high-level language algorithm, THEN translate it to ARM assembly language.

See the course web-page for links to download the ARM simulator for Windows at:

<http://www.cs.uni.edu/~fienup/cs1410s13/>

For non-Windows users, you will need to use the Wright Hall 112 and 339 labs.

You should turn in:

- a print-out of the ARM assembly language program file from inside the Keil uVision 4 IDE
- a window capture of the simulator state after running your assembly language program with array values: 10_{10} -5_{10} -30_{10} 15_{10} 20_{10} -1_{10} 0_{10} and the POS_SUM result showing 45_{10} and NEG_SUM result showing -36_{10} . You can capture this window by (1) right-clicking anywhere in the window to make it the "currently active" window, (2) while holding down the <Alt> key, press the <PrtScn> key to capture the window into the Window's clipboard, and (3) open some word processor (Word, Open Office, etc.) and paste the image into the document. Add your name to this document before printing it.