

## HW 4 - ARM Assembly Language (30 points)

Due by Monday March 7th at the start of class at 9:20AM.

In this homework assignment you are going to redo two of the problems from HW 1 but in ARM Assembly language.

1. [10 points] Write an ARM Assembly language function **sum3or5** that takes an integer parameter **n** and returns the sum of the integers less than **n** that are multiples of 3 or 5. For example if **n** was 10 then the function would return 23 because  $3 + 5 + 6 + 9 = 23$ . Put your code in a file named **sum3or5.s**
2. [10 points] Consider the integer sequence defined as follows. Starting with any positive integer: If **n** is even, the next number in the sequence is  $n / 2$ . If **n** is odd, the next number in the sequence is  $3n + 1$ . It is conjectured (though it is not known) that every such sequence eventually reaches 1. For example, if we started with 10 then the sequence is 10 5 16 8 4 2 1. Write an ARM Assembly function named **sequence** that takes an integer **n** and returns the length of the sequence generated. In the above example this would be 7.
3. [10] Write a main program in C (**main.c**) that takes one non-negative integer command line argument and calls both **sum3or5** and **sequence** for that argument. Remember, good programs do not crash, they fail gracefully with an error message.
  - a. Verify that the number of command line arguments is correct
  - b. Verify that the command line argument contains only digits by looping through the string and making sure each character is a digit. Don't do this in main. Write a C function named **verifyarg** that takes a string as a parameter and returns true if the parameter contains only digits, false otherwise.

### What to turn in

Create a directory **hw4** and create files **sum3or5.s**, **sum3or5.h**, **sequence.s**, **sequence.h**, and **main.c**. Push the files to your course repo by the due date.