CDA 3103 Assignment #2: Assembly Language Fall 2017

Pestaina **DUE: Wednesday, 11/29**

Overview

Many processors provide instructions to perform various types of shift operations. A shift operation moves all bits of the datum in a register one place in either direction. Some shifts are illustrated here: http://users.cis.fiu.edu/~pestaina/ShiftInstructions.pdf .

Shift Algorithms

Logical Left Shift

Adding a datum to itself results in a logical left shift of the datum. (*Why?*)

Logical Right Shift

See the class notes: http://users.cis.fiu.edu/~pestaina/RightShift.pdf .

Console Print

The LC-3 service routine, trap vector **x22**, displays a character string in the console:

- The characters must be stored, one per word, in contiguous memory words
- The end of the character string must be marked by a zero word, **x0000**
- The address of the first character of the string must be provided in **R0**

Binary Print

To print a datum in binary, first construct a character string in memory describing its data bits; then display the character string via the service routine described above. To construct the character string:

```
repeat 16 times {
    store( datum[15] ?  '1' :  '0' ) into the next memory location
    left_shift( datum )
}
```

Your Assignment

A partially completed program is provided on the class web-page. It includes a completed main program and stubs for a logical right shift subroutine, and a subroutine to print the contents of **R0**, in binary, on the console

1. Implement and test the print subroutine.
2. Implement and test the logical right-shift subroutine.

Specific Requirements

- Add a customized *Program Identification Paragraph* at the start of your program: http://users.cis.fiu.edu/~pestaina/asmpip.txt .
- Each subroutine must **save and restore** its working registers, including **R7**.
- Upload your completed source code, assign2**.asm**, in SCIS Moodle by the due date. **Moodle will not allow late submissions**.