ECED 3403 – Computer Architecture

Assignment 2 for students without a First Pass of the Assembler

17 June 2019

For those students who have been unable to complete Assignment 1, the First Pass of the assembler, you have an opportunity to complete Assignment 2.

This will require you to design, implement, and test a Second Pass of the assembler that reads the assembler file (.ASM) and a symbol table file (.SYM). For example, the following assembler file:

```
      org   $80
Label01    word  #0
      org   $FF00
Label02    word  #1
      org   $100
Label03    MOVLZ Label01,R0
      MOVLS Label02,R1
      LD    R0,R0
      LD    R1,R2
Label04    ADD   R0,R2
      CMP   #16,R2
      BNE   Label04
      ST    R2,R1
Done  BRA   Done
      END   Label03
```

And its symbol table file (Symbol in column 1, Type in column 2, Hex value in column 3, and Decimal value in column 4):

```
Done                                    LBL   0110  272
Label04                                 LBL   0108  264
Label03                                 LBL   0100  256
Label02                                 LBL   FF00  -256
Label01                                 LBL   0080  128
R7                                      REG   0007  7
R6                                      REG   0006  6
R5                                      REG   0005  5
R4                                      REG   0004  4
R3                                      REG   0003  3
R2                                      REG   0002  2
R1                                      REG   0001  1
R0                                      REG   0000  0
```

Can be combined to produce to assembler the above program and symbol table to the second pass listing file:

```
 1                  org   $80
 2   0080  0000 Label01    word  #0
 3                  org   $FF00
 4   FF00  0001 Label02    word  #1
 5                  org   $100
 6   0100  6C00 Label03    MOVLZ Label01,R0
 7   0102  7001       MOVLS Label02,R1
 8   0104  5000       LD    R0,R0
 9   0106  500A       LD    R1,R2
10   0108  4002 Label04    ADD   R0,R2
11   010A  45AA       CMP   #16,R2
12   010C  27FD       BNE   Label04
13   010E  5411       ST    R2,R1
14   0110  3FFF Done  BRA   Done
15                  END   Label03

Successful completion of assembly

** Symbol table **
Name                                    Type  Value Decimal
Done                                    LBL   0110  272
Label04                                 LBL   0108  264
Label03                                 LBL   0100  256
Label02                                 LBL   FF00  -256
Label01                                 LBL   0080  128
R7                                      REG   0007  7
R6                                      REG   0006  6
R5                                      REG   0005  5
R4                                      REG   0004  4
R3                                      REG   0003  3
R2                                      REG   0002  2
R1                                      REG   0001  1
R0                                      REG   0000  0
```

And the executable module (.xme):

```
S00D0000A2ex01.txtB3
S105008000007A
S105FF000100FA
S1150100006C017000500A500240AA45FD271154FF3F6A
S9030100FB
```

If time permits and you can complete your first assignment, it will be graded with a late penalty, otherwise the implementation and testing components of the first assignment will receive a grade of zero.

If you have questions regarding the above or any other part of the course, please contact Dr. Hughes.