CMPEN 472, The Pennsylvania State University

Homework 7

Due: Oct. 14, 2015 11:30pm

Objective

To learn how to use arithmetic instructions and write basic I/O system subroutines.

Textbook Reading (for next homework):

1. Chapter 9: Section 9.1, Section 9.2
2. Chapter 9: Section 9.4, Section 9.5

Instruction

1. Write a program to make an elementary calculator, displayed on the HyperTerminal connected to the HCS12 board.

2. The calculator rules are:

    1. Input positive decimal numbers only
    2. Input maximum three digit numbers only
    3. Valid operators are: +, -, *, and /
    4. Input number with leading zero is OK
    5. Input only two numbers and one operator in between, no spaces
    6. Show 'Ecalc> 'prompt and echo print user keystrokes unltil Return key
    7. Repeat print user input and print answer after the '=' sign
    8. In case of an invalid input format, repeat print the user input until the error character
    9. In case of an invalid input format, print error message on the next line: 'Invalid input format'
    10. Keep 16bit internal binary number format, detect and flag overflow error
    11. Use integer division and truncate any fraction

3. The HyperTerminal display should look something like the following:

```
Ecalc>
Ecalc> 123+4
       123+4=127
Ecalc> 96*15
       96*15=1440
Ecalc> 456@5
       456@
       Invalid input format
Ecalc> 7h4*12
       7h
       Invalid input format
Ecalc> 3*1234
       3*1234
```

```
       Invalid input format     ;due to 4th digit
Ecalc> 003-678
       003-678=-675
Ecalc> 100+999*2
       100+999*
       Invalid input format
Ecalc> 555/3
       555/3=185
Ecalc> 7*(45+123)
       7*(
       Invalid input format
Ecalc> 78*999
       78*999
       Overflow error
Ecalc> -2*123
       -
       Invalid input format
Ecalc> 73/15
       73/15=4
Ecalc>
```

4. Make your program user friendly by giving directions as to how to correctly use your program.
5. Also, make your program 'fool-proof', never crash or stop based on wrong user response.
6. You may add other features or decorations.
7. Design the program to start at $3100 and data to start at $3000.
8. Be sure to put much comments so that grader and others can clearly and quickly understand your program. Comments are very important in assembly language programs.
9. Copy your 'main.asm' file to 'cmpen472hw7_YourLastName.asm'. For example, mine will be 'cmpen472hw7_choi.asm' (Do not ZIP your file.)
10. Turn-in your project source code file through Penn State ANGEL. Deposit your source code file into the Homework 7 DropBox under CLASS tab in CMPEN 472 Course.

Congratulations on your seventh CMPEN 472 homework completion!
