Problem Set #5

Date Assigned: Friday, April 8, 2016
Date Due: Monday, April 18, 2016
Points: 50 pts

1. (14 pts) Express the number $0.2_{(10)}$ in the IEEE 754 Binary32 floating-point format. There are two possible answers to this question depending on the rounding method that is used.
    a. (6 pts) Write out your two answers in HEX notation and show all steps.
    b. Write a simple C program (name it ieeetest.c) that shows how 0.2 is represented on zeus. Run your program on zeus using GCC.
        i. (6 pts) Place a copy of the code in your solution document.
        ii. (2 pts) Place a copy your properly labeled output in your solution document. The output must show which of the two answers that you gave in a is used on zeus.

2. (10 pts) Work problem 10.32 on p. 362.

3. (14 pts) Consider the expression: A + B * C / D - E * F:
    a. (5 pts) Convert this expression from infix to postfix notation.
    b. (9 pts) Write program segments for a stack machine and a 1-Address machine that evaluates the above expression. In the case of the stack machine, leave the result on top of the stack. In the case of the 1-Address machine, identify where your result is. The instruction sets are listed below:

```
Stack Machine     One-address Machine
-------------     -------------------
push m            load m
pop m             store m
add               add m
sub               sub m
mul               mul m
div               div m
```

4. (12 pts) Write a fully documented C program endiantest.c that determines the endianness of a machine. Your program is to print either a) BIG ENDIAN MACHINE or b) LITTLE ENDIAN MACHINE. I do not want you to talk about the solution to this problem even at a high level as I am interested in how each of you attack this problem.
    a. Paste your C program into your solution document.
    b. Report on the endianness of the following machines: (a) zeus (b) ada and (c) circe. I have created an account for each of you on circe which we will talk about in class. You can ssh into ada and circe through zeus.

How to turn in your solution:

- Create a folder called 05punet, and place inside it: (1) your word document 05punet.docx, (2) your program ieeetest.c, and (3) your program endiantest.c. Submit the folder by placing it into the CS 430 drop folder on Grace by the deadline. Make sure that both of your programs follow the C coding standards. Be sure to explain in the comments at the top of each file how each program works.

- Please make sure your problem sets are typed, answered in order, and stapled together. A hard copy of your Problem Set Solution is due on the instructor's desk by the deadline.