CMSC 216 Quiz 4 Worksheet

The next quiz for the course will be on Thu, Jul 13. The following list provides additional information about the quiz:

- The quiz will be a written quiz (no computer).
- The quiz will be in lab session.
- Closed book, closed notes quiz.
- Answers must be neat and legible.
- Quiz instructions can be found at http://www.cs.umd.edu/~nelson/classes/utilities/examRules.html
- Make sure you know your section number and your TA's name.
- **Regarding Piazza** - Feel free to post questions in Piazza regarding the worksheet and possible solutions to problems, but for coding questions please do not post code. You can post suggestions on how to solve coding problems, but your classmates will benefit more if they themselves actually solve the problems. Pretend you are a TA while addressing or providing help in Piazza 😊

The following exercises cover the material to be included in this quiz. Solutions to these exercises will not be provided, but you are welcome to discuss your solutions with the TA or instructor during office hours. We will include the following cheat sheet in the quiz so you don’t have to memorize some Assembly constructs.

**Assembly Cheat Sheet**

- **Registers** → %eax, %ecx, %edx, %ebx, %esi, %edi
- **Assembler Directives** → .align, .long, halt, .pos
- **Data movement** → irmovl, rrmovl, rmmovl, mrmovl
- **Integer instructions** → addl, subl, multl, divl, modl
- **Branch instructions** → jmp, jle, jl, je, jne, jge, jg
- **Reading/Writing instructions** → rdch, rdint, wrch, writ
- **Ascii code for newline character** → 0x0a
- **Ascii code for space** → 0x20

**End of Assembly Cheat Sheet**

**Exercises**

1. What is the difference between Big Endian and Little Endian? Suppose we have the value 0x02143657. How would the value be represented using Big/Little Endian?

2. What is the purpose of the .align directive?

3. What is the purpose of the .pos directive?

4. Is it possible to have an Assembly (Y86) program with an array of 5000 elements? Briefly explain.

5. What is the difference between irmovl MyData, %eax and mrmovl MyData, %eax, assuming MyData is a label?

6. Write an Assembly program that reads an uppercase letter and prints the corresponding lowercase. To compute the lowercase just add 32 to the ascii value of the uppercase.

7. Write Assembly code that will define a global variable named x that has the initial value 216. The program will read an integer value and will print “Y” if x is divisible by the provided value, and “N” otherwise. The ascii value for “Y” is 0x59 and for “N” 0x4E. You DO NOT need to print a newline at the end of the program.

8. Write Assembly code that will read an integer and print the even values between 1 and the integer value provided.
9. Implement Assembly code that corresponds to the following C code:

```c
#include <stdio.h>

int size = 3;
int data[3] = {2, 7, 3};

int main() {
    int i;
    for (i = 0; i < size; i++) {
        data[i] *= 2;
    }
    return 0;
}
```