

COS 335 Spring 2009

Homework 4

Due Thursday Feb 19

Note: this assignment is due *after* the exam, however, completing the Hamming code problems *before* the exam will be an effective way to study this topic. **The Hamming code problems assume left-to-right 1-based bit numbering rather than right-to-left as shown in the text.**

1. (1 point) Using Hamming codes, show complete SEC code words for the following 4-bit words:

1000

1111

2. (2 points) Using Hamming codes, show complete SEC code words for the following 8-bit words:

01101001

10111101

3. (3 points) For each of the following three SEC code words, determine whether any errors are present and (for all three) show the correct data that has been encoded. These strings are encoded with left-to-right bit numbering.

011010100011 110000101101 111010010111

4. Text p. 166 ex. 5.3. (1 point) Express the data rate in megabits / second. (Sometimes incorrectly written as Mbs). Note that in discussing data transfer rates, one megabit/second normally means 10^6 bits/second, not 2^{20} bits/second.

Please turn in problem on a separate sheet of paper. I will grade these personally.

5. (3 points) Using the internet, research the question "What is the approximate frequency of soft memory errors in DRAM?" and write a brief essay (1 double spaced page) summarizing your findings. Because actual studies are relatively few and far between, some older studies may not be directly applicable to modern high-density DRAM memories so you may have to extrapolate to answer the question meaningfully for today's memories.

Cite your references using the IEEE style. These are numbered in square brackets. The elements of website references listed by [1] are:

Author. (year, month). Title. [Type of Medium]. Available: site/path/file

Example:

Dr Jean Armstrong: (2007, Mar.) Brief Biography.[Online]. Available:
<http://www.ecse.monash.edu.au/staff/jeana/aboutarmstrong.html>

Another good online reference to IEEE citation style is [2]. This has useful information on in-text practices.

Grading will be based on writing quality as well as content. You may resubmit to correct problems in writing quality and improve your grade.

References:

[1] Monash University. (2006, April). Institute of Electrical and Electronics Engineers (IEEE) style examples [Online] Available: <http://www.lib.monash.edu.au/tutorials/citing/ieee.html>

[2] Engineering Communication Centre Staff, University of Toronto. (2002, Aug.) IEEE Style Documentation [Online]. Available: <http://www.ecf.utoronto.ca/~writing/handbook-docum1b.html>