

Computer Science 801

Fall 2000

Homework 2

Due: Thursday, 10/26/2000

1. Hamming codes:
 - a. Given the following bit sequence with a 4-bit Hamming code, is the byte represented correct or in error? If it is in error, which bit is incorrect?

010000011000
 - b. What is the Hamming code for the ASCII character 'A', given by the hexadecimal string 41?
 - c. Give an example of a Hamming code with 3 mistakes that would appear correct to the decoding algorithm. Show your work.
2. What parts of the system are involved with DMA? Why do we use it?
3. Convert the following decimal numbers to (i) binary, (ii) octal, and (iii) hex:
 - a. 117
 - b. 0
 - c. 255
 - d. 999
4. Compute the following binary sums and products:
 - a. $0110 + 1110$
 - b. 0011×0010
 - c. $(1001 + 0001) \times (0111 + 1)$
5. What are the pros and cons in CISC vs. RISC?
6. Convert the following numbers to their 4-bit binary representation using (i) 1's complement and (ii) 2's complement format:
 - a. 4
 - b. -6
 - c. 0

7. Given a 1-bit sign bit, 8-bit exponent, and a 15-bit significand, how would the following floating-point numbers be represented?
- a. 1.0
 - b. -15.0
 - c. $1/64$
 - d. 5.4×10^{-79}
8. What is the largest number that can be represented, given the format in the previous exercise? Give your answer in both binary and decimal.