

## CDA 3103 Computer Organization

### Homework Ch. 5 (and first part of Ch. 6): Closer Look at ISAs and Memory Hierarchy

**Assigned:** Friday, April 11, 2014

**Due:** Wednesday, April 23, 2014, 11:59pm

#### 1 Problems

1. Complete the following problems in the exercises section at the end of Ch. 5:  
1, 2, 4, 5, 8, 9, 17, 19, 20, 23, 24, 25
2. From the True/False section: 2, 3
3. Express your answer in powers of two:
  - a. How many bytes are in 16 TB?
  - b. How many bytes are in 20 MB?
  - c. How many bytes are in 16 GB – 40 MB? (Just express this as the difference between two numbers that are some power of two)
  - d. Don't worry about expressing this as a power of two (unless you would like to). How many nanoseconds are in  $2^{20}$  microseconds?
4. How many unique values can be represented by:
  - a. A 2-bit value?
  - b. A 4-bit value?
  - c. An n-bit value (n is a positive integer)?
5. What is the range of values that can be represented by an unsigned:
  - a. 2-bit value?
  - b. 4-bit value?
  - c. n-bit value (n is a positive integer)?
6. If caching introduces latency on a cache hit, why don't computer designers simply eliminate caching and directly access memory on a memory access? (Explain.)
7. Work example 6.2 of your book (p. 324) but assume that the memory size is  $2^{16}$  bytes with a cache of 16 blocks and where each block has 8 bytes.

#### 2 Submission Requirements

- Your solutions must be in a single file with a file name  
**yourname-hw-ch5andBegin6**
- If scanned from hand-written copies, then the writing must be legible, or loss of credits may occur. The interpretation of hand-written scanned copies rests ultimately with me.
- Acceptable file formats are: PDF, .doc, .docx
- *Only submissions in the designated location on Canvas are graded. Submissions in any other form will be ignored. To avoid submission issues, it is strongly recommended that you submit your work at least 24 hours before the submission deadline.*