LBSC 690 Midterm Exam **Fall 2006**

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You have 120 minutes to complete this exam. Time will begin as soon as you start reading the first question.

- You may use any material, including the text book, lecture slides, and notes. You may also use anything found on the Internet that existed before the exam started.
- You may NOT communicate with any other person during this exam, either in person or using electronic means.

As strategies for completing the exam, keep the following in mind:

- If you find a question to be ambiguous, make reasonable assumptions as you see fit, but write down your assumptions.
- You are more likely to get partial credit for a wrong answer if you show your work.
- Be careful not to get carried away and run over the time limit by spending too much time on one question. Plan ahead, and don't devote more time to a question than it is worth.

Please write your answers in the space provided.

Score Summary (for use by grader)

Question	Possible points	Actual points
1	10	10
2	15	15
3	15	15
4	15	15
5	20	20
6	15	15
TOTAL	90	90

1. [10 points total] Processors. Intel's previous generation CPU, the Pentium 4, topped out at 3.8 GHz. The company's newest processor, the Core Duo 2, runs at 2.33 GHz.

A. [3 points] What exactly is GHz? (a sentence or less)

A Gigahertz (GHz) is a unit of frequency that equals 1 billion cycles per second.

B. [3 points] What is the GHz rating actually measuring? (a sentence or less)

The GHz rating measures the speed of the system clock, which controls the timing of all operations inside the computer.

C. [4 points] Comparing the two chips, we note that the GHz rating of the Pentium 4 is higher than the GHz rating for the Core Duo 2. Does this actually mean that the Pentium 4 is a faster processor? Explain. (a few sentences or less)

There are many reasons why the Core Duo 2 is faster than the Pentium 4, but this is the reason most relevant to this question: It takes the Pentium 4 more clock cycles to execute each instruction.

2. [15 points total] Downloading movies. Going to Blockbuster to rent a movie is so last century. Even NetFlix will eventually give way to video-on-demand, where you (legally!) download movies onto a hard drive and play back on your TV. This question explores such video-on-demand services.

A. [5 points] Approximately how much space does a feature-length DVD-quality film take up?

Between 4.7 GB and 8.5 GB. (Source: http://en.wikipedia.org/wiki/HD_DVD)

B. [5 points] How many CDs would it take to store a feature-length DVD-quality film?

A typical CD holds 650MB.
Number of CD's required = 4.7 GB/ 650 MB = 7.2 (CD's)

C. [5 points] Approximately long would it take to download a feature-length DVD-quality film over a typical household Internet connection?

DVD size: 4.7 GB
DSL speed: 768 kbps (bits/sec)
Time required:
= (4.7 G × 8) / 768 k
(multiply with 8 to convert bytes to bits)
= 48958.33 s
= 13.6 hours (approx.)

NOTE: You may need to search for information on the Web in order to answer this question. Values might vary depending on source, but any reasonable number will be accepted. For reference, you might choose to include the URL of the source.

3. [15 points] Horizontal vs. vertical navigation bars. For some Web sites, the navigation bar runs vertically along the left edge of the screen. For other Web sites, the navigation bar runs horizontally along the top edge of the screen. What are the advantages and disadvantages of either approach? (a few paragraphs at most)

- **Both are commonly used, and so users are familiar with both navigation devices.**
- **Horizontal navigation bars are usually limited to the width of the screen, since horizontal scrolling is awkward for most users. This constrains the number of possible items displayed.**
- **Vertical navigation bars can have more items, but users must scroll to see them.**
- **It is possible to nest items in the vertical setup (e.g., a bulleted list); this is much more difficult to accomplish in the horizontal setup.**
- **One can make horizontal navigation bars into a familiar drop-down menu. With vertical navigation bars, the menu items would have to pop out from the left, which may be less familiar to users.**
- **Horizontal navigation bars take up room at the top of the screen; vertical navigation bars take up room on the side. Since most screens are wider than they are tall, it can be argued that vertical navigation bars waste less space. Also, very long horizontal lines are difficult to scan as the eye moves back to pick up the next line, so one might argue for narrower text columns anyway.**

4. [15 points] Toaster. In what way is a toaster well designed? Explain explicitly using concepts introduced in Week 3. (a few paragraphs at most)

- **Affordances: Slots are shaped for bread; it's obvious where the bread goes.**
- **Visible constraints: Bread fits much more easily one way than the other.**
- **Causality: Depressing lever lowers bread.**
- **Familiar Idioms: Knob or slider to control darkness similar to controls found in many other appliances. All toasters are basically designed the same way.**
- **Mental Model: Easy to understand — bread goes in, gets toasted, pops back out**

5. [20 points] XML. List five differences and five similarities between HTML and XHTML. (bullet points)

Similarities:

- **Both are markup languages**
- **Both use tags denoted by angle brackets**
- **Both use tags that contain attributes**
- **Both transported over HTTP**

- **Both can be displayed by a browser**
- **Both sets of tags share the same semantics**
- **Both derive their ancestry from SGML**

Differences:

- **XHTML is proper XML**
- **XHTML tags must be properly nested**
- **XHTML tags must always be closed**
- **XHTML tags must be in lowercase**
- **XHTML documents must have one root element**
- **XHTML values for attributes must be enclosed in quotes**

6. [15 points] Discuss three different ways in which XML standards emerge. (a few paragraphs at most)

1. **By committee: stakeholders getting together and agreeing on the standard.**
2. **By fiat: a major player (monopoly, government, etc.) defining a particular standard and forcing others to adopt it.**
3. **By market forces: A useful XML application fills a need, and is rapidly adopted by others.**