CSCI 2321 (Principles of Computer Design), Spring 2004

Review for Midterm

1 Format of the exam

The exam will be in class March 10. You will have 50 minutes. You may use your textbook and any notes or papers you care to bring, but you may not use other books, *a calculator or computer*, or (of course) each other's papers.

Most questions will be similar in form to those in the homework assignments and quizzes.

2 Lecture topics to review

You are responsible for all material covered in class, but the following is a summary of topics I think are most important.

- Terminology from chapter 1; the five classic components of a computer.
- Defining and measuring performance; relationship among execution time, clock rate, cycle time, and cycles per instruction.
- Idea of "instruction set architecture" (as the interface between hardware and software).
- MIPS instructions described in chapter 3 — usage and binary (machine-language) representation.
- Compilers, assemblers, linkers, and loaders.
- MIPS conventions for procedure calls.
- Binary, decimal, and hexadecimal number systems; two's complement notation.
- Computer arithmetic (on integers): addition, subtraction, multiplication and division (basic ideas only, not details of algorithms), overflow.
- MIPS instructions for manipulating bits (`sll`, `srl`, `and`, `or`, etc.).
- AND and OR gates and inverters, and how to use them to implement Boolean functions.
- Design of an ALU.
- Floating-point representation and arithmetic (basic ideas only, not details).

3 Reading to review

You should have read (or at least skimmed) all of chapters 1, 2, 3, and 4. The following is a list of sections to read more carefully and/or review.

- In chapter 1: 1.1, 1.2, and 1.7.
- In chapter 2: 2.1, 2.2, and 2.3.
- In chapter 3: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.8, 3.9, 3.11, and 3.14.
- In chapter 4: 4.1, 4.2, 4.3, 4.4, 4.10 (first two pages), 4.11. (For the multiplication and division algorithms, you don't need to memorize details, just see in general how the sketched hardware design relates to the algorithm.)