CS 320, Spring 2014 — Midterm 1 — Due in class, Friday, February 28th

This is a take-home exam:

- The exam is to be completed individually. Do not discuss any of the questions with any other person.
- Do not use any resources other than your notes, the assigned textbooks, and the resources explicitly linked from the course web page.
- Express your answers *in your own words*.
- I recommend typing your answers, and using a drawing program or UML modeling program (e.g., Violet UML) to create the class diagram for Question 8. However, *neatly* hand-written and hand-drawn answers are acceptable. **Your name should appear on each page.**
- Turn in a hard copy of your completed exam at the beginning of class on Friday, Feb 28th.

Part I — Short Answer

Question 1. [9 points] "Big Design Up-Front" (BDUF) is the idea that when starting a software project, a complete system design addressing all of the known requirements should be created.

Briefly explain advantages and disadvantages of BDUF.

Question 2. [9 points] When using a version control system (such as Git), developers have a choice regarding how they commit and push their work. ("Pushing" means sharing changes to a public repository where they become available to other developers to incorporate into their own repositories.)

- One option is to make larger sets of changes and push less frequently.
- Another option is to make smaller sets of changes and push more frequently.

Briefly discuss some advantages and disadvantages of both styles of working.

Question 3. [9 points] Explain under what circumstances it is appropriate for one class to be a subclass of another class. Be specific.

Question 4. [9 points] The concept of *semantic markup* in HTML is that the body of an HTML document should contain only tags such as `div` and `span` that describe the meaning of the data in the document, rather than tags that specify how the data should be rendered visually. In semantic markup, all visual presentation is specified using CSS stylesheets that are separate from the HTML documents.

Briefly discuss advantages to using semantic markup. Suggestion: talk about things you can do if your website or web application uses semantic markup that are difficult to do if you don't use semantic markup.

Part II — Requirements and Analysis

For the questions in Part II, choose one of the following software projects:

- An online discussion forum
- An online question and answer forum (like StackOverflow)
- A blog hosting website (such as blogger.com, wordpress.com, etc.)
- A photo hosting website (such as flickr.com)

Question 5. [10 points] List the *names* of at least 10 important use cases that will help document the requirements. Each name should indicate which actor is the initiator of the use case, and what goal is being accomplished.

Question 6. [14 points] Pick two of the use cases you identified in Question 5. Write them in the form suggested in Chapter 9 of *UML Distilled*. Make sure that in each use case, the top-level items show an important goal being initiated and completed by an actor external to the system.

Question 7. [8 points] Perform a textual analysis of the use cases from questions 5–6. Write down the important noun and verb phrases. (If you can think of any important noun of verb phrases from the problem domain that did not appear in your answers to Questions 5–6, include them as well.)

Question 8. [24 points] Identify the *most important* noun and verb phrases from your textual analysis (Question 7). (Pick *at least* 5 of each.) Use them as the basis for an analysis model expressed as a UML class diagram. Add the most important verb phrases to appropriate classes as operations (methods). **Important**: make sure that your model makes it clear how the important data in your system will be represented.

Question 9. [8 points] Briefly explain your analysis model. Explain each relationship (generalization, association, aggregation, and composition) between classes. Explain how you chose the class in which each operation (method) was placed.