# Midterm Exam

## Software Engineering
810:172
Fall 2009

**Instructions**

- The exam consists of this cover sheet and eleven (11) problems.
  Be sure that you have all of these items and that they are all legible.

- Read all questions and their instructions thoroughly before you begin.
  It is always worth your time to plan ahead!

- Write your answers in the spaces provided on the exam.

- Whenever I ask you to answer "... *briefly*...", a one- or two-sentence answer is long enough to express the each bullet item.

- Whenever a problem contains multiple parts, be sure that your response includes answers to each part.

- The exam is worth sixty (60) points total. The point value of each question is given in brackets immediately after the problem number. You may wish to use these point values as you budget your time across the exam period.

- Points will be awarded based on your explicit answers. Partial credit will be given where possible, so show all of your work.

- The exam lasts sixty-five (65) minutes. It is due at 1:45 PM.

# Name:

1. **[6 points]** List the stages of the software development lifecycle. Describe each stage in *one phrase* each.

2. **[6 points]** Summarize *briefly* the distinction between accidental and essential complexity outlined in the "No Silver Bullet" article by Brooks. Identify at least one promising approach to improving how we build software.

**3.** [6 points]  What role does a functional specification play in the software lifecycle? Summarize *briefly* the essential contents of a specification.

**4.** [6 points]  Describe *briefly* what distinguishes the "agile" approaches to software development from more traditional approaches.  Identify at least two of the reasons behind the agile approaches described by Fowler in his "The New Methodology" article.

**5.** [3 points] Describe *briefly* what we mean by the terms **coupling** and **cohesion**.

**6.** [3 points] Describe *briefly* what we mean by the term **software architecture**. Give an example of at least one architectural style from our readings.

**7.** [3 points] Describe *briefly* what we mean by the term **design pattern**. Give two examples of design patterns from our readings.

8. **[6 points]** Give an example of how Model-View-Controller could be used to implement a system you are familiar with.

9. **[6 points]** Choose **three** of these design principles. For each, <u>either</u> describe it *briefly* <u>or</u> give an example that illustrates it.

- Single Responsibility Principle
- Liskov's Substitution Principle
- Interface Segregation Principle
- Open-Closed Principle
- Dependency Inversion Principle

**10.** [9 points]   Draw a simple UML class diagram that shows the relationships among customers who place orders for various kinds of office supplies from a retail store. The store serves both individuals and corporate clients.  Payments are made via cash, credit, and invoice.

**11.** [6 points]  Draw a simple data flow diagram (DFD) to model the placing of and payment for orders in the retail store scenario in Problem 11.

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