

NAME: \_\_\_\_\_

**SAMPLE MIDTERM EXAM**  
**CS 3398, Spring or Fall 20XX**  
**Maximum Points: 100**

**Multiple choice questions (34 pts):** circle the letter of the **best** answer:

1. **(2 pts)** Software engineering is an engineering discipline that is concerned with:
  - (a) how computer systems work
  - (b) theories and methods that underlie computers and software systems
  - (c) all aspects of software production.
  - (d) how complex engineering projects should be designed and managed over their life cycles
  
2. **(2 pts)** A structured set of activities used to develop a software system or product is called
  - (a) project management.
  - (b) a software process.
  - (c) software engineering.
  - (d) requirements engineering.
  
3. **(2 pts)** \_\_\_\_\_ is a disciplined technique for restructuring an existing body of code, altering its internal structure without changing its external behavior.
  - (a) Continuous integration
  - (b) Test-first development
  - (c) Refactoring
  - (d) Unit testing
  
4. **(2 pts)** Which of the following is NOT one of the five principles of agile methods?
  - (a) Customer Involvement
  - (b) Embrace Change
  - (c) Incremental Delivery
  - (d) Following the Plan
  
5. **(2 pts)** The software system that generates and prints a utility bill at the end of the month for each customer is an example of which type of application?
  - (a) Interactive transaction-based app
  - (b) Batch processing system
  - (c) Embedded control system
  - (d) Data collection system

**(17 multiple choice questions in all, these 5 are easy ones)**

**Problems and written answer questions (66 pts):** Write your answers on the blank papers provided. Number your answers and write your name on the papers! You may use both sides.

- (10 pts)** Using a natural language format write one user level and several system level requirements to describe a function to allow a librarian to record a book loan. In the system, a book has an ISBN and may have multiple copies. Each copy has a number (1, 2, 3, ...) and is either available or has a due date and the id of the current borrower. Books are loaned for two weeks at a time. Assume the librarian is logged in and has already indicated they want to record a book loan. Assume that the borrower knows the ISBN of the book they want to borrow, and that the librarian will retrieve it from the stacks. Consider what information must be gathered, what conditions must be checked, and what information must be recorded or changed.
- (10 pts)** Develop a set of use case diagrams (with one-sentence textual descriptions) to describe the requirements for a university scheduling system that manages the university's course offerings, including students registering for courses. You should include at least 3 actors. Each actor should have at least one use case that is unique. You should have at least 5 use cases (interactions).
- (12 pts)** Design and draw the basic architecture of a video chess game that can be played on a smart phone using one of the architectural design patterns from chapter 6 (**indicate in your answer which pattern you are using**). The current state of the game board should be able to be viewed in 2D or 3D or even in a text format (suitable for e-mailing). The user can move pieces by touching and dragging the pieces on the screen. The moves may be animated (or not).
- (10 pts)** Briefly describe 2 of the 3 main software process models we studied in Ch. 2. Give at least one advantage and disadvantage for each process model.
- (12 pts)** Choose 3 of the 12 core practices of Extreme Programming (XP) and give a brief description of each. For each one indicate what benefit it provides over more traditional development methods (assuming it is used in the context of agile development).
- (12 pts)** List and describe three methods or tools used during requirements development (in any of the four sub-disciplines). How does each method contribute to the goal of developing requirements specifications of good quality?