Software Engineering Comprehensive Exam
Fall Semester 1999

Answer any four of the following six questions. Please mark which questions you want graded below. Use only the space provided. *Do not attach additional sheets or use the back of the exam.*

Questions to grade (circle the appropriate number): **1 2 3 4 5 6**   (If you leave this blank, questions 1-4 will be graded.)

1. A software company has asked you to settle a dispute among its engineers. The company has acquired a reusable code library and some of its engineers are arguing that they should build specifications for each routine in the library. Another group of engineers considers such specification activity to be a waste of time. State which of these two groups of engineers you agree with and explain why.

2. Data structures are created during the design phase. What information does one use to create data structures? Where does this information come from?

3. Name the five phases of the software engineering lifecycle. Which phase do you believe is the most important? Justify your answer.

4. The general engineering process proceeds as follows: specify functionality in the discovery (requirements) phase, design data in the design phase, and code the algorithm in the development phase. In what situation might you design data structures before fully specifying functionality? In what situation might you design the algorithm without worrying too much about data structures?

5. What is information hiding? How does information hiding help to make software more robust and easier to debug? What role does information hiding play in assisting developers with changes to requirements?

6. There are two ways in which routines or modules can communicate information. First, they can make calls to each other and pass data as parameters. Second, they can each share common global data. The idea of module or routine *coupling* is a measure of this communication of information. Compare and contrast coupling via parameter passing and coupling via global data. What are the advantages and disadvantages of each? Are there some circumstances in which one is better than the other?