

## **SWE Comprehensive Examination**

Software Metrics

Student ID:

Each answered question is worth 20 points.

Part 1 Answer each of the following questions.

1. Describe the six sigma program and describe how it can improve the quality of each of the phases of software development. (Phases: requirements, preliminary design, detailed design, coding, integration, system testing)
2. Define each of the following terms or concepts used in software metrics: code coverage; defect density; ratio scale; directed flow graph; basis set of cycles; resource measure; fan out; ordinal scale; attribute of a metric; fan in.
3. What attribute does McCabe's cyclomatic complexity metric actually measure? When (during which phases) and how is the metric used to measure software development?

Part 2 Answer 3 of the following questions.

1. List 3 examples of resource measures and 3 examples of process measures.  
List 3 examples of product measures and 3 examples of project measures.  
What is a model? Why are models important in measurement?  
List 3 benefits and 3 risks of establishing a software measurement program.
  
2. A project manager, X, circulates a list of 75 tasks to the staff of programmers. X asks them to rate the difficulty of each task, on a scale of 1 to 100 (1 is easy, 100 is hard). They can use any number within that range, including numbers like 22.5 and  $\pi$  (pi). In your opinion, what is the scale of these ratings? Explain Why this is the case? As X works with the ratings from a specific programmer, X computes the mode, median and mean ratings, the range of numbers used, the number of different numbers used, and the standard deviation of the programmer's ratings. Which of these are appropriate to the scale in use?
  
3. What is the Goal Question Metric paradigm? How can the GQM help a project? Is it more appropriate in specific phases of the project development? If so explain why. Explain its strengths and weaknesses.
  
4. Ishikawa's Seven Basic Quality tools in software development are tools that can be used for metrics collection and analysis of metric data. Describe three (3) of the seven tools along with the types of parameters that are tracked using the three tools you choose.