BLG411E-SOFTWARE ENGINEERING
Midterm Exam – 15/11/2005

- Notes are closed.
- Exam help sheet is allowed.
- Calculator and dictionary are allowed.
- Exam duration is 2 hours.

PROBLEM (60 points)

Definition: You are asked to develop a web-based Quizzing Application. There are two portions: The Student Program and the Instructor Program. Both of the programs will run on a web-server.You are required to develop only the Student Program at this time.
A student will be able to login to the system by entering a username and a password.
Then the student will select a test subject from a list. Questions will be randomly chosen from a question-bank by the program. Question types are multiple-choice or true/false questions. Upon starting a quiz, a timer should be started to count (such as 10 minutes). After the time-out, all areas of the quiz window should be disabled, except the submit button. When student finishes the quiz by clicking the submit button, he will see the anser keys as well as the following results:

- Number of correct answers
- Number of incorrect answers
- Number of blank answers

A record of quiz taken by the student should be logged in the system, and the student should not be allowed to retake the same quiz for the same subject.

Question1) Using the Function Point approach, estimate the LOC for the program. Assume that the implementation will be in PHP+MySQL languages with a 70 LOC/FP. (20 points)

Question2) Using the Basic COCOMO Model, estimate the effort (PM) and development duration (T_{DEV}); and determine how many people have to be employed. (5 points)

Question3) Give the following diagrams for the program. (35 points)

- Entity-Relationship Diagram
- Data/Control Flow Diagrams (Level 0, Level 1, and Level 2)
- Architectural Structure

TEST QUESTIONS (20 questions, 2 points each)

Q1) The incremental model of software development is
a. A reasonable approach when requirements are well defined.
b. A good approach when a working core product is required quickly.
c. The best approach to use for projects with large development teams.
d. A revolutionary model that is not used for commercial products.

Q2) Which of these software characteristics are used to determine the scope of a software project?
a. context,lines of code, function
b. context, function, communication requirements
c. information objectives, function, performance
d. communications requirements, performance, information objectives

Q3) Which of following is an advantage of using Lines Of Code as a size-oriented metric?
a. LOC is easily computed.
b. LOC is a language dependent measure.
c. LOC is a language independent measure.
d. LOC can be computed before a design is completed.

Q4) Which of the following is an advantage of using Function Points as a measure of the functionality delivered by a software application?
a. FP is easily computed.
b. FP is a language dependent measure.
c. FP is a function of LOC.
d. FP can be computed before a design is completed.

Q5) Which ofthe following provide useful measures of software quality?
a. correctness, performance, integrity, usability
b. reliability, maintainability, integrity, sales
c. correctness, maintainability, size, satisfaction
d. correctness, maintainability, integrity, usability

Q6) Why is it important to measure the process of software engineering and software it produces?
a. It is really not necessary unless the project is extremely complex.
b. To determine costs and allow a profit margin to be set.
c. To determine whether a software group is improving or not.
d. To make software engineering more like other engineering processes.

Q7) The most common way to determine the information needed to define project scope is to
a. conduct a preliminary meeting with the customer.
b. examine historical project data from similar applications.
c. build a software prototype and show it to the customer.
d. perform a market analysis to determine potential customers.

Q8) Empirical estimation models are typically based on
a. expert judgement based on past project experiences
b. refinement of expected value estimation
c. regression models derived from historical project data
d. trial and error determination of the parameters and coefficients

Q9) Three categories of risks are
a. business risks, personnel risks, budget risks
b. project risks, technical risks, business risks
c. planning risks, technical risks, personnel risks
d. management risks, technical risks, design risks

Q10) The task (activity) network is a useful mechanism for
a. computing the overall effort estimate
b. detecting inter-task dependencies
c. specifying the task set to the customer
d. none of the above

Q11) The software plan is not a static document, it is frequently adjusted to make the project appear on track to meet all deadlines and quality targets.
a. True
b. False

Q12) Which of these are valid software configuration items?
a. case tools
b. documentation
c. executable programs and test data
d. all of the above

Q13) What task is not performed as part of software requirements analysis?
a. evaluation and synthesis
b. modeling and problem recognition
c. planning and scheduling
d. specification and review

Q14) The goal of facilitated application specification techniques(FAST) is to have the developer and customer
a. construct a software prototype quickly
b. learn each other's jobs
c. work together to develop a preliminary set of requirements
d. work together to develop the technical software specification

Q15) Which of the following is not an objective for building an analysis model?
a. define set of software requirements
b. describe customer requirements
c. develop an abbreviated solution for the problem
d. establish basis for software design

Q16) The state transition diagram
a. depicts relationships between data objects
b. depicts functions that transform the data flow
c. indicates how data are transformed by the system
d. indicates system reactions to external events

Q17) Control flow diagrams are
a. needed to model event driven systems.
b. required for all systems.
c. used in place of data flow diagrams.
d. useful for modeling user interfaces

Q18) Which of these is a characteristic of a good design?
a. exhibits strong coupling between its modules
b. implements all requirements in the analysis model
c. includes test cases for all components
d. incorporates source code for descriptive purposes

Q19) Software procedure focuses on the
a. control hierarchy in a more abstract sense.
b. processing details of each module individually.
c. processing details of each the set of modules collectively.
d. relationship between control and procedure.

Q20) When refining the DFD during transform mapping the goal is to strive to derive bubbles showing high cohesion.
a. True
b. False