Total number of printed pages – 7

B. Tech

BCSE 3402

Eighth Semester Examination – 2007

SOFTWARE ENGINEERING

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

   (a) How do you measure the testability of a user interface ?

   (b) How can you measure software usability ?

   (c) Which are the 7 standard Software Quality Characteristics ?

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(d) Which are the main usages of metrics in software engineering ?

(e) How can one measure software reliability ?

(f) Define and differentiate between 'software validation' and 'verification'.

(g) What is the purpose of a correlation analysis ?

(h) What are the main drawbacks of the *Waterfall model* and what are the positive aspects of the *Incremental model* ?

(i) What is a legacy software product ?

(j) What are the four phases of the Development Process in UML?

2. (a) What are the different categories of software development projects according to the COCOMO estimation model ? 5

(b) Develop a sequence diagram that shows a Professor object, a Student object, and an Exam. object. Then show a possible interaction between these objects in an examination. Interactions are for example:

- The Professor creates an exam
- The Professor hands out the exam
- The student answers question 1
- The student answers question 2
- The student returns the exam
- The Professor evaluates the exam
- The Professor tells the student his/her mark 5

3. (a) What is and which are the main goals of UML? What methods/notations are credited as the main influences on UML? 5

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(b) Describe briefly, both the iterative waterfall and waterfall refinement software life cycle models. Comment on their suitability for object oriented software development. 5

4. (a) Why Analysis and Design Techniques in software development are used ? Define and explain the System Development Lifecycle. 5

(b) Explain *coupling and cohesion* in the context of software design. Describe the types of *coupling* and *cohesion*. 5

5. (a) In your own words describe why the class is the smallest reasonable unit for testing within an OO system. 5

(b) Define 'CASE tools' and 'CASE environment'. How it supports system development using SDLC. 5

6. (a) What are the main steps that must be taken to ensure that there is a high degree of reusability in a software system ? 5

(b) Assume you have been asked to design a new user-interface for the School's Marks Entry system. Academic staff and administrative staff use this system heavily only at examination times. What principles would you use to guide your design and how would you go about the design of such a system ? 5

7. (a) What are the principal quality problems that can occur with requirements and what steps can be taken to minimize these problems ? 5

(b) Explain what is the main goal of high-level or architectural design and how it differs from the detailed design phase. 5

8. (a) When a software project has got seriously behind schedule it is not usually appropriate to add more staff. Explain why this is so and suggest what effective actions might be taken to best recover from the situation. Justify the actions you would take. 5

(b) Draw a **use case diagram** for the following problem description : 5

A petrol (gas) station is to be set up for fully automated operation. Drivers swipe their credit card through a reader connected to the pump, the card is verified by communication with a credit company computer and a fuel limit established. The driver may take the fuel required. When fuel delivery is complete and the pump hose is returned to its holster, the driver's

credit card account is debited with the cost of the fuel taken. The credit card is returned after debiting. If the card is invalid, it is returned by the pump before fuel is dispensed. The system is supervised by a clerk that can assist, update the system or produce reports from the system.

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