

SEMESTER II
SUMMER EXAMINATIONS 1999/2000

B.Sc. Degree Examination in Information Technology

SOFTWARE ENGINEERING III (CT417)

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Time Allowed : **Three Hours**

Candidates should attempt five questions, at least two from each section.
Please use separate answer books for each section.
All questions carry equal marks

SECTION A

1. (a) Describe the use of software *components* in promoting *software reuse*.
- (b) Use examples to differentiate between different categories of components.
- (c) Describe what is meant by any two of the following terms:
 - architectural pattern
 - design pattern
 - design idiom
 - pattern schema

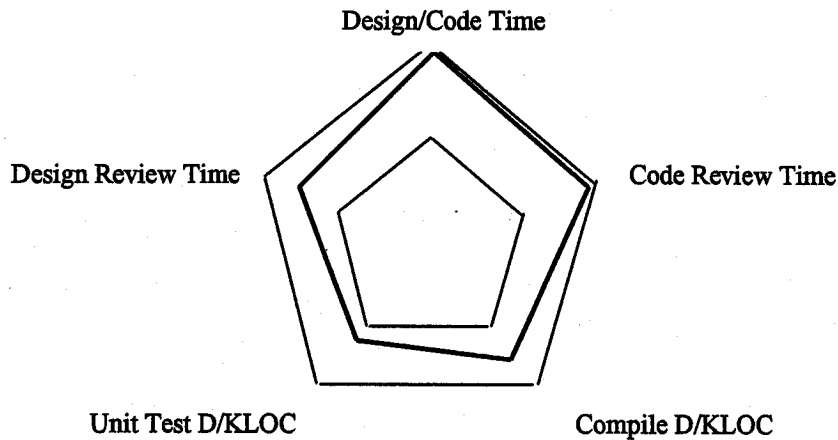
2. (a) Explain how software architecture can be represented as components and connectors
 - (b) Describe in detail (using diagrams and examples if possible) any two of the following architectural styles:
 - Pipes and Filters
 - Call-and-return (main program and subroutines)
 - Layered Systems
 - Object-Oriented (Data Abstraction)
 - (c) Describe the purpose and contents of a domain model in a DSSA (Domain-Specific Software Architecture).
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3. (a) Describe the technological and business influences affecting business (enterprise) information systems today.
 - (b) Describe any two of the following business process modelling concepts (using examples if possible):
 - Elementary business process
 - Business event
 - Process thread
 - Business actor
 - (c) Describe two different strategies for dealing with legacy systems.
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4. (a) Outline some general project management skills and useful traits for project managers.
 - (b) Describe any two of the following software project planning activities:
 - determination of software / project scope
 - estimation (of resources, cost, schedule)
 - risk analysis
 - scheduling
 - (c) Giving as much detail as possible, describe the difference between conventional project size estimation techniques and the use of empirical estimation models, such as COCOMO. Use examples to illustrate your answer.

SECTION B

5. (a) With reference to models of software quality, distinguish between fixed model and define-your-own model approaches, giving an example of each. What are the advantages/disadvantages of using one approach over the other?
- (b) Describe some internal and external measures for *one* of the two quality factors *usability* or *maintainability*.
- (c) The most commonly used software quality measure in industry is the number of faults per thousand lines of product source code. Compare the usefulness of this measure for developers and users. What are some possible problems with this measure.
6. (a) Three of the process areas identified in ISO9001 are:
4.3 Contract Review
4.4 Design Control
4.8 Product Identification and Traceability
Choosing any two of these, describe how they could be applied to the software industry
- (b) Distinguish between the terms *assessment* and *accreditation*. Describe what is meant by first, second and third party assessment, giving examples of when each might be appropriate.
- (c) It has been claimed that staff acceptance is a vital part in the introduction of a quality management system (QMS). Discuss ways in which staff acceptance of a QMS could be cultivated.
7. (a) Describe, using a diagram, the steps involved in software process improvement (SPI).
- (b) The five maturity levels of the CMM are: Initial; Repeatable; Defined; Managed; and Optimising. Describe the characteristics of the first three levels. Why is it not generally possible to skip levels in the CMM?
- (c) Compare the CMM for software and the SPICE model in terms of architecture and assessment.

8. (a) The five measures used in the Software Quality Profile are: Design/Code time; Code Review Time; Compile Defects/KLOC; Design Review Time; Unit Test Defects/KLOC. Give a short description of each of these measures, explaining why they might be quality indicators.
- (b) Consider the following quality profiles for two software components. Give an interpretation of each one, and suggest the likely quality of the components.

Component X Quality Profile



Component Y Quality Profile

