

**OLLSCOIL NA hÉIREANN**  
**The National University of Ireland, Galway**

**SEMESTER II**  
**WINTER EXAMINATIONS 2002/2003**

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 in as much detail as possible the activities needed to develop a risk management strategy for the above project, under the following headings:

- ❖ Risk identification
- ❖ Risk projection
- ❖ Risk assessment
- ❖ Risk management

(b) In the context of Risk Management, give two examples of each of the following types of risks:

- ❖ Customer risks
- ❖ Business risks
- ❖ Application risks

(c) Describe two different risk identification techniques and compare their relative merits.

2. (a) Contrast the following software system architecture types in terms of flexibility, maintainability, scalability, and software and personnel costs:
- ❖ 2-tier Client/Server
  - ❖ 3-tier Client / Server
- (b) Describe the role of distributed component-based systems in developing business systems that can evolve to adapt to changing requirements.
- (c) A prospective client hires you to advise on strategies to deal with a legacy system. The legacy mainframe system is written in Cobol, with tightly integrated GUI and business logic code. Discuss the possible approaches that you could advocate and their relative merits.
3. (a) Discuss briefly the following traits of successful project managers:
- ❖ Problem solving ability
  - ❖ Managerial Identity
  - ❖ People Skills
- (b) Discuss the influence of the following project characteristics on project team structure:
- ❖ Difficulty
  - ❖ Modularity
  - ❖ Rigidity of Delivery Date
  - ❖ Degree of internal team communication required
4. (a) Your fledgling business has been asked to develop an application for a market gardener to help run her successful business. The client is not computer literate and has limited time to devote to the project personally. Discuss how the following factors will influence the price you charge to deliver the system.
- ❖ Market Opportunity
  - ❖ Requirements Volatility
  - ❖ Uncertainty in your cost estimate
- (b) Discuss the relative merits of the following estimation techniques in developing your cost estimate for the above system, and how you would approach the task in each case:
- ❖ Algorithmic models such as COCOMO or Function Points
  - ❖ Price to Win
  - ❖ Top-Down estimation

## SECTION B

5. (a) "The Quality of a Software Product is completely independent of the quality of the process used to create it." Argue for or against this statement.
- (b) Write a paragraph on any two of the following terms:
- Fixed Quality Model
  - Quality Management System
  - Human Quality Culture
- (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.
6. (a) Explain the following aspects of a Quality Management System for Software:
- Quality Control
  - Quality Assurance
  - Quality Improvement
- (b) Describe, using a diagram, the Software Process Improvement cycle.
- (c) In a large software organisation, what do you think are the potential obstacles to software quality? What are the potential benefits of having a good QMS in place?
7. (a) You are a software engineer in a small development company. Your manager, who is aware that you took a course in Software Quality, has asked you "Why should we do technical reviews? We do testing to get out all the bugs." What response would you give?
- (b) A Formal Technical Review is effective only if everyone has prepared in advance. How do you recognise a review participant who has not prepared? What do you do in such a situation, if you are the review leader?
- (c) Since they can't usually attend reviews, suggest ways in which managers can participate in the review process.
8. (a) Describe the characteristics of a typical company at level 2 in the SW-CMM (Capability Maturity Model for Software). How can such an organisation progress to level 3?
- (b) The CMMI (continuous model) is a SPICE-compliant reference model. Explain what this means.

- (c) Discuss the potential benefits of adopting the CMM in a software organisation. How would you advise the manager in a small software company who wants to "implement CMM level 3 by Christmas 2003"?