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UNIVERSITY OF LONDON

279 0061 ZA

BSc degrees and Diplomas for Graduates in Economics, Management, Finance and the Social Sciences, the Diploma in Economics and Access Route for Students in the External Programme

Software Engineering

Thursday, 18 May 2006 : 10.00am to 1.00pm

Candidates should answer **FOUR** of the following **SEVEN** questions. All questions carry equal marks.

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1. (a) Describe the following software development approaches.
 - i. Prototyping. **(4 marks)**
 - ii. Incremental software development. **(4 marks)**
 - iii. The Spiral model. **(4 marks)**
- (b) Compare and contrast the suitability of these three approaches for a range of software engineering projects. **(13 marks)**

2. When undertaking requirements analysis, the analyst must determine what the customer requires from the new software. In doing this the analyst will produce a requirement specification.
 - (a) Give three examples of non-functional requirements from your software engineering project. **(4 marks)**
 - (b) Describe, with examples (perhaps from your project), how a Data Flow Diagram and an Entity Relationship diagram are used to describe the functional requirements for a system. **(16 marks)**
 - (c) Comment on the strengths of Data Flow Diagrams and Entity Relationship Diagrams. **(5 marks)**

3. Testing is an important part of any software engineering project.
 - (a) Explain the difference between white box testing and black box testing techniques. **(8 marks)**
 - (b) Describe, with a short example, how equivalent partitioning and boundary value analysis reduce the number of test cases in black box testing. **(8 marks)**
 - (c) The following types of testing are important within a test plan. Briefly describe each, and discuss how each is used within an object-oriented systems development project:
 - i. Unit testing.
 - ii. Integration testing.
 - iii. Validation testing. **(9 marks)**

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4. A bank's managing director has looked at the IT department's accounts and noted that 80% of its money is spent maintaining existing software, and only 20% is spent developing new software. He thinks this is a waste of money and wants to do something about it!
- (a) Describe three types of software maintenance that the bank's money is likely to be spent on. Discuss whether the managing director is correct to think that each of these is a waste of money. **(11 marks)**
 - (b) Discuss the main problems faced by a maintenance engineer. **(8 marks)**
 - (c) It is noted that the bank's software is somewhat unreliable. Discuss what this means in software engineering terms. **(6 marks)**
5. Compare and contrast object-oriented systems development with conventional systems development (Structured systems analysis). You should discuss the relevance of each for the following elements of a systems development projects:
- (a) requirements analysis. **(6 marks)**
 - (b) design. **(7 marks)**
 - (c) implementation. **(6 marks)**
 - (d) maintenance. **(6 marks)**
6. The unified modelling language (UML) provides the class diagram as a means of defining the relationship between classes in object-orientation.
- (a) Using examples, describe what an object and a class are in object-orientated analysis. Include a discussion of methods (also called operations) and attributes. **(5 marks)**
 - (b) Using an example class diagram demonstrate how associations are made between classes, noting in particular aggregation and generalisation. Discuss how this class diagram might be used in modelling a system. **(12 marks)**
 - (c) Discuss the relationship between the UML class diagram and the object sequence diagram. **(8 marks)**

7. (a) Estimating the effort required for a software engineering project is important, but difficult. Discuss. **(10 marks)**
- (b) COCOMO is a technique which can aid the project manager in effort estimation. Describe COCOMO and outline its advantages and disadvantages within project management. **(10 marks)**
- (c) What problems would you envisage in using COCOMO for a project based on Component Based Software Engineering? **(5 marks)**

END OF PAPER

