



Liverpool John Moores University  
School of Computing and Mathematical Sciences

Semester 2 Examinations, 1998/99

## **CMSCD3005 Software Systems: Planning & Design**

Duration 3 hours

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### **Instructions to candidates**

Do not open this question paper until you have been told to do so by the invigilator. A figure in [] denotes the number of marks available for that question or part of question.

There are 6 questions, 3 in Section A and 3 in Section B.

Answer 4 questions.

If you present answers to more than 4 questions, the first 4 of these answers will be assessed.

Questions carry 25 marks each.

The total number of marks available is 100.

**If you answer question A1 then ensure you hand in your annotated Appendix 1 as well.**

**You MUST use separate answer books for Section A and Section B.**

## Section A

- A1 a)** Figure Q.01 (see *Appendix 1*, detach and use it instead of drawing another) represents a PERT/CPM chart for supporting software project monitoring and management. The diagram contains *event* nodes that indicate the beginning and end of an activity in the project schedule. In this case there are *eleven events*. A line with an arrow (activity vector) is used to indicate the type and duration (in days) of each activity. From your study of PERT/CPM chart for software projects:
- i)** calculate the earliest completion time (ECT) for each *event* and indicate them in your diagram.
  - ii)** compute the latest completion time (LCT) for each *event* and indicate them in your diagram.
  - iii)** show the critical path in your diagram.
  - iv)** calculate the slack time for *event 4* in the figure. [15]
- b)** Describe or explain the following briefly:
- i)** The constituents of software
  - ii)** Software engineering [6]
- c)** Give at least four reasons for measuring software [4]
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- A2 a)** The main activities in the *software project planning process* often lead one to an initial *project plan development* that may not include detailed consideration of possible risk factors. From your study of software project planning demonstrate *pictorially* the relationships among the planning processes of a typical software ‘project plan development’. [7]
- b)** Describe or explain the following briefly.
- i)** The basic procedure (or steps) for carrying out risk analysis.
  - ii)** Project risk management and its main aims [10]
- c)** From your experience of project risk management and monitoring, in order to mitigate the impact of risk if it does occur, show *diagrammatically* the relationships between
- i)** risk management
  - ii)** risk analysis
  - iii)** risk management & monitoring plan. [8]
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- A3** a) As a part of your responsibility in project management, you are required to keep adequate records of all stages of the Systems Development Life Cycle (SDLC) for an information system project. Explain with the aid of a diagram how you would carry out a *document production process* for any stage of the SDLC. [9]
- b) Effective team leadership may be considered essential for achieving various goals at different stages in the process of analysing and developing an information system.
- i) From your experience in developing Information Systems (IS), explain briefly at least *three* factors necessary when selecting members for an IS project team. [4]
- ii) State at least four characteristics of effective team leadership. [6]
- c) In order to assess the possible development of a new information system, *existing documentation* in an organisation is often considered to be a logical starting point for an Information Systems Analyst (ISA), as a means of *finding out* details in the organisation including users' needs. But such existing documentation (which may be available to the ISA) often has limitations.
- i) Give at least two possible limitations associated with such use of available documentation in an organisation. [2]
- ii) From your experience explain briefly two possible logical steps you may revert to as an ISA, in order to balance up for such limitations. [4]
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## Section B

- B1.** Tom DeMarco wrote, "*The idea that a single method should govern even two different projects is highly suspect: the differences between projects are much more important than the similarities*". On the other hand, many enthusiasts of particular methods will argue, often quite convincingly, that their favourite method should be used on all projects because of the advantages the method brings.

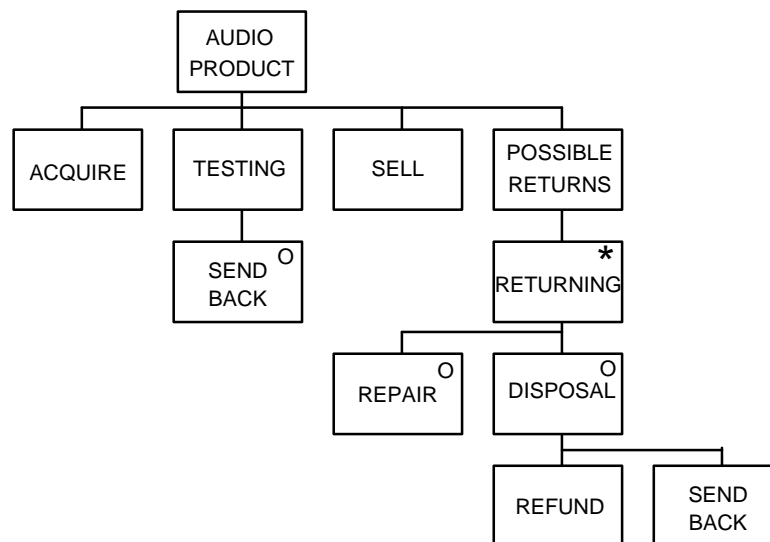
Discuss these two views of methodology and explain whether they are mutually exclusive, or whether there is a way of reconciling both approaches. [25]

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- B2. a)** A shop sells hi-fi audio products (CD players, amplifiers, speakers etc). Figure B1 shows the life history of the entity AUDIO PRODUCT described using the techniques of Jackson System Development (JSD). The structure shows that the product is first acquired. After acquisition it is tested for defects. If a fault is found then the product is sent back to its manufacturer. Then the product is sold after which it may be returned any number of times by the purchasing customer for repair until its guarantee expires. If it cannot be repaired then it is sent back to the manufacturer and a refund is given.

We now learn that if sent back to the manufacturer the life of the entity is to be terminated.

- i) Explain why the diagram is inadequate to describe this early termination of the life history. [2]
- ii) Redraw the entity's structure diagram to account for the entity's abnormal termination. [13]



**Figure B1**

- b) JSD has two basic ways of connecting model processes in the networking step: the datastream and the state-vector connections. Explain the differences between the two and give an example showing how each can be used. [10]
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- B3. i)** The ideal theory and practice of a software method is easily taught through the use of text books, short courses and case studies. However, in *real* software development projects things happen which are not accounted for in the plan.

Discuss some of the factors that cause the practice of software systems development to be much more problematic than expected and suggest some possible ways forward. Hint: do not forget that some of the problems

are caused by internal factors (those to do with the software developer himself/herself.) [15]

- ii) It is claimed that the Jackson System Development (JSD) method results in systems that are inherently more easy to maintain than those built by means of functional decomposition. Explain why this claim is made and state whether you agree or disagree with it. [5]
  - iii) Avison and Fitzgerald criticised JSD for being “*self-consciously incomplete*” as a method. Explain this view. [5]
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**End of Paper**

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