Birkbeck

(University of London)

BSc/FD EXAMINATION

Department of Computer Science and Information Systems

Information Systems Management (COIY019H5)

CREDIT VALUE: 15 credits

Date of examination: 11th June, 2014
Duration of paper: 2 hours (2:30pm to 4:30pm)

There are **four** questions on this paper.

Answer only **three** of the four questions.

Each question carries **33** marks in total. Questions indicate marks for sub-questions.

If more than three questions are attempted, only marks from three questions will be reported as your examination mark.

1 extra mark is available for a well-presented paper.

No extra materials are required or allowed.

1. Reuse

(a) Discuss the two main approaches to reuse: *black box* (Allen & Frost) and *white box* (Jacobson et al.). (**11** marks)

System design and architecture

(b) Illustrate the two main general approaches to a division of a system into subsystems: *layering* and *partitioning*. In particular, discuss the *three-layer* and the *four-layer* architectures as special cases of layering. (**16** marks)

(c) Explain how dividing a system into subsystem helps to maximise reuse at component level. (**6** marks)

2. Project Management

Consider the PERT diagram about the tasks of a project, depicted in Figure 1; tasks/activities are indicated as arc labels, and the duration is indicated in weeks.

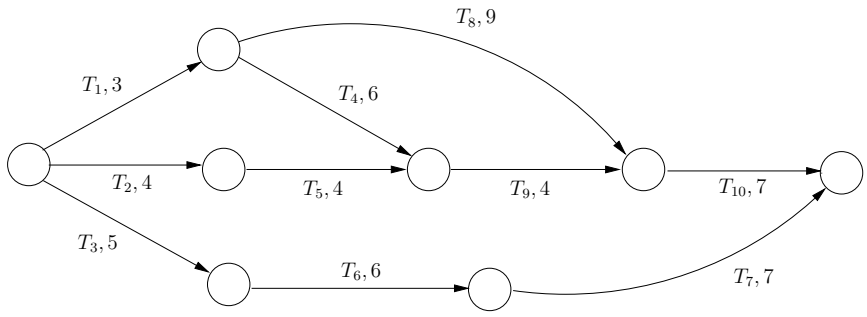

Figure 1: PERT diagram for Question 2.

(a) Identify the critical path(s) and give its (their) duration. (**3** marks)

(b) Give the earliest start time and the latest start time for T_4, T_5, T_6 and T_8. (**9** marks)

(c) Suppose that, due to unexpected performances of the team working on it, the execution of T_4 takes 4 weeks instead of 6. Is the total duration of the project affected? If it is, how? (**9** marks)

(d) Suppose you have a budget of £ 40,000 to reduce the total duration of the project, and that you can shorten the completion of any activity (possibly more than one) at a cost of £ 10,000 per each 1-week reduction. Determine how to spend the budget to achieve the maximum reduction of the total duration. (**12** marks)

3. Detailed design

(a) Discuss the issues surrounding the enforcement of integrity constraints at object level. (**15** marks)

(b) Discuss the main issues surrounding the design of derived attributes in classes. (**7** marks)

Designing boundary classes

(c) Discuss the issues surrounding prototyping user interfaces (UIs). In particular, describe the different types of UI prototypes. Illustrate the risks in designing UIs from the outside in. (**11** marks)

4. Data management

(a) Describe the *three-schema architecture* in database management systems (DBMSs) and illustrate its main advantages. (**15** marks)

(b) Explain the use of a database broker framework in persistent data management. In particular, describe the use of two levels of generalisation among broker classes. (**18** marks)

