



THE UNIVERSITY
of LIVERPOOL

JUNE 2002 EXAMINATIONS

Degree of Master of Science

TECHNOLOGIES FOR E-COMMERCE

TIME ALLOWED: TWO Hours

INSTRUCTIONS TO CANDIDATES

**Answer the one question in Section A
and THREE questions from Section B
(25 marks for each question)**



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SECTION A

There is one question in this section. Attempt all parts of this question. The question carries 25 marks.

QUESTION 1

- (a) List the layers in the ISO-Open Systems Interconnection 7-Layer Model. **7 marks**
- (b) Draw a diagram to show the relationship between this 7-Layer model and the three protocols TCP, IP and HTTP. **3 marks**
- (c) You are tasked with writing an XML program for an online seller of CDs and records. The seller has stock information in a database containing details of the album title, artist (performer), label and price. The artist information is further identified by style of music and nationality. Define a set of XML tags, elements and attributes for this application. Give an example of the tags using the details of the following CD.
- "Sketches of Spain", jazz ballads performed by American trumpeter Miles Davis and recorded on the Sony Jazz label, price 10.99. **7 marks**
- (d) Briefly describe some of the key challenges created by open systems. **8 marks**



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SECTION B

Attempt **THREE** questions from this section. Each question carries 25 marks. Credit will be given for the best 3 answers only.

QUESTION 2

- (a) What is the name of a model of distributed computing in which one computer requests something from a second computer, and the second computer seeks to fulfill this request? **1 mark**
- (b) Draw diagrams for the following distributed system architectures:
- (i) 2-tier architecture
 - (ii) 3-tier architecture.
- 4 marks**
- (c) Give brief definitions of the following terms:
- (i) Applets
 - (ii) Servlets.
- 4 marks**
- (d) (i) What is the function of a stub in a CORBA architecture?
- (ii) What is the function of the Object Request Broker in a CORBA architecture?
- (iii) Draw a diagram to show how a CORBA client and server are connected through an Object Request Broker, showing stubs and skeletons.
- 7 marks**
- (e) (i) Localism, sharing and parallelism are three principles for the design of distributed systems. Give a brief definition of two of these principles.
- (ii) Give an example to show how two of these three principles may conflict.
- 9 marks**

QUESTION 3

- (a) What are each of the following auction protocols called?
- (i) Bidders place a single bid in a sealed envelope. The winner is the bidder with the highest bid. The amount paid is the amount of the highest bid.
 - (ii) Bidders place a single bid in a sealed envelope. The winner is the bidder with the highest bid. The amount paid is the amount of the second-highest bid.
 - (iii) Bidders call out their bids in successive rounds, each bidding higher than any previous price called. The winner is the bidder who bids the highest amount. The amount paid is the amount of the highest bid.
 - (iv) The auctioneer starts by calling out a high price. When a bidder hears a price he or she is willing to pay, he/she calls out "Accept". The winner is the first bidder to call out "Accept". The amount paid is the price at which this call is made.

4 marks



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QUESTION 3 (Continued)

- (b) (i) What does FIPA ACL stand for?
(ii) Briefly describe the purpose of the following FIPA performatives:
inform cfp query-if. 7 marks
- (c) Draw a diagram to show the sequence of FIPA ACL performatives for an English Auction protocol. 8 marks
- (d) Briefly list the main strengths and weaknesses of auction protocols as means of negotiation. 6 marks

QUESTION 4

- (a) What is a cookie? 2 marks
- (b) (i) Which British Law governs the electronic storage of personal data?
(ii) What is its main provision? 3 marks
- (c) What is a firewall? 2 marks
- (d) (i) What is a screened subnet?
(ii) Draw a diagram to show a screened subnet architecture. 5 marks
- (e) Briefly describe two methods of secure payment of goods purchased over the internet. 4 marks
- (f) (i) Non-repudiation, integrity and authentication are three requirements for secure e-commerce. Briefly describe each of these.
(ii) Which methods and technologies support these requirements? 9 marks

QUESTION 5

- (a) (i) Explain the difference between symmetric and asymmetric key algorithms for encryption.
(ii) What is the key weakness of symmetric key algorithms?
(iii) List three types of attacks which symmetric key encryption algorithms are subject to. 6 marks
- (b) (i) List two types of attacks which public key encryption algorithms are subject to.
(ii) Explain the steps involved in public key encryption methods. 6 marks
- (c) (i) What does SSL stand for?
(ii) What are the functions of SSL?
(iii) What is the function of the SSL handshake protocol?
(iv) Draw a diagram to explain the steps in the SSL handshake protocol. 13 marks