THIS PAPER IS NOT TO BE REMOVED FROM THE EXAMINATION HALLS

UNIVERSITY OF LONDON **291 0110 ZB**

BSc/Diploma Examination
for External Students

COMPUTING AND INFORMATION SYSTEMS AND CREATIVE COMPUTING

Introduction to Computing and the Internet

Dateline: Tuesday 19 May 2009 : 10.00 – 1.00 pm

Duration: 3 hours

This paper is in two parts, **Part A** and **Part B**. There are a total of three questions in each part. Candidates should answer **TWO** questions from **Part A** and **TWO** questions from **Part B.**

Your answers to Part A and Part B should be written in separate answer books.

Full marks will be awarded for complete answers to the total of four questions, two from Part A and two from Part B. There are 100 marks available on this paper.

A hand held calculator may be used when answering questions on this paper but it must not be pre-programmed or able to display graphics, texts or algebraic equations. The make and type of machine must be stated clearly on the front cover of the answer book.

PART A: Answer TWO questions from this section

QUESTION 1

(a) Describe the relative merits of magnetic tape and CD-ROM for off line storage.

[4 Marks]

(b) Explain how data is transfered from an optical disc (i.e. CD-ROM) to the main memory.

[6 Marks]

(c) (i) What is the difference between CAV and CLV?

(ii) Which one of the above is related to an optical disc, i.e. CD-ROM?

(iii) Is the access time in an optical drive slower or faster than that of a magnetic drive? Explain your answer.

[10 Marks]

(d) Suppose a computer memory with 4000 memory cells is linked to a decoder with 6 address lines.

(i) What problem will this computer have?

(ii) What is the maximum number of addresses generated if multiplexed addresses are used?

[5 Marks]

QUESTION 2

(a) Consider the following 8-bits binary sequence, 11111111. Find the decimal value it represents in:

(i) Signed notation,

(ii) Excess notation and,

(iii) Two's Complement notation.

[6 Marks]

(b) (i) What is an overflow?

(ii) Give an example where the result of an operation contains an overflow (use 8-bits binary sequence).

[5 Marks]

(c) (i) What is pipelining? How does it enhance a computer's performance?

(ii) Pipelining has some shortcomings. Describe one of them.

[5 Marks]

(d) Consider a 9-bit variant of the IEEE floating point representation defined as follows:

- Sign bit
- 4-bit exponent with a bias of 7
- 4-bit significand

(i) Represent the decimal value, 0.4 in this representation

(ii) Calculate the relative error of approximating 0.4 in this way.

[9 Marks]

QUESTION 3

(a) (i) Describe the following three I/O methods: programmed I/O; interrupt driven I/O; and direct memory access.

(ii) Which I/O method is better suited for dealing with the keyboard?

[10 Marks]

(b) What are the roles of long-term queue, short-term queue, and medium-term queue, with respect to I/O?

[3 Marks]

(c) (i) Define external and internal fragments with regards to memory.

(ii) Which memory management scheme does not have external fragments? Explain your answer.

[4 Marks]

(d) An 8-bit processor has instructions that consists of a 3-bit op-code with a 5-bit operand, as described in the following table.(The operand "ddddd" stands for any sequence of 5-bits which is to be interpreted as data. The operand "aaaaa" stands for any sequence of 5-bits which is to be interpreted as an address.)

Opcode	Operand	Description
001	ddddd	Load the accumulator with the data 000ddddd
010	aaaaa	Add to the accumulator the data at the address aaaaa
100	aaaaa	Write the content of the accumulator to the address aaaaa
110	aaaaa	Make the content of the cell aaaaa to 00000000
111	aaaaa	Halt.

Write a program in machine code which adds up the numbers stored in the cells 00100, 00101, and stores the sum in cell 00110. The program should start at address 00000.

[8 Marks]

PART B: Answer TWO questions from this section

QUESTION 4

(a) Briefly describe the OSI model. Explain the role played by each layer.

[9 Marks]

(b) What is the difference between POP3 and SMTP protocols?

[3 Marks]

(c) Given the following IP address and subnet mask:
IP Address: 130.40.32.16
Mask: 255.255.248.0
Which class of network does this belong to? What are the subnet and the host addresses?

[7 Marks]

(d) NAK stands for negative acknowledgement. The receiver sends a NAK to the sender only when a packet was received incorrectly. The sender must then take action and retransmit the corrupted or lost packet. No acknowledgement is received by the sender for the correctly transmitted packets

(i) Explain how a reliable transmission based on positive acknowledgements (ACK) differs from one that uses negative acknowledgements (NAK).

(ii) Assume a host A has a lot of data to send to a host B and the end-to-end connection experiences few losses. Explain why in this case a reliable transmission based on negative acknowledgements (NAK) would be preferred to a one that uses positive acknowledgements.

[6 Marks]

QUESTION 5

(a) What is the difference between a browser and a web server? Give an example of each.

[6 Marks]

(b) What are the differences between, HTML, DHTML, and XHTML?

[8 Marks]

(c) What does it mean for HTTP1.1 to be "persistent"? What is the value of HTTP1.1 being persistent, as opposed to being non-persistent, as in HTTP 1.0?

[4 Marks]

(d) Describe three ways used to add CSS to a web document. Describe the advantages/disadvantages of each one.

[7 Marks]

QUESTION 6

(a) Hardware protection and file protection are security features in Operating Systems. Explain the difference between the two.

[6 Marks]

(b) In the context of computer security, explain the difference between a macro virus and a buffer overflow attack

[6 Marks]

(c) Describe a common business activity involving transfer of personal data from one country to another

[5 Marks]

(d) Describe ways to ensure that the transfer of data from an EU country to non EU country is lawful.

[8 Marks]