OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced Subsidiary GCE

COMPUTING **2506**

Introductory Computer Systems, Communications and Software

Thursday **13 JANUARY 2005** Afternoon 1 hour 30 minutes

Candidate Name	Centre Number	Candidate Number

TIME 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- If you run out of space for an answer, continue on the spare pages at the back of the booklet.
- If you use these spare pages, you must write the question number next to your answer. You can also use the spare pages for rough work.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 90 (86 + 4 for the quality of written communication).
- You will be awarded marks for the quality of written communication where an answer requires a piece of extended writing.
- No marks will be awarded for using brand names of software packages or hardware.

FOR EXAMINER'S USE	
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TOTAL	

This question paper consists of 11 printed pages, 3 lined pages and 2 blank pages.

Registered Charity Number: 1066969
[Turn over

Answer **all** questions.

1 **(a)** State what is meant by the term *human-computer interface* (HCI).

_____

_____[1]

(b) Two types of HCI are *command line* and *menus*.

State what is meant by each of these types of HCI and give an example of a situation where it would be used.

Command line _____

_____[1]

Situation _____

_____[1]

Menus _____

_____[1]

Situation _____

_____[1]

2 **(a)** Utility programs are part of the operating system designed to carry out common tasks.

Explain the purpose of the following types of utility program.

(i) File handling utilities _____

_____

_____

_____

_____

_____[3]

(ii) An automatic back-up _____

_____

_____

_____

_____

_____[3]

(b) Describe **one** other example of a utility program.

_____

_____

_____

_____[2]

[Turn over

3 A file, containing records of seats available in a theatre, stores information about each seat for a six month period. Each record contains the following fields.

- Seat identification which is a letter followed by two digits (e.g. A21)
- Date of the performance (e.g. 01/02/05)
- Price of the seat (e.g. £20.00)
- Whether or not the seat has been sold (e.g. Y)

(a) Complete the following table to estimate the size of a record.

Field	Data type	Size of field (bytes)
Seat identification	_____	_____
Date	_____	_____
Price	_____	_____
Sold or not	_____	_____
	Total	_____

[6]

(b) During a six month booking period, the theatre will have 100,000 seats to sell. Estimate the size of the file, showing your working.

_____

_____

_____

_____

_____

_____[4]

4 A bank offers customers access to computer controlled automatic teller machines (ATMs) from which they can withdraw money or ask for a statement to be sent to their home address.

(a) When a customer attempts to withdraw money the ATM is on-line to the bank computer and operates in real-time.

Explain the meaning of the terms *on-line* and *real-time* and give **one** reason why they would be necessary in this example.

On-line _____

_____[1]

Real-time _____

_____[1]

Reason_____

_____[1]

(b) When a customer requests a statement to be mailed to their home address, the statement is produced in batch mode and later printed on a printer which is off-line.

Explain the meaning of the terms *batch mode* and *off-line* and give **one** reason why they would be used in this example.

Batch mode _____

_____[1]

Off-line _____

_____[1]

Reason_____

_____[1]

5 **(a)** State what is meant by serial and parallel types of data transmission.

Serial _____

_____[1]

Parallel _____

_____[1]

(b) A file is sent from a computer to a printer so that it can be printed out.

(i) Explain why half duplex would be a suitable mode of data transmission in this case.

_____

_____

_____

_____[2]

(ii) State what is meant by the terms *buffer* and *interrupt* and explain how they are used in transferring the file from the computer to the printer.

Buffer _____

_____[1]

Interrupt _____

_____[1]

Explanation of how they are used_____

_____

_____

_____

_____

_____[3]

6 **(a)** Explain what is meant by the following types of programming error and give an example of each.

(i) Syntax error _____

_____[1]

Example _____

_____[1]

(ii) Logic error _____

_____[1]

Example _____

_____[1]

(iii) Arithmetic error _____

_____[1]

Example _____

_____[1]

(b) State **three** methods that can be used to detect errors in a program.

Method 1 _____

_____[1]

Method 2 _____

_____[1]

Method 3 _____

_____[1]

[Turn over

7 **(a)** Records of students are held in a linked list in alphabetic order of student surname.

By drawing a diagram, show how the following records would be stored.

ROGERS, ASTRIDGE, FALLIS, GREIG

[4]

(b) The alphabetic linked list in part **(a)** is actually storing print jobs to be carried out on a single network printer.

The jobs are created by the user sending a job for printing from their computer. The jobs are identified by the log-on name of the person sending the job.

Discuss the suitability of the structure described and suggest changes that could be made to improve the procedure for storing print jobs.

_____

_____

_____

_____

_____

_____

_____

_____[4]

8 State **three** types of repetition construct available in high level languages, giving a characteristic of each.

Type 1 _____

_____[1]

Characteristic_____

_____[1]

Type 2 _____

_____[1]

Characteristic_____

_____[1]

Type 3 _____

_____[1]

Characteristic_____

_____[1]

9 A program has been written which is intended to accept the ages of the five members of a secondary school chess team and to output the average (mean) age.
Each age is input in digits as a whole number of years.
State **three** different sets of test data that could be used as part of a test plan to test this program, giving a reason for each set of data.

First set of test data_____

_____[1]

Reason for choice _____

_____[1]

Second set of test data _____

_____[1]

Reason for choice _____

_____[1]

Third set of test data _____

_____[1]

Reason for choice _____

_____[1]

[Turn over

10 **(a)** Draw and label diagrams to show the topologies of the following types of network.

(i) A bus network.

(ii) A star network.

[5]

(b) Data can be sent over a wide area network (WAN) by either circuit switching or packet switching.
Explain what is meant by the terms:
- circuit switching;
- packet switching.

Give an advantage and a disadvantage of each.

(i) Circuit switching _____

_____[1]

Advantage_____

_____[1]

Disadvantage _____

_____[1]

(ii) Packet switching _____

_____[1]

Advantage_____

_____[1]

Disadvantage _____

_____[1]

11 **(a)** Express the denary number 81 as an eight-bit binary number.

_____

_____[1]

(b) Write the following denary numbers in two's complement form using eight-bit bytes.

(i) –81 _____

_____

_____

_____[2]

(ii) –60 _____

_____

_____

_____[2]

(c) **(i)** Using your answers to **(b)**, add together the two's complement forms of –81 and –60 giving your answer as an eight-bit byte.

(–81) + (–60)_____

_____

_____

_____[1]

(ii) Explain your result _____

_____

_____

_____[2]

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