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General Certificate of Education
January 2002
Advanced Subsidiary Examination



COMPUTING **CPT2**
Unit 2 Principles of Hardware, Software and Applications

Tuesday 15 January 2002 Afternoon Session

No additional materials are required.
You may use a calculator.

For Examiner's Use			
Number	Mark	Number	Mark
1			
2			
3			
4			
5			
6			
7			
8			
9			
Total (Column 1)	→		
Total (Column 2)	→		
TOTAL			
Examiner's Initials			

Time allowed: 1 hour 30 minutes

Instructions

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided. All working must be shown.
- Do all rough work in this book. Cross through any work you do not want marked.

Information

- The maximum mark for this paper is 65.
- Mark allocations are shown in brackets.
- You will be assessed on your ability to use an appropriate form and style of writing, to organise relevant information clearly and coherently, and to use specialist vocabulary, where appropriate.
- The degree of legibility of your handwriting and the level of accuracy of your spelling, punctuation and grammar will also be taken into account.

Answer **all** questions in the spaces provided.

- 1 Suggest the most appropriate storage medium for distributing the electronic form of a mail-order catalogue through the post. The catalogue occupies 500 Mb of storage space.

.....
 (1 mark)

- 2 Janlori Goldman wrote “There is barely a piece of information about people that isn’t used for purposes different from what it was initially gathered for, and always without their approval”.

Give **two** different pieces of information in addition to name and address that a supermarket chain might gather about a customer who makes regular purchases from its many branches and who can be identified by the supermarket. For each piece of information, state **one** purpose that the supermarket might use the information for. The purpose must be different in each case.

1 Information:

.....

Purpose:

.....

2 Information:

.....

Purpose:

.....

(4 marks)

1

4

3 In some countries government agencies routinely monitor the content of e-mail routed over the Internet.

(a) Give **two** reasons why some governments may allow this to happen.

1
.....
(1 mark)

2
.....
(1 mark)

(b) Suggest **one** way in which an individual may make it difficult for any such agency to read the content of a particular e-mail sent over the Internet.

.....
(1 mark)

4 (a) What is meant by:

(i) batch processing;

.....
.....
(1 mark)

(ii) real time processing?

.....
.....
(1 mark)

(b) For each of the following state the most suitable method of processing.

(i) A computer system dedicated to controlling the anti-lock braking system of a racing car.

.....
(1 mark)

(ii) A computer system dedicated to processing the monthly billing system for a credit card company.

.....
(1 mark)

3

4

Turn over ►

5 (a) Distinguish file backing-up from archiving.

.....

.....

.....

.....

(2 marks)

(b) The directory structure shown in **Figure 1** contains a **root** directory (/) and four sub-directories, named **User1**, **User2**, **Project** and **Homework**.

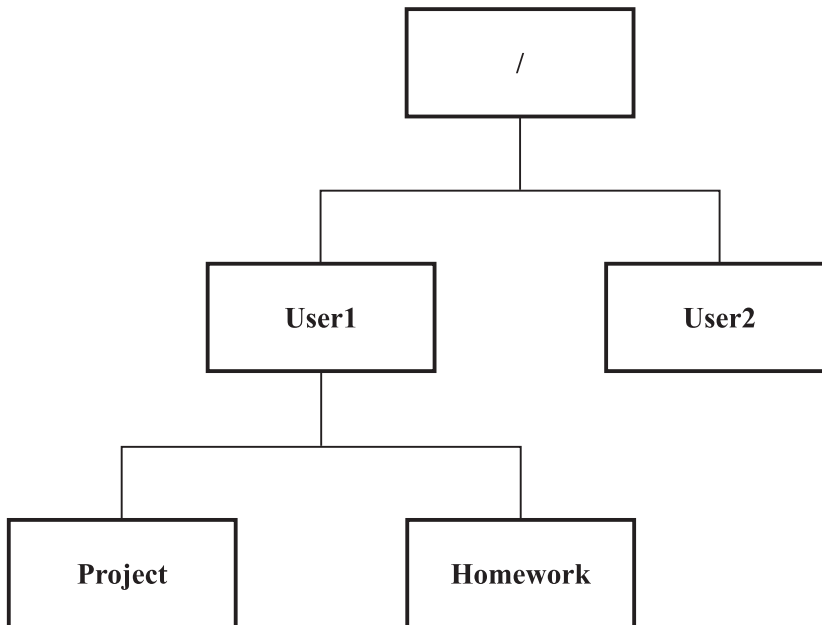


Figure 1

A file with the filename **Project1.Pas** is stored in the system with the directory structure shown in **Figure 1**.

What is the pathname for Project1.Pas if it is stored in the:

(i) root directory;

.....

(1 mark)

(ii) sub-directory Project?

.....

(1 mark)

(iii)

Field 1	Field 2	Field 3	Field 4	Field 5
---------	---------	---------	---------	---------

Project1.Pas	rw	14286	12/12/2001	13:32
Project2.Pas	r	2560	01/01/2002	09:12

Figure 2

Figure 2 displays in five fields a directory listing of the **Project** directory. The first field is used to display a filename. What might the other **four** fields display?

Field 2:

Field 3:

Field 4:

Field 5:

(4 marks)

(iv)

Field 1	Field 2	Field 3	Field 4	Field 5
---------	---------	---------	---------	---------

	rwX	512	11/12/2001	13:32
	rwX	512	31/12/2001	09:12

Figure 3

Figure 3 shows the directory listing for the directory **User1** with the two entries for Field 1 removed.

What should have appeared in Field 1 for these **two** entries?

1

2

(2 marks)

6 A small film production company makes training videos for sale to schools and colleges. It uses a computer to add background music, downloaded from a particular site on the Internet, to its training videos. The editing software that it uses was found on another site on the Internet.

(a) Name the legislation that this company might be breaking and describe **one** possible way in which this might be happening.

Name:

Way:

.....
(2 marks)

(b) The company wishes to distribute its training videos in digital form so that they can be played directly through a computer system.

(i) State the most suitable medium for this purpose.

.....
(1 mark)

(ii) Name **two** peripherals excluding video monitor, mouse and keyboard that the computer system must use to play back a training video.

1

2.....

(2 marks)

(c) The company also offers a microfilming service to companies dealing in personal information. The personal information is transferred to microfilm. The recording, processing and use of personal information is governed by legislation. Name this legislation and state **one** principle of this legislation that relates to the integrity of the personal data and **one** that relates to its security.

Name:

Integrity:

.....

Security:

.....

(3 marks)

- 7 (a) The following is an extract from a spreadsheet which calculates Value Added Tax (VAT) on goods sold by mail-order catalogue. In column E the digit 1 means that VAT is charged at the rate stored in cell I2; the digit 0 means VAT is zero.

	C	D	E	F	G	H	I
1	Catalogue No	Price excluding VAT	VAT rating	VAT	Price including VAT	Postage	VAT rate %
2						£10.00	17.5
3							
4	30	53	1	9.28	62.28	£4.00	
5	45		1				
6	61		0				
:	:		:				
:	:		:				
520	746		1				
521	768		0				
522	777		1				

- (i) When this spreadsheet was being developed the formula $I2 \times D4 \times E4/100$ was placed in F4. Why will this formula not work as desired without further editing when copied down into any of the cells in column F below F4? How should it be changed?

Why:

How:

(2 marks)

- (ii) The value in cell F4 is calculated from $17.5 \times 53 \times 1/100$ which equals 9.275 to three decimal places. However, the value displayed in cell F4 is 9.28. Why might this happen?

.....

.....

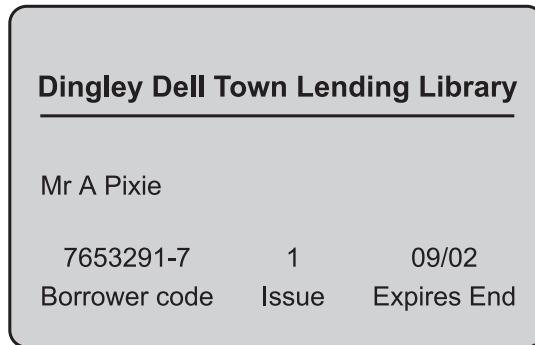
(1 mark)

- (b) Postage is in one of two bands: £2 if the price excluding VAT is less than £10.00, £4 otherwise. Write the formula for cell H4. The postage band boundary price is held in cell H2. Your formula should perform an automatic recalculation if the value in H2 is changed.

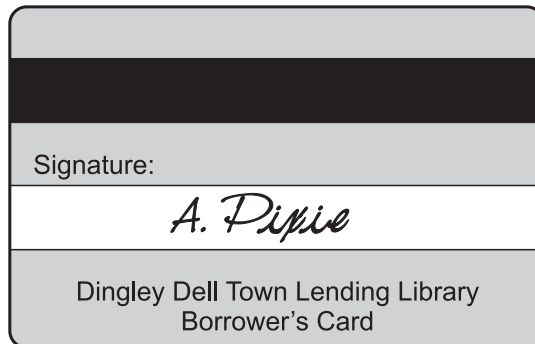
.....

(3 marks)

8 A book lending library lends books to borrowers. Each borrower is assigned a unique borrower code. This code is encoded magnetically on to an identity card issued to each borrower when they join the library. The code is read from the identity card by swiping it through a machine connected to the library’s computer system. The code is also printed on the card in human-readable form.



Front-side view



Rear-side view

Figure 4

(a) Name the type of machine used to read the borrower code from the card.

.....
(1 mark)

(b) Each borrower code includes a check digit. What is a check digit and why is it used?

.....
.....
.....
.....
(2 marks)

- (c) State **one** reason for having the human-readable form of the borrower code printed on the card.

Reason:

.....

.....

(1 mark)

Each book is allocated a unique book code. The book code together with other details as shown in **Figure 5** are pasted on to the inside cover of the book. When a borrower borrows a book the book code is scanned into the computer system so that the loan can be recorded.

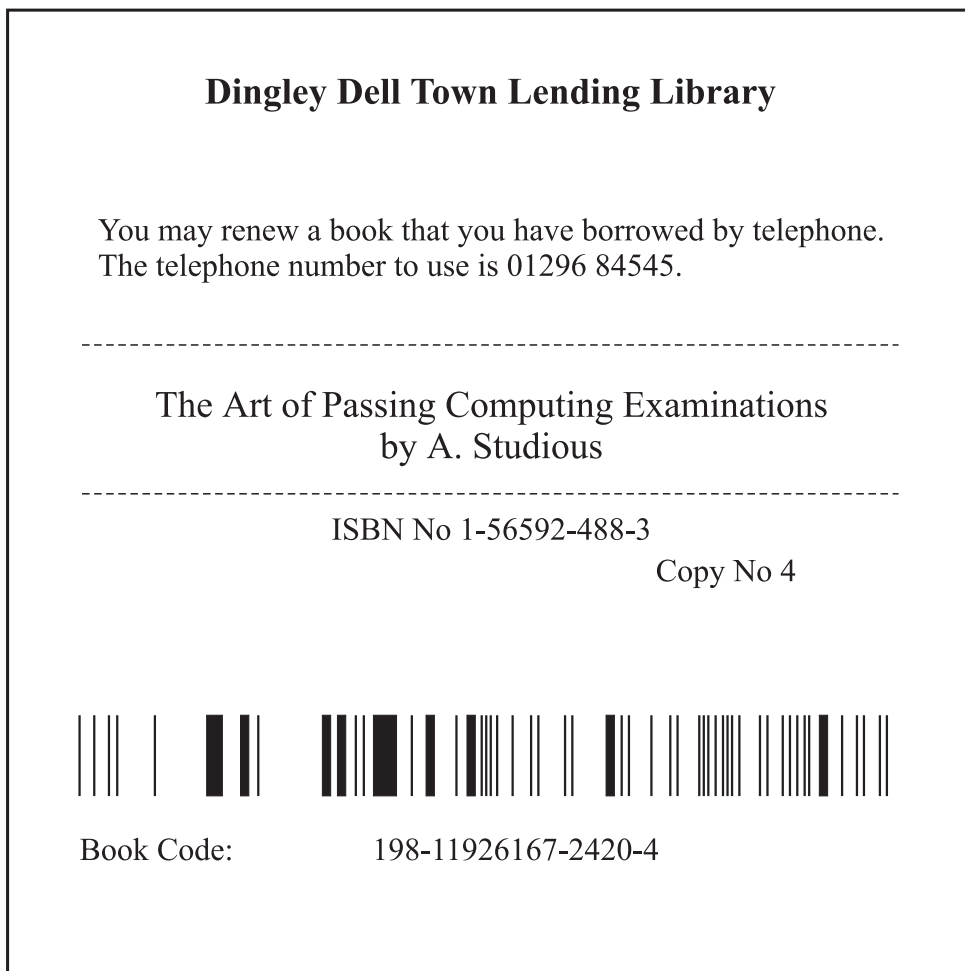


Figure 5

- (d) Name the device used to scan the book code into the computer system.

.....

(1 mark)

QUESTION 8 CONTINUES ON THE NEXT PAGE

Turn over ►

(e) Each loan is recorded in a separate record. All loan records are stored in a Loans file.

The loan record includes the following fields:

BookCode
BorrowerCode
DateBookToBeReturnedBy

(i) What is meant by primary key?

.....
.....
(1 mark)

(ii) Which of the above fields should be chosen as the primary key?

.....
(1 mark)

(iii) Each new loan can only be recorded at the end of the Loans file. What type of file organisation does the Loans file use?

.....
(1 mark)

(f) At the end of each day the information stored in the Loans file is transferred to the Books file using sequential file access. The Books file contains a separate record for each copy of a book that the library stocks.

The book record includes the following fields:

BookCode
BorrowerCode
LoanStatus
DateBookToBeReturnedBy

The Books file is organised sequentially. The field LoanStatus is used to record whether or not a book is currently on loan.

(i) Suggest a suitable field on which the Books file would be sorted.

.....
(1 mark)

(ii) Why should the Loans file be sorted and in what order, before the Books file is updated?

Reason:
.....
.....

Order:
(2 marks)

(g) At the end of each day overdue books are identified. State the processing steps that need to be executed in the library's computer system to extract the loan details of books that have not been returned by the date recorded in the Books file and to record these details in a separate OverDueBooks file. State clearly the data that will be extracted.

Steps:
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
(4 marks)

Data:
.....
.....
(3 marks)

9 A sporting federation that organises races uses a relational database to keep track of the racing division in which each competitor races and the points accumulated in that division. The twenty racing divisions are uniquely coded “Cat20”, “Cat19”, ..., “Cat2”, “Cat1”. On reaching the maximum points allowed the competitor withdraws from further competition in that division and starts again from zero points in the division above, if it exists.

Two relations (tables) are used for this database

Competitor and RacingDivision

Competitor (CompetitorId, Name, Address, PointsAccumulated, RacingDivisionId)

RacingDivision (RacingDivisionId, MaximumPointsAllowed)

Each competitor is assigned a unique CompetitorId.

(a) What is a relational database?

.....
.....
(1 mark)

(b) (i) Select a suitable primary key for the relation Competitor. Justify your choice.

.....
.....
(2 marks)

(ii) Select a suitable primary key for the relation RacingDivision.

.....
(1 mark)

(c) (i) Explain what is meant by the term foreign key.

.....
.....
(2 marks)

(ii) Name the attribute which is the foreign key in the relation Competitor.

.....
(1 mark)

(d) Indexes are created on **CompetitorId** and **RacingDivisionId** attributes for the relation Competitor.

(i) Why is an index used?

.....
.....
(1 mark)

(ii) Which of the two attribute indexes is a secondary index?

.....
(1 mark)

(e)

CompetitorId	Name	Address	PointsAccumulated	RacingDivisionId
:	:	:		:
:	:	:		:
567	Jones	.....	55	Cat2
868	Smith	.....	412	Cat1
919	Adams	.....	23	Cat2
920	Gregory	.....	534	Cat1
:	:	:		:
:	:	:		:

Competitor table

DivisionId	MaximumPointsAllowed
Cat1	1000
Cat2	900
Cat3	850
Cat4	800
Cat5	750
:	:
:	:
Cat19	50
Cat20	25

RacingDivision table

Using the template, show the QBE for the query to find the CompetitorId, Name, Points Accumulated of those competitors in racing division Cat1 who have more than 300 points?

CompetitorId	Name	PointsAccumulated	RacingDivisionId

QBE

(2 marks)

END OF QUESTIONS

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