

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

COMPUTING

9691/02

Paper 2: Practical Tasks

October/November 2004

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **5** printed pages and **3** blank pages.



Answer **all** questions.

Task 1 [29 Marks]

This is a software development task and an implementation task.

A small company, that supplies motor components, wishes to keep details of components bought by customers. A customer may buy many components and many customers may buy a component.

A database consisting of the tables Customer, Component and CustComp is to be created. The CustComp table is used to link the other two tables and has the following attributes (fields), each with the specified data type.

Attribute (field)	Data Type
CustomerID	Numeric type
ComponentID	Numeric type
Purchase Date	Date type

The key is a compound key formed from CustomerID and ComponentID.

- (a) Create a table called Customer to hold details of all the customers.
- (i) Describe the
- purpose of each attribute,
 - data type of each attribute. [8]
- (ii) Identify the key. [1]
- (b) Create a table called Component to hold the details of the components.
- (i) Describe the
- purpose of each attribute,
 - data type of each attribute. [6]
- (ii) Identify the key. [1]
- (c) Create data for the three tables. You should have at least 20 customers and 15 components. The data should be suitable for testing the tables. Include a print out of your tables in your documentation. [7]
- (d) Create an interface that allows a user to input a component's ID. A report, showing
- a list of the customers who have bought that component,
 - the dates on which each customer bought the component,
- should then be automatically printed. Provide hard copy evidence that the report is produced. [3]
- (e) Create an interface that allows a user to input a customer's ID. A report, showing
- a list of the components the customer has bought,
 - the dates on which each component was bought,
- should then be automatically printed. Provide hard copy evidence that the report is produced. [3]

Task 2 [10 Marks]

This is an algorithm trace task. No implementation is required.

L, R and Data are one-dimensional arrays, each with 7 elements numbered from 1 to 7. The contents of the three arrays are shown in Fig. 2.1.

Index	L	Index	R	Index	Data
1	3	1	2	1	email
2	0	2	4	2	is
3	0	3	7	3	a
4	6	4	5	4	quick
5	0	5	0	5	way
6	0	6	0	6	of
7	0	7	0	7	communicating

Fig. 2.1

In these arrays, L(4) contains the number 6, R(3) contains the number 7 and Data(1) contains the data email.

Read the following algorithm.

```

T = 1
S(T) = 1
WHILE T > 0 DO
  P = S(T)
  T = T - 1
  WHILE P <> 0 DO
    OUTPUT Data(P)
    IF R(P) <> 0 THEN
      T = T + 1
      S(T) = R(P)
    END IF
    P = L(P)
  END WHILE
END WHILE
EXIT

```

Task 2 is continued on page 4 overleaf.

Complete the trace table shown in Fig. 2.2. It is only necessary to enter numbers in the table when they change value. You should work from left to right and top to bottom. The first two lines are completed for you.

T	P	S(1)	S(2)	Output
1		1		
	1			

Fig 2.2

[10]

Task 3 [21 Marks]

This is a software development task and an implementation task.

A manufacturer wishes to make a new calculator, for use by young children, with the following facilities.

- User is able to enter positive and negative decimal numbers.
- The numbers appear in a display on the calculator.
- User can enter the operations add, subtract, multiply and divide.
- User can clear the display, which then shows the number zero.
- When an operation is entered, the display shows the result of the previous calculation.
- When a new number is entered, the display clears the previous contents and shows the new number.
- When an equals sign is pressed, the display shows the result of the previous calculation.

You are advised to familiarise yourself with displays on a calculator.

The manufacturer wishes to use a simulation of the new calculator so that the user interface can be tested.

- (a) Design a user interface that can be used to test the above facilities. Provide hard copy showing this design. (A screen dump is acceptable.) [5]
- (b) Using a high-level language of your choice, implement and test your design to show that all the above facilities work correctly.
- (i) Provide hard copy of your annotated program, stating the language and version used. [5]
- (ii) Provide a table showing your test data and the expected and actual results. [6]
- (iii) Supply hard copy evidence of testing your solution. (Screen dumps are acceptable, but must show the data entered and the results.) [5]

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