

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**General Certificate of Education Advanced Subsidiary Level and Advanced Level**

**COMPUTING**  
**PAPER 2**

**9691/2**

**OCTOBER/NOVEMBER SESSION 2002**

Additional materials:

Answer paper

Access to a computer and printer

**INSTRUCTIONS TO CANDIDATES**

Write your name, Centre number and candidate number on your work.

Answer **all** questions.

**INFORMATION FOR CANDIDATES**

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

You are reminded of the need for good English and clear presentation in your work.

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**This question paper consists of 4 printed pages.**

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**[Turn Over**



UNIVERSITY of CAMBRIDGE  
Local Examinations Syndicate

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- 1** An employment agency's business is to match job vacancies with people who are looking for work. You have been asked to design a system to handle the matching of the requirements of the employers and the job seekers.

The system will require the operator to input the following two sets of information.

1. From the employers:
  - Name of company
  - District
  - Telephone number
  - Job type
  - Employment start date
  - Salary.
2. From the person seeking a job:
  - Forename
  - Surname
  - Address
  - Telephone number
  - Job type.

**(a)** Using appropriate software, design a method of storing both sets of data. [4]

**(b)** Create a user-friendly interface for the operator to

**(i)** input new data as it arrives,

**(ii)** delete out-of-date data,

**(iii)** amend data according to any changes in circumstances.

[5]

**(c)** The operator needs to be able to use a query screen to input a person's name to find out what jobs of the relevant job type are available. Set up a user-friendly system, with sufficient test data, in order to do this.

Devise and implement a method to input the person's name, which will result in the system producing the details of the relevant jobs. [5]

**(d)** Produce a short user guide so that an operator can use this system. [10]

- 2 The following algorithm is not intended to be in any particular computer language.

```

read m
for a = 1 to m
    read x (a)
next a
read n
for b = 1 to n
    read y (b)
next b
s = t = d = 1
while s ≤ m and t ≤ n
    if x (s) < y (t)
        z (d) = x (s)
        s = s + 1
        d = d + 1
    endif
    else
        if x (s) > y (t)
            z (d) = y (t)
            t = t + 1
            d = d + 1
        endif
    else
        z (d) = x (s)
        s = s + 1
        d = d + 1
    endif
endwhile
while m ≥ s
    z (d) = x (s)
    d = d + 1
    s = s + 1
endwhile
while n ≥ t
    z (d) = y (t)
    d = d + 1
    t = t + 1
endwhile

```

- (a) Implement this algorithm. Write down the final contents of arrays x, y and z when the algorithm is executed with the following test data.

(i) 3, 1, 4, 9, 3, 2, 3, 7

(ii) 4, 2, 4, 6, 7, 3, 3, 5, 9

[6]

- (b) The test data does not test all branches of the algorithm.

(i) Write down the part of the algorithm not yet tested.

(ii) Write a set of test data which will test this branch.

(iii) Using your set of test data, write down the final contents of array z.

[4]

- (c) Explain the purpose of the algorithm.

[3]

[Turn over

- 3** An examination consists of two papers, each marked out of 100. Each candidate has a four-digit candidate number.

If a candidate scores 80 or more marks on each paper, he is awarded a **DISTINCTION**.

If he fails to be awarded a distinction but the sum of his marks is 120 or more, he is awarded a **MERIT**.

If he fails to be awarded a distinction or a merit but the sum of his marks is 100 or more, he is awarded a **PASS**.

If none of these conditions is met, he is awarded a **FAIL**.

A computer will process and grade the examination results for candidates taking the examination, using the following conditions.

- Each candidate's number and marks for the two papers will be input and then processed.
- The list of candidate's numbers and marks will be ended with the rogue data 9999, 0, 0
- The candidate's number and **DISTINCTION**, **MERIT**, **PASS** or **FAIL** grade will be printed as appropriate.
- Following the printout of individual results, the total number of candidates who took the examination will be printed along with the total number of **DISTINCTION**, **MERIT**, **PASS** and **FAIL** grades awarded.

**(a)** Draw a Jackson diagram to show how the problem may be broken down. [9]

**(b)** Write an algorithm that will allow all the candidates' marks to be processed. [14]