INTERNATIONAL BACCALAUREATE
BACCALAURÉAT INTERNATIONAL
BACHILLERATO INTERNACIONAL

COMPUTER SCIENCE
STANDARD LEVEL
PAPER 2

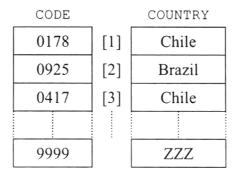Tuesday 9 May 2000 (morning)

1 hour 45 minutes

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Answer all the questions.

1. An international business with branches in several countries sells educational products to schools. Each branch keeps details about the schools it sells to.

The data, which consists of the school's unique IB code and its country, is stored in two parallel string arrays, CODE and COUNTRY.

An example of the data is:

CODE		COUNTRY
0178	[1]	Chile
0925	[2]	Brazil
0417	[3]	Chile
⋮	⋮	⋮
9999		ZZZ

(a) Construct the algorithm to accept a country input by the user, and perform a linear (sequential) search to display all the school codes in that country. (A suitable message should be displayed if no schools are found.) *[8 marks]*

(b) State **two** reasons why a binary search is not suitable as an alternative search method in (a). *[2 marks]*

(c) Construct the algorithm to order the first 100 data items, with the school code as the key, using the bubble sort. *[8 marks]*

(d) Two branches decide to combine their data, since some schools appear on the lists of both branches. The data are in arrays CODE1 and COUNTRY1 for the first branch, and CODE2 and COUNTRY2 for the second branch. The data has been sorted on school code, as in (c).

Construct the algorithm that transfers the data to CODE3 and COUNTRY3 in school code order. (If the same school appears in both branches, only one set of data should be transferred.) *[12 marks]*

For example, the following transfer would occur:

CODE1	COUNTRY1	CODE2	COUNTRY2	CODE3	COUNTRY3
0101	Zaire	0178	Chile	0101	Zaire
0178	Chile	0540	Australia	0178	Chile
0417	Chile	0925	Brazil	0417	Chile
0925	Brazil	9999	ZZZ	0540	Australia
9999	ZZZ			0925	Brazil
				9999	ZZZ

This question requires the use of the Case Study.

2. (a) State why a magnetic stripe is used to store the data on a cash card, rather than optical character recognition (OCR). *[1 mark]*

    (b) Outline why the personal identification number (PIN) is **encrypted** in the magnetic stripe of a cash card. *[2 marks]*

    (c) Compare the use of automated teller machines (ATMs) accessed by:

        • fingerprints;
        • "eye-prints" using iris patterns.

        (As part of your comparison refer to **two** similarities and **one** difference.) *[6 marks]*

    (d) Draw the systems flowchart for processing cheques. *[6 marks]*

    (e) Describe a computer security method that allows a Bank employee to have access to any document in the shared area, but only access to one (the employee's own) personal area. *[4 marks]*

    (f) Discuss **one** negative social effect of the Bank's developments on an employee. *[3 marks]*

    (g) State **one** batch processing task that the Bank carries out, and outline why this processing method is appropriate. *[3 marks]*

3.   The diagram below represents the Input–Process–Output nature of a computer system:

| INPUT DEVICE | → | COMPUTER | → | OUTPUT DEVICE |

(a)   State the full names of the components **ALU**, **CU** and **RAM** which are located within the computer.   *[3 marks]*

(b)   Explain **one** device that could be both input **and** output. Include in your answer:

- the name of the device;
- an application for which it is appropriate;
- how the required data is input;
- what processing is required;
- how the relevant data is output.   *[8 marks]*

(c)   Outline the function of the following within the computer:

(i)   RAM;   *[2 marks]*

(ii)   cache memory.   *[2 marks]*