INTERNATIONAL BACCALAUREATE
BACCALAURÉAT INTERNATIONAL
BACHILLERATO INTERNACIONAL

COMPUTER SCIENCE
STANDARD LEVEL
PAPER 1

Thursday 9 November 2000 (afternoon)

1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Answer all of Section A.
- Answer three questions from Section B.

SECTION A

*Answer **all** questions.*

1. Define the terms *syntax error*, *logical error* and *run-time error*. *[3 marks]*

2. State **two** reasons for having secondary memory as well as main (internal) memory. *[2 marks]*

3. State whether the double entry method of error detection is an example of verification or validation. *[1 mark]*

4. Outline the principal characteristic of a real-time system. *[2 marks]*

5. State the answer to the expression `7 MOD 2`. *[1 mark]*

6. State **two** iterative constructs used in programming. *[2 marks]*

7. Outline the function of the CU. *[2 marks]*

8. State the function of a router in a network. *[1 mark]*

9. Program construction (which includes testing and debugging) is one of the stages in the software life cycle. Outline **three** other stages. *[6 marks]*

10. Explain when re-transmission would be used to recover from an error. *[2 marks]*

11. Discuss whether parameters passed into a function should be pass-by-value or pass-by-reference. *[4 marks]*

12. When a document needs to be sent from one country to another, it is much faster to send it by email rather than by normal mail. Outline **one** further advantage of email over normal mail, and **one** disadvantage. *[4 marks]*

SECTION B

*Answer **three** questions.*

13. Below is an algorithm fragment which is part of a procedure, `ABC`, which uses three parameters. An example call to the procedure is `ABC(DATA,LENGTH,COUNT)`.

```
HALF <-- LENGTH div 2
MIDDLE <-- HALF + 1
for POSITION <-- 1 upto HALF do
   SAME <-- DATA[MIDDLE+POSITION] = DATA[MIDDLE-POSITION]
   if SAME then
      COUNT <-- COUNT + 1
   endif
endfor
```

Where:

`DATA` is an integer array containing

9	3	1	0	1	4	9
[1]	[2]	[3]	[4]	[5]	[6]	[7]

`LENGTH` is an integer variable containing 7, and
`COUNT` is an integer variable initially containing 0.

(a) State the data type of `SAME`. *[1 mark]*

(b) Trace the algorithm fragment with the data given, using the following trace table format:

HALF	MIDDLE	POSITION	SAME	COUNT
3	4	1		

[3 marks]

(c) Explain the purpose of the algorithm. *[2 marks]*

(d) Explain why `COUNT` should be a pass-by-reference parameter. *[2 marks]*

(e) Explain why `ABC` could be declared as a function, rather than a procedure. *[2 marks]*

14. Different software companies have agreed to use a standard code for colours in their graphics. The colours are stored using 8 bits. Each colour has a code, for example the decimal value for Red is 5, and Blue is 20.

(a) State the binary representation of the colour with the highest value and calculate how many different colours can be used with the 8 bit coding. *[2 marks]*

(b) State the binary representation for Blue. *[1 mark]*

(c) Outline **one** other example of standardisation used in computing. (Include in your answer a brief reason why standardisation is an advantage for your chosen example.) *[2 marks]*

(d) Calculate how many gigabytes (GB) of storage would be needed to store 30 000 graphics, if each one is estimated to occupy 1230 kilobytes (kB). *[2 marks]*

(e) Explain why a data compressor may be used on stored graphics, with reference to a specific situation. *[3 marks]*

15. A software company is creating a program in a high-level language.

(a) Describe **two** differences between the operation of a compiler and the operation of an interpreter when translating a high-level program. *[4 marks]*

(b) Identify **two** items of system documentation for the program, and describe how they would be used for future maintenance. *[4 marks]*

(c) Suggest **one** application for which the software company might use an HTML editor. *[2 marks]*

16. A company has an internet server and it provides free email to its employees. Company managers are allowed to check the contents of any email.

An employee makes copies of CD-ROMs at home to sell to other people. He uses his email address at the company to receive orders.

(a) Discuss **two** ethical issues concerning this situation. *[4 marks]*

(b) Describe **one** precaution that could be taken in order to minimise the company's computers being affected by viruses through the use of emails. *[2 marks]*

(c) Outline **two** tasks that need to be carried out by the network manager before a new employee can use the system. *[4 marks]*