



**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 $7 \text{ MOD } 2$. [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 30000 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]*
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