



88137013



International Baccalaureate®  
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**COMPUTER SCIENCE  
STANDARD LEVEL  
PAPER 1**

Thursday 14 November 2013 (afternoon)

1 hour 30 minutes

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**INSTRUCTIONS TO CANDIDATES**

- Do not open this examination paper until instructed to do so.
- Section A: answer all the questions.
- Section B: answer all the questions.
- The maximum mark for this examination paper is *[70 marks]*.

## SECTION A

Answer **all** the questions.

1. State **two** items of documentation that are usually included for the user in a software package. *[2 marks]*
  
2. Outline the need for an operating system to perform defragmentation. *[2 marks]*
  
3. State **two** functions of operating systems. *[2 marks]*
  
4. State **two** features of HTML that make it a good choice for creating and updating a website. *[2 marks]*
  
5. A school network is connected to the Internet.
  - (a) Outline **one** threat to the security of the school's data that may arise from the use of the Internet. *[2 marks]*
  
  - (b) Outline **two** implications of a school administrator being able to monitor students' use of the Internet. *[4 marks]*
  
6. Using 8-bit two's complement representation of integers,
  - (a) state the binary representation of the decimal numbers 33 and –33; *[2 marks]*
  
  - (b) identify the range of available integers. *[2 marks]*
  
7. State the role of the ALU. *[1 mark]*
  
8. Construct a systems flowchart for the process described below.
  - A transaction file held on disk is validated.
  - An error report which gives details of invalid transactions is printed out.
  - All valid transactions are stored on a disk file, which is then sorted.*[5 marks]*

9. Consider the following code.

```
int n=4;
int k=2;
int s=-1;
for( int j=n; j>=1; j=j-1)
{ output(s*k);
  k=k+2;
  s=-s;
}
```

Construct a trace table to determine the output produced by the code.

*[4 marks]*

10. Describe the role of debugging programs.

*[2 marks]*

## SECTION B

Answer **all** the questions.

- 11.** A fashion designer works from home to create a new clothing range for a company.
- (a) Outline **two** advantages of using a graphic tablet to create a design. *[4 marks]*
  - (b) Describe a communication system that would allow a fast transmission of data files from the designer to the company. *[2 marks]*
  - (c) Outline the benefits of data compression in storing and sending the designer’s work to the company. *[2 marks]*
  - (d) Explain the need for encryption when sending the designer’s work to the company. *[2 marks]*
- 12.** A company plans to build an off-site “Data Centre” to house its servers and associated devices. A system analyst is employed by the company to design and implement a computer system for the new Data Centre.
- (a) State **two** methods of data collection which could be used in the analysis stage. *[2 marks]*
  - (b) Explain why it may be useful to produce more than one prototype of the new computer system. *[2 marks]*
- There are two possible locations for the Data Centre:
- A central location in a major city
  - A town in an area where previously the main industry had been coal mining.
- (c) Discuss the social implications of the company’s choice of location for the Data Centre. *[6 marks]*

13. Weather data at 20 different locations in the mountains are measured by sensors and sent to a weather station's computer where they are stored.

Twice a day the data files holding the weather data are transferred from the weather station to the central server in a nearby city for processing.

- (a) State the type of processing. *[1 mark]*
- (b) Outline how the weather data could be transferred
  - (i) from the sensors to the weather station's computer. *[1 mark]*
  - (ii) from the weather station's computer to the central server. *[1 mark]*
- (c) Explain the need for analog-to-digital conversion in this system. *[3 marks]*
- (d) Explain **two** backup strategies that could be used in the event of a failure of the weather station's computer or the central server. *[4 marks]*

14. Consider the following method.

```
boolean check(double[] A)
{
    boolean p=true;
    int k=-1;
    while( k+1 < A.length-1 )
    {
        k=k+1;
        if (A[k] < A[k+1])
            {p=false;}
    }
    return p;
}
```

- (a) Define the term *local variable* and identify all the local variables in the method `check()`. [2 marks]
- (b) Identify any formal parameters in the method `check()`. [1 mark]
- (c) Given the following array,

Data	14.3	13.98	11.6	8.123	9.2	4.15
	[0]	[1]	[2]	[3]	[4]	[5]

consider the following statement.

`z = check(Data);`

- (i) Identify the *type* of `z`. [1 mark]
- (ii) Determine, by creating the trace table, the value of `z`. [4 marks]
- (d) State the purpose of the method `check()`. [2 marks]
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