N13/5/COMSC/SP1/ENG/TZ0/XX

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International Baccalaureate®
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COMPUTER SCIENCE
STANDARD LEVEL
PAPER 1

Thursday 14 November 2013 (afternoon)

1 hour 30 minutes

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]*