



88087013



**COMPUTER SCIENCE
STANDARD LEVEL
PAPER 1**

Friday 14 November 2008 (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.

SECTION A

Answer *all* the questions.

1. Draw a diagram showing clearly the cyclical nature of the *systems life cycle*. You should include the different stages of the cycle in your diagram. [3 marks]

2. Identify **three** characteristics of a user interface that would make it suitable for use by young children. [3 marks]

3. Outline **two** different methods of debugging a program. [4 marks]

4. Determine the output from the following Java method.

```
void loop ()  
{  
    for (int counter = 3; counter > 0; counter = counter - 1)  
    {  
        output (10/counter);  
    }  
}
```

[2 marks]

5. By giving an actual example, describe a set of data that could be stored in each of the following data structures:
 - (a) an array of integer; [2 marks]

 - (b) a 2-D array of real. [2 marks]

6. Outline the use of **one** software development tool. [2 marks]

7. State the calculation required to convert the value **6GB** (gigabytes) into kilobytes (kB). [2 marks]

8. With the use of an example, explain the term *volatile* when used to describe computer memory. [2 marks]

9. One of the functions of an operating system is *memory management*. Outline the function of memory management. [2 marks]
10. Outline the basic difference between the functions of a *hub* and a *router*. [2 marks]
11. (a) Outline the function of *defragmentation software*. [2 marks]
- (b) Explain the reason for running defragmentation software. [2 marks]

SECTION B

Answer *all* the questions.

12. Consider the following methods.

```

public void numbers()
{
    int x = 1;
    int counter = 0;
    int[] list = new int [100];
    while (x > 0)
    {
        x = inputInt("Input an integer: ");
        if (x > 0)
        {
            if (validate(x))
            {
                list [counter] = x;
                counter++;
            }
        }
    }
}

private boolean validate (int n)
{
    if ((n%2 == 0) && (n%3 == 0))
        return true;
    else
        return false;
}

```

Recall that, in Java, the symbol % represents the modulo operator (mod).

- (a) Identify the primitive data types used in the above methods. [1 mark]
- (b) Copy and complete the trace table if the following set of data is input in the method `numbers()`: 6, 8, 24, -999. [3 marks]

x	x > 0?	validate(x)	counter	list
6				
8				
24				
-999				

(This question continues on the following page)

(Question 12 continued)

- (c) Explain the inclusion of the value **–999** in the data list in part (b). [2 marks]

The method `numbers()` is now changed so that it returns the number of items in the array `list[]` to the method that called it.

- (d) Determine the **two** changes that need to be made to the method `numbers()`. [2 marks]

- (e) Explain the significance of the word **private** in the first line of the method `validate()`. [2 marks]

13. A company is designing a fully-automated, on-line theatre booking system that will be installed on machines at different locations within a major city. At each location, the customer is able to purchase tickets for any of the theatres listed on the system.

- (a) Explain, with reference to the above system, what is meant by the term *on-line*. [2 marks]
- (b) Suggest, with reasons, a suitable method of entering data into this system. [2 marks]
- (c) Discuss how the system might prevent the same seat being booked by two different people. [4 marks]
- (d) Explain **one** disadvantage that this system might present to potential customers. [2 marks]

14. A weather station is positioned at the top of a mountain, where the temperatures can range between -20°C and $+50^{\circ}\text{C}$. Temperatures are measured by a sensor and stored in the station’s computer memory. Once a day, the data is transferred to the central server, which stores and processes this data. The server is located a large distance away.
- (a) State the type of processing that is being used here. *[1 mark]*
 - (b) Explain why the data from the sensor needs to be converted. *[3 marks]*
 - (c) Suggest, with reasons, a method of transferring the data from the weather station to the central server. *[2 marks]*
 - (d) If an item of temperature data is stored as an integer, explain how it might be represented in the memory. *[2 marks]*
 - (e) Suggest, with reasons, an alternative data representation that would represent the temperatures more accurately. *[2 marks]*
15. A supermarket has bar coded all of the items on sale.
- (a) Explain **one** reason for bar coding these items. *[2 marks]*
- A check digit is normally added to the code for verification purposes.
- (b) Explain how the check digit can be obtained with the use of a modulo operator. *[4 marks]*
- The supermarket stores the data from each transaction on a central computer.
- (c) Discuss backup strategies that could be put in place to safeguard the data in the event of a system failure to this computer. *[4 marks]*
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