



22097014



**COMPUTER SCIENCE
STANDARD LEVEL
PAPER 2**

Wednesday 20 May 2009 (morning)

1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Answer all the questions.

Answer **all** the questions.

1. A manager of a company requires a range of basic statistics to be calculated on her companies weekly sales figures. There are 10 sales people.

It has been decided to store the sales figures in an array that is 10 elements in length. The array name is `sales`.

Consider the `Stats` class and `DoStats` class as shown below.

```
public class Stats
{
    private //insert your array declaration
    public Stats(){ } //default constructor
    public void add(double saleAmount, int index)
    {
        //missing code
    }
}
public class DoStats
{
    public static void main(String[] args)
    {
        //insert line to create the Stats object called sell
        double s;
        for(int i = 0; i < 10; i++)
        {
            s = inputDouble("Enter sales figure");
            sell.add(s, i);
        }
    }
}
```

- (a) Construct the Java statement to declare the array called `sales` in the `Stats` class. [1 mark]
- (b) Construct the Java statement to create the `Stats` object called `sell` in the `DoStats` class. [2 marks]
- (c) Outline the purpose of the code within the `for` loop of the `DoStats` class. [2 marks]
- (d) Construct the line of code needed in the `add()` method of the `Stats` class. [2 marks]
- (e) Construct a method in the `Stats` class called `averageSales()` that returns the average of all sales. [3 marks]

(This question continues on the following page)

(Question 1 continued)

- (f) Construct a method in the `Stats` class called `countAboveAverage` (**double** `av`) that returns the number of sales greater than but not equal to the average.
(Note: `av` holds the average) *[3 marks]*

- (g) Construct the Java statements required in `DoStats` to get the average and then output the number of sales above the average. *[3 marks]*

An array called `salespersons` is defined as shown and included in the `DoStats` class.

```
String[] salespersons = {"Bill", "John", "Mary", "Jane", "Kathy",  
                        "Bob", "Jack", "Steve", "Brian", "Jenny"};
```

- (h) Construct a method for the `Stats` class called `printList` that outputs a list of the salesperson's name, sale amount and if the amount is below the average. *[4 marks]*

2. A sequential access file contains the following data on DVDs: dvdIDNumber, title, salePrice and numberInStock. The data is stored in a sequential access file. All data is written as text to the file.

- (a) State **two** features of a sequential access file. *[2 marks]*
- (b) State why the dvdIDNumber is likely to act as the key field. *[2 marks]*

It is important to be able to update the numberInStock value as DVDs are sold.

- (c) Identify **four** steps that would need to be followed in order to update the numberInStock value for one DVD on the file. *[4 marks]*
- (d) Construct a class named `DvdRecord` to allow the data of a DVD to be stored in RAM. You are not required to include any methods. *[2 marks]*

An alphabetical list by DVD title needs to be output.

- (e) Construct a suitable Java data structure to enable all the DVDs to be stored in memory using the class constructed in part (d). *[3 marks]*
- (f) Outline how the data structure could be used to create the alphabetic list. *[2 marks]*

Study the following method before answering the questions that follow.

```
public boolean method(int sKey, int[] n)
{
    int bottom = 0, top = n.length-1, middle = 0;
    boolean found = false;
    while (bottom <= top && !found)
    {
        middle = (top + bottom)/2;
        if (n[middle] == sKey)
        {
            found = true;
        }
        if (sKey < n[middle])
            top = middle-1;
        if (sKey > n[middle])
            bottom = middle+1;
    }
    return found;
}
```

- (g) State the name of the algorithm shown in the above method. *[1 mark]*
- (h) Explain how the method could be used without modification to determine if a particular DVD existed in the file. *[4 marks]*

3. *This question requires the use of the case study.*

Compared to a desktop, a laptop typically uses a lower-power processor, a smaller keyboard and a smaller screen. It also has a touchpad instead of a mouse and a battery with a relatively short life. Disabled persons use these for word processing.

- (a) Outline a problem that **one** of these features can cause for
 - (i) sight-impaired users. *[2 marks]*
 - (ii) users with limited dexterity. *[2 marks]*
- (b) Outline a way in which laptops can benefit
 - (i) hearing-impaired users. *[2 marks]*
 - (ii) users with limited dexterity. *[2 marks]*
- (c) Outline **two** ways in which specialist keyboards can assist disabled people. *[4 marks]*
- (d) For the following two features of an operating system, discuss a problem that a disabled person might have in using them, and suggest a possible improvement that will help that person.
 - (i) menus and icons *[4 marks]*
 - (ii) sounds *[4 marks]*
- (e) For the following two hardware devices, identify a problem that a disabled person might have in using them, and suggest a possible modification that will help that person.
 - (i) screen *[3 marks]*
 - (ii) scanner *[3 marks]*

A programmer is writing documentation for another programmer who is sight-impaired.

- (f) For any **two** items of system documentation, discuss the strategies the programmer could use to make the documentation more accessible to this colleague. *[4 marks]*