M08/5/COMSC/SP2/ENG/TZ0/XX

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COMPUTER SCIENCE
STANDARD LEVEL
PAPER 2

Friday 23 May 2008 (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 building has four floors, numbered 0, 1, 2 and 3. Each floor consists of an office (with 0 bedrooms), a 1-bedroom apartment and a 2-bedroom apartment.

The monthly rents for each office and type of apartment are different, as shown in the table below.

Monthly Rents Charged ($)

Floor	0 Bedrooms (office)	1 Bedroom	2 Bedrooms
0	400	450	510
1	500	560	630
2	625	676	740
3	1000	1250	1600

(a) Write the statement required to declare a new two dimensional array `rents` to hold the monthly rent data given in the above table.

Hint: A two-dimensional integer array with two rows and three columns can be defined as:

```
int[][] arrayName = new int[2][3];
```

[2 marks]

(b) The method `readData()`, reads the rent data that is input at the keyboard, and enters it into the correct position in the `rents` array.

Write the complete method `readData()`, which has been partially written below. *[4 marks]*

You can assume the array `rents` has been declared as global, *i.e.* a class array.

```
void readData()
{
  //one or more lines is incomplete or missing
  for(int floor =
  {
    for(int beds =
    {
    }
  }
}
```

(c) Write a method `getRent()`, which accepts the floor number and the number of bedrooms as parameters, and returns the rent of the office or apartment situated on that particular floor and having that number of bedrooms. *[4 marks]*

(d) Write a method `avgRent()`, which outputs, with an appropriate message, the average rent for **each** floor of the building. *[6 marks]*

(e) Suggest **two** reasons why an array structure was chosen to hold the data. *[4 marks]*

2. In the class `Numbers`, the array `nums` stores the following integer list.

{17, 70, 8, 1, 0, 88, 52, 95, 44, 37}

The class `Numbers` has the following structure.

```
class Numbers
{ int [] nums;
  Numbers()      //the class constructor
  { int [] nums = {17, 70, 8, 1, 0, 88, 52, 95, 44, 37};
    this.nums = nums;
  }
  int findMaximum()
  {
  }
  int findIndex(int n)
  {
  }
  public static void main(String args)
  { Numbers array = new Numbers();
  }
}
```

(a) (i) Define the term *constructor*. *[2 marks]*

(ii) Describe the result of the line `Numbers array = new Numbers();` in the main method. *[2 marks]*

(b) Write the method `findMaximum()`, which searches for and returns the maximum value in the array. *[4 marks]*

(c) Write the method `findIndex()`, which accepts an integer search value as a parameter to the method and returns the index of the search value in the array. If the search value cannot be found in the array, the method should return the value –1. *[4 marks]*

(d) (i) Identify the type of search being carried out in part (c). *[1 mark]*

(ii) Explain how the search process could be made more efficient, especially if the array contains a large number of values. *[2 marks]*

(e) Complete the main method of the class `Numbers` so that it performs the following actions.

- Outputs the maximum value of the array `nums` by calling the method `findMaximum()`, defined above.
- By calling the `findIndex()` method, outputs the array index of a number input by the user. If the number does not exist in the array, the message "The number cannot be found in the array" is output. *[5 marks]*

3. *This question requires the use of the Case Study*.

(a) Discuss factors involved in the design of input devices/software for people who have disabilities in the following areas:

(i) touch/dexterity; *[2 marks]*

(ii) sound/hearing; *[2 marks]*

(iii) vision/sight. *[2 marks]*

"Biometric control devices can be used to detect nervous impulses and take specified action in response to certain patterns."

(b) Suggest **three** applications of biometric control. *[6 marks]*

Sign language is a powerful aid to communication for the deaf and hard of hearing.

(c) Outline **two** problems with the incorporation of sign languages into a specialised computer laboratory. *[4 marks]*

(d) Explain how electronic reading aids can be used by disabled people. *[4 marks]*

(e) Discuss **two** ways in which software can help the partially sighted to view a web page. *[4 marks]*

(f) Explain **three** social implications with respect to the increased dependency of people on computers. *[6 marks]*