



22097013



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

Tuesday 19 May 2009 (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.

## SECTION A

Answer *all* the questions.

1. Explain **two** differences between the analysis and design stages of the software development life cycle. [4 marks]
  
2. Explain **two** advantages of using a modular approach in constructing computer programs. [4 marks]
  
3. The implementation of computer systems often has an effect on individuals. Describe a situation where a new system could have
  - (a) a positive effect on a group of people. [2 marks]
  - (b) a negative effect on a group of people. [2 marks]
  
4. State **two** functions of an operating system. [2 marks]
  
5. The method `calculateHours()`, listed below, is called by the statement
 

```
double hours = calculateHours(minutes);

public void calculateHours(double mins)
{
    double h = mins/60;
}
```

An attempt is made to compile the program.

  - (a) Define the term *compilation*. [2 marks]
  - (b) By considering the code given above, identify the type of error that would cause the compilation process to fail. [1 mark]
  - (c) Explain the reason why this error has occurred. [2 marks]
  
6. Describe a single data structure that would store the following data:
  - (a) rainfall data on 30 consecutive days [3 marks]
  - (b) the age of a person and whether or not football is his/her favourite sport [3 marks]

7. Outline the function of the *address bus*. [2 marks]
8. Express the 8-bit binary number **01011111** in
- (a) hexadecimal. [1 mark]
  - (b) decimal. [1 mark]
9. Outline what is meant by the term *user-defined method* in relation to Java programs. [1 mark]

## SECTION B

Answer *all* the questions.

10. Consider the class SelectionSort shown below.

```
public class SelectionSort
{
    public static void main(String[] args)
    {
        int[] unsortedArray = {3,6,2,8,5};
        int[] sortedArray = selection(unsortedArray);
    }
    public static int[] selection(int[] list) // sorts array in ascending order
    {
        for (int x = 0; x < 4; x++)
        {
            int p = x;
            int smallest = list[p];
            for (int y = x + 1; y < 5; y++)
            {
                if (list[y] < smallest)
                {
                    p = y;
                    smallest = list[y];
                }
            } // end of 'y' loop
            if (p != x)
            {
                list[p] = list[x];
                list[x] = smallest;
            }
        } // end of 'x' loop
        return list;
    }
}
```

(a) Describe the information given in the following line.

```
public int[] selection(int[] list)
```

[4 marks]

(b) State the values of the array `list[]` when the end of the 'x' loop is reached for the first time.

[2 marks]

(c) Explain what would happen if the array `unsortedArray[]` was already sorted.

[2 marks]

(d) Explain, without writing code, how the method `selection()` could be modified to sort an integer array of any size.

[2 marks]

- 11.** A company stores the details of all of its employees in a sequential master file. Every month the payroll program is run during which the master file is updated by a transaction file.
- (a) With reference to the payroll program, explain the relationship between the master file and the transaction file. [4 marks]
  - (b) Identify the characteristics of the above system that would allow batch processing to take place. [2 marks]
  - (c) Outline
    - (i) how a deliberate error could enter the system. [2 marks]
    - (ii) how the company could try to prevent this type of error. [2 marks]
- 12.** A company uses a *wide area network* (WAN) for a variety of reasons, one of which is the sending of large files between one office and another.
- (a) Discuss **two** ways in which the company could speed up the transmission of these files. [4 marks]
  - (b) Explain the need for protocols in this network. [2 marks]
  - (c) Other than sending files, describe **two** examples where the company could use its WAN. [4 marks]
- 13.** Many modern devices use microprocessors.
- (a) Define the term *microprocessor*. [2 marks]
  - (b) Identify a device, other than a computer, that uses a microprocessor. [1 mark]
  - (c) For this device, describe
    - (i) the function of its microprocessor. [2 marks]
    - (ii) its inputs. [1 mark]
    - (iii) its outputs. [1 mark]
  - (d) Describe **two** different types of memory that might be found within the microprocessor from part (b). [3 marks]
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