International Baccalaureate®
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COMPUTER SCIENCE
STANDARD LEVEL
PAPER 1

SPECIMEN PAPER

1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Section A: answer all questions.
- Section B: answer all questions.

SECTION A

*Answer **all** questions.*

1. State **one** example of *application software*. *[1 mark]*

2. Identify **two** methods that can be used to prevent data loss. *[2 marks]*

3. Identify **two** methods of providing *user documentation*. *[2 marks]*

4. Outline the need for higher level languages. *[2 marks]*

5. The contents of a 12-bit register is represented in *hexadecimal* as A5F.

(a) State its binary representation. *[1 mark]*

(b) State how many different integers can be represented in this register. *[1 mark]*

6. Construct a *logic diagram* for the Boolean expression

A AND B OR NOT B. *[3 marks]*

7. When the wages for company employees are calculated, all hours above 38 are paid at the overtime rate of 1.5 times the base rate.

Construct a flowchart that represents this algorithm. *[3 marks]*

8. Consider the following array

NAMES	[0]	[1]	[2]	[3]	[4]
	Robert	Boris	Brad	George	David

and the following algorithm, which is constructed to reverse the contents of the array `NAMES`.

```
N = 5  // the number of elements in the array
K = 0  // this is the first index in the array

loop while K < N - 1
  TEMP = NAMES[K]
  NAMES [K] = NAMES [N - K - 1]
  NAMES [N - K - 1] = TEMP
  K = K + 1
end loop
```

(a) Trace the algorithm, showing the contents of the array after each execution of the loop. *[2 marks]*

(b) Identify the type of error that occurs. *[1 mark]*

(c) Outline why the error occurs and how it could be corrected. *[2 marks]*

9. (a) Outline the differences between a LAN and a VLAN. *[3 marks]*

(b) Identify **two** factors that should be considered when selecting transmission media. *[2 marks]*

SECTION B

*Answer **all** questions.*

10. The temperature of a lake for one day is recorded every hour and data is stored in a one-dimensional array named `TEMPDAY`.

TEMPDAY

[1]	12.4
[2]	12.4
[3]	12.3
.	
.	
.	
[12]	12.9
[13]	13.0
[14]	13.1
.	
.	
.	
[23]	12.3
[24]	12.3

(a) State the temperature of the lake at noon. *[1 mark]*

(b) Construct an algorithm that will calculate and output the average temperature. *[4 marks]*

(c) Construct an algorithm to find and output the minimum and maximum temperatures for the day. *[7 marks]*

(d) (i) Describe how a two-dimensional array could be used to hold temperature measured every hour, every day for one week. *[2 marks]*

(ii) Outline how the temperature on Thursday at 5pm can be accessed. *[1 mark]*

11. A business has decided to replace their current computer system with a new computer system.

(a) Identify **three** examples of how employees, as users of the computer system, may participate in the development of the new system. *[3 marks]*

(b) One method of conversion from the old computer system to the new computer system is parallel running.

(i) Define the term *parallel running*. *[1 mark]*

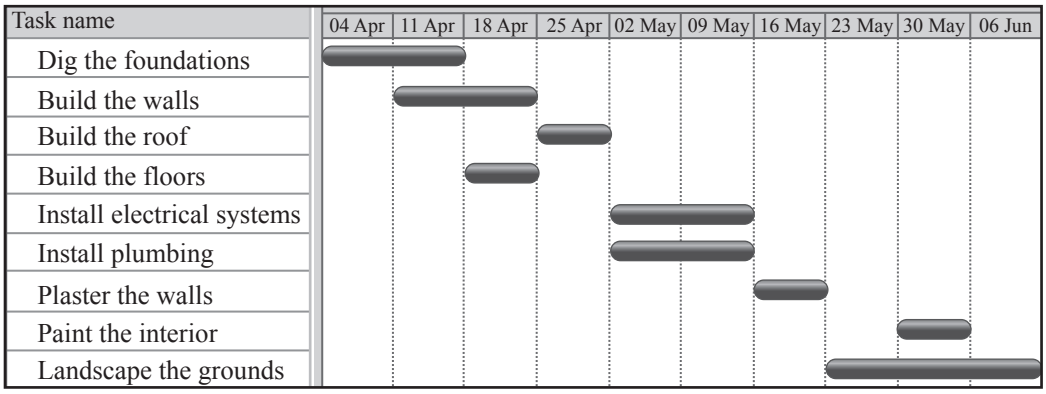
(ii) Identify **one** other method of conversion. *[1 mark]*

(iii) Compare parallel running with the method of conversion identified in part (ii). *[4 marks]*

(c) The data from the old computer system needs to be transferred onto the new computer system. Discuss **two** problems that may arise as a result of this data migration. *[6 marks]*

12. Señor Rodriguez is having a new house built and will require local tradesmen to complete a number of tasks.

The Gantt chart below shows the tasks involved in the building of the house.



(a) Define the term *concurrent processing*. *[1 mark]*

(b) Identify **two** tasks that are carried out concurrently. *[1 mark]*

(c) Identify **two** tasks that are carried out sequentially. *[1 mark]*

(d) Describe how the idea of abstraction applies to one of the tasks. *[2 marks]*

(e) Explain **one** advantage and **one** disadvantage of carrying out a number of tasks concurrently. *[4 marks]*

Amalia Rodriguez, his daughter, is a student and is completing her homework. This requires her to view web pages, edit a document, and print out draft copies.

However, she is also surfing the web, keeping up to date on her social networking site as well as downloading apps and music from a P2P site.

(f) For one of the application programs which she uses to perform these activities, outline **one** task that is carried out by the application program itself. *[2 marks]*

Within the application the graphical user interface (GUI) elements are reliant on the operating system.

(g) Identify **two** GUI components that are common to all of the above and are carried out by the operating system. *[2 marks]*

(h) Outline how the use of abstract GUI components simplifies application programming. *[2 marks]*