2020L219GAES

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination
Sample Paper

Computer Science

Sections A & B

Ordinary Level

Time: 1 hour, 30 minutes

130 marks

Examination number					

Centre stamp

Instructions

There are **three** sections in this examination. Section A and B appear in this booklet. Section C is in a separate booklet that will be provided for the computer-based element.

Section A	Short Answer Questions	60 marks	12 questions
Section B	Long Questions	70 marks	3 questions
Section C	Programming	80 marks	1 question

Answer all questions.

Write your answers for Section A and Section B in the spaces provided in this booklet. There is space for extra work at the end of the booklet. Label any such extra work clearly with the question number and part.

This examination booklet will be scanned and your work will be presented to an examiner on screen. Anything that you write outside of the answer areas may not be seen by the examiner.

Section A — Short Answer Questions — 60 marks

Answer all twelve questions.

Question 1

Working as part of a team is an important aspect of software development. You have worked as a member of a team for your Applied Learning Tasks (ALTs).

(a) Name **two** roles in a typical software development team.

1.
2.

(b) List **one** advantage of working in a software development team.

Question 2

(a) What is meant by the term ‘cloud computing’?

(b) Give **two** examples of how cloud computing is used in everyday life.

1.
2.

Question 3

Choose each term from the following list and place it in Column B to match a description in Column A.

Unicode **CSS** **HTTP**

Column A Description	Column B Term
A style sheet language used for describing the presentation of a document written in a markup language like HTML.	
A large character set that attempts to include all possible characters.	
The underlying protocol used by the World Wide Web.	

Question 4

(a) How many megabytes (MB) are in one gigabyte (GB)?

(b) How many bits are there in one byte?

(c) A computer stores data and instructions in binary form.
Explain the reason for using the binary number system in computing.

Question 5

What is the output of the following piece of Python code:

```
1  x = 10
2  y = x + 20
3  print(y)
```

Output:

Question 6

The following line of JavaScript code is intended to run a function called **myJS** when a button is clicked.

Fill in the **two** pieces of missing JavaScript code:

```
<button _____ = " _____">Click me</button>
```

Question 7

The Python programming language has a variety of inbuilt data types.

An example of an **Integer** data type is the number 10.

Give an example of the following datatypes:

(a)	Float:	
(b)	Boolean:	
(c)	List:	

Question 8

Turtle graphics was part of the original Logo programming language developed by Seymour Papert in 1966. The following Python programme makes use of turtle graphics.

```
1 import turtle
2
3 pencil = turtle.Turtle()
4
5 for i in range(4):
6     pencil.forward(50)
7     pencil.right(90)
8
9 turtle.done()
```

(a) Name the shape that will be drawn out.

(b) Using Python or pseudocode, write out the instructions to draw a triangle.

Question 9

Complete the following truth table for the **OR** logic gate:

INPUTS		OUTPUTS
A	B	A OR B
0	0	
0	1	
1	0	
1	1	

Question 10

(a) In JavaScript, which of the following is the correct method for inserting a multi-line comment?
Insert a tick in the correct box.

```
//This is a multi
line comment//
```

☐

```
<!--This is a multi
line comment-->
```

☐

```
/*This is a multi
line comment*/
```

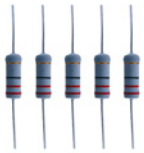
☐

(b) Describe **one** possible feature you could include on a webpage using JavaScript.

Question 11

Using the letters A, B, C and D match each image with its corresponding term in the table below:

A



B

C

D

Term	Image
Resistor	
LED	
Switch	
Embedded system	

Question 12

(a) Bubble sort, simple sort and insertion sort are examples of sorting algorithms. What is the purpose of a sorting algorithm?

(b)

7	3	9	1	4

An ascending bubble sort algorithm is applied to the data set above.
Which **two** numbers will **first** swap position?

Section B	Long Questions	70 marks

Answer all three questions.

Question 13

Jenny is building a desktop computer using various pieces of hardware.

(a) Describe **each** of the following components of a desktop computer – **Central Processing Unit (CPU)**, **Input Devices**, and **Memory**.

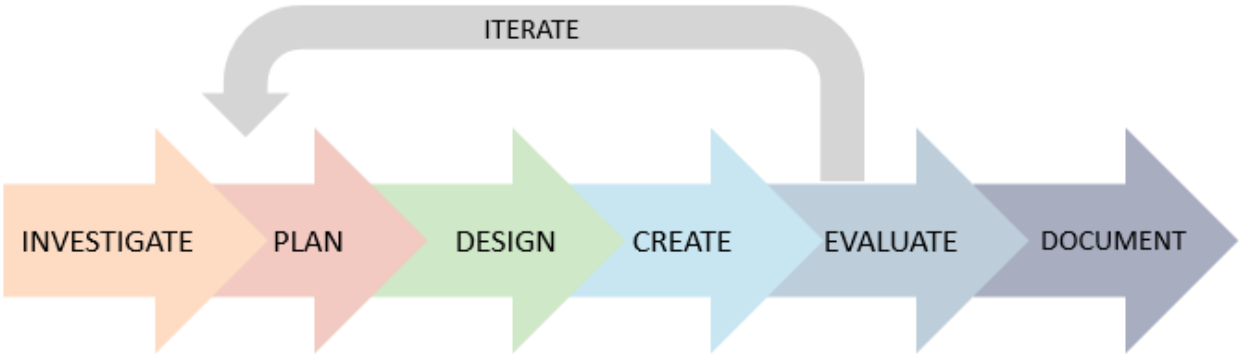
Central Processing Unit (CPU):
Input Devices:
Memory:

(b) List **three** different factors which affect the processing speed of Jenny's computer?

(c) When Jenny finishes building her new desktop computer she installs an operating system. Describe **three** functions of an operating system?

Question 14

It is important to follow a design process when working on computer science projects such as the Applied Learning Tasks (ALTs).



(a) The diagram above outlines the stages involved in a typical design process. Describe what is involved in the first two stages of the process – **(i) Investigate** and **(ii) Plan**.

Investigate:
Plan:

(b) What are the ethical considerations that need to be addressed with respect to any personal data that is collected?

(c) Iteration is an important part of the design process.

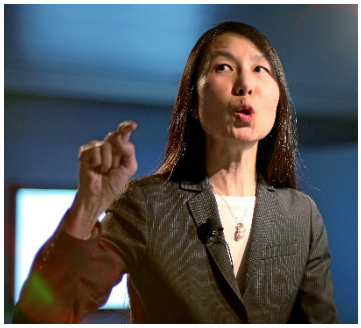
(i) What is an iterative design process?

(ii) Explain the advantages of implementing an iterative design process.

Question 15

Jeannette Marie Wing is Director of the Data Science Institute at Columbia University, where she is also a professor of computer science.

In a 2010 publication, Wing stated that 'algorithms are at the heart of computational thinking and computer science'.



(a) What is an algorithm?

(b) In her 2006 essay, entitled *Computational Thinking*, Jeannette Wing stated that 'computational thinking is using abstraction and decomposition when attacking a large complex task or designing a large complex system.'

Describe what is meant by the terms **(i) abstraction** and **(ii) decomposition.**

Abstraction:

Decomposition:

(c) Read the following excerpt from *Artificial Intelligence in Medicine* and answer the questions that follow.

> One of AI's biggest potential benefits is early detection and prevention of deadly diseases. Imagine having an app that can tell you when something's wrong with your body, even before you visit a doctor or feel unwell. That's exactly what researchers at Stanford University are trying to accomplish, and they've already made a huge breakthrough. In early 2017, a group of scientists announced the development of an AI algorithm that detects skin cancer. They first created a system containing 130,000 images of skin abnormalities and diseases. Based on this large data-set, they trained an algorithm to diagnose skin cancer. The results were then compared to diagnoses made by board-certified dermatologists, showing that the algorithm was 91 percent accurate.
>
> (Adapted from *Artificial Intelligence in Medicine: Current Trends and Future Possibilities*, 2018)

(i) List **two** benefits of artificial intelligence in medicine.

(ii) The algorithm used by the Stanford University researchers is an example of how artificial intelligence can benefit society.

Describe another example of the use of artificial intelligence and list some of the potential benefits to society.

Example:
Benefits:

(iii) In 2015, Stephen Hawking warned that artificial intelligence will be 'either the best, or the worst thing, ever to happen to humanity'.

Outline **two** ways in which artificial intelligence could impact negatively on human life.

1.
2.

Space for extra work.

Indicate clearly the number and part of the question(s) you are answering.

Space for extra work.

Indicate clearly the number and part of the question(s) you are answering.

Acknowledgements

Images
Image on page 6: www.microbit.org
Image on page 14: en.wikipedia.org/wiki/Jeannette_Wing
Image on page 17: www.aruma.com.au/about-us/blog/6-surprising-facts-about-stephen-hawking/

Texts
Document on page 14: Computational Thinking, Jeannette Wing www.cs.cmu.edu/~15110-s13/Wing06-ct.pdf
Document on page 15: Adapted from Artificial Intelligence in Medicine: Current Trends and Future Possibilities, Richard van Hooijdonk cliniciantoday.com/artificial-intelligence-in-medicine-current-trends-and-future-possibilities/

Leaving Certificate – Ordinary Level

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