L.188

2024-L188A,B-1-EL-01/20

Pre-Leaving Certificate Examination, 2024

Computer Science

Sections A & B

Ordinary Level

Time: 1 hour, 30 minutes

130 marks

CANDIDATE DETAILS

DAY and MONTH of BIRTH ✎ | | | / | | | For example, 3rd February is entered as 03/02

NAME ✎

SCHOOL ✎

TEACHER ✎

For Examiner use only	
Section	**Mark**
A	
B	
C	
Total	

2024-L188A,B-1-EL-01/20

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Instructions

There are **three** sections in this examination. Sections 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	Attempt any nine questions All questions carry equal marks	54 marks
Section B	Long Questions	Attempt any two questions All questions carry equal marks	76 marks
Section C	Programming	Answer all question parts	80 marks

Calculators may **not** be used during this section of the examination.

The superintendent will give you a copy of page 78 (Logic gates) of the *Formulae and Tables* booklet on request. You are not allowed to bring your own copy into the examination.

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.

Section A	Short Answer Questions	54 marks

Attempt any **nine** questions.

Question 1

Examine the following piece of Python code and answer the questions below.

```
1  2var1=2
2  var2=3
3  var3=4
4
5  print((var2+var3)**var1)
```

(a) Identify the line containing the mistake in the code.

(b) What is the output of the code when the mistake in this line is corrected?

Question 2

Complete the truth table for the NAND gate, shown below in **Figure 1**.

A	B	out
0	0	
0	1	
1	0	
1	1	

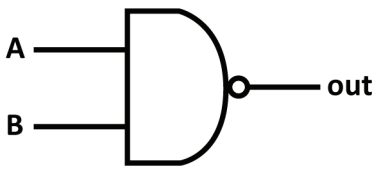

Figure 1

Question 3

Select the correct computer science term from the following list and place it in Column B to match the correct number of bits in Column A in the table below.

Nibble **Kilobyte** **Byte** **Megabit** **Megabyte**

Column A Number of bits	Column B Term
4	
8,000,000	
1,000,000	
8	
1024	

Question 4

Distinguish between a browser and a search engine.

Question 5

CoinLib is an algorithm designed to track the price of a cryptocurrency.

Give **one** advantage and **one** disadvantage of using cryptocurrencies.

Figure 2

Advantage:

Disadvantage:

Question 6

Hexadecimal numbers are very important in facilitating the speed at which a computer system operates.

Using the information provided in **Figure 3**, show that

$$8A_{16} + B7_{16} = 321_{10}$$

Hex	Decimal
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
A	10
B	11

Figure 3

Question 7

(a) Answer the following question by putting a tick (✓) in the relevant box.
Tick one box only.

Which **one** of the following is a volatile data storage medium?

Hard Disk Drive (HDD)	☐
Solid State Drive (SSD)	☐
USB Flash Drive	☐
Random Access Memory (RAM)	☐

(b) Describe **one** difference between primary and secondary storage in computers.

Question 8

Why is pseudocode used in programming?

Question 9

What is the role of a firewall in computer security?

Figure 4

Question 10

There have been many milestones in the history of computer science.

Order the milestones in the list below from earliest to latest, using the letters.
The earliest milestone has been done for you.

Letter	Milestone
A	Development of the first electronic general-purpose computer.
B	Creation of the World Wide Web (WWW).
C	Introduction of the first personal computer.
D	Invention of the transistor.
E	Launch of the first commercially successful graphical user interface (GUI).
F	Invention of the first mouse.

Earliest →					Latest
A					

Question 11

What is the purpose of a loop in programming?

Question 12

Give **two** reasons why many companies decide to build data centres in Ireland.

1.

Figure 5

2.

Section B	Long Questions	76 marks

Answer any **two** questions.

Question 13

(a) A program is designed using the algorithmic flowchart shown in **Figure 6** below.

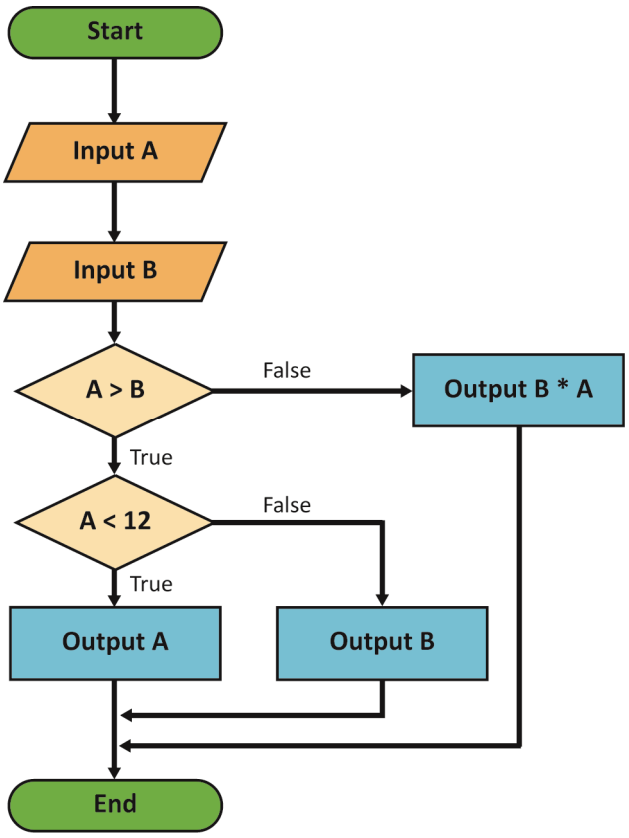

Figure 6

Complete the table below with the outputs obtained when each of the following sets of values are inputted as **A** and **B**.

Input value of A	Input value of B	Output
15	10	
6	5	
2	3	
12	2	

This question continues on the next page.

(b) James plays hurling for St. Enda's GAA club.
He wants to create a program to store the results of each hurling match they play and the names of the point scorers.

James wants individual players from the team to be able to submit this information.

Figure 7

(i) Explain what is meant by the term "abstraction".

(ii) Give **one** example of how abstraction could be used when developing this program.

(iii) Names and scores will be stored in this program.
What data type does each of the above represent?

Names:

Scores:

Question 14

(a) **Figure 8** below shows the most common system architecture used in computers.

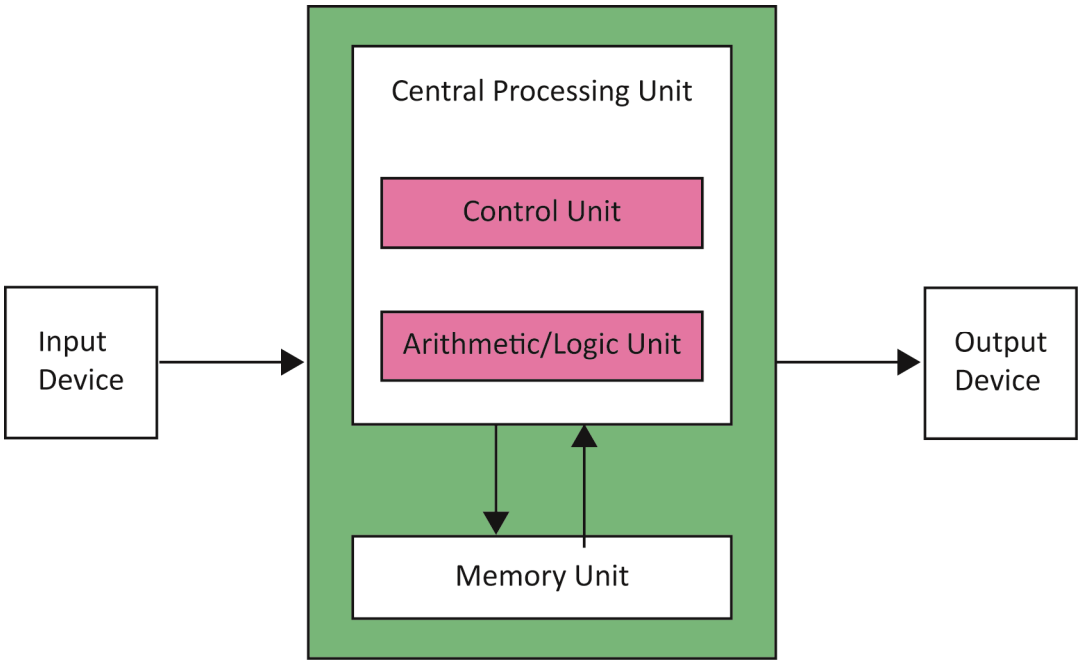

Figure 8

(i) What is the name of this system architecture?

(ii) Give **one** example of an input device and **one** example of an output device that could be connected to this system.

Input device:

Output device:

(iii) State **two** factors that affect the speed of a CPU.

1.
2.

This question continues on the next page.

(b) In the alphabet, the letter G is an example of an open figure and the letter D is an example of a closed figure.

GERRY = €12 AND = €8 JANE = €9 MUSIC = ?

Use computational thinking to determine the cost of the word MUSIC.

(c) **LIST 1 = [1, 5, 8, 4, 8, 2, 11, 3]**
LIST 2 = [1, 5, 7, 9, 11, 21, 33]

(i) Give **one** reason why it is easier to perform binary search on list 2 rather than list 1.

(ii) Identify the type of sorting algorithm shown in **Figure 9** below.

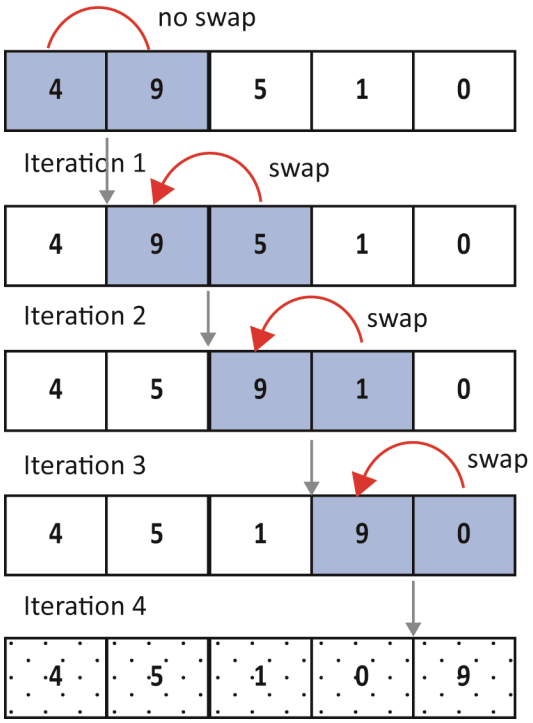

Figure 9

Question 15

(a) Computer X is a software development company situated in Dublin's Silicon Docks. The company has begun hiring personnel to develop a new software product.

(i) Identify **two** roles within a software development team.

1.
2.

(ii) Outline the responsibilities associated with **each** of the roles that you have named in part **(i)**.

Role 1:
Role 2:

(iii) Some of the newly-hired staff have backgrounds in Python. Give a brief description of how Python is used in the IT industry.

This question continues on the next page.

(b) **(i)** Choose the most suitable term from the list below and place it in Column B to match the corresponding definition in Column A. Each term should be used only once.

Beta testing **User-centred design** **White box testing** **Adaptive technology**

Process	**Definition**
The final phase of testing before software is released to the public	
An approach that emphasises the involvement of end-users throughout the design and development process	
Hardware or software solutions that assist individuals with disabilities	
A testing technique that examines the internal structure and implementation details of a software application	

(ii) Computer X wants to make its data centres more environmentally sustainable. Suggest **two** ways in which they can do this.

1.
2.

This question continues on the next page.

(c) Computer X's new product is a social media application that allows users to virtually trade cards and share their location. The target market for this application is users aged between 9 and 12 years.

(i) Discuss the possible ethical issues associated with such a product.

(ii) Suggest a code of behaviour that you think social media companies might need to adopt when developing future technologies.

This question continues on the next page.

Pre-Leaving Certificate Examination, 2024

Computer Science

Section C

Ordinary Level

Time: 1 hour

80 marks

Do not hand this question paper up.
This document will not be examined
and it will not be returned to you.

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Instructions

There is one section in this paper.

Section C	Programming	One question Answer all question parts	80 marks

Answer all parts of the question on your digital device.

Calculators may be used during this section of the examination.

The *Formulae and Tables* booklet cannot be used for this section of the examination.

The superintendent will give you a copy of the *Python Reference Guide*.

Ensure that you save your work regularly.

Save your files using the naming structure described at the beginning of each question part.

If you are unable to get some code to work correctly, you can comment out the code so that you can proceed. The code that has been commented out will be reviewed by the examiner.

Rough work pages are provided at the end of this booklet. Please note that this booklet is not to be handed up and will **not** be reviewed by an examiner.

At the end of the examination it is your responsibility to ensure that you have saved your files onto your external media.

There is no examination material on this page

Section C	Programming	80 marks

Answer all question parts.

Question 16

(a) Open the program called **Question16_A.py** from your device.
The source code is shown and described briefly below.

Before making any changes, you should save your working copy of the file using the format **StudentNameQuestion16_A.py**. For example, you would save the file as **MayMurphyQuestion16_A.py** if your name was May Murphy.

Enter your Name and School in the space provided on **line 2** in your Python file.

The program below is a household budget calculator. The code below calculates how much a household of 2 adults and 2 children would spend on food given a fixed income, e.g. the children's allowance, per month.

```
1  # Question 16(a)
2  # Name and School:
3
4  print("Household budget calculator")
5  num_adult = 2
6  num_child = 2
7
8  food_budget = 300
9  cost_food_adults = 50
10 cost_food_child = 35
11
12 child_allowance = 140
13
14 print("Children's allowance total: €", child_allowance*num_child)
15 print("Total household food cost:
   €",cost_food_adult*num_adults+cost_food_child*num_child)
```

This question continues on the next page.

Make the following changes to the program:

(i) The number of children and adults is hardcoded. Amend the program to allow you to input the number of adults and children in the household.

When the program is run the output may now look as follows:

```
Household budget calculator.  Enter the following
information:
Number of adults in household: 2
Number of children in household: 3
Children's allowance total: €420
Total household food cost: €205
```

(ii) For households with more than 3 children, each child after the third will get an extra €20 in their children's allowance. Amend the program to include this new calculation.

When the program is run and the user enters 1 adult and 4 children, the output may now look as follows:

```
Household budget calculator.  Enter the following
information:
Number of adults in household: 1
Number of children in household: 4
Children's allowance total: €580
Total household food cost: €190
```

(iii) The cost of food increases due to inflation. Amend the program to show what an inflation rate of 10% has on the total household food cost.

When the program is run and the user enters an inflation rate of 0·1, the output may now look as follows:

```
Household budget calculator.  Enter the following
information:
Number of adults in household: 1
Number of children in household: 4
Inflation rate (e.g. 0.05 for 5% inflation): 0.1
Children's allowance total: €580
Total household food cost: €190
Total household food cost with inflation: €209.000000003
```

This question continues on the next page.

(iv) Amend the code in part **(iii)** to round the total household food cost with inflation price to 2 decimal places.

When the program is run, and the user enters an inflation rate of 0.1 the output may now look as follows:

```
Household budget calculator.  Enter the following
information:
Number of adults in household: 1
Number of children in household: 4
Inflation rate (e.g. 0.05 for 5% inflation): 0.1
Children's allowance total: €580
Total household food cost: €190
Total household food cost with inflation: €209.0
```

(v) Amend the program to show the total household food cost (including inflation) as a percentage of the children's allowance total.

When the program is run the output may now look as follows:

```
Household budget calculator.  Enter the following
information:
Number of adults in household: 1
Number of children in household: 4
Inflation rate (e.g. 0.05 for 5% inflation): 0.1
Children's allowance total: €580
Total household food cost: €190
Total household food cost with inflation: €209.0
Percentage spend on food: 36.03%
```

(vi) Amend the program to work out the budget remaining after food spend.
(Hint: Total household food cost with inflation + children's allowance total – food spend.)

When the program is run the output may now look as follows:

```
Household budget calculator.  Enter the following
information:
Number of adults in household: 1
Number of children in household: 4
Inflation rate (e.g. 0.05 for 5% inflation): 0.1
Children's allowance total: €580
Total household food cost: €190
Total household food cost with inflation: €209.0
Percentage spend on food: 36.03%
Budget remaining after food spend: €671.0
```

Save your file using the format **StudentNameQuestion16_A.py**. For example, you would save the file as **MayMurphyQuestion16_A.py** if your name was May Murphy.

This question continues on the next page.

(b) Open the program called **Question16_B.py** from your device. This file only contains two comments on line 1 and 2.

Before making any changes, you should use the format **StudentNameQuestion16_B.py** to save your file. For example, you would save the file as **MayMurphyQuestion16_B.py** if your name was May Murphy.

Enter your Name and School in the space provided on **line 2** in your Python file.

Implement a simple python program that prints off the yearly value of a 10-year investment. The program should be mutable, allowing the user to input different principal investment amounts and interest rates.

An example output is shown below, for a principal investment of €3,000 for 10 years at an interest rate of 8% per annum:

```
Enter the principal investment amount: €3000
Enter the annual interest rate (e.g. 0.05 for 5%
interest): 0.08
Year 1 - Investment value: €3210.0
Year 2 - Investment value: €3434.7
Year 3 - Investment value: €3675.13
Year 4 - Investment value: €3932.39
Year 5 - Investment value: €4207.66
Year 6 - Investment value: €4502.19
Year 7 - Investment value: €4817.34
Year 8 - Investment value: €5154.56
Year 9 - Investment value: €5515.38
Year 10 - Investment value: €5901.45
```

Save your file using the format **StudentNameQuestion16_B.py**. For example, you would save the file as **MayMurphyQuestion16_B.py** if your name was May Murphy.

Space for rough work.

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Pre-Leaving Certificate Examination, 2024 – Ordinary Level

Computer Science – Section C

Time: 1 hour

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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.

Space for extra work

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Space for extra work.

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

Acknowledgements

Images

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Pre-Leaving Certificate Examination, 2024 – Ordinary Level

Computer Science – Sections A & B

Time: 1 hour, 30 minutes

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