



MINISTRY OF EDUCATION, SINGAPORE
 in collaboration with
 CAMBRIDGE ASSESSMENT INTERNATIONAL EDUCATION
 General Certificate of Education Ordinary Level

CANDIDATE
 NAME

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CENTRE
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COMPUTING

7155/01

Paper 1 Written

For examination from 2025

SPECIMEN PAPER

2 hours

Candidates answer on the Question Paper.

No Additional Materials are required.



READ THESE INSTRUCTIONS FIRST

Write your Centre number, index number and name in the spaces at the top of this page.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE ON ANY BARCODES.

Approved calculators are allowed.

Answer **all** questions.

The number of marks is given in brackets [] at the end of each question or part question.

You should show all your working.

The total number of marks for this paper is 80.

This document consists of **19** printed pages and **1** blank page.



Singapore Examinations and Assessment Board



Cambridge Assessment
 International Education

Formulae

Euclidean Distance

$$d = \sqrt{x^2 + y^2}$$

Boolean Arithmetic

Property	AND	OR	XOR
Annulment	$A \cdot 0 = 0$	$A + 1 = 1$	
Identity	$A \cdot 1 = A$	$A + 0 = A$	$A \oplus 0 = A$
Idempotent	$A \cdot A = A$	$A + A = A$	
Self-Inverting			$A \oplus A = 0$
Complement	$A \cdot \bar{A} = 0$	$A + \bar{A} = 1$	$A \oplus \bar{A} = 1$
Commutative	$A \cdot B = B \cdot A$	$A + B = B + A$	$A \oplus B = B \oplus A$
Absorption	$A \cdot (A + B) = A$	$A + (A \cdot B) = A$	

- 1 (a) Identify the logic gate that the following truth table represents.

A	B	X
0	0	0
0	1	1
1	0	1
1	1	0

..... [1]

- (b) Identify the logic gate that the following truth table represents.

A	B	X
0	0	1
0	1	1
1	0	1
1	1	0

..... [1]

- (c) Complete the truth table for the following Boolean statement:

$$X = (A \cdot B) \oplus (\overline{C \cdot A})$$

A	B	C	Working space	X
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[4]

- (d) (i) Expand the given Boolean expression by applying the distributive law.

$$\mathbf{A \cdot (B + C)}$$

..... [1]

- (ii) Tick (✓) **one** box to identify the Boolean equation that shows one of De Morgan's theorems.

$\overline{(A \cdot B)} = \overline{(A + B)}$

$\overline{A} \cdot \overline{B} = \overline{(A \cdot B)}$

$\overline{A} + \overline{B} = \overline{(A \cdot B)}$

$\overline{(A \cdot B)} = \overline{(\overline{A} + \overline{B})}$

[1]

2 A computer has main memory and secondary storage.

(a) Describe the purpose of main memory.

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..... [2]

(b) Describe the purpose of secondary storage.

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..... [2]

(c) HDMI is used to connect a monitor with built-in speakers to the computer.

Give **two** features of HDMI and explain how they make HDMI suitable for this device.

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..... [4]

3 (a) Convert the denary number 123 to an 8-bit binary number and calculate the two's complement of this number. Show all your working.

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..... [2]

(b) Tick (✓) the box that represents the number of mebibytes in a gibibyte.

- 10^3
- 10^6
- 10^9
- 2^{10}
- 2^{20}
- 2^{30}

[1]

(c) Convert the hexadecimal number 2F into denary.

Show all your working.

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..... [2]

4 (a) A student's home has a network that is classified as a local area network (LAN).

Give **one** reason why the network is a LAN.

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..... [1]

(b) Describe the purpose of protocols in network communication.

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..... [2]

(c) Use some of the given terms to complete the description of how data is transmitted as packets in a LAN. Some terms may be used more than once.

- | | | | |
|----------------|----------------|-------------------|--------------|
| address | decrypt | varied | fixed |
| lost | numbers | reassemble | route |

Data is split into packets of size.

Each packet is given a header that includes the destination and the packet number.

The packets are transmitted to the destination via routes.

The destination waits until all packets have arrived and then uses the packet
to the original data.

[5]

5 An automatic repeat request is used to check for errors in the data transmitted in a network.

(a) Explain how an automatic repeat request is used to detect errors.

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..... [3]

(b) Computers have Media Access Control (MAC) addresses and IP addresses.

Tick (✓) **one or more** boxes on each row to identify whether each statement applies to a MAC address, an IPv4 address, or an IPv6 address.

Description	MAC	IPv4	IPv6
The address can be used as a destination when transmitting data over the internet.			
The address is usually displayed in denary.			
The address is 48 bits long.			
The address can be static or dynamic.			

[4]

6 A software development company specialises in systems that include Artificial Intelligence (AI).

The company is creating an AI component for a social networking website. Users can upload photographs to the website. The AI system will identify the people within the photographs and notify their accounts that there is a new photograph of them.

(a) The system uses machine learning.

Explain how this machine learning system will be different from traditional programming.

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..... [3]

(b) The system is trained using millions of photographs.

Give **two** reasons why it is important from the company's perspective that the training data for this system is not biased.

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..... [2]

(c) The company is designing a system to monitor posts on the social networking website to identify any attempts to spread fake news.

Identify **two** penalties that can be imposed using the Protection from Online Falsehoods and Manipulation Act (POFMA) in tackling the spread of fake news.

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..... [2]

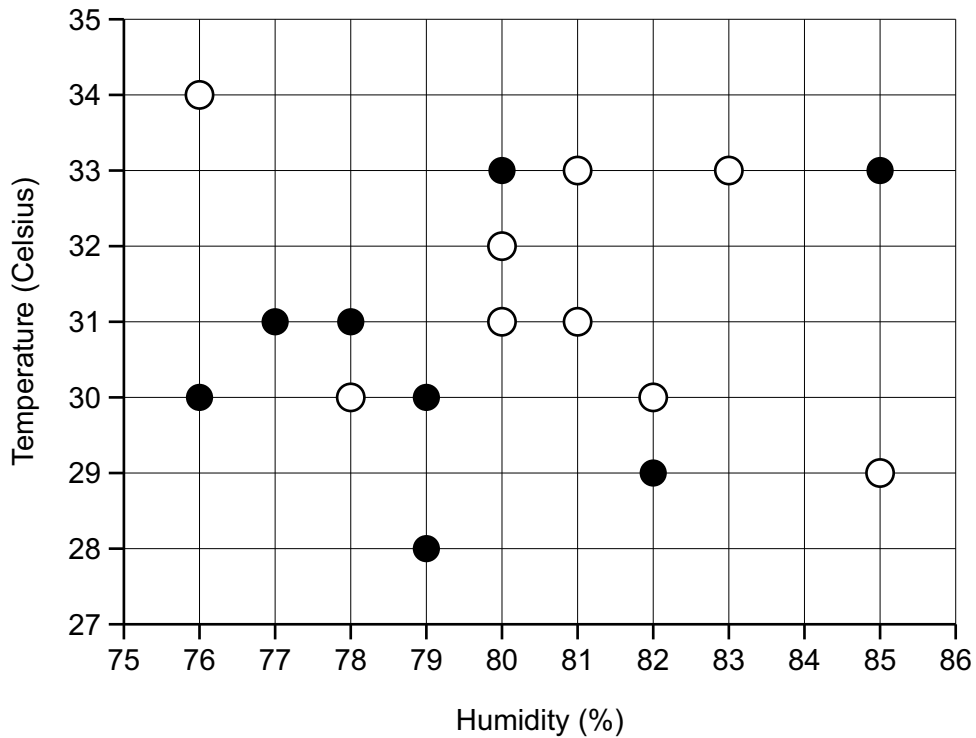
- 7 A company is developing a system to predict the weather in the future.

The following data has been collected by recording the average humidity and average temperature each day for 15 days. The data shows whether it rained or did not rain each day.

The values have been rounded to the nearest integer.

Humidity (%)	Temperature (Celsius)	Rain? (Y/N)
76	30	N
78	31	N
80	32	Y
82	29	N
83	33	Y
79	30	N
78	30	Y
81	33	Y
76	34	Y
77	31	N
79	28	N
80	33	N
81	31	Y
85	29	Y
85	33	N
82	30	Y
80	31	Y

The data is plotted onto this graph:



- A filled in circle identifies that it did **not** rain.
- An unfilled circle identifies that it did rain.

(a) The system uses the nearest neighbour classification to predict whether it will rain. The system uses a random nearest neighbour for its prediction if there are multiple nearest neighbours.

Complete the table to identify whether the system will predict that it will rain, or not rain, for each set of inputs.

Humidity (%)	Temperature (Celsius)	Rain? (Y/N)
77	34	
83	30	
79	29	

[3]

(b) Identify **one** set of inputs where the system would predict equally that it would rain or not rain. The inputs must be integers.

Humidity%

Temperature Celsius

[1]

(c) Identify **two** ways in which the accuracy of this system can be improved.

1

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2

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[2]

8 Study the following program code:

```

01 number_items = int(input("Enter the number of values"))
02 total = 0
03 mult = 1
04 for count in range(number_items):
05     new_num = int(input("Enter a number"))
06     total = total + new_num
07     mult = mult * new_num
08 print(number_items)
09 print(total / number_items)
10 print(mult)

```

(a) The number input for `new_num` must be between 1 and 10 inclusive.

Explain how the program can be adapted to validate the input.

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..... [2]

(b) The program needs to be tested.

Complete the trace table using the following data as input:

3, 1, 3, 5

number_items	total	mult	count	new_num	Output

[4]

9 (a) Draw one or more lines from each description to the relevant threat(s).

Description	Threat
installs software or code without the user's knowledge	pharming
uses fake website for users to enter personal data	phishing
records key presses on a user's keyboard	spyware
displays unwanted advertisements on a user's computer	adware

[4]

(b) Describe how cookies can help a user who is browsing a website.

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..... [2]

10 A spreadsheet stores readings from a temperature sensor. The temperature is read 12 times a day for one week.

	A	B	C	D	E	F	G	H	I
2						Day			
3		Reading number	1	2	3	4	5	6	7
4		1	26.1	27.9	29.2	30.1	27.6	26.8	25.0
5		2	27.0	28.2	29.5	29.8	27.8	27.1	25.3
6		3	27.4	28.7	29.8	29.6	27.9	27.2	25.9
7		4	28.1	29.0	30.1	29.7	28.2	27.4	26.5
8		5	29.0	29.2	30.5	29.9	28.5	27.6	26.8
9		6	30.3	29.5	30.8	30.1	28.6	27.7	27.5
10		7	31.8	30.0	31.3	30.0	28.5	27.4	28.9
11		8	31.3	30.2	31.6	29.8	28.3	27.1	29.6
12		9	30.5	30.1	31.7	29.6	28.1	26.3	29.2
13		10	29.6	29.8	31.5	29.1	27.8	26.0	29.0
14		11	28.6	29.6	31.1	28.5	27.4	25.8	28.8
15		12	28.2	29.4	30.5	28.1	27.0	25.1	28.6
16									
17		Day:	7			Max temperature:	31.8		
18		Reading number:	4			Readings below 26.0:	5		
19		Value:	26.5						

(a) Cell C19 displays the temperature at the reading number in C18, on the day in C17.

Describe the formula that will be used in C19.

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..... [2]

(b) Cell H18 contains a formula to identify how many of the readings in the week were below 26.0

Describe the formula that will be used in H18.

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..... [2]

(c) The formulae in the spreadsheet may use absolute cell references.

Explain the difference between relative and absolute cell referencing.

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..... [2]

(d) The background colour of each cell containing a reading needs to automatically be green if the temperature is below 26.0 and red if it is 26.0 or higher.

Identify the name of the spreadsheet feature that can be used to automatically change the background of a cell based on its content.

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..... [1]

11 A text file `shapes.txt` stores a list of shapes with a comma between each value.

The current contents of `shapes.txt` are:

```
star,sphere,square,triangle
```

A text file `colours.txt` stores a list of colours with a comma between each value.

The current contents of `colours.txt` are:

```
red,yellow,green,blue
```

A program reads the data from each file and creates a dictionary of the values so that each shape has an associated colour. The first value in each file will be joined, for example, star and red.

The data is stored in a global dictionary with the identifier `data_stored`.

(a) State what is meant by a global dictionary.

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..... [2]

