

Surname	Centre Number	Candidate Number
First name(s)		0



GCSE

3500U10-1



MONDAY, 12 MAY 2025 – AFTERNOON

COMPUTER SCIENCE

Unit 1: Understanding Computer Science

1 hour 45 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	12	
2.	7	
3.	9	
4.	16	
5.	6	
6.	8	
7.	6	
8.	10	
9.	6	
10.	8	
11.	12	
Total	100	

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

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

You are reminded of the need for good English and orderly, clear presentation in your answers.

The total number of marks is 100.

Some questions will require you to draw on your knowledge from multiple areas of your course of study.



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Answer **all** questions.

1. (a) Tick (✓) **one** box for each component of a CPU that matches the description. [3]

Description	Control Unit	Arithmetic Logic Unit	RAM	Register
Stores data and instructions that the CPU can quickly access during program execution.	☐	☐	☐	☐
Manages the execution of instructions, directing data flow within the CPU.	☐	☐	☐	☐
Performs mathematical operations for executing the instructions in a computer program.	☐	☐	☐	☐

- (b) (i) State the purpose of the program counter (PC) in a CPU. [1]

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- (ii) Name **two** other registers used by a CPU. [2]

REGISTER 1:

REGISTER 2:

- (c) State **two** differences between RISC and CISC types of processor. [2]

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(d) Describe an embedded system.

[2]

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(e) Describe the environmental impacts of the disposal of hardware components.

[2]

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2. (a) Tick (✓) the statements that are **TRUE** when comparing the functional characteristics of solid-state and magnetic secondary storage technologies. [3]

☐

Solid state storage technologies offer significantly slower access speeds compared to traditional hard disk drives (HDDs).

☐

Solid state storage retains stored data even when power is removed.

☐

With more moving mechanical parts, solid state storage devices are less durable and reliable than traditional HDDs.

☐

Solid state storage technologies generally consume less power than other technologies.

☐

Since there are spinning disks and moving parts, solid state storage devices are less suitable for noise-sensitive applications.

☐

Solid state storage devices are typically smaller and lighter than traditional HDDs, making them ideal for tablets.

- (b) Describe the functional characteristics of optical storage technologies. [4]

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4. The TCP/IP 5-layer model is a conceptual model that characterises the transmission of data on a network.

(a) Tick (✓) **one** box for each layer that matches the description.

[3]

Description	Physical Layer	Network Layer	Transport Layer
This layer is the transceiver that drives the signals on the network.	☐	☐	☐
This layer creates frames that move across the network.	☐	☐	☐
This layer establishes the connection between applications on different hosts.	☐	☐	☐

(b) Complete the name of the following protocols and state their purpose:

(i) H..... T..... T..... P.....

[2]

Purpose:

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(ii) S..... M..... T..... P.....

[2]

Purpose:

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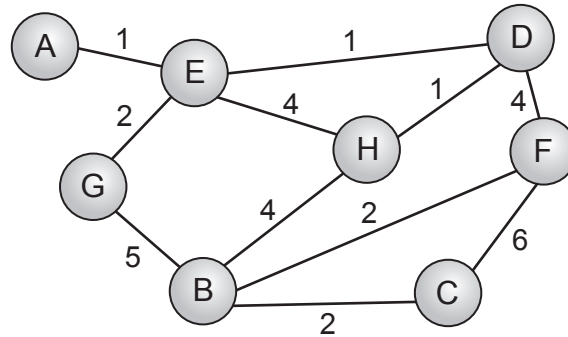
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- [3]

(d) Describe the sequence of DNS operations that resolves a URL into an IP address. [6]



5. The diagram shows the routing cost between each node for data transmitted on a certain network.



Complete the table to indicate the lowest cost route between each origin and destination node. [6]

Origin	Destination	Lowest Cost	Route
E	F		
C	D		
A	B		



6. (a) Showing your workings, determine the largest denary value that can be represented by:

(i) a 6 bit register. [2]

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(ii) a 3 digit hexadecimal number. [2]

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(b) (i) Circle the binary addition that will result in an overflow error in a 4 bit register. [1]

A $1011 + 0001$

B $1011 + 0011$

C $1000 + 1000$

D $0100 + 1000$

(ii) State why this is the case. [1]

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(c) Explain how a computer system divides a number by 4. [2]

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7. A program written using a high-level programming language is intended to calculate and output the perimeter and area of a rectangle. The program contains many errors.

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1   length is real
2   width is real
3   perimeter is ral
4   area is real
5
6   output "Enter the length of the rectangle: "
7   input length
8   output "Enter the width of the rectangle: "
9   input width
10
11  perimter = 2 * (length * width)
12  area = length - width
13
14  output "Perimeter of the rectangle = ", perimeter
15  output "Area of the rectangle = ", ara

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Identify the errors and suggest a suitable change to the code to address each error.

- (a) Syntax error 1

[2]

ERROR:

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CHANGE:

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- Syntax error 2

[2]

ERROR:

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CHANGE:

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(b) Logical error

[2]

ERROR:

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CHANGE:

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8. A Customer Relationship Management (CRM) software platform stores customer details.

The platform is designed to help businesses manage and analyse customer interactions, store contact information, track sales, and facilitate communication with customers.

(a) Create a draft **customer** data structure using the table.

Your design should include at least:

- **three different** data types
- **three different** methods of validation.

[6]

FIELD NAME	DATA TYPE	EXAMPLE DATA	VALIDATION CHECK

(b) Describe the following methods that could be used to protect data security.

(i) Access levels.

[2]

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(ii) Encryption techniques.

[2]

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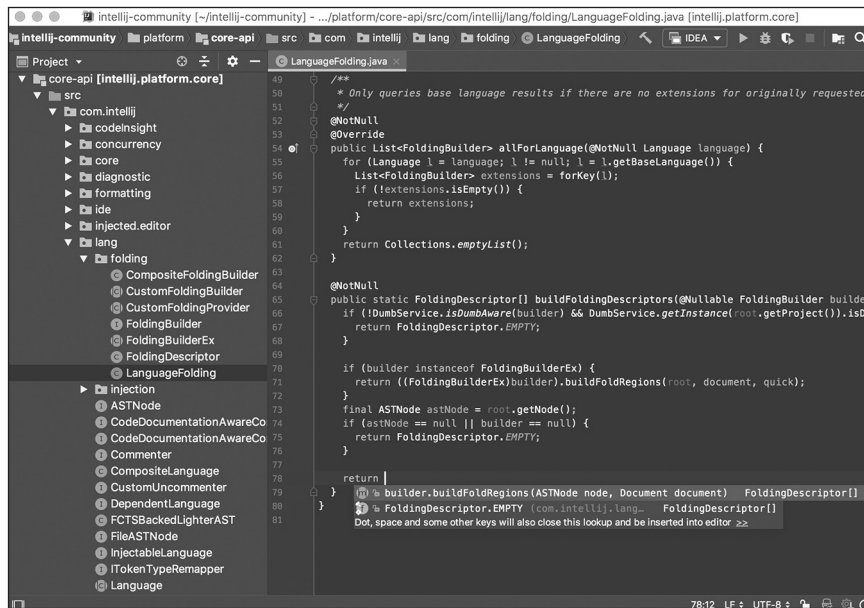
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9. An Integrated Development Environment (IDE) provides programmers with facilities to develop software.



Other than line numbers, identify **three** facilities used in an IDE, and state the use of each. [6]

FACILITY 1

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FACILITY 2

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FACILITY 3

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10. Computer systems all present vulnerabilities that could lead to a cyberattack.

- (a) Complete the following sentences about different forms of cyberattack, using only the terms given below.

VIRUS	ENCRYPTION	SPYWARE	HASH
CACHE	WORM	TROJAN	BRUTE FORCE

- (i) installs malicious software without consent, letting cybercriminals secretly gather sensitive information like keystrokes, browsing habits, and personal data. [1]
- (ii) A attack involves repeatedly guessing passwords until the correct one is found by trying all possible combinations. [1]
- (iii) A is a harmful program that lays dormant in your system until you execute it or take some other required action, such as enabling macros on an infected file. [1]
- (iv) A attack involves deceptive software that disguises itself as legitimate, providing unauthorised access for activities like data theft or remote control. [1]

- (b) Describe the following methods of identifying vulnerabilities through penetration testing.

- (i) Targeted testing. [2]

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(ii) Blind testing.

[2]

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Discuss how these can be compressed.

[illegible]

[illegible]

[illegible]

[illegible]

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