Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2025

Marking Scheme

Computer Science

Ordinary Level

Note to teachers and students on the use of published marking schemes

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

Future Marking Schemes

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

Marking Scheme – Section C

Structure of the marking scheme for Section C (Programming)

Candidate responses are marked according to different scales, depending on the types of response anticipated. Scales labelled B divide candidate responses into four categories (correct response, almost correct response, partially correct response, and response of no substantial merit), and so on. The scales and the marks that they generate are summarised in this table:

Scale Label	A	B	C
No. of categories	3	4	5
10 mark scale	0, 5, 10	0, 3, 7, 10	0, 3, 5, 8, 10

A general descriptor of each point on each scale is given below. More specific directions in relation to interpreting the scales in the context of each question are given in the scheme, where necessary.

Marking scales – level descriptors

A-scales (3 categories)

- response of no substantial merit
- response about half-right
- correct response

B-scales (4 categories)

- response of no substantial merit
- response with some merit
- almost correct response
- correct response

C-scales (5 categories)

- response of no substantial merit
- response with some merit
- response about half-right
- almost correct response
- correct response

Section A Short Answer Questions 54 marks

Answer any **nine** questions.

Question 1

Value Entered For Age	Program Output
21	**A**
-1	**B**
0	**B**
16	**C**
100	**A**
15	**B**

Each correct item 1 mark

Question 2

- **Accessibility: Cloud storage allows you to access your files from anywhere with an internet connection.**
- **Backup and Security: Files stored in the cloud are often automatically backed up and protected with advanced security measures.**
- **File Sharing and Collaboration: Cloud storage makes it easy to share files and collaborate with others.**
- **Automatic Updates: Cloud storage services often come with automatic software updates and maintenance.**
- **Disaster Recovery: In case of a local hardware failure (e.g., a damaged hard drive), cloud storage ensures that your files remain safe and recoverable.**
- **Cost Efficiency: With cloud storage, you only pay for the storage you use, avoiding the upfront cost of purchasing external hard drives or other local storage devices.**
- **Accept any relevant answers given.**

For each reason:
Good description – clear understanding demonstrated 3 marks
Fair description – limited understanding 2 marks

Question 3

(a)

Column A Base Value	Column B Number system
2	**Binary**
10	**Decimal**
16	**Hexadecimal**

Each correct item 1 mark

(b)

- **Simplicity for Hardware: Computers use electrical circuits, which have two states: on (1) and off (0).**
- **Reliability: Using just two states (1 and 0) reduces the chance of errors or misinterpretations.**
- **Efficiency in Processing: The binary system allows computers to perform operations and calculations much faster because it only needs to handle two states.**
- **Compatibility with Logic: Binary aligns with Boolean logic (true/false), which is the foundation of programming and decision-making in computers.**
- **Accept any relevant answers given.**

Good description – clear understanding demonstrated 3 marks
Fair description – limited understanding 2 marks

Question 4

- **Unicode supports a wide range of characters from many languages, whereas ASCII is limited to English characters. This makes Unicode essential for international communication and content.**
- **ASCII can only represent 128 characters, whereas Unicode can represent over a million, allowing for complex symbols, emoji, and special characters used.**
- **Unicode allows for new characters to be added over time, which allows new symbols/ characters to be added in future.**
- **Unicode provides a universal standard for character encoding, making it easier for different systems and platforms to communicate and display text consistently without compatibility issues.**
- **Modern software and web applications are designed to work with Unicode, enabling better integration and support across a wide range of applications.**
- **Accept any relevant answer provided.**

Very good explanation - clear understanding demonstrated 6 marks
Good explanation - clear information, lacking full understanding 4 marks
Fair explanation - limited understanding 2 marks

Question 5

Column A Variable	Column B Python Data Type
`name`	**string**
`age`	**integer**
`student`	**bool**
`exam_marks`	**list**
`average_mark`	**float**

All correct 6 marks
or
Each correct item 1 mark

Question 6

- **Privacy Issues: Devices like the Apple Vision Pro, which use advanced cameras and sensors, could collect large amounts of personal data.**
- **Social Isolation: As these devices become more immersive, there's a risk that people may spend too much time in virtual worlds, leading to social isolation. This could affect face-to-face interactions and weaken real-world relationships.**
- **Addiction and Overuse: The immersive nature of devices like the Apple Vision Pro may lead to addiction or overuse, where individuals spend excessive amounts of time in virtual environments, potentially affecting their health, sleep, and productivity.**
- **Digital Divide: As advanced technology becomes more widespread, there may be concerns about accessibility and inequality. Not everyone can afford or access these high-tech devices, which could widen the gap between those who have access to cutting-edge technology and those who don't.**
- **Impact on Mental Health: Constant exposure to augmented reality (AR) or virtual reality (VR) environments may affect users' perception of reality, potentially leading to mental health issues such as anxiety, disconnection from the real world, or a distorted sense of self.**
- **Accept any other valid answers.**

For each explanation:
Good description – clear understanding demonstrated 3 marks
Fair description – limited understanding 2 marks

Question 7

(a)

Simplified items on the map are considered forms of abstraction such as:

- **Removing unnecessary details such as buildings, trees etc**
- **Simplified roads**
- **Simplified river**
- **Simplified railway line**
- **Green areas**
- **Text labels on street names / road numbers**
- **Symbols for bus stops**
- **Place names for important buildings**
- **Accept any other valid forms of validation given**

Each correct item 1 mark

(b)

Abstraction means simplifying complex systems by focusing only on the important details and hiding the unnecessary ones.

Good description – clear understanding demonstrated	4 marks
Fair description – limited understanding	2 marks

Question 8

- **CPU: The CPU (Central Processing Unit) is often referred to as the "brain" of the computer. It's the main component that performs most of the processing inside a computer**
- **Input Devices: Input devices are components used to enter data, instructions, or signals into a computer system.**

For each:	
Good description – clear understanding demonstrated	3 marks
Fair description – limited understanding	2 marks

Question 9

- **False**
- **False**
- **True**
- **True**
- **True**
- **False**

Each correct item 1 mark

Question 10

0
2
4
6
8
10

Fully correct	6 marks
Almost correct response	4 marks
Any valid response	2 marks

Question 11

Initial state	13	54	4	81	92	26
Swap 1	**4**	**54**	**13**	**81**	**92**	**26**
Swap 2	**4**	**13**	**54**	**81**	**92**	**26**
Swap 3	**4**	**13**	**26**	**81**	**92**	**54**
Swap 4	**4**	**13**	**26**	**54**	**92**	**81**
Swap 5 (Final state)	4	13	26	54	81	92

All rows correct	6 marks
3 rows correct	4 marks
2 rows correct	3 marks
1 row correct	2 marks

Question 12

- **This error has occurred as the code is trying to add a string and an integer which will result in an error. This could be resolved by defining `myNum` as an integer rather than a string or converting the datatype of the `myNum` to an integer.**
- **Any valid response**

Very good explanation - clear understanding demonstrated	6 marks
Good explanation - clear information, lacking full understanding	4 marks
Fair explanation - limited understanding	2 marks

Section B	Long Questions	76 marks

Answer any **two** questions.

Question 13 **38 marks (16, 16, 6)**

(a) **16 marks (6, 6 ,4)**

(i) **6 marks**

- **The development of the Turing Machine**
- **The development of algorithms and software e.g. search/sort algorithms, programming language compilers**
- **The invention of the internet**
- **The development of the personal computer (PC)**
- **The advancement of artificial intelligence (AI)**
- **The creation of the World Wide Web**
- **The development of mobile phones and smartphones**
- **The rise of cloud computing**
- **The expansion of wireless networking (wi-fi and 5g)**
- **The creation of graphical user interfaces (GUIs)**
- **The invention of the microprocessor**
- **The rise of blockchain and cryptocurrencies**
- **Accept other relevant answers**

Each valid answer 2 marks

(ii) **6 marks**

Candidates can select any one of the three developments they have listed above.

Very good explanation - clear understanding demonstrated	6 marks
Fair explanation - limited understanding	3 marks

(iii) **4 (1, 3) marks**

- **Quantum computing: uses qubits, instead of binary, to solve complex problems much faster than classical computers, with applications in cryptography, drug discovery, etc.**
- **Edge Computing: processes data closer to the source (e.g., IoT devices) rather than relying on centralised cloud servers, improving real-time processing for applications like smart cities and autonomous vehicles.**
- **Self-Driving Cars: Cars that use sensors and software to drive themselves without needing a human driver.**
- **Smart Homes: Homes that use technology to control lights, security, and appliances with apps or voice commands.**
- **3D Printing: Printers that can create physical objects layer by layer, like toys, tools, and even houses.**
- **Blockchain: A secure way to store data that makes things like digital money (cryptocurrencies) safer.**
- **Extended Reality (XR): enhances digital interactions by blending the physical and virtual worlds, benefiting gaming, training, and remote collaboration.**
- **Robotics: Robots that can do things humans do, like help in factories, explore space, or assist in hospitals.**
- **Wearable Tech: Devices like smartwatches or fitness trackers that track your health and activity.**
- **Drones: Flying devices used for taking photos, delivering packages, and exploring areas.**
- **Accept any other valid answer**

Valid name	1 mark
Very good explanation - clear understanding demonstrated	3 marks
Fair explanation - limited understanding	2 marks

(b) **16 marks (6, 6, 4)**

(i) **6 (3, 3) marks**

Application Layer: This is to provide the programs and apps that people use to do specific tasks on a computer or device. This includes things like web browsers, email clients, and games. It's what we directly interact with.

Hardware Layer: The purpose of the hardware layer is to provide the physical parts of a computer, like the processor, memory, and storage. These components make it possible for all the software to run and do tasks.

For each:	
Good explanation – clear understanding demonstrated	3 marks
Fair description – limited understanding	2 mark

(ii) **6 (2, 2, 2) marks**

- **Managing Hardware**
- **Managing Resources**
- **Provides a User Interface**
- **Running / Managing Applications**
- **File Management**
- **Memory Management**
- **Security/ Access control**
- **Device Management**
- **Multitasking**
- **Accept other correct functions of the OS**

Each valid answer 2 marks

(iii) **4 (2, 2) marks**

- **Washing Machines – Controls washing cycles, temperature, and spin speeds.**
- **Microwave Ovens – Manages cooking time, power levels, and sensors for even heating.**
- **Smartphones – Operates touchscreens, cameras, and battery management.**
- **Cars – Includes systems for anti-lock brakes (ABS), airbags, and GPS navigation.**
- **Smart TVs – Allows internet connection, streaming, and app functionality.**
- **Fitness Trackers – Monitors heart rate, steps, and sleep patterns.**
- **Home Security Systems – Controls cameras, alarms, and motion sensors for safety.**
- **Digital Cameras – Manages photo capture, storage, and image processing.**
- **Printers – Manages paper feeding, ink usage, and printing tasks.**
- **Thermostats – Controls home heating and cooling based on temperature settings.**
- **Accept any other correct answer.**

For each:
Good description – clear understanding demonstrated 2 marks
Fair description / name only – limited understanding 1 mark

(c) **6 (3,3) marks**

- **Software Developer**
  - **Writing and testing code for applications.**
  - **Collaborating with teams to design software solutions.**
- **Web Developer**
  - **Building and maintaining websites.**
  - **Ensuring websites are optimized for performance and usability.**
- **Data Analyst**
  - **Analysing datasets to extract meaningful insights.**
  - **Creating visualisations and reports to present findings.**
- **Cybersecurity Analyst**
  - **Monitoring systems for security breaches.**
  - **Implementing measures to protect sensitive data.**
- **IT Support Specialist**
  - **Troubleshooting hardware and software issues for users.**
  - **Installing and configuring computer systems.**
- **Network Administrator**
  - **Managing and maintaining computer networks.**
  - **Ensuring network security and performance.**
- **Game Developer**
  - **Designing and programming video games.**
  - **Testing games for bugs and optimizing gameplay.**
- **UX/UI Designer**
  - **Creating wireframes and prototypes for software or websites.**
  - **Conducting user testing to improve product usability.**

For each:	
Valid name	1 mark
Each valid activity	1 mark (max 2)

Question 14 **38 (6, 24, 8) marks**

(a) **6 (5, 1) marks**

(i) **5 marks**

It is to check that the user has entered enough money to buy the selected item

Good explanation – clear understanding demonstrated	5 marks
Fair description – limited understanding	3 marks

(ii) 1 **mark**

float

Correct 1 mark

(b) **24 (4, 9, 3, 8) marks**

(i) **4 marks**

- **Verify that selecting a specific snack (e.g., "A1") correctly identifies the item**
- **Check if the vending machine accepts and processes a specific amount of money (e.g., €1.50) for a €1.50 snack.**
- **Check that the vending machine dispenses the correct change if too much money is entered**
- **Check that the card facility for payment is working**
- **Check that the vending machine doesn't allow an item to be selected if it is sold out**
- **Check that the cancel button returns funds**

Any similar valid response

Good description – clear understanding demonstrated	4 marks
Fair description – limited understanding	2 marks

(ii) **9 (3, 3, 3) marks**

Code Entered	Money Inserted (€)	Expected Result
B1	3	Oreos served, €0.50 change given
A2	1.2	Water served, no change given
C1	<2	Error – not enough money inserted
C2	0.75	Error – not enough money inserted

Each correct item 3 marks

(iii) **3 (1, 2) marks**

- **Functional Testing. Functional testing checks whether the software performs its intended functions correctly. For example, testing that the vending machine dispenses water when the correct amount of money is inserted and the code button is entered.**
- **Non-Functional Testing. Non-functional testing evaluates aspects like performance, usability, or reliability rather than specific behaviours. For example, testing how quickly the vending machine responds after the code is entered or how many users it can serve in an hour.**
- **System Testing. System testing involves evaluating the complete and integrated system to ensure it meets the specified requirements. For example, testing the vending machine as a whole- powering it on, selecting a product, paying, and receiving the item - to confirm everything works together seamlessly.**
- **User Acceptance Testing (UAT). This type of testing is done by the end users to verify the system meets their needs and is ready for real-world use. For example, a customer tests the vending machine in a real-world setting to confirm it operates as expected and is easy to use.**
- **Alpha testing. This the first round of testing done by the developers of the software, usually inside the company. The goal is to find bugs or problems before the software is shared with people outside the company. It helps make sure everything works as expected.**
- **Beta testing. This happens after alpha testing. It's done by a group of real users outside the company who try the software in real-world situations. This helps catch any issues that the developers might have missed.**
- **Any other valid stage of software testing is acceptable**

Valid name 1 mark

Good description – clear understanding demonstrated 2 marks
Fair description – limited understanding 1 mark

(iv) **8 (4, 4) marks**

- **Large Buttons: Easily readable buttons with high-contrast colours and tactile feedback can help users with visual impairments.**
- **Braille: Adding Braille next to each button and on product labels helps blind or low-vision users identify items and make selections.**
- **Audio: A voice-guided system could provide instructions, item names, and prices, which is helpful for visually impaired users.**
- **Height Position: A height-adjustable interface or lower panel allows both standing users and those in wheelchairs to access the machine comfortably.**
- **Touchscreen: A touchscreen interface with an accessibility mode that enlarges text, adds voice assistance, or reduces complexity for users with cognitive disabilities.**
- **Multi-Language Support: Providing instructions in multiple languages accommodates users who may not speak the primary language displayed on the machine.**
- **Any other valid design feature**

For each:

Good description – clear understanding demonstrated	4 marks
Fair description – limited understanding	2 marks

(c) **8 marks**

Pseudocode:

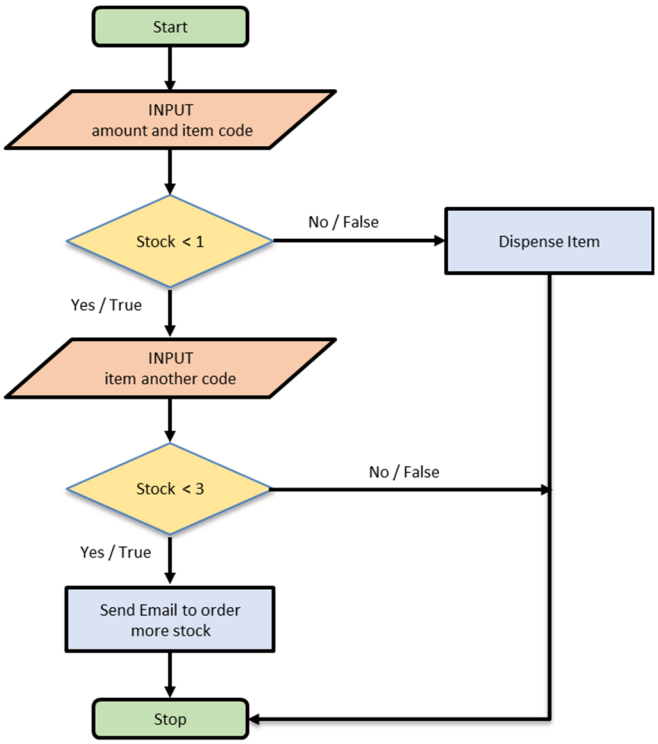
START

User inserts money and enters item code

IF stock is less than 1:
Prompt user to enter another code
IF stock is less than 3:
(Dispense item)
Send Email to head office
ELSE: (stock must be 1 or more)
Dispense item

STOP

Flowchart:



Correctly deals with condition to check if any items available	3 marks *OR*
Reasonable attempt at condition to check if any items available	2 marks
Correctly deals with condition to send email where stock is less than 3	3 marks *OR*
Reasonable attempt at condition to send email where stock is less than 3	2 marks
Good overall coherence of flowchart/pseudocode	2 marks *OR*
Fair overall coherence of flowchart/pseudocode	1 marks

Question 15 **38 (15, 14, 9) marks**

(a) **15 (9, 6) marks**

(i) **9 (3, 3, 3) marks**

Museum Visitors
Requirement: Easy access to detailed information about artwork to enhance their experience as they explore the museum.

Museum Staff
Requirement: A user-friendly way to update and manage the content to keep the app information current and relevant.

Museum Administrators
Requirement: Analytics tracking to monitor app usage and gather visitor insights.

Tour Guides
Requirement: The app should allow syncing or scheduling of guided tour content so it complements live tours without conflicting information.

External Sponsors or Partners (e.g. cultural institutions, art donors)
Requirement: The app should include space to acknowledge sponsors or partners through branded content or dedicated sections.

Project Manager
Requirement: Ensure the app development stays on schedule and within budget, coordinating between stakeholders and managing risks and resources effectively.

Team Leader (e.g., Lead Developer or Design Lead)
Requirement: Oversee technical or design quality, ensuring that the app meets functional, usability, and performance standards set by the project goals.

UX Designer
Requirement: Ensure the app interface is intuitive and user-friendly, using consistent navigation patterns and accessible design principles.

Software Developer
Requirement: Develop the app using a scalable architecture with clean, maintainable code that supports both Android and iOS platforms.

IT Support Staff
Requirement: The app must be designed to integrate smoothly with the museum's existing IT infrastructure and be easy to deploy and troubleshoot.

Any other valid stakeholder and requirement

For each:	
Valid stakeholder	1 mark
Valid requirement	2 marks

(ii) **6 (3, 3) marks**

- **Screen Reader Compatibility: Ensures the content can be read aloud by screen readers, allowing visually impaired users to navigate and consume information effectively.**
- **Text-to-Speech Option: Converts written text into spoken words, enabling users to listen to content instead of reading it.**
- **Adjustable Text Size and Contrast: Allows users to customize text size and colour contrast for better readability and visual comfort.**
- **Alternative Text for Images: Provides descriptive text for images, enabling users with visual impairments to understand visual content through screen readers.**
- **Voice Command Navigation: Lets users control and navigate the application using voice commands for hands-free accessibility.**
- **Multilingual Support: Offers content and navigation in multiple languages to accommodate a diverse range of users.**
- **Simplified Interface with Large Buttons: Features a user-friendly layout with large, easy-to-tap buttons for users with motor impairments or limited dexterity.**
- **Closed Captions for Audio/Video Content: Displays on-screen text for spoken words and sound effects in audio or video, aiding users who are deaf or hard of hearing.**
- **Accept other valid technologies that have been described.**

For each:	
Good description – clear understanding demonstrated	3 marks
Fair description – limited understanding	2 marks

(b) **14 marks (8, 6)**

(i) **8 (2, 2, 2, 2) marks**

Investigate:

- **Identify stakeholders**
- **Gather requirements**
- **Conduct market research**
- **Define project objectives**
- **Review current similar products**
- **Any other valid activity**

Plan:

- **Setout timeline**
- **Setout milestones**
- **Gather requirements**
- **Assign roles & tasks**
- **Create project plan**
- **Any other valid activity**

Evaluate:

- **Quality assurance**
- **Test results**
- **User feedback**
- **Review success criteria**
- **Areas for improvement**
- **Any other valid activity**

Document:

- **Create user guide**
- **Create FAQa**
- **Installation / Setup guide**
- **Troubleshooting support**
- **Project review**
- **Any other valid activity**

For each:
Valid activity 2 marks

(ii) 6 (3, 3) marks

- **Flexibility and adaptability: iterative development allows for continuous feedback and adjustments, making it easier to accommodate changing user requirements and business needs, reducing the risk of delivering an unsuitable product.**
- **Early detection of issues: by testing in small cycles, bugs and design flaws are identified and resolved early, minimising the risk of costly fixes or major failures later in development.**
- **User involvement and satisfaction: regular user feedback ensures the final product meets expectations, improves usability, and increases stakeholder satisfaction by involving them throughout the development process.**
- **Risk management: breaking the project into smaller, manageable stages reduces overall risk, allowing developers to address technical and design challenges before they become major problems.**
- **Improved quality and performance: continuous refinement and testing in each iteration enhance system stability, optimise performance, and lead to a more reliable and user-friendly product.**
- **Encourages collaboration: developers, testers, and stakeholders work closely together throughout the process, fostering transparency, reducing misunderstandings, and ensuring alignment with project goals.**
- **Better cost and time management: prioritising and refining features based on feedback helps avoid wasted effort, prevents unnecessary expenses, and reduces the likelihood of project overruns.**

For each argument:
Good description – clear understanding demonstrated 3 marks
Fair description – limited understanding 2 marks

(c) **9 (5, 4) marks**

(i) **5 marks**

- **Enhanced navigation: users can easily locate exhibits, galleries, toilets, and other amenities within the museum, reducing confusion and improving their overall experience.**
- **Personalised tours: the app can provide tailored suggestions and curated routes based on a user's location and preferences, creating a more engaging and interactive visit.**
- **Contextual information: location tracking can trigger location-based content, such as detailed descriptions, audio guides, or videos, when patrons approach specific exhibits or landmarks.**
- **Crowd management: museums can monitor visitor flow in real time, identifying congested areas and suggesting alternative routes to enhance comfort, security and safety.**
- **Interactive experiences: location-based games, scavenger hunts, or augmented reality features can be integrated to make the museum experience more dynamic and fun.**
- **Accessibility support: the app can guide users with mobility challenges to accessible pathways, lifts, or seating areas based on their location.**
- **Visitor insights: location data provides valuable analytics on visitor behaviour, helping museums understand popular areas, optimise layouts, and plan future exhibits.**
- **Any other valid benefit**

Good description – clear understanding demonstrated	5 marks
Fair description – limited understanding	4 marks

(ii) **4 marks**

- **Privacy and data collection: collecting location data may raise concerns about how users' location information is stored, used, and shared.**
- **Data security: there's a risk of sensitive location data being hacked or leaked, potentially compromising user privacy.**
- **Informed consent (GDPR): users need to be fully informed about what data is being collected, why, and how it will be used, with clear opt-in and opt-out options.**
- **Surveillance concerns: location tracking could be perceived as invasive, leading to discomfort or mistrust among visitors.**
- **Digital divide: visitors without smartphones, location-enabled devices, or the technical skills to use such features may feel excluded or disadvantaged.**
- **Bias in recommendations: algorithms might unintentionally prioritise certain exhibits, reinforcing biases or limiting exposure to less popular but equally important displays.**
- **Dependence on technology: over-reliance on technology could reduce users' sense of discovery or engagement with the physical environment.**
- **Misuse by third parties: If location data is shared with third parties (e.g., advertisers or analytics firms), it could lead to unintended or unethical applications of the data.**
- **Impact on children: if the app is used by children, special care must be taken to protect their location data and ensure parental consent is obtained.**

Good description – clear understanding demonstrated	4 marks
Fair description – limited understanding	3 marks

Section C	Programming	80 marks

Question 16 **80 (60, 20) marks**

(a) **60 (10, 10, 10, 10, 10, 10) marks**

```
1  # Question 16(a)
2  # Examination Number:
3
4  print("Welcome to the Tilers Mate") #(i)
5
6  length = float(input("What length is the room?: "))
7  width = float(input("What width is the room?: ")) # (iii)
8
9  area = length * width
10
11 cost_per_square_metre = 15 #(iv)
12
13 print("You entered a length of:", length, "metres") # (ii)
14 print("You entered a width of:", width, "metres") # (iii)
15 print("The area of the floor is:", area)
16 print("The cost per square metre is:", cost_per_square_metre) # (iv)
17
18 total_cost = cost_per_square_metre * area    # (v)
19 print("The total cost is:", total_cost) # (v)
20
21 # (vi)
22 if total_cost > 1000:
23     print("You are entitled to a 10% discount")
24 elif total_cost >= 100 and total_cost <= 1000:
25     print("You are not entitled to a 10% discount")
26 else:
27     print("Sorry, job is too small")
```

(i) **10 marks (A-10 scale)**

10 marks	**Correct response** Correct implementation using solution above or similar.
5 marks	**Response with some merit** Any other reasonable attempt.

(ii) **10 marks (B-10 scale)**

10 marks	**Correct response** Correct implementation using solution above or similar.
7 marks	**Almost correct response** Correct implementation using solution above or similar but with minor syntax or semantic error.
3 marks	**Response with some merit** Any other reasonable attempt.

(iii) **10 marks (B-10 scale)**

10 marks	**Correct response** Correct implementation using solution above or similar.
7 marks	**Almost correct response** Correct implementation using solution above or similar but with minor syntax or semantic error.
3 marks	**Response with some merit** Any other reasonable attempt.

(iv) **10 marks (C-10 scale)**

10 marks	**Correct response** Correct implementation using solution above or similar.
8 marks	**Almost correct response** Correct implementation using solution above or similar but with minor syntax or semantic error.
5 marks	**Response about half-right** Partially correct implementation using solution above or similar but with significant syntax or semantic error.
3 marks	**Response with some merit** Any other reasonable attempt.

(v) **10 marks (C-10 scale)**

10 marks	**Correct response** Correct implementation using solution above or similar.
8 marks	**Almost correct response** Correct implementation using solution above or similar but with minor syntax or semantic error.
5 marks	**Response about half-right** Partially correct implementation using solution above or similar but with significant syntax or semantic error.
3 marks	**Response with some merit** Any other reasonable attempt.

(vi) **10 marks (C-10 scale)**

10 marks	**Correct response** Correct implementation using solution above or similar.
8 marks	**Almost correct response** Correct implementation using solution above or similar but with minor syntax or semantic error.
5 marks	**Response about half-right** Partially correct implementation using solution above or similar but with significant syntax or semantic error.
3 marks	**Response with some merit** Any other reasonable attempt.

(b) **20 marks**

Possible solution:

```
# Question 16(b)
# Examination Number:

print("Tile Cost Calculator")

# ask user to input cost of tiles and cast as float
cost_per_sq_metre = float(input("How much do the tiles cost per square metre? "))

# ask user to input number of rooms and cast as int
num_rooms = int(input("How many rooms do you want to tile? "))

# initialise total_cost to 0
total_cost = 0.0

# loop through the number of rooms entered
for x in range(num_rooms):
    print("Room ", x+1) # Display the room number

    # prompt user to input room width and cast as float
    width = float(input("What width is room?: "))

    # prompt user to input room length and cast as float
    length = float(input("What length is the room?: "))

    # calculate the room cost
    room_cost = width * length * cost_per_sq_metre

    # add each room cost to total_cost (running total)
    total_cost = total_cost + room_cost

# Display the total cost, rounded to 2 decimal places
print("The total cost is EUR", round(total_cost,2))
```

	High level of achievement **All** of the following implemented correctly and efficiently	**Moderate level of achievement** Reasonable attempt to implement at least two of each of the following	**Low level of achievement** Poor attempt to complete any of the following
Program Inputs (5 marks)	• User correctly prompted to enter each of the following and stored as the correct data type: ▪ cost of tiles (float) ▪ number of rooms (int) ▪ length (float) ▪ width (float) • Variable initialisation and use of assignment statements (5 marks)	• User correctly prompted to enter each of the following and stored as the correct data type: ▪ cost of tiles (float) ▪ number of rooms (int) ▪ length (float) ▪ width (float) • Variable initialisation and use of assignment statements (4marks)	• User correctly prompted to enter each of the following and stored as the correct data type: ▪ cost of tiles (float) ▪ number of rooms (int) ▪ length (float) ▪ width (float) • Variable initialisation and use of assignment statements (3 marks)
Program Logic (Processing) (5 marks)	• Program loops through correct number of rooms • Program calculates the individual room cost • Program correctly increments the total cost in a variable • Total cost rounded to 2 decimal places (5 marks)	• Program loops through correct number of rooms • Program calculates the individual room cost • Program correctly increments the total cost in a variable • Total cost rounded to 2 decimal places (4 marks)	• Program loops through correct number of rooms • Program calculates the individual room cost • Program correctly increments the total cost in a variable • Total cost rounded to 2 decimal places (3 marks)
Program Outputs (5 marks)	• Program outputs "Tile Cost Calculator" at the start • Program outputs the room number correctly for each room • Program outputs the total amount in the correct format (5 marks)	• Program outputs "Tile Cost Calculator" at the start • Program outputs the room number correctly for each room • Program outputs the total amount in the correct format (4 marks)	• Program outputs "Tile Cost Calculator" at the start • Program outputs the room number correctly for each room • Program outputs the total amount in the correct format (3 marks)
Programming Standards (5 marks)	• Program executes correctly with no syntax or runtime errors • Program meets requirements • Program design is well explained with comments • Meaningful variable/function names (5 marks)	• Program executes correctly with no syntax or runtime errors • Program meets requirements • Program design is well explained with comments • Meaningful variable/function names (4 marks)	• Program executes correctly with no syntax or runtime errors • Program meets requirements • Program design is well explained with comments • Meaningful variable/function names (3 marks)

Coursework (90 marks in total)	
The report	***Marks***
• Quality of report website structure and layout. • Evidence of adherence to the principles of good user interface design when creating the website. • Adherence to the word count (penalties may apply).	**5**
1. Meeting the brief	
• Meeting the basic requirements of the brief. • Meeting the advanced requirements of the brief.	**27**
2. Investigation	
• Research into existing interactive information systems. • Research into the chosen area or topic that will be analysed through the information system.	**10**
3. Plan and design	
• A clear, detailed description of the project and how it will meet the requirements. • A description of the technologies you will use and their role within your project. • A flowchart diagram to show how the project will work.	**15**
4. Create	
• A progress log covering the key milestones of the development process. • Evidence of testing applied during development. • Explain a problem that was encountered in the development of the project and how it was overcome. • An explanation of an algorithm that you designed that has been used for the analytics of your project.	**25**
5. Evaluation	
• An evaluation of your project based on the requirements set out in the brief. • Suggest how you would further improve/iterate this project.	**8**
References and summary word count	
• You must also include references and/or a bibliography. • Include a summary of the word count of the report, including the total word count.	**0**

Higher grade	Ordinary grade	Reference Mark	Higher Mark	Ordinary Mark
1		81 – 90	81 – 90	90
2		72 – 80	72 – 80	90
3		63 – 71	63 – 71	90
4		54 – 62	54 – 62	90
5	1	45 – 53	45 – 53	81 – 90
6	2	36 – 44	36 – 44	72 – 80
7	3	27 – 35	27 – 35	63 – 71
8	4	23 – 26	23 – 26	54 – 62
	5	18 – 22	18 – 22	45 – 53
	6	14 – 17	14 – 17	36 – 44
	7	9 – 13	9 – 13	27 – 35
	8	0 – 8	0 – 8	0 - 26

COURSEWORK – conversion from reference mark to Ordinary-level mark

For Ordinary level candidates, the final mark is found from the reference mark as follows:

- If the reference mark is 54 or more the final mark is 90.
- If the reference mark is at least 27 but less than 54, then add 36 to the reference mark to get the final mark.
- If the reference is at least 1 but less than 27, then double the reference mark and add 9 to get the final mark.
- If the reference mark is 0 the final mark is 0

Reference Mark	Conversion
54 or more	Award 90 marks
27 – 53	Add 36 marks
1 - 26	Multiply the reference mark by 2 and add 9 marks
0	0