2025 HSC Software Engineering Familiarisation Questions Marking Guidelines

Question 1

Criteria	Marks
• Correctly orders the steps	1

Answer:

≡ Determining specifications

≡ Design

≡ Development

≡ Testing and debugging

≡ Installation

≡ Maintenance

Question 2

Criteria	Marks
• Correctly selects all options	3
• Correctly selects at least FIVE options	2
• Correctly selects at least TWO options	1

Answer:

SELECT ProductName ProductPrice
FROM Products
WHERE ProductPrice >= 22.00
ORDER BY ProductName ASC

Question 3

Criteria	Marks
• Correctly matches the features to the relevant protocols	2
• Correctly matches at least TWO features to the relevant protocols	1

Answer:

	POP3	SMTP	IMAP
Commonly used for sending email	☐	☑	☐
Commonly used for receiving email	☑	☐	☑
Allows email to synchronise across devices	☐	☐	☑
Server deletes messages when they are downloaded and opened	☑	☐	☐

Question 4

Criteria	Marks
• Correctly identifies all the items that are true about the structure chart	2
• Identifies true/false correctly for at least FIVE checkboxes	1

Sample answer:

- [x] **Booking made** is a flag.
- [x] **Login** is the first module called.
- [ ] **Booking ID** may only be true or false.
- [x] **Display new bookings** may not be executed.
- [ ] Members do not need to log in to browse hotels.
- [x] A choice is continually offered between **Browse hotels** and **Book**.
- [ ] **Login** calls **Enter member details and validate** when Member ID is set to true.

Question 5

Criteria	Marks
• Provides a set of test data within the table that will thoroughly test the algorithm • Includes expected outputs and reasons for inclusion	3
• Provides a set of test data that tests most boundaries and/or paths • Includes most of the expected outputs and reasons for inclusion	2
• Provides some relevant information	1

Sample answer:

Test data (Mark)	Expected output (Grade)	Reason for inclusion
85	H	Testing greater than 80
80	H	Testing boundary value (80)
60	P	Testing between 50 and 80
50	P	Testing boundary value (50)
45	N	Testing ‘otherwise’ (below 50)

Question 6

Criteria	Marks
• Provides a thorough discussion of the use of *sandboxing* in the operating system	3
• Shows some understanding of the advantages and/or disadvantages of the use of *sandboxing*	2
• Identifies a feature of *sandboxing*	1

Sample answer:

Sandboxing allows each application to be isolated so that it cannot pose a security risk by accessing system resources or other applications. However, it requires more resources as each application requires its own container. It may also be less convenient for users to access resources such as the device's camera or files as the sandbox will either prevent access or make it more difficult.

Answers could include:

Sandboxing limits the resource use of different processes (eg applications) running on the device, ensuring that if a process contains bad code, such as a memory leak, it does not consume all the resources of the operating system – potentially starving other processes, or the operating system itself, of resources.

Question 7 (a)

Criteria	Marks
• Correctly determines the outcomes	1

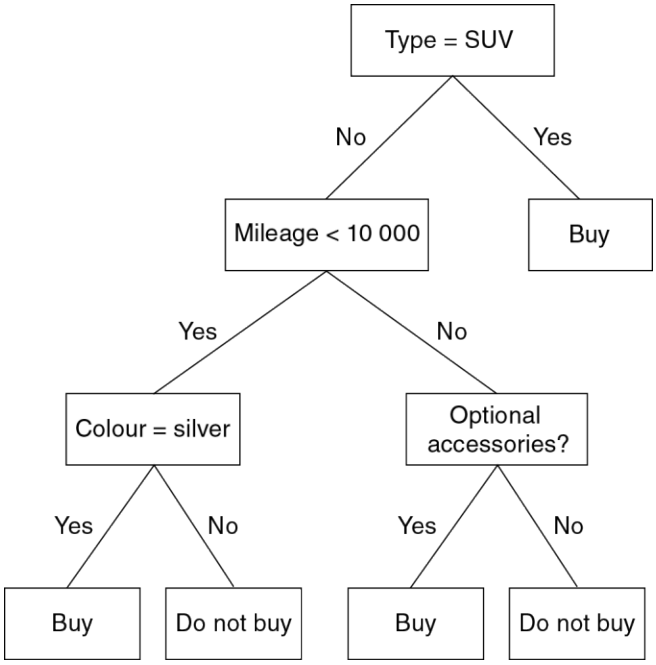
Answer:

	Buy	Not Buy
Mileage = 8000 km, Colour = Silver, Optional Accessories = No	⊙	○
Mileage = 10 000 km, Colour = Red, Optional Accessories = Yes	⊙	○
Type = SUV, Colour = Red, Optional Accessories = No	⊙	○

Question 7 (b)

Criteria	Marks
• Draws a correctly simplified decision tree	3
• Draws a simplified decision tree with most of the logic	2
• Shows some understanding of the requirement	1

Sample answer:



Question 8

Criteria	Marks
• Correctly modifies the algorithm to achieve its intended purpose	3
• Corrects some mistakes in the algorithm	2
• Shows some understanding of the problem	1

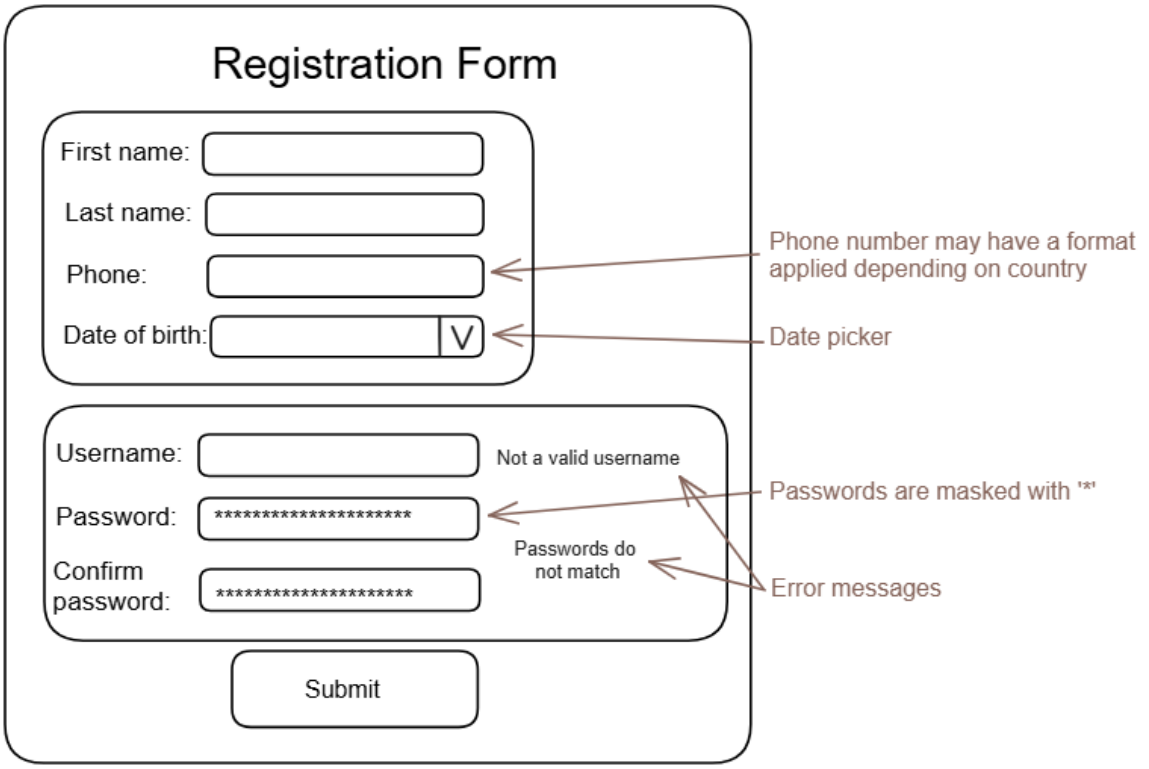
Sample answer:

```
BEGIN Search (SearchItem)
        Set LastIndex to the number of elements in ItemArray
        Found = FALSE
        Index = 1
        WHILE Found = FALSE AND Index < LastIndex + 1
                IF ItemArray(Index) = SearchItem THEN
                        Found = TRUE
                ENDIF
                Index = Index + 1
        ENDWHILE
        IF Found = TRUE THEN
                Display 'Position', Index – 1
        ELSE
                Display 'Not found'
        ENDIF
END Search
```

Question 9 (a)

Criteria	Marks
• Provides a user interface suitable for users to register an account, with features labelled	3
• Designs a user interface with some relevant features	2
• Shows some understanding of the problem	1

Sample answer:



Question 9 (b)

Criteria	Marks
• Provides a correct function in Python that checks whether a username satisfies the rules	3
• Provides a partially correct function in Python that attempts to check whether a username satisfies the rules	2
• Shows some understanding of the problem and Python programming	1

Sample answer:

```
def validateUsername(username):

    # Length check
    if len(username) > 8:
        return False

    # Alpha character only check
    elif username.isalpha() == False:
        return False

    # < character check
    elif "<" in username:
        return False

    # If we reach here then the username meets the requirements
    return True
```

Answers may include print statements to test the code
eg `print(validateUsername("test"))`

Question 10

Criteria	Marks
• Explains how the load time of the web page can be improved	4
• Outlines how some issues affecting the load time can be resolved	3
• Identifies issues affecting the load time OR • Outlines how to resolve ONE issue affecting the load time	2
• Provides some relevant information	1

Sample answer:

The images can be resized to 640 x 480 beforehand so that the webpage does not need to load the large 4000 x 3000 images. The multiple CSS style sheets could be converted into a single .css file, reducing the number of HTTP requests the browser needs to send. If the "image-gallery.js" JavaScript file at the top of the source code loads slowly, it can be moved to the bottom just above </body> so that it will not block the rest of the page from loading.

Answers could include:

If the "image-gallery.js" JavaScript file at the top of the source code loads slowly, the "async" property can be added to the <script> tag so that it can load in parallel with the rest of the page.

Question 11 (a)

Criteria	Marks
• Identifies the correct answer	1

Answer:

Cross site scripting

Question 11 (b)

Criteria	Marks
• Explains ONE way to minimise the vulnerability	2
• Provides some relevant information	1

Sample answer:

The website could check and change user input so that markup and script become plain text. This will still allow the page to display the information but will prevent it from executing script code.

Note:
For example, special characters such as < > and ( ) would be encoded to their HTML equivalent (%3C %3E and %28 %29).

Question 12 (a)

Criteria	Marks
• Provides the correct output for the SQL query, including the correct ordering of the rows	2
• Provides some relevant information	1

Sample answer:

ProductName	ProductPrice
Discovery 1 & 2 (DVD)	26.98
The Plant (DVD)	28.00

Question 12 (b)

Criteria	Marks
• Provides a correct SQL query	3
• Provides a substantially correct SQL query with at least TWO of the following features: – renaming the columns – selecting the three tables – joining the tables	2
• Shows some understanding of renaming the columns or joining the tables	1

Sample answer:

```
SELECT Customers.CustName as 'Customer', Products.ProductName as 'Product',
Orders.OrderQuantity as 'Quantity'
FROM Products, Customers, Orders
WHERE Orders.ProductID = Products.ProductID
AND Orders.CustID = Customers.CustID
ORDER BY Orders.OrderID ASC
```

Question 13

Criteria	Marks
• Provides a substantially correct solution including all of the following features: – looping correctly – referring to contents of the data structure correctly – displaying the player's scores and corresponding points as shown – calculating the total points – taking bonus points into account – handling the final round correctly	6
• Provides a solution that shows understanding of most of the above features	5
• Provides a solution that shows understanding of some features	3–4
• Provides a solution that shows understanding of one feature	2
• Shows some understanding of the requirement	1

Sample answer:

```
# Input code
scores = [3,5,5,2,1,4,0,1,4,5]

# Display the scores and points

# Header row print("Round\tScore\tPoints")
totalPoints = 0

# Calculate the points and print
for i in range(len(scores)):
     roundNumber = i + 1
     score = scores[i]
     points = score

     # Check if any bonuses apply and NOT the final round
     if points == 5 and i != 9:
          # Add the points from the next round as bonus points
          points += scores[i + 1]

     # Check if the final round bonus applies
     if points == 5 and i == 9:
          # Give the bonus points of 10
          points = 10

     # Add to the total points tally
     totalPoints += points

     # Print the results
     print(str(roundNumber) + "\t" + str(score) + "\t" + str(points))

print("\nTOTAL POINTS: " + str(totalPoints))
```

Question 14

Criteria	Marks
• Makes an informed judgement about the use of artificial intelligence in our society, demonstrating comprehensive understanding of its use and effects • Supports answer with information from the slideshow	8
• Shows a broad understanding of the use of artificial intelligence and its advantages and disadvantages • Includes some information from the slideshow	6–7
• Shows a sound understanding of the use of artificial intelligence • Outlines some of its advantages and/or disadvantages	4–5
• Shows some understanding of artificial intelligence	2–3
• Provides some relevant information	1

Sample answer:

- explore models of training Machine Learning (ML), including:
  - supervised learning
  - unsupervised learning
  - semi-supervised learning
  - reinforcement learning.
- investigate common applications of key Machine Learning (ML) algorithms, including:
  - data analysis and forecasting
  - virtual personal assistants
  - image recognition.
- assess the impact of automation on the individual, society and the environment, including:
  - safety of workers
  - people with disability
  - the nature and skills required for employment
  - production efficiency, waste and the environment
  - the economy and distribution of wealth.
- explore by implementation how patterns in human behaviour influence ML and AI software development, including:
  - psychological responses
  - patterns related to acute stress response
  - cultural protocols
  - belief systems.
- investigate the effect of human and data set source bias in the development of ML and AI solutions
- apply security features incorporated into software including data protection, security, privacy and regulatory compliance
- use and explain the ‘privacy by design’ approach in the development of software solutions, including:
  - proactive not reactive
  - embed privacy into design
  - respect for user privacy.

- evaluate the social, ethical, and legal issues and ramifications that affect people and enterprises resulting from the development and implementation of software, including:
  - employment
  - privacy
  - digital disruption.
- data mining
- streaming service management.

HSC Software Engineering Familiarisation Questions Mapping Grid

Question	Marks	Content	Syllabus outcomes	Targeted performance bands
1	1	Secure Software Architecture – development steps	SE-12-1	2–3
2	3	Programming for the Web – SQL	SE-12-6	2–4
3	2	Programming for the Web – mail protocols	SE-12-4	3–4
4	2	Software Engineering Project – structure chart	SE-12-6	3–5
5	3	Software Engineering Project – test data	SE-12-7	2–5
6	3	Secure Software Architecture – sandboxing	SE-12-7	3–5
7 (a)	1	Software Automation – decision tree	SE-12-6	4–5
7 (b)	3	Software Automation – decision tree	SE-12-6	3–5
8	3	Software Engineering Project – algorithm	SE-12-7	3–5
9 (a)	3	Software Project – prototype and user interface (UI) design	SE-12-06	2-4
9 (b)	3	Secure Software Architecture – programming in Python	SE-12-2	3–5
10	4	Programming for the Web – load time	SE-12-8	3–6
11 (a)	1	Secure Software Architecture – XSS	SE-12-7	4–5
11 (b)	2	Secure Software Architecture – XSS	SE-12-7	4–6
12 (a)	2	Programming for the Web – SQL	SE-12-7	2–4
12 (b)	3	Programming for the Web – SQL	SE-12-7	4–6
13	6	Software Engineering Project – programming in Python	SE-12-2 SE-12-7	2–6
14	8	Software Automation – AI and ML Secure Software Architecture – privacy	SE-12-3 SE-12-5	2–6