



UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF INFORMATION TECHNOLOGY

FINAL EXAMINATION
MARCH 2026 SEMESTER

COURSE CODE : IVB 20304
COURSE NAME : PROGRAMMING 3
PROGRAMME NAME : BACHELOR OF GAME DEVELOPMENT TECHNOLOGY
WITH HONOURS
DATE : 23 JUNE 2026
TIME : 9.00 am – 11.00 am
DURATION : 2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please CAREFULLY read the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of TWO (2) sections; Section A and Section B.
4. Answer ALL questions in Section A and B.
5. Please write your answers on the OMR FORM and ANSWER BOOKLET PROVIDED.
6. Answer all questions in English language ONLY.

THERE ARE 6 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

Question 1

You are developing a 2D farming game called *Harvest Friends*. The player can plant seeds, harvest crops, store harvested items inside a backpack and sell crops for different prices. The game contains different crop types such as Carrot, Corn, and Pumpkin, where each crop behaves differently during gameplay. Based on the scenario, answer the following OOP and data structure questions:

- a) Select **TWO (2)** suitable game objects from the scenario and explain how their properties and behaviours support the farming gameplay system. For each object, state **ONE (1)** property and **ONE (1)** behaviour. (4 marks)
- b) Propose **ONE (1)** suitable class design for handling crop objects in the game system. Then provide **TWO (2)** examples of crop objects created from the class. (4 marks)
- c) The function `HarvestCrop()` hides processes such as growth checking, animation, score updating before displaying the final harvesting result. Explain how this implementation improves the farming interaction system and identify the OOP concept applied. (2 marks)
- d) Explain how inheritance can help developers manage different crop types such as Carrot, Corn and Pumpkin more efficiently? (3 marks)
- e) All crops use the same method named `ShowDetails()` but each crop displays different information. Explain how this implementation improves flexibility in the crop system and identify the OOP concept applied. (3 marks)
- f) The game stores the player's earning for 10 in-game days. Write suitable code to :
 - i. Declare an array to store the earnings.
 - ii. Access the earning value for Day 5.
 (3 marks)
- g) The farming system needs to store Crop name together with Selling price. Suggest the most suitable collection and explain how it helps manage crop data efficiently. (3 marks)
- h) The player's Money attribute should not be modified directly from outside the class. Explain how encapsulation can help protect the game economy system while still allowing safe updates to the player's money value. (3 marks)

[Total Mark : 25 marks]

Question 2

A library management system stores student borrowing records in a database table. The current table contains repeated book information and may cause problems in managing the system data efficiently. Study the table below and answer the following questions.

BorrowID	Student ID	Student Name	Phone	BookTitle1	Author1	BookTitle2	Author2	BookTitle3	Author3	TotalBooks
B001	S1001	Sara Malik	012-3456789	DB Concept	Alan John	SQL Basics	Andrew Tan	NULL	NULL	2
B002	S1002	Amir Zaki	019-8765432	Programming	Lee Siew Yuen	Basic to AI	Rizal Fitri	Web Design	Zackary Loo	3
B003	S1006	Aisha Tan	012-3456789	Calculus	Marcus Ben	Discrete Math	Kimberley David	Statistics	A.S. See	3
B004	S1003	Nur Iman	017-1111222	OOP	Tan Bee Sian	Data Structures	Soo Winci	Python	Adam Birkely	3
B005	S1004	John Woo	018-3333444	Mobile App Development	Ashwini Kolam	NULL	NULL	NULL	NULL	1
B006	S1005	Emily Chan	013-2222333	IOT Technology	Murugan Soh	OOP	Tan Bee Sian	NULL	NULL	2
B007	S1006	Aisha Tan	012-3456789	Calculus	Marcus Ben	NULL	NULL	NULL	NULL	1

- Explain **TWO (2)** database design problems that may happen if the current table structure is used.
(2 marks)
- Convert the table into First Normal Form (1NF) to improve the organization of borrowing records.
(5 marks)
- Convert the 1NF table into Second Normal Form (2NF) to reduce partial dependency in the database system.
(10 marks)
- Convert the 2NF tables into Third Normal Form (3NF) to improve data consistency and reduce redundancy in the library system.
(8 marks)

[Total marks : 25]

Question 3

GlobalStay Hotels is a hotel chain with several branches located across major cities in Malaysia, including Kuala Lumpur, Penang, Johor Bahru, and Kota Kinabalu. Each hotel has a unique HotelID, HotelName, City, StarRating, and ContactNumber. Every hotel manages many rooms, and each room is recorded with a RoomID, RoomNumber, RoomType (Standard, Deluxe, Suite), Capacity, PricePerNight, and RoomStatus (Available, Occupied, UnderMaintenance). A room belongs to one hotel only. Before customers can make a reservation, they must register in the system with their CustomerID, FullName, Phone, Email, and IdentificationNumber (IC or passport).

When a customer makes a reservation, the system creates a booking record that includes a BookingID, CheckInDate, CheckOutDate, NumberOfGuests, TotalAmount, BookingStatus (Pending, Confirmed, CheckedIn, CheckedOut, Cancelled), PaymentMethod, and the RoomID and CustomerID involved. A customer may have many bookings over time, while a room can only be booked by one customer at a time for a given period. Bookings may also include optional hotel services such as breakfast packages, airport shuttle, or late checkout. Since a booking can include multiple services and a service can be selected by many bookings, these services must be linked through a suitable relationship. The hotel chain wants the system to ensure accurate booking history, prevent double-booking, track service usage, and maintain reliable and consistent data across all branches.

Draw a complete Entity-Relationship (ER) diagram based on the scenario above. Your ER diagram must include:

- a) Design all suitable entities together with their relevant attributes required for the hotel reservation system. (10 marks)
- b) Specify and underline the primary key for EACH entity. (6 marks)
- c) Design suitable relationships between the entities to support the booking management system. (4 marks)
- d) Determine the correct cardinality for EACH relationship (1:1, 1:N, or M:N) and explain how the relationship supports the hotel reservation process. (5 marks)

[Total marks : 25]

Question 4

An Online Course Registration System uses a relational database to manage course and student registration information. Based on the tables below, write suitable SQL queries to support the database operations required by the system.

Table : Course

Column Name	Data Type
CourseID	INT (Primary Key)
CourseName	VARCHAR (80)
Credits	INT

Table : Registration

Column Name	Data Type
RegID	INT (Primary Key)
CourseID	INT (Foreign Key to Course)
StudentName	VARCHAR (100)
RegDate	DATE

- a) Write an SQL statement to create a new table named Lecturer with the required fields and primary key.
(4 marks)
- b) Write an SQL statement to insert a new lecturer record into the Lecture table.
(3 marks)
- c) Write an SQL statement to update the lecturer specialization for LecturerID = 5878 to "AI Systems".
(2 marks)
- d) Write an SQL query to retrieve the CourseName and Credits from the Course table.
(3 marks)
- e) Write an SQL query to retrieve all registration records made after 1 Jan 2024.
(3 marks)
- f) Write an SQL query to retrieve all course names with Credits = 3.
(3 marks)

- g) Write an SQL query to calculate the total number of registrations in the system.
(4 marks)
- h) Write an SQL statement to remove the course record with CourseID = 105.
(3 marks)

[Total marks : 25]

END OF SECTION

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