JURONG PIONEER JUNIOR COLLEGE

JC2 Test 2 2025

COMPUTING   **9569**

Higher 2   **14 April 2025**

Hybrid (Lab-based and written)

1 hour 15 minutes

READ THESE INSTRUCTIONS FIRST

Answer **all** the questions.

Section A – Lab-based

Section B – Written

All tasks must be done in the computer laboratory. You are not allowed to bring in or take out any pieces of work or materials on paper or electronic media or in any other form.

Approved calculators are allowed.

Save each task as it is completed.

The use of built-in functions, where appropriate, is allowed for this paper unless stated otherwise.

Note that **3** marks out of 40 may be awarded for the use of common coding standards for programming style.

The number of marks is given in brackets [ ] at the end of each task.

The total number of marks for this paper is **40**.

This document consists of **4** printed pages.

Section A – Lab-based

Instructions to candidates:

Your program code and output should be saved in a single **.ipynb** file using Jupyter Notebook. For example, your program code and output for Task 1 should be saved as:

```
TASK1_<your class>_<your name>.ipynb.
```

For each of the sub-tasks, add a comment statement at the beginning of the code using the hash symbol '#' to indicate the sub-task the program code belongs to. For example:

```
In [1] :   # Task 1.1
           Program code
```

Output:

Make sure that each of your `.ipynb` files shows the required output in Jupyter Notebook.

1 Name your Jupyter Notebook as:
```
TASK1_<your class>_<your name>.ipynb.
```

You are developing a stock and sales tracking system for a local supermarket using SQLite.

The text files `customers.txt`, `products.txt` and `purchases.txt` store the current data.

The data in `customers.txt` is stored in the following format:
`CustomerID|Name|Email`

The data in `products.txt` is stored in the following format:
`ProductID|Name|Category|Price|Quantity`

The data in `purchases.txt` is stored in the following format:
`PurchaseID|CustomerID|ProductID|Quantity|DatePurchased`

Task 1.1

Write a Python program that uses SQL to create a database `supermarket.db` with three tables. One table to store data about the customers, one table to store data about the products and one table to store data about the purchases.

Define the primary and foreign keys for each table.   **[9]**

Task 1.2

Write a Python program that uses SQL to insert the data from each of the three text files into the appropriate field in each database table.   **[6]**

Run your program to test the data has been entered correctly.   **[1]**

Task 1.3

Write a Python program that uses SQL code to query the following information from the `Product` table:
- ID of the product.
- Name of the product.
- Category the product belongs to.
- Price of the product.
- Quantity of units currently in stock.

The results should be sorted by category alphabetically. **[4]**

Run your program and display the output in neat columns. **[1]**

Task 1.4

Write a Python procedure `task1_4` to:
- take Product ID as its input parameter
- use SQL code to fetch the following information from the database:
  - Name of the product
  - Total quantity purchased for the product
  - Total amount earned for the product (calculated as Price × Quantity Purchased)
- output the results in the following format:
  ```
  Product:                <Product Name>
  Total Units Sold:       <Total Units Sold>
  Total Revenue:          $<Total Revenue>
  ```
[6]

Test your program with the following Product ID:
- `P001` **[1]**

Section B - Written

Submit your answers on A-4 sized writing papers.

2 An event company has a concert booking system for customers to book tickets.

Each customer account is uniquely identified by their email address. Customers can book tickets for multiple concerts and may also book tickets for the same concert event on different dates. However, a customer cannot book the same event more than once on the same day.

The system currently stores booking data in a flat file format.

Below is a sample of the flat file:

Name	Email	EventID	EventName	Category	Venue	EventDate	Price	Quantity	BookingDate
Alex	alex.t@email.com	1	Laneway Fest	Indie	Gardens	2025-06-01	20	2	2025-05-01
Alex	alex.t@email.com	2	ZoukOut	EDM	Siloso Beach	2025-06-15	30	3	2025-05-01
Bella	bella.g@email.com	1	Laneway Fest	Indie	Gardens	2025-06-01	20	1	2025-05-01
Casey	caseyl@email.com	3	Jazz in July	Jazz	Esplanade	2025-07-10	25	2	2025-05-02
Alex	alex.t@email.com	1	Laneway Fest	Indie	Gardens	2025-06-~~02~~	20	1	2025-05-03
Casey	caseyl@email.com	1	Laneway Fest	Indie	Gardens	2025-06-~~02~~	20	2	2025-05-03

2025-06-01

(a) The company wants to use a relational database to store the data for the system.

    i.   A database needs several tables to store the data.

        Draw an entity-relationship (ER) diagram to show the tables in third normal form (3NF) and the relationship(s) between them. **[4]**

    ii.   Write table descriptions for the tables you identified in part **(a)(i)**, using the information given.

        The primary key is indicated by underlining one or more attributes. Foreign keys are indicated by using a dashed underline. **[6]**

(b) Explain **one** advantage of normalisation. **[2]**

END OF PAPER