



Databases

15 June 2023

Examination Paper

Answer ALL questions.

Clearly cross out surplus answers.

Time: 3 hours

The maximum mark for this paper is 100.

Any reference material brought into the examination room must be handed to the invigilator before the start of the examination.

Answer ALL questions

Marks

Question 1

- a) Identify FOUR (4) reasons why the Police / Law enforcement authorities will want a database. 4
- b) Identify FOUR (4) types of **entities** for which a ski hire store might store data. 4
- c) The Yogi Hotel Group have a flat-file based system that they have been using for several years. 2

Give TWO (2) characteristics of a flat-file system

Total 10 Marks

Question 2

- a) The following table is from an aircraft pilot database which is in *Third Normal Form* (3NF). Suggest appropriate data types, field length (if applicable) **and** keys (if applicable) for the attributes listed. 9

Attribute Name	Data Type	Field Length	Key
PilotID			
FirstName			
LastName			
DateOfBirth			
LicenceExpiryDate			
Salary			
AirlineID			

- b) State the purpose of a Foreign Key. 1

Total 10 Marks

Questions continue on the next page

Question 3

Consider the following scenario:

The Premier Staff Agency recruits permanent and temporary staff for other companies who have a range of job vacancies.

Candidates who are looking for a new job register their details with the agency. The agency wishes to develop a database system to record details about candidates and their applications for job vacancies.

Candidates can make many applications for job vacancies.

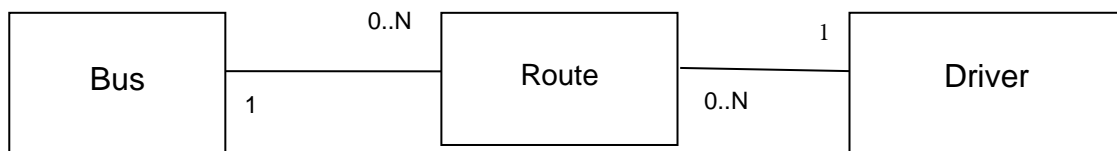
A company may have many job vacancies registered with the agency and each job vacancy may have many applications.

- a) Draw an *Entity-Relationship (ER) diagram* to represent the above scenario. Ensure the cardinality is shown for each side of the relationships. 10
- b) From your answer in Question 3a), choose FOUR (4) entities. For each entity identify the primary **and** any foreign keys. Make sure that you clearly identify which entity each key belongs to. Provide a short description of the purpose of each of the entities chosen. 10

Total 20 Marks

Question 4

- a) Consider the ER diagram shown below for a Bus Company. 5



Create a CRUD matrix to show the following transactions:

- Transaction 1 – Delete an existing route
- Transaction 2 – A new route is created and is assigned an existing bus and driver
- Transaction 3 – An existing route gets a new bus
- Transaction 4 – A driver leaves the company
- Transaction 5 – The company buys some new busses

Questions continue on the next page

- b) Hungry Pet Store is a small retail store that sells pet food and pet supplies to the public. **5**

It has been using a paper based stock and sales system but they wish to move with the time and update their systems to a database stock and sales system.

The owner doesn't really understand what is meant by a database system.

Give a simple definition of what a database is **and** explain THREE (3) advantages that a database system would bring to the Hungry Pet Store.

Total 10 Marks

Question 5

Consider the following tables taken from a vehicle garage database where staff perform a service on the customer's vehicle:

tblCustomer

CustomerID	Name	VehicleReg	ContactNo	LastService
101	Fred Smith	EF1FSE	450-123	12/1/2021
201	Lei Moi Choo	MN12BSD	325-122	18/4/2022
301	Atif Patel	AP1APP	299-912	14/2/2020
401	Laura Jones	SG183AS	250-761	16/7/2020
501	Jai Prince Amoto	HRHJPA	250-119	12/4/2022

tblStaff

StaffID	FName	SName	DOB
1	Elizabeth	Swires	12/09/1982
2	Ashraf	Patel	01/02/1975
3	Floella	Benjamin	27/04/1965
4	Andrew	Gough	30/06/1999

tblService

ServiceID	StaffID	Custo merID	ServiceDate	HoursSpent	Cost
1092	4	301	12/03/2023	3	
1099	2	101	14/03/2023	2	
1298	1	201	14/03/2023	2	
1432	3	501	15/03/2023	4	
1678	4	301	19/03/2023	3	
1881	1	201	21/03/2023	6	

- a) Write an SQL statement that will populate the Cost column by multiplying the HoursSpent by £75. **2**
- b) Write an SQL statement that will delete all customers who last had their vehicle serviced before 1st January 2021. **2**

Questions continue on the next page

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|---|--------------|
| | Marks |
| c) Write the SQL that produces a list of all Customer and Service details where it took longer than THREE (3) hours to complete the service. | 3 |
| d) Explain what would happen if the following SQL statement was executed.
ALTER TABLE tblStaff
ADD Salary Currency | 3 |
| e) Write the SQL that will create the following table and add the data below to the newly created table.
tblParts | 10 |

<i>PartID</i>	<i>Name</i>	<i>Price</i>	<i>QtyInStock</i>
1	Engine Oil	6.99	2

Total 20 Marks

Question 6

- | | |
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| a) CountryLodge Holiday Company is an exclusive holiday park located in the highlands of Scotland. It rents out a range of lodges which have different occupancy types. Several lodges allow dogs to stay with their owners. | 10 |
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Consider the holiday booking form below.

CountryLodge Holiday Company

Date of Booking: 15/09/2022

Name: Mrs Joanne Al-Shanti

Address: 65 The Grange, Sunnyville, Exeter, EX19 9BC

Contact No: 010920192012

DateOfBirth: 14/02/1986

Number of Guests: 4

Number of Dogs: 1

Accommodation Name: Shetland 6

Holiday commencement date: 22nd April 2023

Number of nights: 7

Total Price: £1765.23

Deposit amount: £250

Using the details from the booking form above, you are to normalise the data to First Normal Form (1NF).

Total 10 Marks

Questions continue on the next page

Question 7

A bank's database requires staff to log on to the database system prior to using it.

- a) Explain how the staff log-in process helps protect privacy and security of data. **3**
- b) State **and** briefly explain an additional database security measures that could be implemented to help keep data secure and private and also available to authorised personnel. **3**
- c) State TWO (2) possible types of Data Validation rules that can be used when designing a database system. **2**
- d) Explain the following SQL statement and the affect on the table by executing it **2**

ItemID	Description	StockQty	Price
2	Blueberry Muffin	4	1.19
4	Butter Croissant	3	0.99
7	Custard Doughnut	1	1.25

Delete * from tblItem where Price < £1.01

Total 10 Marks

Question 8

- a) A fast-food restaurant chain has invested in a real-time food ordering system for ONE (1) of its branches. Customers can order via an app, or from a kiosk within the restaurant. **10**

The information is stored in a dynamic database system.

State FIVE (5) advantages of having a real-time dynamic database system **and** why the company should consider expanding this system to its other restaurants within the chain. Ensure each point includes a brief summary of the advantage.

Total 10 Marks

End of Paper