Computer Science

9. Databases

1 Five data types and five data samples are shown below.

Draw a line to link each data type to the correct data sample.

Data type	Data sample
Integer	'a'
Real	2
Char	2.0
String	True
Boolean	"Twelve"

[4]

2 A database, PROPERTY, was set up to show the prices of properties for sale and the features of each property. Part of the database is shown below.

Property Type	Brochure No	Number of Bedrooms	Number of Bathrooms	Garden	Garage	Price in $
Bungalow	B17	7	4	Yes	Yes	750,000
Apartment	A09	2	1	No	No	100,000
House	H10	4	2	Yes	No	450,000
House	H13	3	2	Yes	No	399,000
Apartment	A01	2	2	No	Yes	95,000
Apartment	A16	1	1	No	No	150,000
House	H23	3	1	No	Yes	250,000
House	H46	2	1	Yes	Yes	175,000

(a) Give the number of fields that are in each record.

.....[1]

(b) State which field you would choose for the primary key.

.....

Give a reason for choosing this field.

.....

.....[2]

(c) State the data type you would choose for each of the following fields.

Garage .....

Number of Bedrooms .....

Price in $ .....[3]

(d) The query-by-example grid below selects all houses with more than 1 bathroom and more than 2 bedrooms.

Field:	Property Type	Number of Bedrooms	Number of Bathrooms	Price in $	Brochure No
Table:	PROPERTY	PROPERTY	PROPERTY	PROPERTY	PROPERTY
Sort:				Ascending	
Show:	☐	☐	☐	☑	☑
Criteria:	= 'House'	>2	>1		
or:					

Show what would be output.

.....

.....[2]

(e) Complete the query-by-example grid below to select and show the brochure number, property type and price of all properties with a garage below $200,000.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[4]

3 A database, MARKS, was set up to record the test results for a class of students. Part of the database is shown below.

Student Name	Class ID	Maths	English	Science	History	Geography
Paul Smith	0017	70	55	65	62	59
Ravi Gupta	0009	29	34	38	41	44
Chin Hwee	0010	43	47	50	45	52
John Jones	0013	37	67	21	28	35
Diana Abur	0001	92	88	95	89	78
Rosanna King	0016	21	13	11	27	15

(a) Give the number of fields that are in each record.

.....[1]

(b) State which field you would choose for the primary key.

.....

Give a reason for choosing this field.

.....

.....[2]

(c) The query-by-example grid below selects all students with more than 60 marks in History or more than 60 marks in Geography.

Field:	Student Name	History	Geography
Table:	MARKS	MARKS	MARKS
Sort:	Ascending		
Show:	☑	☐	☐
Criteria:		>60	
or:			>60

Show what would be output.

.....

.....[2]

(d) Complete the query-by-example grid below to select and show the student names only of all students with less than 40 marks in both Maths and English.

Field:			
Table:			
Sort:			
Show:	☐	☐	☐
Criteria:			
or:			

[3]

4 A picture gallery owner has decided to set up a database to keep information about the pictures he has for sale. The database table, PICTURE, will contain the following fields:

Title; Artist; Description; Catalogue Number; Size (area in square centimetres); Price; Arrived (date picture arrived at gallery); Sold (whether picture is already sold)

(a) (i) State what data type you would choose for each field.

Title .....

Artist .....

Description .....

Catalogue Number .....

Size .....

Price .....

Arrived .....

Sold .....[4]

(ii) State which field you would choose for the primary key.

.....[1]

(b) Give a validation check that you can perform on each of these fields. Each validation check must be different.

Catalogue Number .....

Size .....

Price .....

Arrived .....[4]

(c) Complete the query-by-example grid below to select and show the Catalogue Number, Title and Price of all unsold pictures by the artist 'Twister'.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[5]

5 A motor boat hire company decides to set up a database to keep information about boats that are available for hire. The database table, BOAT, will contain the following fields:

Boat Name; Model; Engine Power (in hp); Number of Seats; Life Raft (whether there is a life raft kept on the boat); Day Price (price for a day's hire).

(a) Give the data type you would choose for each field.

Boat Name .....

Model .....

Engine Power .....

Number of Seats .....

Life Raft .....

Day Price .....[3]

(b) State a validation check that you can perform on each of these fields. Each validation check must be different.

Boat Name .....

Model .....

Number of Seats .....

Day Price .....[4]

(c) Complete the query-by-example grid below to select and show the Boat Name, Model and Day Price of a day's hire for all boats with 4 seats and an Engine Power of more than 100 hp.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[5]

6 A program will be written to store information about members of a swimming club.

The following membership details will be recorded:

- Name
- Gender
- Status:
  - Senior
  - Junior
- Fee
- Team member (Yes or No)

(i) Choose a suitable data type for each of the membership details to be recorded.

Membership details	Data type
Name	
Gender	
Status	
Fee	
Team member	

[5]

(ii) The swimming club has 50 members.

State the data structure that would be most suitable to use and give a reason for your choice.

Data structure.....

Reason.....

.....[2]

7 A database, STAFFPHONE, was set up to show the telephone extension numbers for members of staff working in a department store.

Name	Department	Extension number
Jane Smith	Toys	129
Sue Wong	Books	124
David Chow	Toys	129
Amy Tang	Household	123
Joe Higgs	Books	124
Jane Smith	Shoes	125
Adel Abur	Shoes	125
Peter Patel	Toys	129

(a) Explain why none of the fields in the database can be used as a primary key.

.....

.....

.....[2]

(b) State a field that could be added as a primary key.

.....

Give a reason for choosing this field.

.....

.....[2]

(c) Use the query-by-example grid below to provide a list of all members of staff, in alphabetical order, grouped by department.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[5]

8 A database, SOFASELECT, was set up to show the prices of suites, sofas and chairs for sale from an online furniture warehouse. Part of the database is shown below.

Description	Brochure Number	Number of Seats	Number of Pieces	Material	Colour	Price in $
Sofa	SF17	2	1	Leather	Red	950
Sofa	SF19	3	1	Vinyl	Black	1,000
Suite	SU10	4	3	Velvet	Green	1,500
Suite	SU23	5	3	Leather	Brown	950
Recliner chair	RC01	1	1	Leather	Cream	600
Chair	CH16	1	1	Vinyl	Red	250
Recliner sofa	RS23	4	1	Leather	Cream	1,200
Chair	CH10	1	1	Velvet	Red	175

(a) How many fields are in each record?

.....[1]

(b) State which field you would choose for the primary key.

.....

Give a reason for choosing this field.

.....

.....[2]

(c) State the data type you would choose for each of the following fields.

Number of Seats .....

Price in $ .....[2]

(d) The query-by-example grid below selects all the furniture in cream leather.

Field:	Description	Material	Colour	Price in $	Brochure Number
Table:	SOFASELECT	SOFASELECT	SOFASELECT	SOFASELECT	SOFASELECT
Sort:				Descending	
Show:	☑	☐	☐	☑	☑
Criteria:		= 'Leather'	= 'Cream'		
or:					

Show the output from the query-by-example.

.....

.....[3]

(e) Complete the query-by-example grid below to select and show the brochure number, material, colour and price of all the furniture with 3 or more seats.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[5]

9 A program will be written to store information about members of a swimming club.

The following membership details will be recorded:

- Name
- Gender
- Status:
  - Senior
  - Junior
- Fee
- Team member (Yes or No)

(i) Choose a suitable data type for each of the membership details to be recorded.

Membership details	Data type
Name	
Gender	
Status	
Fee	
Team member	

[5]

10 A database, THEATRETOURS, was set up to show the tour dates, towns, number of seats and prices in local currency for a Shakespeare play.

Town	Tour Date	Number of Seats	Price Local Currency
Wigan	18/08/2016	120	15.00
Dumfries	20/08/2016	160	12.50
Turin	25/08/2016	200	17.00
Macon	27/08/2016	75	18.00
Bordeaux	29/08/2016	170	20.00
Algiers	01/09/2016	125	1350.00
Windhoek	05/09/2016	65	90.00
Windhoek	06/09/2016	65	90.00
Port Elizabeth	10/09/2016	200	110.00

(a) Explain why none of the fields in the database can be used as a primary key.

.....

.....

.....[2]

(b) State a field that could be added as a primary key.

.....

Give a reason for choosing this field.

.....

.....[2]

(c) Use the query-by-example grid below to provide a list of tour dates and seat prices in alphabetical order of town.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[4]

11 A database, PLAYPRODUCTION, was set up to show the performance dates, prices and number of seats available at a theatre specialising in Shakespeare productions.

Play	Performance Date	Number Seats Stalls	Number Seats Circle	Price Stalls Seats $	Price Circle Seats $
As You Like It	01/07/2016	120	90	20.00	30.00
As You Like It	02/07/2016	85	45	30.00	40.00
As You Like It	09/07/2016	31	4	30.00	40.00
Macbeth	14/07/2016	101	56	25.00	35.00
Macbeth	15/07/2016	50	34	25.00	35.00
Macbeth	16/07/2016	12	5	35.00	50.00
Julius Caesar	22/07/2016	67	111	20.00	20.00
Julius Caesar	23/07/2016	21	24	15.00	15.00
A Comedy of Errors	30/07/2016	45	36	35.00	45.00

(a) Give the number of fields that are in each record.

..... [1]

(b) State the data type you would choose for each of the following fields.

Play .....

Number Seats Stalls .....

Price Stalls Seats $ ..... [3]

(c) The query-by-example grid below selects all the productions with more than 100 seats left in either the stalls or the circle.

Field:	Play	Performance Date	Number Seats Stalls	Number Seats Circle
Table:	PLAYPRODUCTION	PLAYPRODUCTION	PLAYPRODUCTION	PLAYPRODUCTION
Sort:	Ascending			
Show:	☑	☑	☐	☐
Criteria:			> 100	
or:				> 100

Show what would be output from the query-by-example.

.....

.....

..... [3]

(d) Complete the query-by-example grid below to select all the productions with at least six seats left in the circle and show the Play, Performance Date and Price Circle Seats $ in Performance Date order.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[5]

12 There is a program that stores the following data:

- EmployeeID, an employee ID which must be two letters followed by 4 numbers, e.g. TY4587
- Manager, whether the employee is a manager or not
- AnnualHoliday, number of whole days' annual holiday
- PayGrade, the employee's pay grade which must be a single letter A–F

Complete the following table to identify:

- The most appropriate data type for each variable
- An appropriate validation check for each variable. You must use a different validation check for each variable.

Variable	Data type	Appropriate validation check
EmployeeID		
Manager		
AnnualHoliday		
PayGrade		

[8]

13 A database table, DEVICE, has been set up to record the electronic equipment used in a small business.

Device ID	Device Type	User	Purchase Date	Purchase Price ($)	Portable
3	Desktop	Alan Swales	14/02/2017	1350.00	N
4	Laptop	Chantel Law	01/02/2016	1460.00	Y
5	Tablet	Abdula Saud	31/12/2016	1000.00	Y
6	Desktop	Abdula Saud	14/03/2017	1000.00	N
7	Laptop	Alan Swales	15/03/2016	1700.00	Y
8	Tablet	Taona Jaji	16/12/2016	470.00	Y

(a) The query-by-example grid below selects certain records.

Field:	User	Portable	Purchase Price ($)
Table:	DEVICE	DEVICE	DEVICE
Sort:	Ascending		
Show:	✓	☐	☐
Criteria:		Y	>1000
or:			

Show what would be the output from the query-by-example.

.....

.....

.....[2]

(b) Complete the query-by-example grid below to select all Desktop devices that were either purchased before 31/12/2016 or cost under $1000. Only show the Device ID and Device Type.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[4]

14 A television (TV) store has a database table, TVSTOCK, for its new range of televisions. The table stores the screen size of each TV, whether it will show 3D, whether the screen is curved or flat, if the internet is available on the TV, if it has a built-in hard disk drive and the price. Part of the database table is shown below.

TVID	ScreenSize	3D	CurvedFlat	Internet	HDD	Price
TV80CVINT	80	YES	CV	YES	YES	$7,000.00
TV65CVINT	65	YES	CV	YES	YES	$5,000.00
TV60CVINT	60	YES	CV	YES	YES	$4,500.00
TV60FTINT	60	YES	FT	YES	YES	$4,000.00
TV55CVINT	55	YES	CV	YES	NO	$3,000.00
TV55FTINT	55	YES	FT	YES	NO	$3,500.00
TV55FTNIN	55	YES	FT	NO	NO	$3,000.00
TV50CVINT	50	YES	CV	YES	NO	$2,500.00
TV50FTINT	50	YES	FT	YES	NO	$2,000.00
TV50FTNIN	50	YES	FT	NO	NO	$1,750.00
TV42FTINT	42	YES	FT	YES	NO	$1,500.00
TV37FTINT	37	NO	FT	YES	NO	$1,200.00
TV20FTNIN	20	NO	FT	NO	NO	$800.00
TV15FTNIN	15	NO	FT	NO	NO	$400.00

(a) State the type of the field **TVID** and give a reason for your choice.

.....

.....

.....[1]

(b) Complete the table with the most appropriate data type for each field.

Field name	Data type
ScreenSize	
3D	
CurvedFlat	
Internet	
HDD	
Price	

[3]

(c) Use the query-by-example grid below to provide a list of all of the curved screen TVs that have a built-in hard disk drive. Make sure the list only displays the TVID, the price and the screen size in ascending order of price.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[5]

15 A database table, SHEEP, is used to keep a record of the sheep on a farm. Each sheep has a unique ear tag, EARnnnn; n is a single digit. The farmer keeps a record of the date of birth, the gender and the current weight of each sheep in kilograms.

(a) Identify the **four** fields required for the database. Give each field a suitable name and data type. Provide a sample of data that you could expect to see in the field.

Field 1 name .....

Data type .....

Data sample .....

Field 2 name .....

Data type .....

Data sample .....

Field 3 name .....

Data type .....

Data sample .....

Field 4 name .....

Data type .....

Data sample .....

[8]

(b) State the field that you would choose as the primary key.

.....[1]

(c) Using the query-by-example grid below, write a query to identify the ear tags of all male sheep weighing over 10 kilograms. Only display the ear tags.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[3]

16 A wildlife park has a database table, called LIVESTOCK, to classify and record its animal species. Part of the database table is shown.

Species	Classification	Diet	Legs
Giraffe	Mammal	Herbivore	4
Elephant	Mammal	Herbivore	4
Crocodile	Reptile	Carnivore	4
Ostrich	Bird	Omnivore	2
Gorilla	Mammal	Herbivore	2
Bear	Mammal	Omnivore	4
Rhinoceros	Mammal	Herbivore	4
Hippopotamus	Mammal	Herbivore	4
Flamingo	Bird	Omnivore	2
Lion	Mammal	Carnivore	4
Turtle	Reptile	Omnivore	4
Penguin	Bird	Carnivore	2

(a) Suggest another appropriate field that could be added to this database by stating its name and data type. State its purpose and give an example of the data it could contain.

Field name .....

Data Type .....

Purpose .....

.....

Example of data .....

[2]

(b) Use the query-by-example grid below to provide a list of all four legged mammals that are herbivores, sorted alphabetically by species, with only the species displayed.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[4]

17 A database table, TRAIN, is to be set up for a railway company to keep a record of the engines available for use. Each engine has a unique number made up of 5 digits, nnnnn. The engines are classified as freight (F) or passenger (P) together with a power classification that is a whole number between 0 and 9, for example F8. The railway company keeps a record of the date of the last service for each engine.

(a) Identify the **three** fields required for the database. Give each field a suitable name and data type. Provide a sample of data that you could expect to see in the field.

Field 1 Name .....

Data type .....

Data sample .....

Field 2 Name .....

Data type .....

Data sample .....

Field 3 Name .....

Data type .....

Data sample .....[6]

(b) State the field that you should choose as the primary key.

.....[1]

(c) Using the query-by-example grid below, write a query to identify all passenger engines that have not been serviced in the past 12 months. Only display the engine numbers.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[3]

18 A database table, JEWEL, is used to keep a record of jewellery for sale in a shop. Each item of jewellery can be made of silver, platinum or gold metal. The shop stocks rings, bracelets and necklaces. The number in stock and the price is also stored.

(a) Identify the **four** fields required for the database. Give each field a suitable name and data type. Explain why you chose the data type for each field.

Field 1 Name ..... Data type .....

Explanation .....

.....

Field 2 Name ..... Data type .....

Explanation .....

.....

Field 3 Name ..... Data type .....

Explanation .....

.....

Field 4 Name ..... Data type .....

Explanation .....

.....

[8]

(b) Explain why none of these fields could be used as a primary key.

.....

.....[1]

(c) Using the query-by-example grid below, write a query to identify the silver bracelets. Only display the number in stock and the price.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[3]

19 A database table, PERFORMANCE, is used to keep a record of the performances at a local theatre.

Show Number	Type	Title	Date	Sold Out
SN091	Comedy	An Evening at Home	01 Sept	Yes
SN102	Drama	Old Places	02 Oct	No
SN113	Jazz	Acoustic Evening	03 Nov	No
SN124	Classical	Mozart Evening	04 Dec	Yes
SN021	Classical	Bach Favourites	01 Feb	Yes
SN032	Jazz	30 Years of Jazz	02 Mar	Yes
SN043	Comedy	Street Night	03 Apr	No
SN054	Comedy	Hoot	04 May	No

(a) State the number of fields and records in the table.

Fields .....

Records .....

[2]

(b) Give **two** validation checks that could be performed on the **Show Number** field.

Validation check 1 .....

.....

Validation check 2 .....

.....

[2]

(c) Using the query-by-example grid, write a query to identify jazz performances that are not sold out. Only display the date and the title.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[4]

20 A database table, TREES, is used to keep a record of the trees in a park. Each tree is given a unique number and is examined to see if it is at risk of dying. There are over 900 trees; part of the database table is shown.

Tree Number	Type	Map Position	Age in Years	At Risk
TN091	Acacia	A7	250	Y
TN172	Olive	C5	110	N
TN913	Cedar	B9	8	N
TN824	Banyan	A3	50	Y
TN021	Pine	D5	560	Y
TN532	Teak	C8	76	Y
TN043	Yew	B1	340	N
TN354	Spruce	D4	65	N
TN731	Elm	B10	22	Y
TN869	Oak	C9	13	N
TN954	Pine	E11	3	N

(a) State the number of fields in the table.

.....[1]

(b) The tree numbering system uses TN followed by three digits. The numbering system will not work if there are over 1000 trees.
Describe, with the aid of an example, how you could change the tree numbering system to allow for over 1000 trees. Existing tree numbers must not be changed.

.....

.....

.....

.....[2]

(c) Using the query-by-example grid, write a query to identify at risk trees over 100 years old. Display only the type and the position on the map.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[4]

21 A shop that sells copies of movies to the public has set up a new database table called 2018MOV to store some new releases. Part of this table is given, showing the catalogue number, title, genres and available formats (Blu-ray, DVD or streaming) of each movie.

CatNo	Title	Genre 1	Genre 2	Blu-ray	DVD	Stream
18m01	Battery Rangers	Adventure	Fantasy	Yes	No	Yes
18m02	Golfwatch	Comedy	Drama	Yes	No	Yes
18m03	Chair 27	Comedy	Drama	Yes	Yes	No
18m04	Wander Woman	Action	Fantasy	Yes	No	Yes
18m05	Justine League	Action	Fantasy	Yes	Yes	Yes
18m06	That	Horror	Thriller	Yes	Yes	No
18m07	Insect Dude	Action	Fantasy	No	Yes	No
18m08	Dover Beach	Action	History	No	Yes	No
18m12	Slow 25	Action	Thriller	No	Yes	No
18m15	Kongkers	Adventure	Fantasy	No	Yes	No
18m16	Transducers: The Last Night	Action	Sci-Fi	Yes	Yes	Yes
18m17	The Pale Tower	Fantasy	Sci-Fi	Yes	Yes	No
18m19	Bea and the Bute	Fantasy	Romance	Yes	Yes	Yes
18m21	The Daddy	Action	Fantasy	No	No	Yes
18m22	Planet Wars: Episode X	Sci-Fi	Action	Yes	No	Yes
18m23	Guardians of the Milky Way	Action	Sci-Fi	Yes	Yes	Yes
18m26	Odin	Horror	Sci-Fi	No	Yes	Yes
18m27	That	Fantasy	Sci-Fi	No	No	Yes
18m30	Underneath	Action	Horror	Yes	No	No
18m31	Debatable Me	Animation	Action	Yes	Yes	No

(a) State the number of records in this part of the table.

.....[1]

(b) **(i)** Give the name of the field that should be used for the primary key.

.....[1]

(ii) State the reason for choosing this field for the primary key.

.....

.....[1]

(c) Complete the table to show the most appropriate data type for each field based on the data shown in the table at the start of question 6.

Field	Data type
CatNo	
Title	
Genre 1	
Stream	

[2]

(d) List the output that would be given by this query-by-example.

Field:	CatNo	Title	Genre 1	Blu-ray	DVD	Stream	
Table:	2018MOV	2018MOV	2018MOV	2018MOV	2018MOV	2018MOV	
Sort:							
Show:	✓	✓	☐	✓	✓	✓	☐
Criteria:			="Comedy"				
or:							

.....

.....

.....

.....[2]

(e) Using the query-by-example grid, write a query to identify all the movies that are categorised as Sci-Fi and available to stream. Only display the catalogue number and title of the film, with the titles listed in alphabetical order.

Field:							
Table:							
Sort:							
Show:	☐	☐	☐	☐	☐	☐	☐
Criteria:							
or:							

[4]

22 The database table, PCSTOCK, is a part of the database in an electronics shop, showing some of the desktop (DT), tablet (TB) and laptop (LT) computers they have in stock.

PCID	ScreenSize	RAM	Type	HDD(GB)	Price
DT303240	30	32	DT	4000	$5000.00
DT303220	30	32	DT	2000	$4500.00
DT301620	30	16	DT	2000	$4000.00
DT231610	23	16	DT	1000	$3000.00
LT191620	19	16	LT	2000	$3000.00
LT171610	17	16	LT	1000	$2500.00
DT230820	23	8	DT	2000	$2000.00
DT190810	19	8	DT	1000	$1500.00
LT190810	19	8	LT	1000	$1500.00
LT170805	17	8	LT	500	$1200.00
DT230420	23	4	DT	2000	$1000.00
DT190410	19	4	DT	1000	$750.00
LT190410	19	4	LT	1000	$950.00
TB100206	10	2	TB	64	$200.00

(a) Complete the table to show the most appropriate data type for each field based on the data shown in the table at the start of question 6.

Field	Data type
PCID	
ScreenSize	
Type	
Price	

[2]

(b) Using the query-by-example grid, write a query to identify all the desktop computers with a hard drive larger than 1000 GB. All fields in the table should be shown, sorted in descending order by price.

Field:						
Table:						
Sort:						
Show:	☐	☐	☐	☐	☐	☐
Criteria:						
or:						

[4]

23 A database table, PORTRAIT, is used to keep a record of the portraits available from a photographic studio. Each portrait has a unique reference number PICnnn, where n is a single digit, for example PIC123. The studio keeps a record of the size (for example 20 × 15), the type (black and white or colour), and the price in dollars.

(a) Complete the table to show the most appropriate data type for each of the fields.

Field	Data type
Reference Number	
Size	
Type	
Price in $	

[4]

(b) The results from the query-by-example grid should show the reference number, price, type and size of all portraits under $50. Identify the **three** errors in the query-by-example grid.

Field:	Reference No	Price in $	Type	Size
Table:	PORTRAIT	PORTRAIT	PORTRAIT	PORTRAIT
Sort:				
Show:	☑	☑	☐	☑
Criteria:		>50.00		
or:				

Error 1 .....

.....

Error 2 .....

.....

Error 3 .....

.....

[3]

24 Describe, giving an example for each, the following data types used in programming.

Integer

Description .....

.....

Example .....

String

Description .....

.....

Example .....

[4]

25 An online fruit tree specialist sells fruit trees in various sizes. A database table, TREETAB, shows the tree type and, for each size, the price and whether they are in stock.

Tree Type	Size1	Size1 In	Size2	Size2 In	Size3	Size3 In
Apple	10.95	Yes	14.95	Yes	29.95	Yes
Apple	12.95	Yes	14.95	Yes	29.95	Yes
Cherry	24.95	No	34.95	No	59.95	Yes
Fig	19.95	Yes	29.95	No	49.95	Yes
Guava	19.95	No	29.95	No	59.95	No
Nectarine	8.50	Yes	11.95	Yes	19.95	Yes
Olive	19.95	No	39.95	Yes	59.95	Yes
Peach	9.25	No	11.95	Yes	19.95	Yes
Pear	10.95	Yes	14.95	Yes	29.95	Yes
Plum	8.95	Yes	11.95	Yes	19.95	Yes
Pomegranate	12.95	No	18.95	Yes	34.95	No
Quince	34.95	Yes	44.95	Yes	84.95	No

(a) State whether any of the fields shown would be suitable as a primary key.

.....

Explain your answer .....

.....

.....

[2]

(b) Complete the table to show the most appropriate data type for each of the fields based on the data shown in the table at the start of question 6.

Field	Data type
Tree Type	
Size3	
Size2 In	

[3]

(c) Show the output that would be given by this query-by-example.

Field:	Tree Type	Size1	Size1 In		
Table:	TREETAB	TREETAB	TREETAB		
Sort:		Descending			
Show:	☑	☑	☑	☐	☐
Criteria:		<10.00			
or:					

.....

.....

.....

.....[4]

(d) Using the following query-by-example grid, write a query to identify all types of the fruit trees that are out of stock for all three sizes. Make sure the type of the tree and the various 'in stock' fields are shown. The trees should be listed in alphabetical order by type.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[4]

26 A database table, BIKETYRES, is used to keep a record of tyres for sale in a cycle shop. Tyres are categorised by width and diameter in millimetres, whether they have an inner tube and the type of terrain for which they are designed.

Tyre Code	Width	Diameter	Tube	Terrain	Stock Level
SLTT	23	700	YES	Asphalt	18
MLNT	24	700	NO	Asphalt	23
LLNT	28	700	NO	Asphalt	19
SLTM	23	700	YES	Mixed	22
MLTM	24	700	YES	Mixed	14
LLTM	28	700	YES	Mixed	12
SLTH	23	700	YES	Hard	10
MLTH	24	700	YES	Hard	5
LLNH	28	700	NO	Hard	7
SLNM	23	700	NO	Mixed	12
MLNM	24	700	NO	Mixed	22
LLNM	28	700	NO	Mixed	18
SSNT	23	650	NO	Asphalt	10
MSNT	24	650	NO	Asphalt	8
SSTM	23	650	YES	Mixed	5
MSNM	24	650	NO	Mixed	4

The query-by-example grid below displays the tyre code and the stock level of all 28 mm width tyres suitable for mixed terrain.

Field:	Tyre Code	Stock Level	Width	Terrain
Table:	BIKETYRES	BIKETYRES	BIKETYRES	BIKETYRES
Sort:				
Show:	☑	☑	☐	☐
Criteria:			= 28	= 'Mixed'
or:				

Alter the query to show the tyre code and stock level in ascending order of stock level for all 24 mm asphalt terrain tyres. Write the new query in the following query-by-example grid.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[4]

27 Describe each of the following data types used in programming. In each case, give an example of a piece of data to illustrate your answer. Each example must be different.

Char

.....

.....

.....

String

.....

.....

.....

Boolean

.....

.....

.....

[6]

28 The table, BEVERAGES, shows the number of calories in 100 ml of a range of popular beverages. It also shows the availability of these drinks in a can, a small bottle and a large bottle.

BevNo	BevName	Calories	Can	Small Bottle	Large Bottle
Bev01	Cola	40	Yes	Yes	Yes
Bev02	Lime	45	Yes	No	Yes
Bev03	Energy Drink 1	52	Yes	Yes	No
Bev04	Energy Drink 2	43	Yes	No	No
Bev05	Mango	47	Yes	No	Yes
Bev06	Lemon Iced Tea	38	Yes	No	Yes
Bev07	Lemonade	58	Yes	Yes	Yes
Bev08	Orange Juice	46	Yes	Yes	No
Bev12	Apple Juice	50	Yes	Yes	No
Bev15	Chocolate Milk	83	Yes	Yes	No

(a) Give a reason for choosing BevNo as the primary key for this table.

.....

..... [1]

(b) State the number of records shown in the table BEVERAGES.

..... [1]

(c) List the output that would be given by this query-by-example.

Field:	BevNo	BevName	Can	Small Bottle	Large Bottle	
Table:	BEVERAGES	BEVERAGES	BEVERAGES	BEVERAGES	BEVERAGES	
Sort:		Descending				
Show:	☑	☑	☐	☐	☐	☐
Criteria:			= "Yes"	= "Yes"	= "Yes"	
or:						

.....

.....

.....

..... [3]

(d) Complete the query-by-example grid to output a list showing just the names and primary keys of all the beverages with a calorie count greater than 45. The list should be in alphabetical order of names.

Field:						
Table:						
Sort:						
Show:	☐	☐	☐	☐	☐	☐
Criteria:						
or:						

[4]

29 A database table, FLIGHT, is used to keep a record of flights from a small airfield. Planes can carry passengers, freight or both. Some flights are marked as private and only carry passengers.

Flight number	Plane	Notes	Departure time	Passengers
FN101	Caravan 1	Private passenger flight	08:00	Y
CN101	Caravan 2	Freight only	08:30	N
CN102	Piper 1	Freight only	09:00	N
FN104	Piper 2	Passengers only	09:20	Y
FN105	Piper 1	Freight and passengers	10:00	Y
FN106	Caravan 1	Passengers only	10:30	Y
CN108	Caravan 2	Freight only	08:00	N
CN110	Lear	Private passenger flight	08:00	Y

(a) State the field that could have a Boolean data type.

Field ..... [1]

(b) A query-by-example has been written to display just the flight numbers of all planes leaving after 10:00 that only carry passengers.

Field:	Flight number	Passengers	Departure time	
Table:	FLIGHT	FLIGHT	FLIGHT	
Sort:				
Show:	☐	☑	☐	☐
Criteria:		= Y	= 10:00	
or:				

Explain why the query-by-example is incorrect, and write a correct query-by-example.

Explanation .....

.....

.....

.....

.....

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[7]

30 A database table, TRAIN, is used to keep a record of train departures from a station.

Train Number	Platform	Destination	Departure Time	Status
1A37	1	Newtown	08:00	On time
2X19	2	Anytown	08:10	Late
1A29	1	Bigcity	08:15	On time
1A28	2	Anytown	08:30	Cancelled
1A67	3	Gardenvillage	08:45	On time
1A37	1	Newtown	08:50	On time
1A24	2	Charter Train	09:00	Late
1A67	3	Gardenvillage	09:15	On time

(a) Explain why the field **Train Number** could not be used as a primary key.

.....

..... [1]

(b) A query-by-example has been written to display only the train numbers and platforms of all trains leaving after 08:30 that are late.

Field:	Train Number	Platform	Departure Time	Status
Table:	TRAIN	TRAIN	TRAIN	TRAIN
Sort:				
Show:	☐	☑	☐	☐
Criteria:		= Y	< 08:30	
or:				= "Late"

Explain why the query-by-example is incorrect, and write a correct query-by-example.

Explanation .....

.....

.....

.....

.....

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[7]

31 A car manufacturer makes a range of car models named Pegasus, Apollo and Cupid. It keeps a database to store the records of its range and the different options for each car model. Within the table CAR_RANGE, the following data needs to be stored:

1. Car model
2. Body style – saloon, hatchback or estate
3. How many doors it has
4. Whether it uses petrol, diesel or batteries as fuel
5. An identifier for a specific car.

(a) Complete the table to show suitable field names and an example of appropriate data for each field in the database table CAR_RANGE.

Field name	Example of data

[3]

(b) State which of your fields would be most appropriate for a primary key and give a reason for your choice.

.....

.....

.....[2]

(c) Complete the query-by-example grid to provide a list of car models using petrol and the number of doors these cars have, in alphabetical order of car model. Display only the car models and the number of doors.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[3]

32 A database table, SALES, is used to keep a record of items made and sold by a furniture maker.

Item number	Order number	Notes	Amount	Status
CH001	1921	Smith – six dining chairs	6	Delivered
TB003	1921	Smith – large table	1	In progress
CH001	1924	Hue – extra chairs	4	In progress
CH003	1925	For stock	2	Cancelled
BN001	1927	Patel – replacement bench	1	Not started
ST002	1931	Sola – small table	1	Delivered
CH003	1927	Patel – eight dining chairs with arms	8	Not started
TB003	1927	Patel – large table	1	Not started

(a) Explain why the field **Item number** could not be used as a primary key.

.....

..... [1]

(b) A query-by-example has been written to display only the order number and item numbers of any items in progress or not started.

Field:	Item number	Order number	Amount	Status
Table:	SALES	SALES	SALES	SALES
Sort:				
Show:	☐	☑	☑	☐
Criteria:				Not Like "Delivered"
or:				

Explain why the query-by-example is incorrect, and write a correct query-by-example.

Explanation .....

.....

.....

.....

.....

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[5]

33 A teacher has decided to use a database table as her mark book for her Computer Science class, which she has called MARKBOOK. For each student, the following data will be recorded: first name, last name, their year 10 test score and their year 11 test score. The class has 32 students.

(a) State the number of fields and records required for this database.

Number of Fields .....

Number of Records .....

[2]

(b) The data in MARKBOOK is stored under category headings: LastName, FirstName, Y10TestScore and Y11TestScore.

State, with a reason, whether any of these headings would be suitable as a primary key.

.....

.....

.....

..... [2]

(c) Complete the query-by-example grid to only display the first name, last name and year 10 test score of each student who achieved 50 or more in their year 10 test. The output should be in test score order with the highest marks at the top of the list.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[4]

34 A database table, BOX, is used to keep a record of boxes made and sold by a craftsman. Boxes are categorised by:

- SIZE – small, medium or large
- SHAPE – brief description for example 'star shaped'
- WOOD – maple, beech, walnut or ebony
- PRICE – price in $
- SOLD – whether the box is sold or not.

A database management system uses these data types:

Text Number Currency Boolean

(a) Select the most appropriate data type for each field from the four types shown. State the reason why you chose the data type.

SIZE data type .....

Reason .....

.....

SHAPE data type .....

Reason .....

.....

WOOD data type .....

Reason .....

.....

PRICE data type .....

Reason .....

.....

SOLD data type .....

Reason .....

.....

[5]

(b) **(i)** Complete the query-by-example grid below to only display the price of small walnut boxes.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[3]

(ii) The query-by-example grid from part **(b)(i)** needs to be changed to show both walnut and beech boxes and display the wood used. Only one column needs to be changed. Write the changed column.

Field:	
Table:	
Sort:	
Show:	☐
Criteria:	
or:	

[2]

35 A garden centre sells garden tools and stores details of these in a database table named TOOLS. **Code** is the primary key in the TOOLS table.

Code	Description	Price ($)	Quantity_Stock	Quantity_Ordered
GFLG	Garden Fork	50.00	1	50
GSLG	Garden Spade	50.00	11	0
GHLG	Garden Hoe	45.00	8	0
HFSM	Hand Fork	9.99	42	0
HSSM	Hand Spade	9.99	40	0
HWSM	Hand Weeder	9.99	11	0
HS20	Hose (20 metres)	45.00	10	0
HS35	Hose (35 metres)	60.00	2	0
HS50	Hose (50 metres)	75.00	20	60
YBLG	Yard Brush	24.99	100	0
LMHD	Lawn Mower	99.99	5	0
LMBT	Lawn Mower (Battery)	249.99	7	0
LMPT	Lawn Mower (Petrol)	349.99	10	25
TRBT	Edge Trimmer (Battery)	79.99	15	0
TRPT	Edge Trimmer (Petrol)	59.99	20	0
SHSM	Shears	40.00	40	0
HCSM	Hedge Clippers	40.00	45	0

(a) State the purpose of the primary key in the TOOLS table.

.....

.....

..... [1]

(b) List the output from the data shown in the table TOOLS that would be given by this query-by-example.

Field:	Code	Description	Price ($)	Quantity_Stock	Quantity_Ordered
Table:	TOOLS	TOOLS	TOOLS	TOOLS	TOOLS
Sort:					Descending
Show:	☑	☑	☐	☐	☑
Criteria:			>40	>0	>0
or:					

.....

.....

.....

.....

.....

..... [3]

(c) Complete the query-by-example grid to output the tools where the quantity in stock is below 25. Only show the Code, Description and Quantity_Stock fields in ascending order of Code.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[3]

36 Most programming languages include basic data types. Ahmad is describing the basic data types he has used.

State the data type that Ahmad is describing in each sentence.

Choose the data type from this list of programming terms.

Array **Boolean** **Char** **Constant** **Function** **Integer**

Iteration **Procedure** **Real** **String** **Variable**

A number with a fractional part that can be positive or negative and used in calculations

Data type .....

A whole number that can be positive, negative or zero and used in calculations

Data type .....

A single number, symbol or letter

Data type .....

A sequence of characters

Data type .....

A data type with two values, True or False

Data type .....

[5]

37 A database table, JUICE, is used to keep a record of cartons of fresh fruit juice available for sale.

Juice code	Fruit 1	Fruit 2	Size	Volume (ml)	Stock level
LMO10	Mango	Orange	Large	1000	18
MOO05	Orange	Orange	Medium	500	8
SAM02	Apple	Mango	Small	200	25
SAA02	Apple	Apple	Small	200	50
SPP02	Pineapple	Pineapple	Small	200	10
MMM05	Mango	Mango	Medium	500	12
LMM10	Mango	Mango	Large	1000	5
MGG05	Guava	Guava	Medium	500	5
SMO02	Mango	Orange	Small	200	7
MOP05	Orange	Pineapple	Medium	500	12
LAA10	Apple	Apple	Large	1000	32
SGO02	Guava	Orange	Small	200	10
LPP10	Pineapple	Pineapple	Large	1000	3
LOO10	Orange	Orange	Large	1000	25
SOO02	Orange	Orange	Small	200	40

(a) Identify a suitable field to use as the primary key. State a reason for your choice.

Field .....

Reason .....

.....

[2]

(b) Complete the query-by-example grid to display only the stock level and size of all cartons containing only apple juice.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[4]

38 A convenience store which sells general groceries wants to set up a database table called STOCK. The table will contain fields including a description of the item, the price of the item and the number in stock for each item. The STOCK table also has a fourth field to be used as a primary key.

(a) Complete the table to suggest a suitable field name for each of the **four** fields in the table STOCK. Give the purpose of the data to be stored in each field.

Field name	Purpose of field contents

[4]

(b) Complete the query-by-example grid to output stock items where the quantity in stock has fallen below 20. Only show the primary key and description of the items.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[3]

39 A database table, AIRLINE, stores data used to compare airlines.

Code	Airline name	Number of employees	Number of countries	Head office	Share price
FJ	FastJet	60000	30	Europe	514.50
MA	MurphyAir	35000	8	Europe	152.67
JS	JetSeven	45000	22	Asia	257.44
K3	Koala3	22000	11	Australia	501.21
NS	NorthState	30000	4	America	108.22
SS	SouthState	30000	4	America	126.35
BJ	BlueJet	15000	7	Africa	215.45
SK	SkyKing	32000	27	Europe	506.12
PF	PandaFly	50000	35	Asia	317.88

(a) State how many fields and how many records are shown in the AIRLINE table.

Number of Fields .....

Number of Records .....

[2]

(b) Show the output that would be given by this query-by-example.

Field:	Airline name	Number of employees	Head office	Share price
Table:	AIRLINE	AIRLINE	AIRLINE	AIRLINE
Sort:				
Show:	✓	☐	✓	☐
Criteria:		< 35000		> 500.00
or:				

.....

.....

..... [2]

(c) Complete the query-by-example grid to find every airline with a head office in Asia or Africa, and number of countries greater than 4. Only show the airline name and number of countries.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[4]

40 The table AUDIOPARTS stores the part number, description, cost and quantity in stock of the items sold by a music shop.

PartNum	Description	Cost	Quantity
A01	Compact Amplifier Case	50.00	15
A02	Deluxe Amplifier Case	75.00	1
A03	Amplifier Standard	79.99	48
A04	Amplifier Midrange	149.99	50
A05	Amplifier Megablaster	299.99	48
S01	Tweeter	59.99	10
S02	Midrange Woofer	99.99	0
S03	Subwoofer	139.99	16
S04	Tower Speaker Basic	159.99	25
S05	Tower Speaker Skyscraper	219.99	9
S06	Centre Speaker	149.99	25
S07	Soundbar	89.99	2
S20	Soundbar	129.99	0
S21	Ceiling Surround Speaker	75.00	15
S22	Ceiling Full Range Speaker	100.00	1
S25	Surround Speaker	100.00	60
T19	Speaker Stands (Pair)	75.00	60

(a) State the number of records in the table AUDIOPARTS

..... [1]

(b) Identify the field that is most suitable to be a primary key and give a reason for your choice.

Fieldname .....

Reason .....

.....

.....

[2]

(c) Complete the query-by-example grid to show the items where the quantity in stock is fewer than 10. Show all the fields from the database table in descending order of cost.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[4]

41 A marine wildlife rescue centre uses a database table, MARINE, to keep records of its creatures.

Creature	Class	Quantity	Ready for release	Offspring
Manta Ray	Fish	3	Y	N
Short-tailed Albatross	Bird	4	Y	N
Emperor Penguin	Bird	50	Y	Y
Bluefin Tuna	Fish	2	N	N
Manatee	Mammal	4	Y	N
Hawksbill Turtle	Reptile	10	Y	Y
Hammerhead Shark	Fish	3	Y	N
Yellow-eyed Penguin	Bird	4	Y	N
Kemp's Ridley Sea Turtle	Reptile	1	Y	N

(a) State how many fields and how many records are shown in this table.

Number of fields .....

Number of records .....

[2]

(b) Show the output that would be given by this query-by-example.

Field:	Creature	Class	Ready for release
Table:	MARINE	MARINE	MARINE
Sort:			
Show:	☑	☐	☑
Criteria:		="Bird"	
or:			

.....

.....

..... [2]

(c) Complete the query-by-example grid to display the creatures, in ascending order of quantity, that have no offspring and are ready for release. Display only the creature field.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[4]

42 Name and describe the most appropriate programming data type for each of the examples of data given. Each data type must be different.

Data: `37`

Data type name .....

Data type description .....

.....

.....

Data: `Cambridge2021`

Data type name .....

Data type description .....

.....

.....

Data: `47.86`

Data type name .....

Data type description .....

.....

.....

[6]

43 A library uses a database table, GENRE, to keep a record of the number of books it has in each genre.

ID	GenreName	Total	Available	Loaned	Overdue
ABI	Autobiography	500	250	250	20
BIO	Biography	650	400	250	0
EDU	Education	20200	10000	10200	1250
FAN	Fantasy	1575	500	1075	13
GFI	General Fiction	35253	23520	11733	0
GNF	General Non-Fiction	25200	12020	13180	0
HFI	Historical Fiction	6300	3500	2800	0
HNF	Historical Non-Fiction	8000	1523	6477	0
HUM	Humour	13500	9580	3920	46
MYS	Mystery	26000	13269	12731	0
PFI	Political Fiction	23561	10523	13038	500
PNF	Political Non-Fiction	1823	750	1073	23
REF	Reference	374	374	0	0
ROM	Romance	18269	16800	1469	0
SAT	Satirical	23567	12500	11067	0
SCF	Science Fiction	36025	25000	11025	0
SPO	Sport	45720	32687	13033	3256
THR	Thriller	86000	46859	39141	0

(a) State the reason ID could be used as a primary key in the table GENRE.

.....

..... [1]

(b) State the number of records in the table GENRE.

.....

..... [1]

(c) Complete the query-by-example grid to display any genres with overdue books. Only display the ID, GenreName and Overdue fields in order of the number of books overdue from largest to smallest.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[4]

44 A database table, PLANT, is used to keep a record of plants sold by a nursery. The table has these fields:

- NAME – name of plant
- FLOWER – whether the plant flowers (True) or not (False)
- POSITION – shade, partial shade or sun
- SIZE – small, medium or large
- PRICE – price in $
- NUMBERSOLD – how many sold

A query-by-example grid has been completed to display only the price, name and number sold of small plants that do not flower.

Field:	NAME	PRICE	NUMBERSOLD	SIZE	FLOWER	POSITION
Table:	PLANT					
Sort:						
Show:	✓	✓	✓	☐	☐	☐
Criteria:						= "shade"
or:						

Identify the errors in the query-by-example grid.

.....

.....

.....

.....

.....

.....

Rewrite the corrected query-by-example grid.

Field:						
Table:						
Sort:						
Show:	☐	☐	☐	☐	☐	☐
Criteria:						
or:						

[5]

45 Draw a line to connect each **Data Type** to the most appropriate **Description**.

Data Type	Description
Real	Must be a whole number
String	Must be one of two values
Integer	May be any number
Boolean	May contain any combination of characters

[3]

46 A car hire company uses a database table, TREAD, to store details of the cars. The table has fields to represent each car's licence number, mileage, and the tread depth of each of its four tyres.

(a) Suggest suitable names for each of the fields described.

Field name

[2]

(b) Complete the query-by-example grid to display cars where all four tyres have a tread depth of less than 2. Display all the fields, using the field names you created in **part (a)**. The output should be sorted by licence number.

Field:						
Table:						
Sort:						
Show:	☐	☐	☐	☐	☐	☐
Criteria:						
or:						

[4]

47 A database table, APPLIANCE, is used to keep a record of kitchen appliances available for sale.

The following data is stored for each appliance:

- CATEGORY – washer, dishwasher, fridge or freezer
- ECONOMYRATING – A, B, C or D
- MANUFACTURER – Baku or ABC
- PRICE – price in $
- CODE – a unique code allocated by the manufacturer e.g. B982
- STOCK – number in stock.

The database management system uses these data types:

Text Number Currency Boolean

The ECONOMYRATING field and MANUFACTURER field have a data type of text.

(a) Identify the most appropriate data type for each field from the **four** types shown. State the reason why you chose each data type.

CATEGORY data type .....

Reason .....

.....

PRICE data type .....

Reason .....

.....

CODE data type .....

Reason .....

.....

STOCK data type .....

Reason .....

.....

[4]

(b) Complete the query-by-example grid to display only the category, manufacturer and code of the appliances with an economy rating of A.

Field:				
Table:				
Sort:				
Show:	☐	☐	☐	☐
Criteria:				
or:				

[3]

48 A pet supplier uses the database table, STOCK, to keep records of its products for pets.

The fields are:

Field name	Description
ProductID	code to identify the product
ProductName	name of product
ProductDescription	information about the product
Animal	type of animal the product is for, e.g. cat, bird, horse
ProductType	type of product, e.g. food, toy, medicine
InStock	whether the product is in stock or **not**

(a) (i) Identify the field that could have a Boolean data type.

..... [1]

(ii) Identify the field that should be used as the primary key.

..... [1]

(b) Complete the query-by-example grid to output the products intended for a cat that are in stock. Display only the primary key and the name of the products. The output should be sorted by the primary key.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[4]

49 A database table, COMPUTER, is used to keep a record of computers available for sale.

The following data is stored for each computer:

- CATEGORY – desktop, laptop or tablet
- WEIGHT – weight in kilograms
- MANUFACTURER – ICN, Linoldo, Pear or JoeSing
- PRICE – price in $
- CODE – a unique code allocated by the manufacturer, e.g. P771
- STOCK – quantity in stock.

A database management system uses these data types:

Text Number Currency Boolean

The CATEGORY field and MANUFACTURER field have a data type of text.

(a) Select the most appropriate data type for each field from the **four** types shown. State the reason why you chose the data type.

WEIGHT data type .....

Reason .....

.....

PRICE data type .....

Reason .....

.....

CODE data type .....

Reason .....

.....

STOCK data type .....

Reason .....

.....

[4]

(b) Complete the query-by-example grid to display only the category, manufacturer, price and code of the computers with weight of less than 2.5 kilograms.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[3]

50 Tick (✓) **one** box in each row to identify the most appropriate data type for each description. Only **one** tick (✓) per column.

Description	Data type				
	Boolean	**Char**	**Integer**	**Real**	**String**
a single character from the keyboard					
multiple characters from the keyboard					
only one of two possible values					
only whole numbers					
any number					

[4]

51 A computer game shop records its stock levels in a database table called GAMES. The fields used in the stock table are shown.

Name	Description
GameID	primary key
GameName	the name of each game
AgeRestriction	the minimum age at which a person is allowed to play each game
GamePrice	the selling price for each game
NumberStock	the quantity of each game currently in stock
OnOrder	whether or **not** each game is on order from the suppliers
DateLastOrdered	the date the most recent order for each game was placed
GameDescription	a summary of the contents and purpose of each game

(a) State the number of fields that are in the table GAMES.

.....

[1]

(b) State **one** important fact that must be true for a field to be a primary key.

.....

.....

[1]

(c) Complete the query-by-example grid to output all the games that have no stock and that are on order with the supplier. Display only the GameID, GameName and GamePrice fields in alphabetical order of the name of the game.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[3]

52 A database table, NURSE, is used to keep a record of disposable items worn by veterinary nurses.

This is part of the table:

ItemNumber	Description	SingleUse	Uses	StockLevel	ReorderLevel
DIG1	Glove (pair)	Y	1	500	800
DIA1	Apron	Y	1	700	800
DIM5	Hair net	Y	1	650	500
DIA2	Apron	N	5	25	100
DIS4	Suit	N	3	70	50
DIV9	Shoe cover (pair)	Y	1	400	250

(a) Complete this query-by-example grid to display only the item number and the description of single use items, where the stock level is below the reorder level.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[4]

(b) Give a reason why the field SingleUse is **not** required in the table NURSE.

.....

..... [1]

53 Data about planets in the solar system is stored in a database table called PLANETS. The fields used in the table are shown.

Name of field	Contents of field
PlanetName	the name of the planet
PlanetMass	the planet's mass in kilograms
Larger	whether or **not** the planet has a greater mass than Earth
MaxDistance	the maximum distance the planet is from Earth in kilometres
MinDistance	the minimum distance the planet is from Earth in kilometres
YearLength	the length of time it takes for the planet to orbit the Sun in Earth days

(a) State the name of the field that could contain Boolean data.

..... [1]

(b) Complete the query-by-example grid to output the planets with a longer year length and greater mass than Earth. Assume Earth's year length is 365 days.

Display only the name of the planets sorted in alphabetical order.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[3]

54 A database table called `TVRange` shows the main features and prices of a range of televisions.

TVCode	ScreenSize	Satellite	SmartTV	SoundBar	Price$
TV90SaSmSd	90	YES	YES	YES	9750.00
TV75SaSmSd	75	YES	YES	YES	8500.00
TV75SaSd	75	YES	NO	YES	8000.00
TV65SaSmSd	65	YES	YES	YES	6000.00
TV65SmSd	65	NO	YES	YES	5000.00
TV65SaSd	65	YES	NO	YES	5000.00
TV55SaSmSd	55	YES	YES	YES	4000.00
TV55SaSd	55	YES	NO	YES	3500.00
TV55SmSd	55	NO	YES	YES	3500.00
TV50SaSmSd	50	YES	YES	YES	2500.00
TV50Sa	50	YES	NO	NO	1750.00
TV50Sm	50	NO	YES	NO	1750.00
TV40Sa	40	YES	NO	NO	1200.00
TV40	40	NO	NO	NO	950.00
TV32	32	NO	NO	NO	650.00

(a) Give the name of the field that is most suitable to be the primary key.

State the reason for this choice.

Field .....

Reason .....

.....

[2]

(b) The database uses the data types:

- text
- character
- Boolean
- integer
- real
- date/time.

Complete the table to show the most appropriate data type for each field.
Each data type must be different.

Field	Data type
TVCode	
ScreenSize	
SmartTV	
Price$	

[2]

(c) Complete the structured query language (SQL) query to return the television (TV) code, screen size and price of all Smart TVs in the database table.

```
SELECT TVCode, ....., .....

..... TVRange

WHERE SmartTV = .....;
```

[4]

55 A music streaming service has a new database table named `Songs` to store details of songs available for streaming. The table contains the fields:

- `SongNumber` – the catalogue number, for example AG123
- `Title` – the title of the song
- `Author` – the name of the song writer(s)
- `Singer` – the name of the singer(s)
- `Genre` – the type of music, for example rock
- `Minutes` – the length of the song in minutes, for example 3.75
- `Recorded` – the date the song was recorded.

(a) Identify the field that will be the most appropriate primary key for this table.

..... [1]

(b) Complete the table to identify the most appropriate data type for the fields in `Songs`

Field	Data type
`SongNumber`	
`Title`	
`Recorded`	
`Minutes`	

[2]

(c) Explain the purpose of the structured query language (SQL) statements.

```
SUM (Minutes) FROM Songs WHERE Genre = "rock";

COUNT (Title) FROM Songs WHERE Genre = "rock";
```

.....

.....

.....

.....

.....

..... [3]

56 A database table called `Site1` stores details of some holiday homes at a holiday park. The database shows the type of home, number of guests, whether it is privately owned and the weekly rate to hire it.

Name	Type	Private	Rate$	NumberGuest
Bay Lodge	Lodge	NO	1000	10
Bay View	Cabin	NO	400	4
Blue Skies	Cabin	NO	350	4
Cliff View	Cabin	NO	650	6
Coppice Lodge	Lodge	NO	1200	12
Green Lodge	Lodge	NO	1000	8
Henry	Cabin	YES	300	2
Hikers' Rest	Retreat	NO	750	6
Poppy	Cabin	NO	300	2
Summer Joy	Retreat	YES	750	6
Valley View	Cabin	NO	600	6
West Lodge	Lodge	YES	1200	12

(a) State the number of fields and the number of records in this database table.

Fields .....

Records .....

[2]

(b) Describe the purpose of a primary key.

.....

..... [1]

(c) The database uses the data types:

- alphanumeric
- character
- Boolean
- integer
- real
- date/time.

Complete the table to show the most appropriate data type for each field.

Field	Data type
`Type`	
`Private`	
`Rate$`	
`NumberGuest`	

[2]

(d) Give the output that would be produced by the structured query language (SQL) statement:

```
SELECT Name, NumberGuest, Rate$
FROM Site1
WHERE NumberGuest >= 10;
```

.....

.....

.....

.....

.....

..... [3]

57 **Four** descriptions of data and **five** data types are shown.

Draw **one** line to link each description to the most appropriate data type.
Not all data types will be used.

Description	Data type
a whole number	BOOLEAN
a single letter	CHAR
a word or phrase	INTEGER
a number with two decimal places	REAL
	STRING

[4]

58 A model shop wants to set up a database to help with stock control of the model figures available for sale. The shop wants to store this information about the model figures:
Field 1 – catalogue number, for example MD1234
Field 2 – description, for example 'small white dog'
Field 3 – number in stock, for example 5
Field 4 – the price of each model, for example 7.40
Field 5 – if the model has already been painted, yes or no.

(a) The shop needs **five** fields for each record.
Give a suitable name and data type for each field.

Field 1 name .....

Data type .....

Field 2 name .....

Data type .....

Field 3 name .....

Data type .....

Field 4 name .....

Data type .....

Field 5 name .....

Data type .....

[5]

(b) **(i)** Give the name of the field that should be used for the primary key.

..... [1]

(ii) State why this field is used as the primary key.

.....

[1]

(c) Structured query language (SQL) is used to query data stored in this database.
State what these SQL commands are used for.

SELECT .....

.....

FROM .....

.....

WHERE .....

.....

[3]

59 A database table called `Horses` stores details about the horses kept at a horse sanctuary.

Code	Breed	BreedOrigin	Gender	Age	Arrived
H002	Arabian	Saudi Arabia	M	5	28/09/2022
H004	Percheron	France	M	5	30/10/2022
H010	Friesian	Netherlands	M	6	15/11/2022
H011	Fjord	Norway	F	4	17/11/2022
H012	Clydesdale	Scotland	M	10	18/11/2022
H015	Arabian	Saudi Arabia	F	5	15/12/2022
H016	Arabian	Saudi Arabia	F	5	15/12/2022
H017	Clydesdale	Scotland	F	4	16/01/2023
H019	Percheron	France	M	3	16/01/2023
H025	Percheron	France	M	7	16/01/2023
H026	Clydesdale	Scotland	F	9	20/01/2023
H030	Clydesdale	Scotland	M	12	20/01/2023
H032	Fjord	Norway	M	3	24/03/2023
H033	Arabian	Saudi Arabia	F	15	27/04/2023
H034	Clydesdale	Scotland	F	4	14/06/2023
H035	Fjord	Norway	M	7	15/06/2023
H036	Friesian	Netherlands	F	15	20/07/2023
H037	Friesian	Netherlands	M	12	20/07/2023

(a) State the number of records in this database table.

..... [1]

(b) Give the name of the field that is most suitable to be the primary key.

State the reason for this choice.

Field .....

Reason .....

.....

[2]

(c) The database only allows the data types:

- Boolean
- character
- date/time
- integer
- real
- text.

Complete the table to show the most appropriate data type for each field.
Each data type must be different.

Field	Data type
Breed	
Gender	
Age	
Arrived	

[2]

(d) Complete the structured query language (SQL) to return the code and breed of all the horses whose breed originated in Scotland.

```
..... Code, Breed,

FROM .....

WHERE ..... = "Scotland";
```

[3]

60 A sanctuary for pheasants has set up a new database table called `PheasantList` to store details of the different species of bird at the sanctuary. Part of this table is given, showing: species, description, number of birds at the sanctuary, if the birds are breeding or **not**, and number of young born this year.

Species	Description	NumberBirds	Breeding	Young
Edwards	blue-black with white tail	5	Yes	0
Japanese green	dark green with pale grey tail	2	Yes	2
Reeves	golden, white and red scaled plumage	4	Yes	1
Crawfords Kalij	glossy blue-black plumage	4	No	0
Crested fireback	blue-black with black tail	3	No	0
True silver	white laced top half and black lower half	7	Yes	1
Siamese fireback	grey plumage with crimson legs and feet	5	No	0
Mikado	iridescent plumage with white striped wings	3	Yes	4
Red junglefowl	many colours	2	Yes	0
Himalayan monal	many colours with metallic green crest	3	Yes	2
White eared	white with ear tufts	5	Yes	3
Brown eared	brown with ear tufts	9	Yes	1
Ring necked	long tail with white ring neck	2	Yes	2
Golden	rainbow coloured	3	Yes	4

(a) State the number of records and fields in this part of the database table.

Records .....

Fields .....

[2]

(b) **(i)** Give the name of a field that could be used for the primary key.

..... [1]

(ii) Explain why the sanctuary might decide **not** to use the field in **(b)(i)** as the primary key.

.....

..... [1]

(iii) A new field `SpeciesID` is added to the database table.
This field contains a six-character code, for example Ph0001.

Give a reason why this field would be a better primary key.

.....

..... [1]

(c) Write the output that would be given by this structured query language (SQL) statement:

```
SELECT Species, Description

FROM PheasantList

WHERE NumberBirds > 6;
```

.....

..... [2]

(d) Complete this SQL statement to display all the species of pheasant where the birds are breeding and there were no young born this year:

```
SELECT .....

FROM .....

WHERE .....

..... ;
```

[4]

61 A database table called `SoftDrinks` stores details of the soft drinks sold by a small shop.

Field	Example data
`Name`	Cola
`Supplier`	Cambridge Beverages
`Container`	Can
`SizeCl`	330
`NumberInStock`	30
`ReorderLevel`	15
`Reordered`	Yes

(a) State whether any of the given fields would be suitable as a primary key and give a reason for your answer.

.....

..... [1]

(b) Complete the structured query language (SQL) statement to return the number of cans the shop has in stock.

```
SELECT ..... (.....)

FROM .....

WHERE ..... = ..... ;
```

[5]

62 A television subscription service has a new database table named `Contract` to store details of their subscribers' contracts. The table contains these fields:

- `ContractNumber` – the contract number, for example CT567
- `Months` – the length of the contract in months, for example 6
- `EndDate` – the date the contract finishes, for example 30 November 2024
- `News` – the news service, yes or no
- `Movie` – the movie service, yes or no
- `Sport` – the sports service, yes or no
- `Junior` – the children's service, yes or no.

(a) Identify the field that will be the most appropriate primary key for this table.

..... [1]

(b) Complete the table to identify the most appropriate data type for these fields in `Contract`

Field	Data type
`ContractNumber`	
`Months`	
`EndDate`	
`Sport`	

[2]

(c) Explain the purpose of these structured query language (SQL) statements.

Statement 1: `SELECT SUM (Months) FROM Contract;`

Statement 2: `SELECT COUNT (News) FROM Contract WHERE News;`

Statement 1 .....

.....

.....

Statement 2 .....

.....

.....

[3]

(d) Complete this SQL statement to find the contract numbers of the subscribers that take both the news and sports services.

```
SELECT .....

FROM Contract

WHERE ..... AND ..... ;
```

[2]

63 A database table called `Hangar1` stores details of a collection of historic aircraft at a museum.

ID	Make	Model	Year	Engines	Airworthy
JM1	Hawker Siddeley	Nimrod	1966	4	Y
JM2	Douglas	DC-10	1970	3	Y
JM3	Aérospatiale-BAC	Concorde	1973	4	N
PB1	De Havilland	DH-9	1918	1	Y
PB2	Hawker	Fury	1935	1	Y
PB3	Hawker	Nimrod	1934	1	Y
PM1	Fieseler	Storch	1942	1	N
PM2	Hawker	Hurricane	1942	1	Y
PM3	Supermarine	Spitfire	1942	1	N
PM4	Douglas	C-47 Dakota	1942	2	N
PS1	Boeing	314 Clipper	1936	4	N

(a) State the number of fields and records in the database table.

Fields .....

Records .....

[2]

(b) Give the output that would be produced by the structured query language (SQL) statement:

```
SELECT Model, Year, Engines
FROM Hangar1
WHERE Engines > 1
ORDER BY Year;
```

.....

.....

.....

.....

.....

.....

.....

..... [4]

(c) Complete the SQL statement to display only the ID and model of all the aircraft that are airworthy.

```
SELECT ID, .....
.....
.....
..... ;
```

[4]

64 A shop that sells cheese has set up a new database table called `CheeseStock` to store details of the cheeses available for sale. Part of this table is given.

ChNo	Name	InStock	SupplierCode	PricePerKg	WeightKg
CH01	American	Yes	XYZ	4.50	20.0
CH02	Brie	Yes	XYZ	7.50	21.0
CH03	Burrata	No	IMP	13.75	0.0
CH04	Camembert	No	ABC	16.85	0.0
CH05	Cheddar	Yes	ABC	5.00	50.0
CH06	Comté	No	SPC	7.35	0.0
CH07	Cottage	Yes	XYZ	4.50	3.0
CH08	Cream	Yes	XYZ	5.50	6.5
CH12	Emmental	Yes	IMP	2.75	1.5
CH15	Feta	Yes	IMP	12.75	12.0
CH16	Fontina	Yes	SPC	15.99	1.2
CH17	Gorgonzola	Yes	SPC	15.25	0.3
CH19	Gouda	Yes	SPC	7.99	2.5
CH21	Gruyère	No	SPC	16.75	0.0
CH22	Halloumi	Yes	IMP	4.75	15.0
CH23	Havarti	No	SPC	6.75	0.0
CH27	Manchego	No	IMP	13.99	0.0
CH30	Manouri	No	IMP	18.50	0.0
CH31	Mascarpone	No	SPC	12.99	0.0

(a) State the number of records in this part of the database table.

..... [1]

(b) **(i)** Give the name of the field that would be used for the primary key.

..... [1]

(ii) State the reason for choosing this field for the primary key.

.....

..... [1]

(c) Write the output from this structured query language (SQL) statement.

```
SELECT ChNo, WeightKg
FROM CheeseStock
WHERE SupplierCode = 'ABC';
```

.....

.....

..... [2]

(d) **(i)** Complete this SQL statement to display only the name of all the cheeses that are out of stock.

```
SELECT .....
FROM .....
WHERE ..... ;
```

[3]

(ii) Explain how **one** of the lines in your statement in part **(d)(i)** could be changed to display the same information.

.....

.....

.....

..... [2]

65 A database table called `Booking28` stores details of hotel rooms and bookings for the week beginning Monday 7 July 2025.

RoomNo	Type	Guests	Rate$	Mon	Tue	Wed	Thu	Fri	Sat	Sun
101D	Double	2	99.99	T	T	T	T	F	T	T
102D	Double	2	99.99	T	T	T	F	T	T	T
103F	Family	4	150.00	T	T	T	T	T	T	T
104S	Single	1	72.50	F	T	T	F	T	T	T
105S	Single	1	72.50	F	T	T	F	T	T	T
106T	Twin	2	120.00	T	T	T	T	F	T	T
201F	Family	4	160.00	F	F	T	T	T	T	T
202D	Double	2	120.00	T	F	T	T	T	T	T
203T	Twin	2	120.00	T	F	T	T	T	T	T
204T	Twin	2	125.00	T	F	T	F	T	T	T
205S	Single	1	79.99	T	F	T	T	F	T	T
301D	Double	2	200.00	F	T	T	F	F	T	T
302T	Twin	2	200.00	T	T	T	T	F	T	T
303P	Suite	4	500.00	T	T	T	T	F	T	T
304P	Suite	6	700.00	F	F	F	F	T	T	T

(a) State the number of fields and records in this database table.

Fields .....

Records .....

[2]

(b) State the reason why the `Type` field would **not** be suitable as a primary key.

.....

..... [1]

(c) The database uses only the data types:

- alphanumeric
- character
- Boolean
- integer
- real
- date/time.

Complete the table to show the fields that could have the given data types.

Only **one** field name is required in each box and each field name must be different.

Field	Data type
	alphanumeric
	Boolean
	real
	integer

[2]

(d) Give the output that would be produced by the structured query language (SQL) statement:

```
SELECT RoomNo, Type, Guests, Rate$

FROM Booking28

WHERE Mon <> T;
```

.....

.....

.....

.....

.....

..... [3]

66 Building materials are sold in bags. A new database table called `BuildStock` has been set up to store details about the materials for sale. Part of this table is given.

MtNo	Name	InStock	WeightKg	PricePerBag	NumberBags
MT01	Builders sand	Yes	50	4.50	50
MT02	Sharp sand	Yes	25	3.50	21
MT03	Red sand	No	50	2.75	0
MT04	Cement	No	25	6.85	0
MT05	Chippings	Yes	50	35.00	50
MT06	Cobbles	No	75	67.35	0
MT07	Pebbles small	Yes	50	34.50	3
MT08	Pebbles medium	Yes	25	25.50	10
MT12	Pebbles large	Yes	75	62.75	20
MT15	Washed gravel	Yes	50	12.75	12
MT16	Pea gravel	Yes	100	15.95	24

(a) Write the output from this structured query language (SQL) statement.

```
SELECT MtNo, Name
FROM BuildStock
WHERE WeightKg = 75
ORDER BY PricePerBag;
```

.....

.....

..... [3]

(b) **(i)** Complete this SQL statement to display only the names of all the materials that are out of stock.

```
SELECT .....

FROM .....

WHERE .....
```

[2]

(ii) Explain how another SQL statement using a different field could be used to display the same information.

.....

.....

.....

..... [2]