DATABASE DESIGN & DEVELOPMENT

Name:

ANALYSIS

Identify the end-user and functional requirements of a database problem that relates to the implementation at this level

2019 Q14a

14. A youth club plans to create a database to store details of club members.

(a) The youth club leaders have been discussing the requirements of the new database.

Use the information above to identify two functional requirements. **2**

Requirement 1

_____

Requirement 2

_____

DESIGN

Describe and identify the implications for individuals and businesses of the UK General Data Protection Regulation (UK GDPR) that data must be:

- *Processed lawfully, fairly, and in a transparent manner in relation to individuals*
- *Used for the declared purpose only*
- *Limited to data need for the declared purpose*
- *Accurate*
- *Not kept longer than necessary*
- *Held securely*

SQP Q3

3. State two implications of the General Data Protection Regulation for a business that stores the personal details of its staff. **2**

Implication 1

_____

Implication 2

_____

2017 Q14b

14. Bike Scotland uses a flat file database to store details of its members and affiliated cycling clubs.

(b) The database contains personal information.

(i) State the **Act** with which Bike Scotland must comply. **1**

(ii) Describe what Bike Scotland must do to ensure it complies with this Act when collecting this information. **1**

2016 Q18e

18. A software development company decides to review staff knowledge of computer related legislation.

Mikal is asked to create an app covering a range of legal issues.

(e) When a staff member runs the finished quiz, the app sends their details and their total score to a database file.

State **two** rights that a staff member has under the Data Protection Act with regard to their own data. **2**

DESIGN

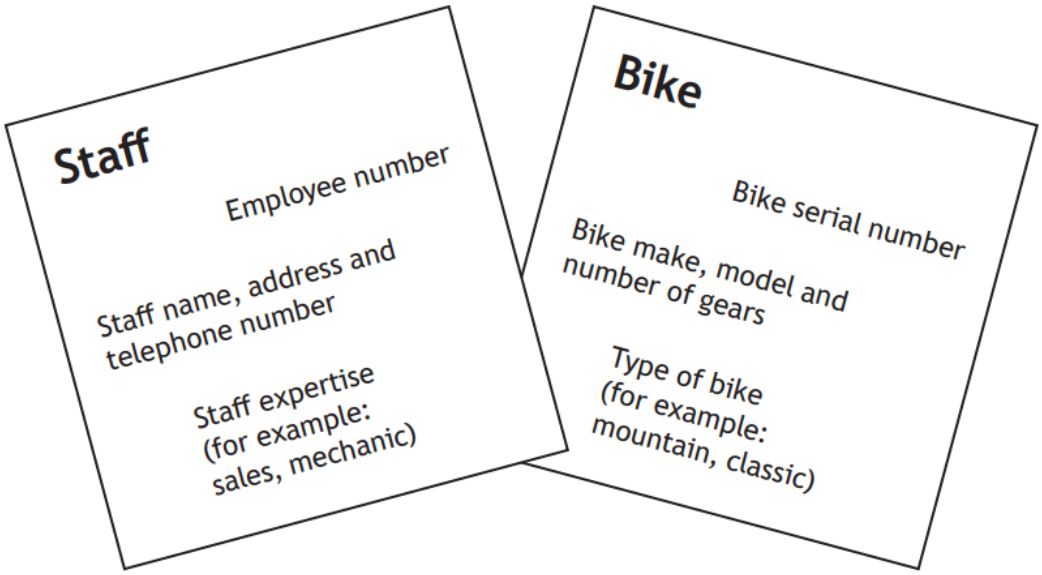
Describe and exemplify entity-relationship diagrams with two entities indicating:

- *Entity name*
- *Attributes*
- *Relationship (one to many)*

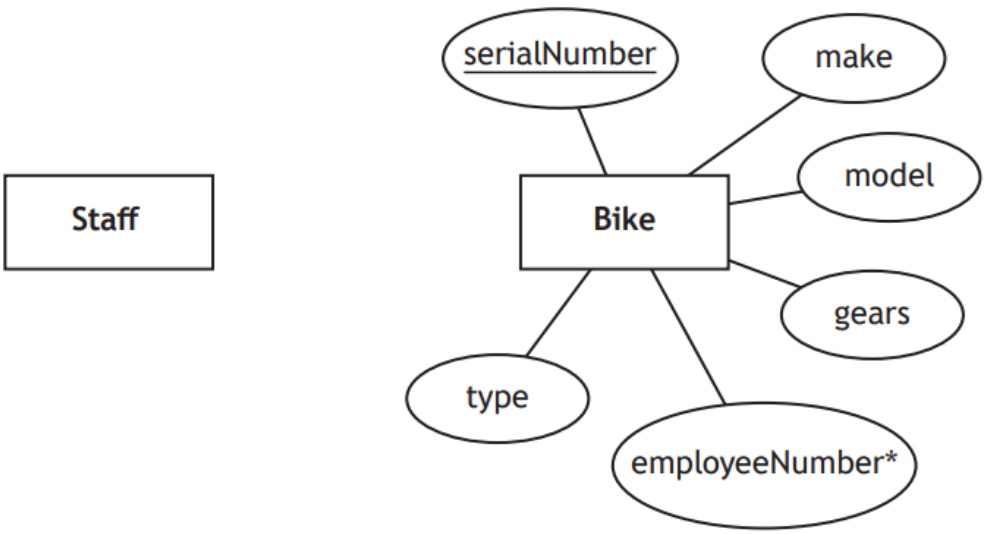
SQP Q17a

17. Angela works in a cycle shop. She decides to create a database to store information on staff and bikes. This would make it easier to record which staff member prepared each bike for sale.

Angela starts by analysing the problem. She looks at what information the store currently holds on paper and makes notes as follows:



(a) Complete the entity-relationship diagram below. **4**



SQP Q20a(iii)

20. Scot Cars (a second-hand car company) has branches located in five different Scottish towns and cities. They maintain a database of all cars they have in stock. Some of the records from the relational database are shown below.

Table name: Branch				
branchNumber	**street**	**town**	**postcode**	**dateFounded**
18536423	10 Glasgow Road	Hamilton	HA9 8FR	14/07/1962
29736453	13 Pretty Drive	Inverness	IN2 13GW	11/12/1970
99108663	194 Collinton Avenue	Edinburgh	EH28 1PK	28/02/1965
36352363	125 Milk Way	Glasgow	G2 3HJ	17/01/2010
28635491	243 Bents Road	Dundee	DN14 7CD	01/10/1997

Table name: Car							
make	**model**	**colour**	**registration**	**mileage**	**electricWindows**	**alloyWheels**	**branchNumber**
Ford	Ka	White	SL23 GTD	37970	Yes	No	99108663
Volkswagen	Golf	Black	ST99 FDT	33200	Yes	Yes	18536423
Ford	Escort	Silver	X364 TNK	120665	No	No	28635491
Vauxhall	Corsa	Yellow	BH20 SWZ	4009	Yes	Yes	28635491
Nissan	Qashqai	Black	SH88 NNG	67118	Yes	Yes	18536423
BMW	3 Series	Blue	SH34 BNM	33200	Yes	Yes	29736453
Ford	Ka	Green	SL85 HDF	40029	No	No	29736453

(iii) State the relationship that exists between the two implemented tables. **1**

2019 Q10a

10. A database query design includes the following conditions in the search criteria.

```
delivery > 01/05/2019 AND delivery < 31/05/2019
```

(a) State the attribute type used above. **1**

2019 Q14b

(b) The youth club currently records information on paper documents.

Examples are shown below.

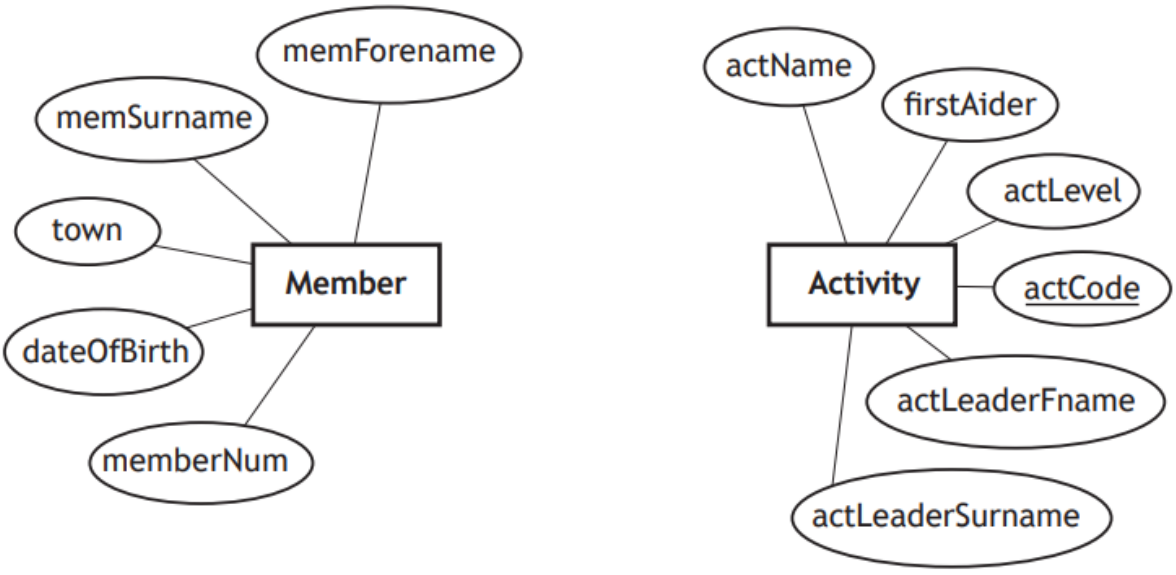
Club Membership Card	
Member Forename:	*Saliha*
Member Surname:	*Shad*
Membership Number:	*43*
Town:	*Corkerhill*
Date of Birth:	*18/03/2006*
Activity Code:	*426*

Activity Card	
Activity Name:	*Craft*
Activity Code:	*426*
Activity Level:	
Beginner (Intermediate) Advanced	
Activity Leader First Name:	*Jack*
Activity Leader Surname:	*Jones*
First Aider:	☑ Yes ☐ No

Each activity can have a maximum of 10 club members. Each club member can register for only one activity.

Use the information provided to complete the entity relationship diagram below by

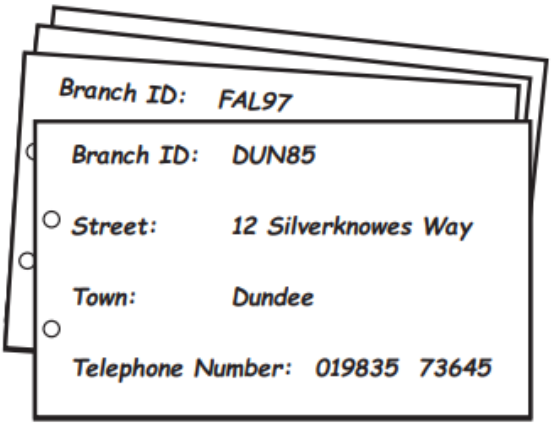
- drawing any missing attributes
- drawing the relationship between the entities
- naming the relationship between the entities
- identifying any additional key attributes. **4**



2018 Q23a

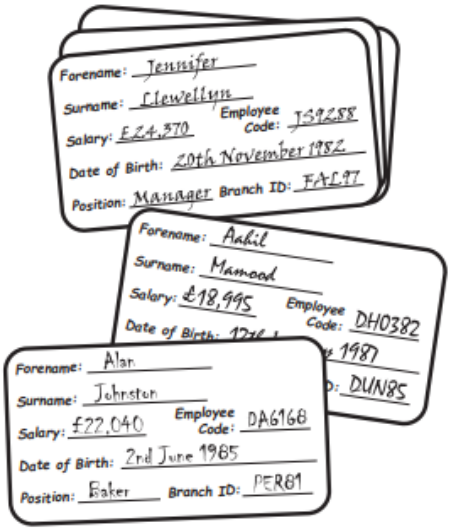
23. Sydney Bakery owns three high street shops in Dundee, Falkirk and Perth.

The bakery wishes to design and implement a database to store the information shown below.



Examples of Shop Information Cards

Currently typed up by staff and kept as printed copies.

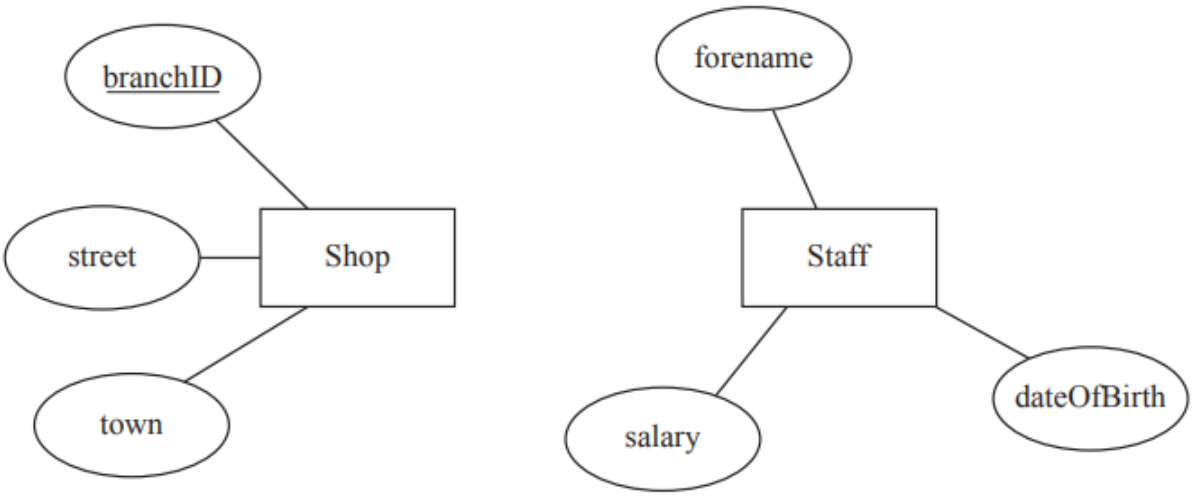


Examples of Staff Information Cards

Currently hand written by each shop manager and kept for reference.

(a) Complete the entity relationship diagram below by:

- drawing any missing attributes from either entity
- drawing the relationship between the entities
- naming the relationship between the entities
- identifying any additional key fields. **6**



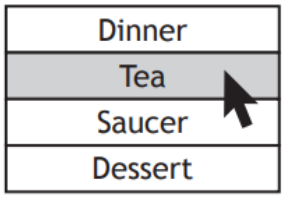
DESIGN

Describe and identify a data dictionary:

Entity name; attribute name; primary and foreign key; attribute type (test, number, date, time, Boolean); attribute size, validation (presence check, restricted choice, field length, range)

SQP Q9

9. A pottery shop's database allows users to choose a type of plate, as follows:



(a) State the type of validation shown above. **1**

(b) Describe why the database uses this type of validation. **1**

SQP Q20a(i)

(i) State the purpose of a foreign key in a relational database. **1**

SQP Q20a(ii)

20. Scot Cars (a second-hand car company) has branches located in five different Scottish towns and cities. They maintain a database of all cars they have in stock. Some of the records from the relational database are shown below.

Table name: Branch				
branchNumber	**street**	**town**	**postcode**	**dateFounded**
18536423	10 Glasgow Road	Hamilton	HA9 8FR	14/07/1962
29736453	13 Pretty Drive	Inverness	IN2 13GW	11/12/1970
99108663	194 Collinton Avenue	Edinburgh	EH28 1PK	28/02/1965
36352363	125 Milk Way	Glasgow	G2 3HJ	17/01/2010
28635491	243 Bents Road	Dundee	DN14 7CD	01/10/1997

Table name: Car							
make	**model**	**colour**	**registration**	**mileage**	**electricWindows**	**alloyWheels**	**branchNumber**
Ford	Ka	White	SL23 GTD	37970	Yes	No	99108663
Volkswagen	Golf	Black	ST99 FDT	33200	Yes	Yes	18536423
Ford	Escort	Silver	X364 TNK	120665	No	No	28635491
Vauxhall	Corsa	Yellow	BH20 SWZ	4009	Yes	Yes	28635491
Nissan	Qashqai	Black	SH88 NNG	67118	Yes	Yes	18536423
BMW	3 Series	Blue	SH34 BNM	33200	Yes	Yes	29736453
Ford	Ka	Green	SL85 HDF	40029	No	No	29736453

(ii) Complete the table below to identify the keys that were created when this relational database was implemented. **3**

	Table	Field
Primary key		
Primary key		
Foreign key		

2019 Q8a

8. Three records from a database table are shown below.

Book			
bookRef	**title**	**author**	**publisher**
0783567328120	The Cat's Pyjamas	R J Petersen	Germiston
0703487922417	Grass Is Green	V R Singh	East Rand
0724603125633	Climb the Hill	R McGrath	Brown

(a) State a suitable type of validation for the `bookRef` field. **1**

2019 Q14c – Q14b included for reference

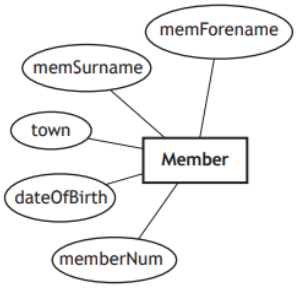
(b) The youth club currently records information on paper documents.
Examples are shown below.

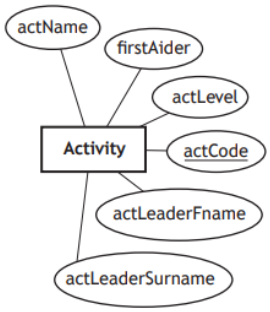
Club Membership Card

Member Forename: *Saliha*
Member Surname: *Shad*
Membership Number: *43*
Town: *Corkerhill*
Date of Birth: *18/03/2006*
Activity Code: *426*

Activity Card

Activity Name: *Craft*
Activity Code: *426*
Activity Level:
Beginner (Intermediate) Advanced
Activity Leader First Name: *Jack*
Activity Leader Surname: *Jones*
First Aider: ☑ Yes ☐ No





Each activity can have a maximum of 10 club members. Each club member can register for only one activity.

Use the information provided to complete the entity relationship diagram below by

- drawing any missing attributes
- drawing the relationship between the entities
- naming the relationship between the entities
- identifying any additional key attributes. **4**

(c) State and describe a type of validation that could be applied to the `actLevel` attribute. **2**

Type of validation

Description

2019 Q17a

17. A company uses a relational database to store details of job vacancies for current employees. Each employee can apply for only one vacancy.

The tables below show current job vacancies and employees.

Vacancy			
jobRef	**jobTitle**	**department**	**startDate**
HR22	Clerk	HR	04/06/2019
PD18	Manager	Production	
AD36	Administrator	Admin	30/06/2019
FN42	Finance Officer	Finance	
PD20	Sales Manager	Production	10/07/2019

Employee						
appRef	**jobRef**	**initial**	**surname**	**payGrade**	**drivingLicence**	**cvAttached**
325	HR22	C P	Martin	2	☑	☑
326	PD18	G L	Wood	1	☑	☑
327	HR22	H	Patel	3	☐	☑
328	HR22	B F	Lee	3	☑	☐
329	AD36	M	Aliyev	3	☐	☑
330	PD18	L M	Nowak	2	☐	☑
331	HR22	S	Patel	1	☑	☑

(a) The start date for two jobs in the Vacancy table has not been entered.

Describe what should be done to ensure that `startDate` is not left blank. **1**

2018 Q5

5. State why a database table should be designed to include a primary key field. **1**

2018 Q20a & Q20b

20. A database stores information about a walking club.

The table 'Route' stores all the available routes.

The table 'Walk' stores information when one of these routes is completed.

Part of the information stored in each table is shown below.

Route						
routeID	start	finish	estimatedMins	Kms	routeType	rating
1	Shiel Bridge	Glen More	480	23	Mountain	5
2	Aberdour	Anstruther	600	44	Coastal	4
3	Rackwick	Rackwick	180	12	Coastal	2
4	Kelty	Loch Glow	90	5	Forest	1
5	Fort William	Steall Falls	210	8	Hill	4
6	Pitlochry	Blair Atholl	175	11	Forest	2

Walk						
walkNumber	walkDay	departure	numberWalkers	rained	minutesTaken	routeID
1893	21/03/17	09:00	9	Yes	213	3
2002	30/04/17	07:30	15	No	167	3
0019	27/11/14	11:10	30	No	606	2
0218	01/02/16	13:30	3	No	102	4
0723	16/10/15	02:00	12	Yes	713	2
0086	01/01/15	08:45	24	Yes	180	6
1992	05/04/17	13:00	2	No	512	1
0499	19/11/15	14:00	9	No	190	5

(a) Complete the table below to identify the keys that were created when this relational database was implemented. **3**

	Table	Field
Primary Key		
Primary Key		
Foreign Key		

(b) State the attribute type that would be most suitable for the following fields. **2**

walkDay

minutesTaken

2018 Q23b

(i) State the purpose of a data dictionary. **1**

2017 Q8

8. An example of a database record is shown below.

Employees					
Employee ID	**Forename**	**Surname**	**Full Time**	**Home Phone Number**	**Mobile Phone Number**
2365	Dee	Rossborough	True	01383 712345	07974 354267

(a) Explain why the Employee ID field requires a presence check. **1**

(b) Employee photographs are to be added to the database record.

State a field type which should be used to contain a photograph of each employee. **1**

2017 Q14a & Q14d

14. Bike Scotland uses a flat file database to store details of its members and affiliated cycling clubs.

Membership Number	Forename	Surname	Date of Birth	Club Code	Club Name	Founded	Number of Members
011-423	Alojzy	Czajka	15/03/1979	24FW05	Free Wheel	16/10/2000	67
192-033	Donny	Carruthers	20/02/1982	77SU22	Spokes United	29/04/1985	29
213-847	Salim	Hanif	09/06/1994	12DW39	District Wheelers	03/01/1954	45
624-536	Harry	Fence	01/02/1963	12DW39	District Wheelers	03/01/1954	45
018-253	Derrick	Smith	12/12/1970	77SU22	Spokes United	29/04/1985	29
773-362	Maria	Amonte	02/11/1999	24FW05	Free Wheel	16/10/2000	67
836-555	Fiona	Hewitt	20/02/1972	77SU22	Spokes United	29/04/1985	29
983-543	Samantha	Wellbeck	18/09/1975	77SU22	Spokes United	29/04/1985	29
098-133	Tracy	Uttley	30/05/2000	12DW39	District Wheelers	03/01/1954	45

(a) State the **field type** used to store each Membership Number. **1**

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14. (continued)

The database is redesigned and implemented as a relational database with two linked tables.

Cyclist

Membership Number	Forename	Surname	Date of Birth	Club Code
098-133	Tracy	Uttley	30/05/2000	12DW39
213-847	Salim	Hanif	09/06/1994	12DW39
624-536	Harry	Fence	01/02/1963	12DW39
011-423	Alojzy	Czajka	15/03/1979	24FW05
773-362	Maria	Amonte	02/11/1999	24FW05
018-253	Derrick	Smith	12/12/1970	77SU22
192-033	Donny	Carruthers	20/02/1982	77SU22
836-555	Fiona	Hewitt	20/02/1972	77SU22
983-543	Samantha	Wellbeck	18/09/1975	77SU22

Club

Club Code	Club Name	Founded	Number of Members
12DW39	District Wheelers	03/01/1954	45
24FW05	Free Wheel	16/10/2000	67
77SU22	Spokes United	29/04/1985	29

(d) (i) Explain why the Club Code field is a primary key and a foreign key in the relational database. **2**

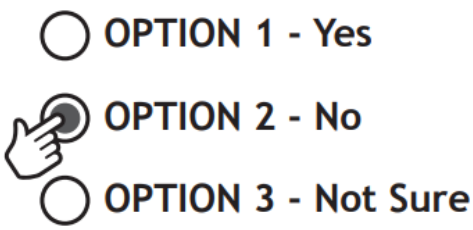
(ii) When adding a new club to the Club table the following error message is displayed:

Club code **12OYB22** is invalid, please re-enter

State the validation that has been applied to the field Club Code. **1**

2016 Q4

4. Give **one** reason for using this type of selection.



1

2016 Q15a & Q15d & Q15e(i)

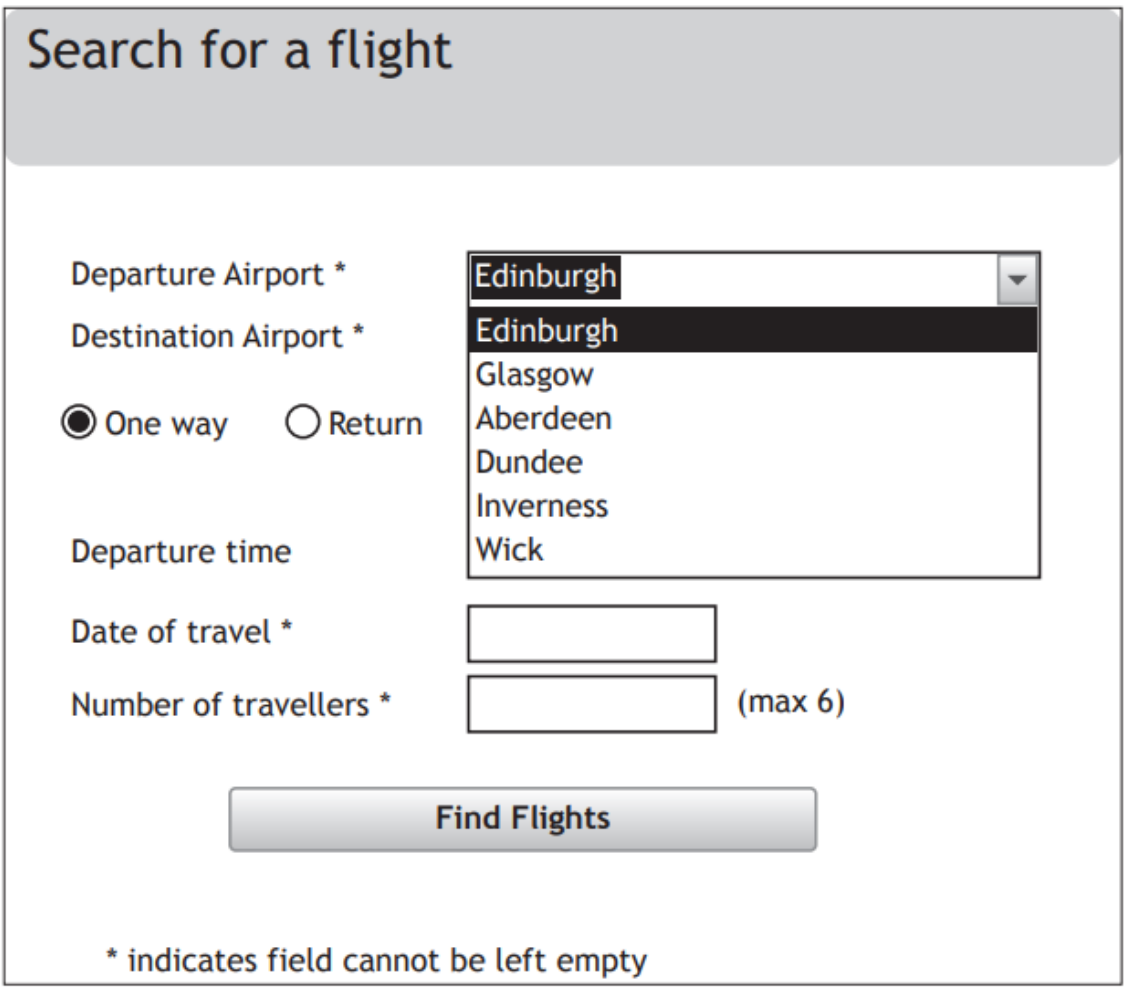
15. FlightCrazy is a new company offering a flight booking service to business customers. They want to set up a database to store flight details. A researcher starts to gather information from airport timetables about available flight times.

Route ID	Departure Airport	Destination Airport	Day	Departure Time	Duration (hrs)	Airline Ref	Airline Name	Flight Number	Aircraft Code
001	Edinburgh	Amsterdam	Monday	07:00	01:35	KL	KLM	KL1276	737
001	Edinburgh	Amsterdam	Monday	08:00	01:30	U2	Easyjet	U26921	319
001	Edinburgh	Amsterdam	Saturday	10:15	01:30	U2	Easyjet	U26921	320
001	Edin	Amsterdam	Monday	11:10	01:30	KL	KLM	KL1280	737
001	Edinburgh	Ams	Tuesday	07:00	01:35	KL	KLM	KL1276	737
003	Edinburgh	London Heathrow	Monday	08:00	01:35	BA	British Airways	BA1461	EQV
002	Edinburgh	London Gatwick	Mon	06:40	01:35	BA	British Airways	BA2931	EQV
002	Edin	London GAT	Sat	06:25	01:30	U2	Easyjet	U2802	EQV
003	Edinburgh	Heathrow	Monday	09:10	01:30	VS	Virgin Atlantic	VS3002	320

(a) If the full database is created as a flat file, explain why "RouteID" is not a suitable primary key for the table. **1**

(d) State the **field type** that should be used for "Aircraft Code". **1**

(e) During the development of this database the following input form is created.



(i) State **one** suitable type of validation for the Departure Airport field. **1**

DESIGN

Exemplify a design of a solution to the query: multiple tables; fields; search criteria; sort order

SQP Q20c

20. Scot Cars (a second-hand car company) has branches located in five different Scottish towns and cities. They maintain a database of all cars they have in stock. Some of the records from the relational database are shown below.

Table name: Branch

branchNumber	street	town	postcode	dateFounded
18536423	10 Glasgow Road	Hamilton	HA9 8FR	14/07/1962
29736453	13 Pretty Drive	Inverness	IN2 13GW	11/12/1970
99108663	194 Collinton Avenue	Edinburgh	EH28 1PK	28/02/1965
36352363	125 Milk Way	Glasgow	G2 3HJ	17/01/2010
28635491	243 Bents Road	Dundee	DN14 7CD	01/10/1997

Table name: Car

make	model	colour	registration	mileage	electricWindows	alloyWheels	branchNumber
Ford	Ka	White	SL23 GTD	37970	Yes	No	99108663
Volkswagen	Golf	Black	ST99 FDT	33200	Yes	Yes	18536423
Ford	Escort	Silver	X364 TNK	120665	No	No	28635491
Vauxhall	Corsa	Yellow	BH20 SWZ	4009	Yes	Yes	28635491
Nissan	Qashqai	Black	SH88 NNG	67118	Yes	Yes	18536423
BMW	3 Series	Blue	SH34 BNM	33200	Yes	Yes	29736453
Ford	Ka	Green	SL85 HDF	40029	No	No	29736453

(c) Customers often visit Scot Cars looking for a particular make and model of car.

Design a search that would provide customers with an ordered list of cars, as shown below. **4**

Model	Colour	Town	Mileage
Ka	White	Edinburgh	37970
Ka	Silver	Glasgow	38002
Ka	Green	Inverness	40029
Ka	Black	Dundee	43099
Ka	Green	Hamilton	50103
Ka	White	Edinburgh	52086
Ka	Brown	Edinburgh	78192

Field(s)	
Table(s)	
Search criteria	
Sort order	

2019 Q17b

17. A company uses a relational database to store details of job vacancies for current employees. Each employee can apply for only one vacancy.

The tables below show current job vacancies and employees.

Vacancy			
jobRef	**jobTitle**	**department**	**startDate**
HR22	Clerk	HR	04/06/2019
PD18	Manager	Production	
AD36	Administrator	Admin	30/06/2019
FN42	Finance Officer	Finance	
PD20	Sales Manager	Production	10/07/2019

Employee						
appRef	**jobRef**	**initial**	**surname**	**payGrade**	**drivingLicence**	**cvAttached**
325	HR22	C P	Martin	2	☑	☑
326	PD18	G L	Wood	1	☑	☑
327	HR22	H	Patel	3	☐	☑
328	HR22	B F	Lee	3	☑	☐
329	AD36	M	Aliyev	3	☐	☑
330	PD18	L M	Nowak	2	☐	☑
331	HR22	S	Patel	1	☑	☑

(b) Design a query to display the job title and names of employees at pay grade 2 who have applied for any job in the Production department. **4**

Field(s)	
Table(s)	
Search criteria	

2018 Q20c

20. A database stores information about a walking club.

The table 'Route' stores all the available routes.

The table 'Walk' stores information when one of these routes is completed.

Part of the information stored in each table is shown below.

Route						
routeID	start	finish	estimatedMins	Kms	routeType	rating
1	Shiel Bridge	Glen More	480	23	Mountain	5
2	Aberdour	Anstruther	600	44	Coastal	4
3	Rackwick	Rackwick	180	12	Coastal	2
4	Kelty	Loch Glow	90	5	Forest	1
5	Fort William	Steall Falls	210	8	Hill	4
6	Pitlochry	Blair Atholl	175	11	Forest	2

Walk						
walkNumber	walkDay	departure	numberWalkers	rained	minutesTaken	routeID
1893	21/03/17	09:00	9	Yes	213	3
2002	30/04/17	07:30	15	No	167	3
0019	27/11/14	11:10	30	No	606	2
0218	01/02/16	13:30	3	No	102	4
0723	16/10/15	02:00	12	Yes	713	2
0086	01/01/15	08:45	24	Yes	180	6
1992	05/04/17	13:00	2	No	512	1
0499	19/11/15	14:00	9	No	190	5

(c) Design a query that would find the routeID of all the Mountain routes with a rating of 3 or more. **5**

Field(s)	
Table(s)	
Search criteria	

IMPLEMENTATION

Implement relational databases with two linked tables to match the design with referential integrity

2018 Q20e

20. A database stores information about a walking club.

The table 'Route' stores all the available routes.

The table 'Walk' stores information when one of these routes is completed.

Part of the information stored in each table is shown below.

Route						
routeID	start	finish	estimatedMins	Kms	routeType	rating
1	Shiel Bridge	Glen More	480	23	Mountain	5
2	Aberdour	Anstruther	600	44	Coastal	4
3	Rackwick	Rackwick	180	12	Coastal	2
4	Kelty	Loch Glow	90	5	Forest	1
5	Fort William	Steall Falls	210	8	Hill	4
6	Pitlochry	Blair Atholl	175	11	Forest	2

Walk						
walkNumber	walkDay	departure	numberWalkers	rained	minutesTaken	routeID
1893	21/03/17	09:00	9	Yes	213	3
2002	30/04/17	07:30	15	No	167	3
0019	27/11/14	11:10	30	No	606	2
0218	01/02/16	13:30	3	No	102	4
0723	16/10/15	02:00	12	Yes	713	2
0086	01/01/15	08:45	24	Yes	180	6
1992	05/04/17	13:00	2	No	512	1
0499	19/11/15	14:00	9	No	190	5

(e) The database was implemented without referential integrity.

Describe a problem that may occur when adding a new record to the 'Walk' table. **1**

IMPLEMENTATION

Describe, exemplify and implement SQL operations for pre-populated relational databases, with a maximum of two linked tables

- *Select*
- *From*
- *Where (AND, OR, <, > =); (order by with a maximum of two fields)*
- *Insert*
- *Update*
- *Delete*
- *Equi-join between tables*

Read and explain code that makes use of the above SQL

SQP Q17b & 17c

(b) Following implementation of the database, the 'Bike' table below contains 11 records.

serialNumber	make	model	type	gears	employeeNumber
20X5346F	Boardman	CX Team 14	Road	20	11
RAL09787	Raleigh	Cameo	Classic	7	9
RAL026356	Raleigh	Cuckoo	Classic	3	9
863345467	Carrera	Kraken	Mountain	27	10
20X62983	Boardman	MB Comp	Mountain	20	7
V0973647	Voodoo	Malice	BMX	1	7
30X6253J	Boardman	Team	Hybrid	21	9
V02377643	Voodoo	Malice	BMX	1	7
RAL97436	Raleigh	Cameo	Classic	7	12
RAL09944	Raleigh	Sprint	Road	21	11
30X76543	Boardman	CX Team 14	Road	20	11

Angela notices data entry errors. The two Raleigh Cameo bikes have 8 gears and not 7 as entered in the database.

She writes the following SQL statement to correct these errors.

```
UPDATE Bike
SET gears = 7
WHERE make = "Raleigh";
```

(i) Explain why Angela's SQL statement **would not** correct these errors. **1**

(ii) Explain why Angela's SQL statement would create additional errors in the database. **1**

(c) Angela wishes to remove the following bike from the database.

Serial Number: 30X76543

Make: Boardman

Model: CX Team 14

Type: Road

Gears: 20

(i) Evaluate the effect of running the SQL statement below: **2**

```
DELETE FROM Bike
WHERE make = "Boardman" AND model = "CX Team 14";
```

(ii) Describe a better solution Angela could use to remove the bike from the database. **1**

SQP Q20b

20. Scot Cars (a second-hand car company) has branches located in five different Scottish towns and cities. They maintain a database of all cars they have in stock. Some of the records from the relational database are shown below.

Table name: Branch

branchNumber	street	town	postcode	dateFounded
18536423	10 Glasgow Road	Hamilton	HA9 8FR	14/07/1962
29736453	13 Pretty Drive	Inverness	IN2 13GW	11/12/1970
99108663	194 Collinton Avenue	Edinburgh	EH28 1PK	28/02/1965
36352363	125 Milk Way	Glasgow	G2 3HJ	17/01/2010
28635491	243 Bents Road	Dundee	DN14 7CD	01/10/1997

Table name: Car

make	model	colour	registration	mileage	electricWindows	alloyWheels	branchNumber
Ford	Ka	White	SL23 GTD	37970	Yes	No	99108663
Volkswagen	Golf	Black	ST99 FDT	33200	Yes	Yes	18536423
Ford	Escort	Silver	X364 TNK	120665	No	No	28635491
Vauxhall	Corsa	Yellow	BH20 SWZ	4009	Yes	Yes	28635491
Nissan	Qashqai	Black	SH88 NNG	67118	Yes	Yes	18536423
BMW	3 Series	Blue	SH34 BNM	33200	Yes	Yes	29736453
Ford	Ka	Green	SL85 HDF	40029	No	No	29736453

(b) State the output from the following SQL statement. **3**

```
SELECT make, model, registration
FROM Car
WHERE colour="Black"
ORDER BY make ASC;
```

2019 Q4

4. The sorted output below was produced by running a query in a database.

Product

productCode	productName	manufacturer	description
366	Picture Frame	Frame Design	Silver
439	Crystal Vase	Glass Gifts	10cm
316	Glass Bowl	Glass Gifts	20cm
285	Scented Candle	WaxWorks	Vanilla
123	Candle Holder	WaxWorks	Glass jar
56	Tea Lights	WaxWorks	Pack of 6
112	Place Mats	Zingy Zebra	Pack of 5

Complete the SQL statement used to produce this sorted output. **2**

```
SELECT productCode, productName, manufacturer, description
FROM Product
ORDER BY
```

2019 Q17c(ii)

17. A company uses a relational database to store details of job vacancies for current employees. Each employee can apply for only one vacancy.

The tables below show current job vacancies and employees.

Vacancy			
jobRef	**jobTitle**	**department**	**startDate**
HR22	Clerk	HR	04/06/2019
PD18	Manager	Production	
AD36	Administrator	Admin	30/06/2019
FN42	Finance Officer	Finance	
PD20	Sales Manager	Production	10/07/2019

Employee						
appRef	**jobRef**	**initial**	**surname**	**payGrade**	**drivingLicence**	**cvAttached**
325	HR22	C P	Martin	2	☑	☑
326	PD18	G L	Wood	1	☑	☑
327	HR22	H	Patel	3	☐	☑
328	HR22	B F	Lee	3	☑	☐
329	AD36	M	Aliyev	3	☐	☑
330	PD18	L M	Nowak	2	☐	☑
331	HR22	S	Patel	1	☑	☑

(c) The pay grade for H Patel should be pay grade 2 and not pay grade 3. The SQL statement below is written to make the change.

```
UPDATE Employee
SET payGrade = 3
WHERE surname = "Patel";
```

(i) Give two reasons why this SQL statement is not fit for purpose. **2**

Reason 1 .

Reason 2 .

(ii) Re-write the SQL statement to make it fit for purpose. **2**

2019 Q17d

(d) The updated tables below show current job vacancies and employees.

Vacancy			
jobRef	**jobTitle**	**department**	**startDate**
HR22	Clerk	HR	04/06/2019
PD18	Manager	Production	28/06/2019
AD36	Administrator	Admin	30/06/2019
FN42	Finance Officer	Finance	04/07/2019
PD20	Sales Manager	Production	10/07/2019

Employee						
appRef	**jobRef**	**initial**	**surname**	**payGrade**	**drivingLicence**	**cvAttached**
325	HR22	C P	Martin	2	☑	☑
326	PD18	G L	Wood	1	☑	☑
327	HR22	H	Patel	2	☐	☑
328	HR22	B F	Lee	3	☑	☐
329	AD36	M	Aliyev	3	☐	☑
330	PD18	L M	Nowak	2	☐	☑
331	HR22	S	Patel	1	☑	☑

The following SQL statement is implemented in the database.

```
SELECT jobTitle, appRef
FROM Vacancy, Employee
WHERE Vacancy.jobRef=Employee.jobRef AND drivingLicence=False
ORDER BY jobTitle DESC;
```

(i) Write the expected output from the SQL statement. **5**

(ii) Describe how this expected output could be used to check that the SQL statement works correctly. **1**

2018 Q10

10. A shop stores stock information in a database. Part of the database table is shown below.

Stock				
stockCode	**type**	**description**	**price**	**quantity**
2374	Vase	Blue with floral pattern	12.40	1
3467	Book	Satellite Games	0.45	2
4576	Book	Organic Farming	0.45	1
186	Garden	Hand fork	0.90	1
8964	Jigsaw	Picture of Culzean Castle	1.00	1
3647	DVD	The 49 Steps	0.45	1
762	Book	Baking Pies	0.45	1

The manager writes the following SQL statement to change the price of all books to 50p.

```
UPDATE Stock
SET price = 0.50
WHERE price = 0.45;
```

(a) Explain why the SQL statement above would give an unexpected result. **1**

(b) Rewrite the SQL statement to give the expected output. **2**

2018 Q16

16. A database table 'TeamScore' stores information about a team's top scorers. The table is shown below.

TeamScore		
competitor	**club**	**averageScore**
R. Oliver	Fairmilehead	92.0
G. Byer	Currie	92.5
K. Willis	Peterborough	91.4
B. McRae	Dunfermline	97.0

Describe what would happen to the table when the SQL statement below is run.

```
DELETE FROM TeamScore
WHERE averageScore < 92.0;
```

1

TESTING

Describe and exemplify testing: SQL operations work correctly at this level

SQP 17c(i)

serialNumber	make	model	type	gears	employeeNumber
20X5346F	Boardman	CX Team 14	Road	20	11
RAL09787	Raleigh	Cameo	Classic	7	9
RAL026356	Raleigh	Cuckoo	Classic	3	9
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RAL97436	Raleigh	Cameo	Classic	7	12
RAL09944	Raleigh	Sprint	Road	21	11
30X76543	Boardman	CX Team 14	Road	20	11

(c) Angela wishes to remove the following bike from the database.

Serial Number: 30X76543

Make: Boardman

Model: CX Team 14

Type: Road

Gears: 20

(i) Evaluate the effect of running the SQL statement below: **2**

```
DELETE FROM Bike
WHERE make = "Boardman" AND model = "CX Team 14";
```

2019 Q8b

8. Three records from a database table are shown below.

Book			
bookRef	**title**	**author**	**publisher**
0783567328120	The Cat's Pyjamas	R J Petersen	Germiston
0703487922417	Grass Is Green	V R Singh	East Rand
0724603125633	Climb the Hill	R McGrath	Brown

(b) Another book by V R Singh is to be added to the table.

The SQL statement below is used to insert this record.

```
INSERT INTO Book (bookRef, title, author, publisher)
VALUES ("0745198374564","V R Singh","I'll Do It
Yesterday","East Rand");
```

Explain why the SQL statement will not produce the intended result. **1**

2018 Q20d(i)

20. A database stores information about a walking club.

The table 'Route' stores all the available routes.

The table 'Walk' stores information when one of these routes is completed.

Part of the information stored in each table is shown below.

Route						
routeID	start	finish	estimatedMins	Kms	routeType	rating
1	Shiel Bridge	Glen More	480	23	Mountain	5
2	Aberdour	Anstruther	600	44	Coastal	4
3	Rackwick	Rackwick	180	12	Coastal	2
4	Kelty	Loch Glow	90	5	Forest	1
5	Fort William	Steall Falls	210	8	Hill	4
6	Pitlochry	Blair Atholl	175	11	Forest	2

Walk						
walkNumber	walkDay	departure	numberWalkers	rained	minutesTaken	routeID
1893	21/03/17	09:00	9	Yes	213	3
2002	30/04/17	07:30	15	No	167	3
0019	27/11/14	11:10	30	No	606	2
0218	01/02/16	13:30	3	No	102	4
0723	16/10/15	02:00	12	Yes	713	2
0086	01/01/15	08:45	24	Yes	180	6
1992	05/04/17	13:00	2	No	512	1
0499	19/11/15	14:00	9	No	190	5

(d) (i) Read the SQL statement below.

```
SELECT start, routeType, minutesTaken
FROM Route, Walk
WHERE Route.routeID = Walk.routeID
AND rating = 2;
```

Complete the table below to show the expected output from this SQL statement. **3**

start	routeType	minutesTaken

EVALUATION

Evaluate solution in terms of: fitness for purpose; accuracy of output

2019 Q17c(i)

17. A company uses a relational database to store details of job vacancies for current employees. Each employee can apply for only one vacancy.

The tables below show current job vacancies and employees.

Vacancy			
jobRef	**jobTitle**	**department**	**startDate**
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327	HR22	H	Patel	3	☐	☑
328	HR22	B F	Lee	3	☑	☐
329	AD36	M	Aliyev	3	☐	☑
330	PD18	L M	Nowak	2	☐	☑
331	HR22	S	Patel	1	☑	☑

(c) The pay grade for H Patel should be pay grade 2 and not pay grade 3. The SQL statement below is written to make the change.

```
UPDATE Employee
SET payGrade = 3
WHERE surname = "Patel";
```

(i) Give two reasons why this SQL statement is not fit for purpose. **2**

Reason 1

Reason 2

2018 Q20d(ii)

Read the SQL statement below.

```
SELECT start, routeType, minutesTaken
FROM Route, Walk
WHERE Route.routeID = Walk.routeID
AND rating = 2;
```

(ii) Describe how to evaluate the accuracy of the expected output from an SQL statement. **1**