



Year 9

Computing

5. Databases with SQL

STUDENT	
TEACHER	
CLASS	

WORKING AT	
GRADE	
TERM	
TARGET	
YEAR	
TARGET	

GRADE FOR THIS TOPIC	
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The long answer questions in this booklet are designed to stretch and challenge you. It is important that you understand how they should be answered. You should structure your answer like this:

1st Paragraph – should explain the key term e.g. give a definition.

2nd Paragraph – should make a point (could be an advantage or disadvantage) and explain the point fully giving an example where necessary.

3rd Paragraph – should make another point (could be an advantage or disadvantage) and explain the point fully giving an example where necessary.

4th Paragraph – should make a point (could be an advantage or disadvantage) and explain the point fully giving an example where necessary.

You should have at least 1 advantage and 1 disadvantage.

Progress against termly target												
ABOVE												
ON												
BELOW												
TERM	1	2	3	4	5	6						

Learning Outcomes			
	Levels		
Lesson	5	6	7
1 Introduction to databases	I can define data types: real numbers and Boolean.	I can distinguish between data used in a simple program (a variable) and the storage structure for that data.	I know how and why values are data typed in many different languages when manipulated within programs.
2 Introduction to SQL	I can define data types: real numbers and Boolean.	I can distinguish between data used in a simple program (a variable) and the storage structure for that data.	I know how and why values are data typed in many different languages when manipulated within programs.
3 Updating and deleting records	I can recognise ethical issues surrounding the application of information technology beyond school.	I can identify and explain how the use of technology can impact on society.	I can explain and justify how the use of technology impacts on society, from the perspective of social, economic, political legal, ethical and moral issues.
4 Searching and sorting data	I can query data on one table using a typical query language.	I can distinguish between data used in a simple program (a variable) and the storage structure for that data.	I know how and why values are data typed in many different languages when manipulated within programs.
5 Introduction to relational databases	I can define data types: real numbers and Boolean.	I can distinguish between data used in a simple program (a variable) and the storage structure for that data.	I know the relationship between data representation and data quality.
6 Assessment	Achieves a level 5 in the end of term assessment	Achieves a level 6 in the end of term assessment	Achieves a level 7 in the end of term assessment

1. Introduction to relational databases



This term we will begin to look at Databases.

What is a database?

Why would it need to be used?

Can you think of some examples of the kind of data you could store in a database

When using databases it is important to be aware of the data types you are using. Some are the same as the data types used in Python, others are different.



Using the data types below , can you correctly identify the data type for each of these fields?

DATA	FIELD	DATA TYPE
Morecambe	Town	Text
44	House Number	
Dr.	Title	
£149.99	Cost	
Paul	First Name	
LA1 4FH	Postcode	
11/12/2005	Date booked	
True	Fully paid?	

TEXT REAL / FLOAT INTEGER CURRENCY DATE/TIME BOOLEAN LOOKUP*

Draw your ER diagram for your burger bar database below:



You are now going to plan all of the burgers that you could sell in your burger shop. Complete the table on the right.

Burger name	Price

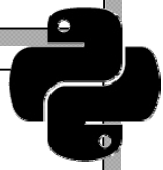


Entity description for burger table:



Adapt the code below to create your burgerBar .db file

```
import sqlite3
with sqlite3.connect('_____') as db:
    pass
```



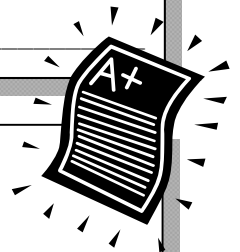
Why do programmers use databases when writing programs?



Self Assessment:

R A G

Exit Ticket: What storage structure must data be written in when adding it to a database?



2. Introduction to SQL



SQLite Datatypes

Match up the datatype to the bit of data that corresponds to it.

- | | |
|------------------|----------------|
| 1. _____ NULL | a. 56 |
| 2. _____ INTEGER | b. _____ |
| 3. _____ BLOB | c. 10110011 |
| 4. _____ TEXT | d. 12.5 |
| 5. _____ REAL | e. David Smith |

SQL is used throughout the IT industry to create, maintain and manipulate databases.



SQL can be separated into two parts, explain each:

Data Definition Language (DDL)

Data Manipulation Language (DML)

Today you are going to start writing SQL to create your burger bar database. In the box below complete the SQL statement that you will use to create your burger table.

```
CREATE TABLE _____ ( BurgerID  
_____, Name _____, Price _____,  
Primary Key(_____));
```

Change the insert statement below to add a cheeseburger with the price 1.50 to your table.

```
INSERT INTO _____ (_____, _____)  
VALUES ('_____', _____)
```

Name one data type that has been used in this database.

Explain why this datatype has been used:

Name another data type that has been used in this database.

Explain why this datatype has been used:

Name a variable that has been used in this database:

What data structure is being used to store data for this variable:

Can you add more records to your burger table?

Can you add a second table to your database?

Can you work out how to add records to your new table?

3. Updating and deleting records



Can you think of a situation using your burger bar database where something will need to be updated?

What about deleting something?

The burger bar is running a special promotion with a space theme. they have changed the cheeseburgers name to the moon burger and are offering it at a special price of 1.00. Complete the update statement below to update the data for a cheeseburger

```
UPDATE _____  
SET Name=' _____ ', Price= _____  
WHERE BurgerID= _____
```



The moon burger has been taken off the menu and so it needs to be deleted from the database. Complete the delete statement below to delete the moon burger.

```
DELETE FROM _____  
WHERE _____ ID= _____
```



4. Searching and sorting data



How could you find out how many people were born in the same month?

The burger bar would like to know what burgers they sell that are less than 3.00 in price. Complete the select statement below to search for all of the data contained in records for burgers that are less than 3.00. **NOTE:** you will need to use either the more than symbol > or the less than symbol <

```
SELECT _____  
FROM _____  
WHERE Price ____ _____
```

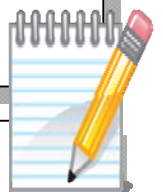


Sometimes you will only want to return specific data not everything. Adapt the select statement below so you only return the names of the burgers and not their prices too.


```
SELECT _____  
FROM _____  
WHERE Price ____ _____
```



What order is the data returned in?




To sort the data you can use ASC for ascending (A-Z) or DEC for descending (Z_A). Complete the select statement below to search for all burgers with a BurgerID of more than 2, a price of more than 1.00 and return the names of the burgers in ascending order.



```
SELECT _____  
FROM _____  
WHERE Price > __ AND BurgerID > __  
ORDER BY Name _____
```

For today's level 7 task download and print off the movie_worksheet.

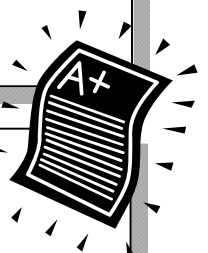


Stick your movie_worksheet here

Self Assessment:

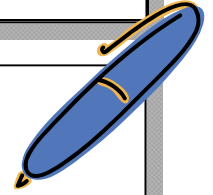
R A G

Exit Ticket: Name one piece of data that you used to search for data:



STRENGTH	TARGET	ACTION	EFFORT

Green Pen Activity:



5. Introduction to relational databases



Make	Model	Size of engine	Registration	Price (£)
Opel	Vectra	1.8	VSE 648	19000
Opel	Zafira	2.0	BFK 297	29000
Volkswagen	Golf	1.4	SB A5526	15000
Volkswagen	Polo	1.2	DD B4978	11000
Volkswagen	Jetta	1.6	B G8347	19000
Renault	Megane	1.4	1233 CD 33	17000
Renault	Clio	1.2	6289 XF 54	11000

The manager of a car showroom uses the above database to store data about cars he sells. This is part of the database.

How many records are there in this part of the database? _____

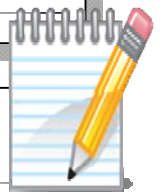
How many fields are there in this part of the database? _____

The records shown are to be sorted in descending order of size of engine. What will be the registration of the first record in the database after it has been sorted? _____

Which field would make a suitable Primary Key? Explain why.

Explain why it is important to normalise data in a database:

Draw a new entity relationship diagram which allows for normalisation of your database:



The burger bar has a tablet computer system where people can place their order from a tablet computer on their table. To use this a new table needs to be created for tables.

NOTE: table cannot be used as the table name for this.



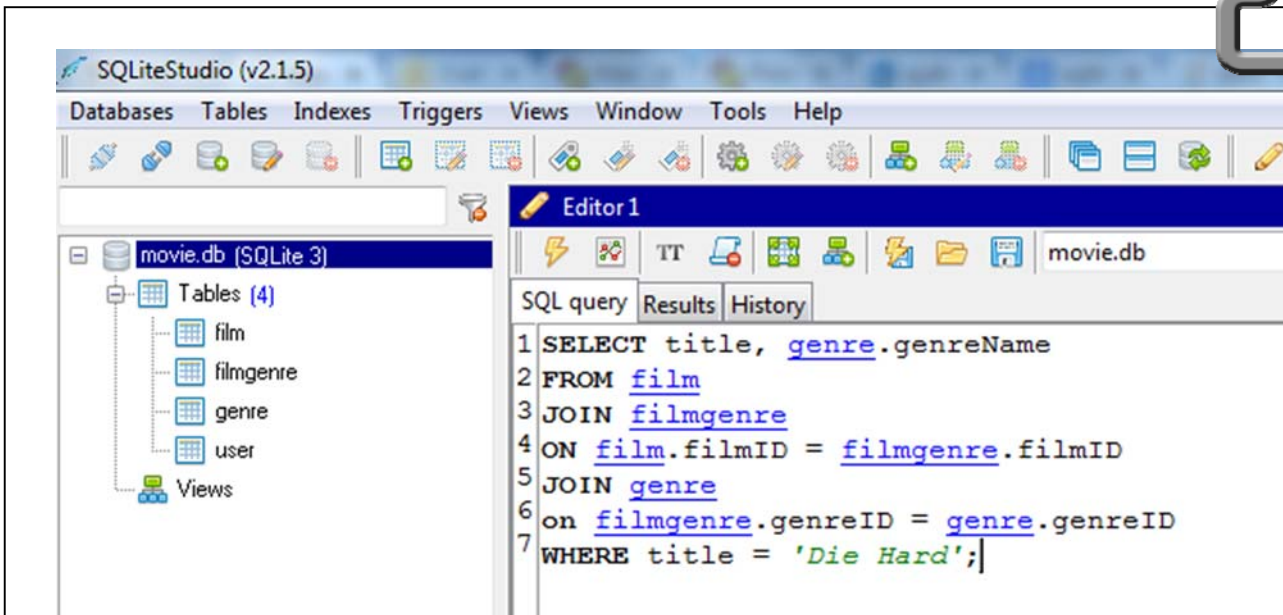
Why can you not use table as the name of the table?

Complete the SQL below for creating your tables table

```
CREATE TABLE _____  
( _____ ID Integer,  
_____ integer, Primary  
Key( _____ ID))
```

Now create the table which will store orders **NOTE:** you cannot use order as the table name

```
CREATE TABLE _____ ( _____ ID  
Integer, OrderDate _____, OrderTime  
_____, _____ ID Integer,  
_____ ID Integer, Primary Key  
( _____ ID), Foreign Key  
( _____ ID) references  
_____ ( _____ ID), Foreign  
Key( _____ ID) references  
_____ ( _____ ID))
```



Above is a select statement which searches for the genre of the Die Hard films by using filmID as a join between both tables. Can you work out how to write the select statement which will be needed to search for the orders from table number 1?



SELECT

FROM

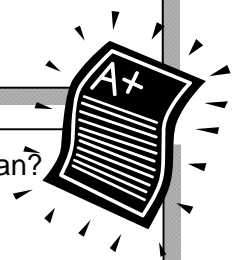
JOIN

ON

JOIN

ON

WHERE



Self Assessment:

R A G

Exit Ticket: Table is known as a restricted word, what does this mean?



Database keywords

G K M O D O M E X T E R N A L P N B J C
 J P R S P T B I I L V I E W E I F L G E
 S W E C W U J F A I A C U F S Y T I B H
 M O G T L A U T P E C N O C A J B X B C
 W J E R T G Q C N F R P K U B W E I V B
 Y U T K E Y A W L L L D A T A B A S E O
 C C N A R Q Q O E L S A M K T C O G T O
 V X I H C O N S T A N T T E A Y V N L L
 J A V K B F T C C C H K B - D M F V U E
 P I R G V R R J S I S L C G F C S J U A
 Q E N I I E X S M H B X Y V R I M E S N
 D P E N A R N T K C R B S B V C L Q H C
 S W G L P B Y A R R E A Y L M Q L E W B
 S Q F M F P L T B A T G Y H J R A O N E
 S W L W T V W E U R C C C H I O C H H T
 Z Y F N T N I M J E A E O E N A I F Q Y
 Y N I V U R T E Q I R I M K M H S K W B
 Y R H S I Z Q N N H A K U W V S Y I O Z
 H V E U A D Y T H F H F N S I S H L M A
 O D M M P K E D R O C E R X L N P N D Q

CONCEPTUAL

VIEW

HIERARCHICAL

VIEW

BOOLEAN

CONSTANT

MOD

VARIABLE

VIEW

FLAT-FILE

DATABASE

SQL

BYTE

DIV

REAL

STATEMENT

EXTERNAL

DATABASE

PHYSICAL

BIT

CHARACTER

INTEGER

STRING

RECORD

End of term assessment

Functional Specification (use the one below or stick in your own one)

Car database.

I am going to create a database for a garage.

The database will contain a table which will allow people to search for different makes of car or by price.

Cars (carID, make, model, engine size, price)

1. Create your database (see p4) (write out or print and stick in your Python program)

2. Create the table(s) (see p6) (write out or stick in your SQL statement(s))

3. Populate your table(s) with at least 5 records (see p6) (write out or stick in your SQL statement(s))

4. Create at least 3 queries (see p10 / 11) (write out or stick in your SQL statement(s)). Comment your queries to explain why they would be used by the business.

4. continued...

5. Why do most programmers use SQL?

The data protection act protects peoples data, explain 2 of the main principles of this act:

Keywords



Conceptual view	How the data is organised in a database.
External view	What the user sees of a database application.
Flat-file database	A database of only one table.
Hierarchical database	A database organised on a tree structure.
Physical view	How the data is stored on the secondary storage.
SQL	QL Structured Query Language – a way to program queries to interrogate, maintain and set up a database.
Bit	A Binary digit, '0' or '1'.
Boolean	Variables that store just two values, e.g. TRUE or FALSE.
Byte	A group of binary ('0' or '1') digits, usually 8 bits.
Character	Data type that stores a single character.
Constant	Name used to identify a value in memory that does not change during the execution of the program.
DIV	An arithmetic operator that returns the quotient after division.
Integer	Whole number values, positive or negative.
MOD	An arithmetic operator that returns the remainder after division.
Real	Data type that will store decimal (or fractional) values.
String	Data type used to store a string of characters.
Variable	Name used to identify a value in memory that can change during the execution of the program.
Statement	A single instruction or step within a program.
Record	All of the data stored in a database about one person or thing