Databases

Explain the terms in the table below.

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| Data |
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| Information |
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| Database |
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| Column/Field |
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| Row/Record |
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| Table/File |
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| Data types – Text, Number, Date/time, Currency, Autonumber, Yes/No, OLE Object, Memo |
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| Flat-file Database |
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| Relational Database |
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| Why use a computerised database? |
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| Primary key |
|  |
| Foreign key |
|  |
| Types of relationship – One-to-many, One-to-one, Many-to-many |
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|  |
|  |
| Queries |
|  |
| Forms |
|  |

Relational databases

Five rules:

1. Data must be atomic – one piece of data per field. Eg. First name and last name must be in two separate fields
2. No duplication of data – one piece of data must be in one field only. Eg. Don’t enter date of birth and age, as they represent the same data item
3. Field independence – modifying the contents of one field must not force you to modify another data item
4. No calculation result in the fields – the fields would not be independent in such a case. Eg price inclusive of VAT is the result of a calculation on the price exclusive of VAT
5. A single index per table – this is called the ‘primary key’

# Student Mobile Phones

Create an Access Database that records the details of each pupil’s mobile phone. Initially that will be the student’s name, the make and model of their phone and the phone’s operating system.

There is a flat-file of mobile phones (see “accompanying database”) that you could use on: <http://agbonline.co.uk/SKE.html#Databases_SQL>

SQL

SQL is a standard language for accessing and manipulating databases

## What is SQL?

* SQL stands for Structured Query Language
* SQL lets you access and manipulate databases
* SQL is an ANSI (American National Standards Institute) standard

## What Can SQL do?

* SQL can execute queries against a database
* SQL can retrieve data from a database
* SQL can insert records in a database
* SQL can update records in a database
* SQL can delete records from a database
* SQL can create new databases
* SQL can create new tables in a database
* SQL can create stored procedures in a database
* SQL can create views in a database
* SQL can set permissions on tables, procedures, and views

# Work through the first few exercises on the w3schools website <http://www.w3schools.com/sql/default.asp> , down to ‘SQL Between’

## Here is the SQL Quick Reference from w3schools:

|  |  |
| --- | --- |
| **SQL Statement** | **Syntax** |
| AND / OR | SELECT column\_name(s) FROM table\_name WHERE condition AND|OR condition |
| ALTER TABLE | ALTER TABLE table\_name  ADD column\_name datatype  or  ALTER TABLE table\_name  DROP COLUMN column\_name |
| AS (alias) | SELECT column\_name AS column\_alias FROM table\_name  or  SELECT column\_name FROM table\_name  AS table\_alias |
| BETWEEN | SELECT column\_name(s) FROM table\_name WHERE column\_name BETWEEN value1 AND value2 |
| CREATE DATABASE | CREATE DATABASE database\_name |
| CREATE TABLE | CREATE TABLE table\_name ( column\_name1 data\_type, column\_name2 data\_type, column\_name2 data\_type, ... ) |
| CREATE INDEX | CREATE INDEX index\_name ON table\_name (column\_name)  or  CREATE UNIQUE INDEX index\_name ON table\_name (column\_name) |
| CREATE VIEW | CREATE VIEW view\_name AS SELECT column\_name(s) FROM table\_name WHERE condition |
| DELETE | DELETE FROM table\_name WHERE some\_column=some\_value  or  DELETE FROM table\_name  (**Note:**Deletes the entire table!!)  DELETE \* FROM table\_name  (**Note:**Deletes the entire table!!) |
| DROP DATABASE | DROP DATABASE database\_name |
| DROP INDEX | DROP INDEX table\_name.index\_name (SQL Server) DROP INDEX index\_name ON table\_name (MS Access) DROP INDEX index\_name (DB2/Oracle) ALTER TABLE table\_name DROP INDEX index\_name (MySQL) |
| DROP TABLE | DROP TABLE table\_name |
| EXISTS | IF EXISTS (SELECT \* FROM table\_name WHERE id = ?) BEGIN --do what needs to be done if exists END ELSE BEGIN --do what needs to be done if not END |
| GROUP BY | SELECT column\_name, aggregate\_function(column\_name) FROM table\_name WHERE column\_name operator value GROUP BY column\_name |
| HAVING | SELECT column\_name, aggregate\_function(column\_name) FROM table\_name WHERE column\_name operator value GROUP BY column\_name HAVING aggregate\_function(column\_name) operator value |
| IN | SELECT column\_name(s) FROM table\_name WHERE column\_name IN (value1,value2,..) |
| INSERT INTO | INSERT INTO table\_name VALUES (value1, value2, value3,....)  *or*  INSERT INTO table\_name (column1, column2, column3,...) VALUES (value1, value2, value3,....) |
| INNER JOIN | SELECT column\_name(s) FROM table\_name1 INNER JOIN table\_name2  ON table\_name1.column\_name=table\_name2.column\_name |
| LEFT JOIN | SELECT column\_name(s) FROM table\_name1 LEFT JOIN table\_name2  ON table\_name1.column\_name=table\_name2.column\_name |
| RIGHT JOIN | SELECT column\_name(s) FROM table\_name1 RIGHT JOIN table\_name2  ON table\_name1.column\_name=table\_name2.column\_name |
| FULL JOIN | SELECT column\_name(s) FROM table\_name1 FULL JOIN table\_name2  ON table\_name1.column\_name=table\_name2.column\_name |
| LIKE | SELECT column\_name(s) FROM table\_name WHERE column\_name LIKE pattern |
| ORDER BY | SELECT column\_name(s) FROM table\_name ORDER BY column\_name [ASC|DESC] |
| SELECT | SELECT column\_name(s) FROM table\_name |
| SELECT \* | SELECT \* FROM table\_name |
| SELECT DISTINCT | SELECT DISTINCT column\_name(s) FROM table\_name |
| SELECT INTO | SELECT \* INTO new\_table\_name [IN externaldatabase] FROM old\_table\_name  *or*  SELECT column\_name(s) INTO new\_table\_name [IN externaldatabase] FROM old\_table\_name |
| SELECT TOP | SELECT TOP number|percent column\_name(s) FROM table\_name |
| TRUNCATE TABLE | TRUNCATE TABLE table\_name |
| UNION | SELECT column\_name(s) FROM table\_name1 UNION SELECT column\_name(s) FROM table\_name2 |
| UNION ALL | SELECT column\_name(s) FROM table\_name1 UNION ALL SELECT column\_name(s) FROM table\_name2 |
| UPDATE | UPDATE table\_name SET column1=value, column2=value,... WHERE some\_column=some\_value |
| WHERE | SELECT column\_name(s) FROM table\_name WHERE column\_name operator value |