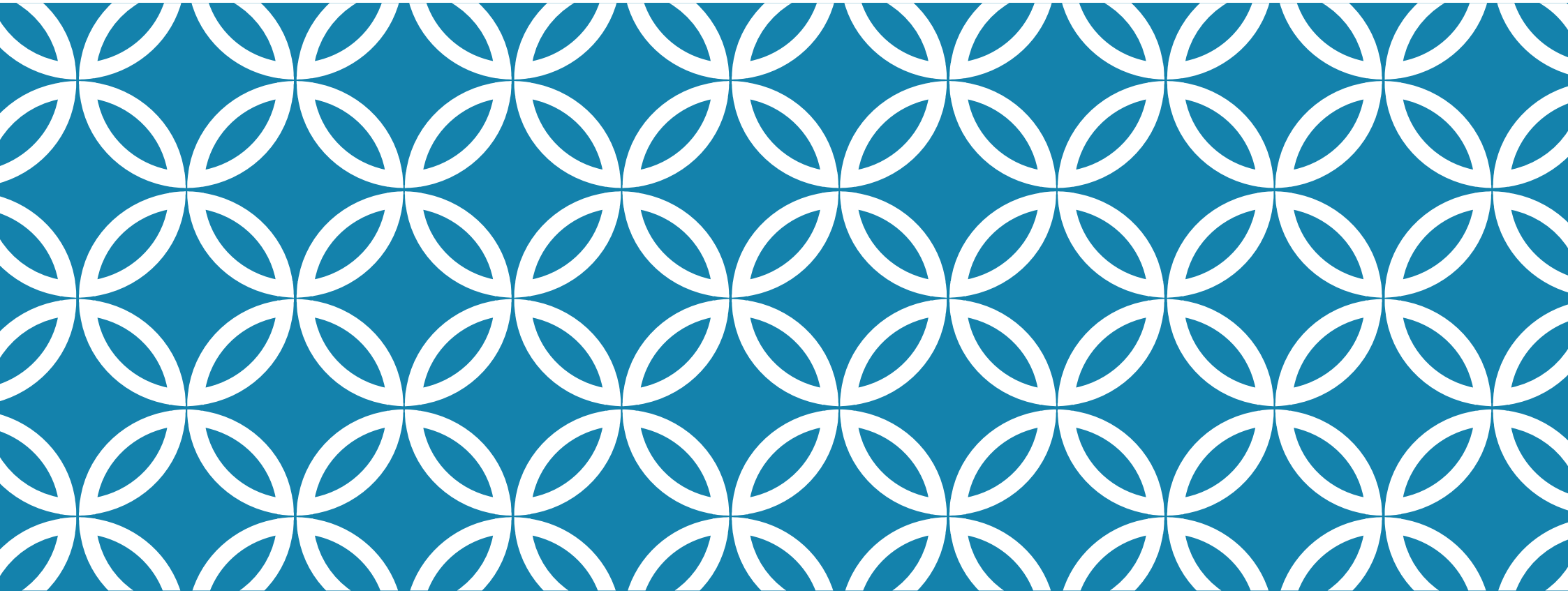
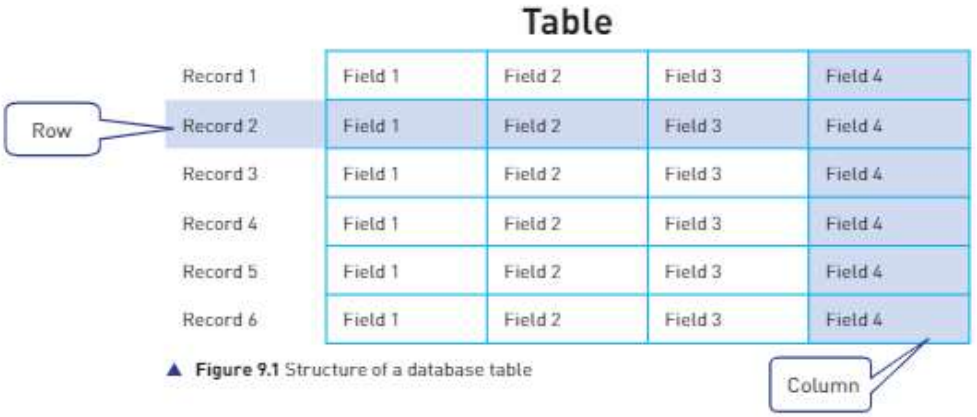


DATABASE

Chapter 11

DATABASES

- Database is a structured collection of data that allows people to extract information in a way that meets their needs
  - Data can be text, numbers, pictures
  - Database can be used in hospital, school, library
- Components of a table
  - a collection of related records in a database
  - Column = field = a piece of information
  - Row = record = collection of fields
  - Every record contains the same number of fields



▲ **Figure 9.1** Structure of a database table

Field names

ID No.	Name	D.o.B.	Phone	Class	Tutor	Room
356	Jess	3 Mar 1995	7564356	5B	Mr Noggin	56
412	Hamad	12 Nov 1994	7465846	5B	Mr Noggin	56
459	Sita	9 Jan 1994	8565634	6Y	Ms Take	18
502	Hamad	3 Mar 1995	6554546	5B	Mr Noggin	56

One record

BASIC DATA TYPES

- There are six basic data types that you need to be able to use in a database:

Syllabus data type	Description	Access data type
text/alphanumeric	A number of characters	short text/long text
character	A single character	short text with a field size of one
Boolean	One of two values: either True or False, 1 or 0, Yes or No	Yes/No
integer	Whole number	number formatted as fixed with zero decimal places
real	A decimal number	number formatted as decimal
date/time	Date and/or time	Date/Time

PRIMARY KEYS

- Primary key is a field in a database that uniquely identifies a record
  - Example of fields that can be primary keys
    - ID
    - Telephone number
    - Email

SQL

- Structured Query Language (SQL) is the standard query language for writing scripts to obtain useful information from a database
  - It will used to obtain and display only the information required from a database
- SQL scripts
  - It is a list of SQL commands that perform a given task, often stored in a file so the script can be reused

SQL Query Statement	Description
SELECT	Fetches specified fields (columns) from a table; queries always begin with SELECT.
FROM	Identifies the table to use.
WHERE	Includes only records (rows) in a query that match a given condition.
ORDER BY	Sorts the results from a query by a given column either alphabetically or numerically.
SUM	Returns the sum of all the values in a field (column). Used with SELECT.
COUNT	Counts the number of records (rows) where the field (column) matches a specified condition. Used with SELECT.

Operator	Description
=	equal to
>	greater than
<	less than
>=	greater than or equal to
<=	less than equal to
<>	not equal to
BETWEEN	between a range of two values
LIKE	search for a pattern
IN	specify multiple values
AND	specify multiple conditions that must all be true
OR	specify multiple conditions where one or more conditions must be true
NOT	specify a condition that must be false

SQL

Practical use of a database

As an IGCSE Computer Science student you need to be able to do the following:

- define a single-table database from given data storage requirements
- choose a suitable primary key for a database table
- read, complete and understand SQL scripts.

SQL

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

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$`	

SQL

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

- 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 = ...;

SQL

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

- Give the output that would be produced by the structured query language (SQL) statement:
- SELECT Name, NumberGuest, Rate$
- FROM Site1
- WHERE NumberGuest >= 10;

SQL

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

- Give the output that would be produced by the structured query language (SQL) statement:
- SELECT SUM(NumberGuest)
- FROM Site1
- WHERE Type = 'Cabin';

SQL

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

- Give the output that would be produced by the structured query language (SQL) statement:
- SELECT COUNT(Type)
- FROM Site1
- WHERE Rate$ >= 1000;

SQL

- Practice online at https://www.hackerrank.com/domains/sql