

Informatics
Teach Yourself Series
Topic 3: Databases

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SAMPLE

Databases

Databases are used to create solutions to information problems in Units 2 and 3.

Databases Introduction

As it appears in Unit 2, 3 and 4

A database is a collection of data that a computer program (Relational Database Management Software, also known as RDBMS) can store, select, sort and report on pieces of data. A database could be a solution that is used in order to solve an organisations information problem.

Structure of a database

The structure of the database refers to the elements that make up the database and how they all link to each other. It is important that the structure of the database is well planned in the design stage before you begin to develop it, as it can be difficult to change the structure once you begin.

There are many terms that you will need to be aware of in order to fully understand how databases work. This section will provide an insight into some of these terms that make up the structure of databases.

- Tables
 - A table is a collection of data, made up of fields and records.
 - Every database must have at least one table.
 - Relational databases must have at least two tables linked together.

TblSongs		
SongID	SongName	ArtistID
001	My Way	001
002	White Christmas	003
003	Hound Dog	002
004	New York New York	001

← Table

- Record
 - Each row in a table is called a record.
 - This record is made up of a number of fields.

TblSongs		
SongID	SongName	ArtistID
001	My Way	001
002	White Christmas	003
003	Hound Dog	002
004	New York New York	001

← Record

- Field
 - Each column in a table is called a field.
 - Each field represents a common piece of data and must be of the same data type.

TblSongs		
SongID	SongName	ArtistID
001	My Way	001
002	White Christmas	003
003	Hound Dog	002
004	New York New York	001

Field

↙

- Relational database
 - A relational database consists of at least two tables that are linked (related) to each other by a common field that can uniquely identify a certain record.
 - This is indicated by the dotted arrow in the diagram above.

TblSongs		
SongID	SongName	ArtistID
001	My Way	001
002	White Christmas	003
003	Hound Dog	002
004	New York New York	001

Relationship link of common field

↙

TblArtists		
ArtistID	ArtistName	ArtistSurname
001	Frank	Sinatra
002	Elvis	Presley
003	Bing	Crosby
004	Aretha	Franklin

- Query
 - A query allows to filter data according to specified criteria.
 - This data (fields) may be collected from any table within the relationship..

Field	SongID	SongName	ArtistID	ArtistName	ArtistSurname
Table	TblSongs	TblSongs	TblSongs	TblArtists	TblArtists
Sort		Ascending			
Show	☐	☒	☐	☒	☒
Criteria					= "Presley"

- Primary key
 - A primary key is a field that uniquely identifies a record in a table. This field cannot be null.

Primary Key

↘

TblSongs		
SongID	SongName	ArtistID
001	My Way	001
002	White Christmas	003
003	Hound Dog	002
004	New York New York	001

- Form
 - A form is a screen which allows data to be input and displayed.
 - When creating a form, appropriate formats and conventions must be considered.



Songs

Song ID:

Song Name:

Artist:

- Report
 - A report allows for a summary of information to be displayed in a readable manner.
 - A report is usually based on a query.
 - When creating a report, appropriate formats and conventions must be considered.



Bing Crosby	White Christmas
Elvis Presley	Hound Dog
Frank Sinatra	My Way
	New York New York

- Macro
 - A macro allows a series of actions to be recorded then performed over and over with one simple key stroke.
 - These are often used for the creation of buttons on a form.
 - Most RDBMS have some pre existing macros that can be used.

Solutions to Review Questions

1. Fields represent a common piece of information that is the same data type where as a record is made up of a number of fields.
2. A primary key is important as it allows each record in a table to be uniquely identified.
3. A macro is a series of commands built into a program. It automates a series of steps into a single one.
4. A form also allows for data input where as a report only displays information.
5. Data visualisation allows users to quickly understand data graphically instead of having to filter through large amounts of data.
6. The correct answer is: A
Charts, graphs and histograms can all be created to visualise database contents. Maps are not appropriate for databases.
7. The correct answer is: B
IPO can be used to determine the formula (process) that is needed to achieve the desired output.
8. The correct answer is: D
A mockup diagram outlines what the form / report will look like, where the elements will appear on the screen and describes the fonts and colours that will be used.
9. Each 'book' can have only one (1) 'category', but each 'category' can have many (∞) 'books'.
10. Following naming conventions is important so that the content and purpose of each element is clear to anyone accessing the database.
11. The correct answer is: D
Option D follows the naming conventions. It states the type of element. (Option A does not); it is prefixed with the element type (Option B does not); it does not have spaces (Option B does) and it uses the accepted abbreviation for the table element (Tbl) (Option C does not).
12. The correct answer is: A
Phone numbers could have spaces, parenthesis or a leading zero. Eg (09) 9999 9999. Spaces and parenthesis cannot be used in the other options. Additionally, no calculations are required on a phone number therefore it does not need to be a number data type.
13. The correct answer is: D
Limited list would allow the valid year levels (eg 7-12) to be provided as options. This would mean that users could not input any other number.