



# Access 2013

FOUNDATION – ADVANCED MANUAL

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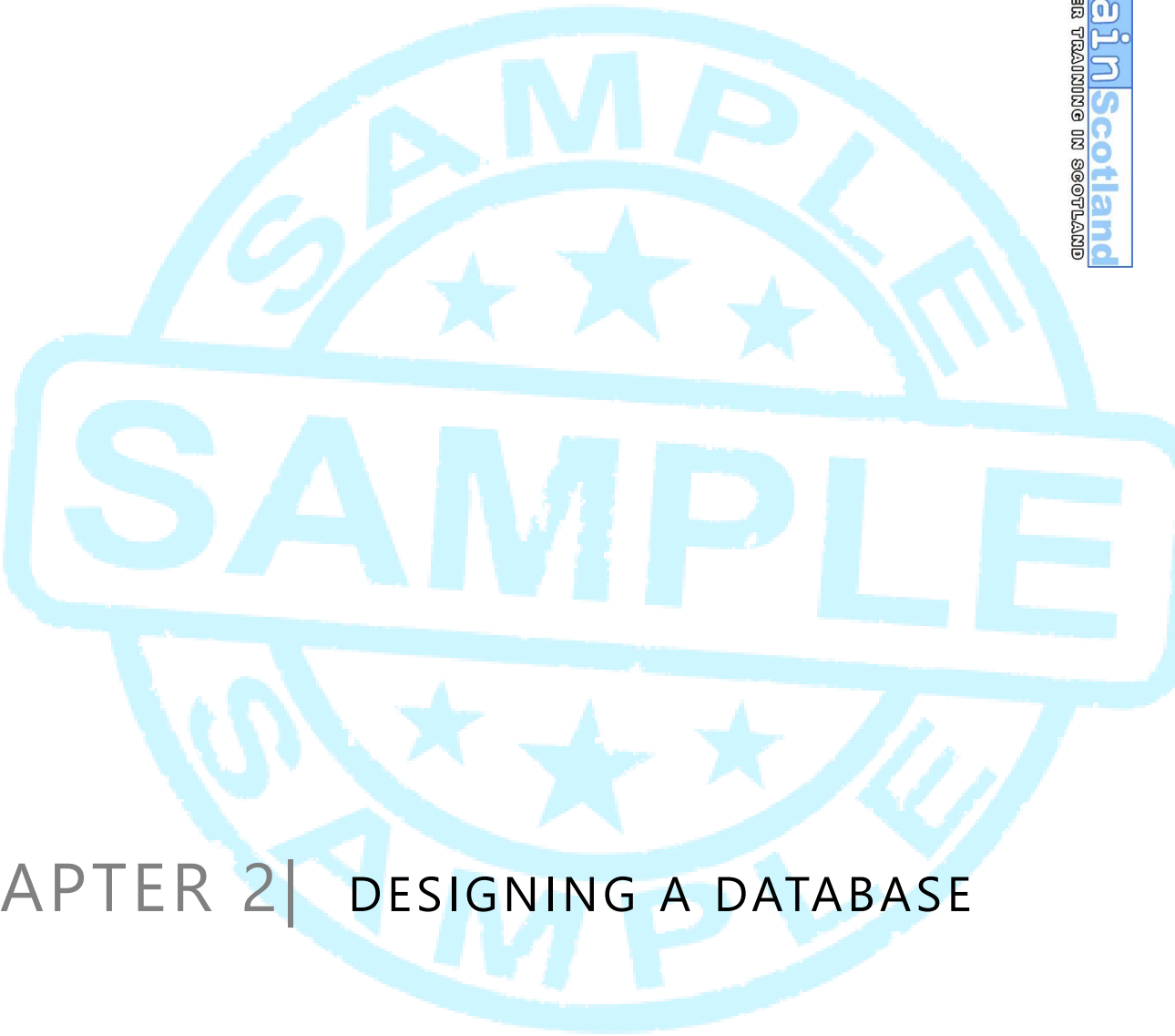
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## CHAPTER 2 | DESIGNING A DATABASE



## CHAPTER 2 | DESIGNING A DATABASE

### Relational Vs Flat File

#### Flat file

A flat file database is a database designed around a single table. The flat file design puts all database information in one table, or list, with fields to represent all parameters. A flat file may contain many fields, often, with duplicate data that are prone to data corruption. If you decide to merge data between two flat files, you need to copy and paste relevant information from one file to the other. There is no automation between flat files. If you have two or more flat files that contain client addresses, for example, and a client moved, you would have to manually modify the address parameters in each file that contains that client's information. Changing information in one file has no bearing on other files. A Microsoft Excel spreadsheet is an example of a flat file database.

#### Relational *(Microsoft Access creates relational databases)*

A relational database, on the other hand, incorporates multiple tables with methods for the tables to work together. The relationships between table data can be collated, merged and displayed in database forms. Designing a relational database takes more planning than flat file databases. With flat files, you may add information, as you deem necessary. With relational databases, you must be careful to store data in tables such that the relationships make sense. Building a relational database is dependent upon your ability to establish a [relational model](#). The model must fully describe how the data is organised, in terms of data structure, integrity, querying, manipulation and storage.

### Planning a relational database

#### Database purpose and objectives

Before building your relational model, it is recommended that a certain level of planning is carried out beforehand. The scale and complexity of such planning is dependent on the overall purpose and goals of the database. It is best to put thought into the following topics:

- What is the purpose of the database
- What are the long-term objectives of the database
- Who will be adding and retrieving data from the database
- Will the data stored in the database be used by other colleagues / departments

#### List of Subjects (Tables)

Once you have given thought to the purpose it is time to form a list of the main subjects within the database. These subjects are likely to form the main **Tables** within the database. Here is an example list of subjects for an *HR* database:

- Employees
- Training
- Disciplinary
- Holidays
- Sickness



### List of Facts (Fields)

For each subject it is necessary to create a list of facts about each subject. These facts will form the bulk of the main **Fields** within your tables. Here is an example of facts about the *Employees* table:

- Name
- Address
- Phone Number
- Department
- Manager
- Start Date
- NI number

### Defining a Unique Field (Primary Key)

For every subject (**Table**) it is necessary to allocate one fact (**Field**) within the table as the **Unique Field**. By definition this is a field which has to be unique for each item (**Record**) in your database.

Using the example *Employees table* (above), the only possible field that could be used as the Unique Field would be *NI number* as this is unique for each employee. Although it is possible to use *NI number* it may be a better idea to create a new field such as *Employee ID*. This way you control the format of the unique identifier field. Here are some examples of *Employee ID* formats:

- Autonumber- Each new record is assigned a unique number automatically as they are entered into the database. Autonumbers are usually sequential and if so, have the added benefit of recording the order in which the records are entered into the database.
- Simple code- E.g. *Emp1*
- Complex code- E.g. *Emp01001-2014a*

The **Unique Field** is commonly referred to as the **Primary Key** and this is the term that will be used throughout this manual.

### Naming the Primary Key Field

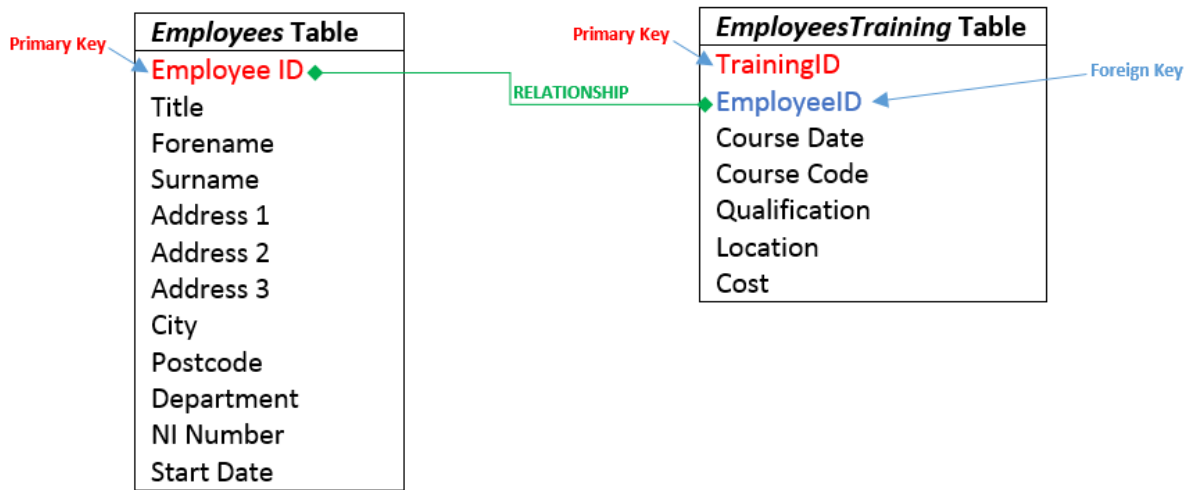
In order to be consistent it is recommended that you stick to a naming convention for all of your objects. A commonly used method is to name objects according to their properties, so in the case of Primary Key fields, name the field the same name as the **Table** the field belongs to with **ID** added:

Table Name	Primary Key Name
Employee	EmployeeID
Training	TrainingID
Product	ProductID
Order	OrderID

## Linking Tables (Creating Relationships)

Once you have decided on your main tables it is now necessary to relate the data between tables. So for example if you have one table called *Employees* and one called *EmployeeTraining*, rather than duplicating a lot of the information from the *Employees* table into the *EmployeeTraining* table (e.g. *Employee name etc.*) simply place the **Primary Key** field from the *Employees* table into the *EmployeeTraining* table and link these two fields. Now the two tables are linked. This link is referred to as a **Relationship**. When you place a **Primary Key** field in another table, this new field is referred to as the **Foreign Key** field in the new table. **A relationship is always created between a Primary Key field and its associated Foreign Key field.**

The diagram below demonstrates this relationship:



Once you have created your relationships, it is now necessary to identify the types of these relationships. This is discussed in the next section.

## Types of Relationship

There are three types of relationship:

**One-to-many (1-∞)** The majority of relationships are one-to-many. In a **one-to-many** relationship, a record in one table relates to multiple records in a second table, but the records in the second table relate to only one record in the first table. An example is a *Suppliers* table and a *Products* table. One supplier might be the only source of multiple products, all of which relate only to that supplier.

**One-to-One (1-1)** In a one-to-one relationship, each record in one table relates directly to a single record in another table. An example is an *Employees* table and a company *Football Players* table. An employee will be listed in the *Football Players* table only once, and vice versa.

**Many-to-many (∞-∞)** In a many-to-many relationship, a record in one table relates to multiple records in a second table, and a record in the second table relates to multiple records in the first table. This type of relationship requires a third table, called a junction table.

### Junction Tables (many-to-many relationships)

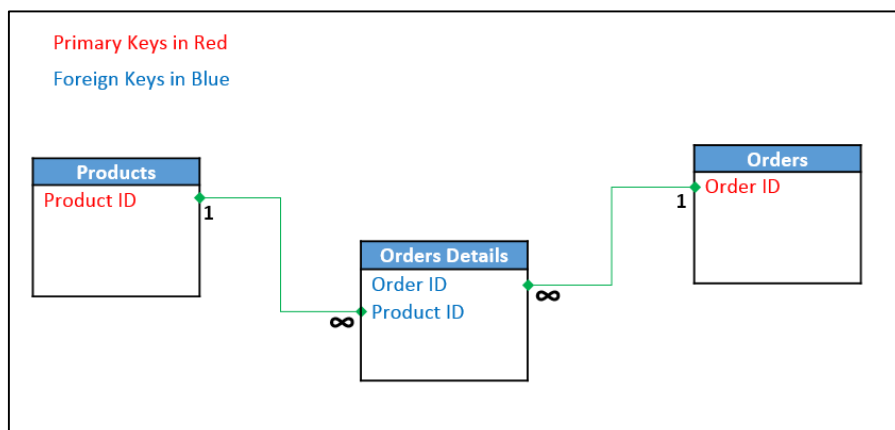
It is not actually possible to create a many-to-many relationship directly between two tables. Instead an intermediary table called a **Junction** table is required and two one-to-many relationships are created between the three tables.

The junction table contains the primary keys from the other two tables as its foreign keys.

For example, the *Orders* table and the *Products* table have a many-to-many relationship i.e. one order can contain many products, and each product can appear in many orders.

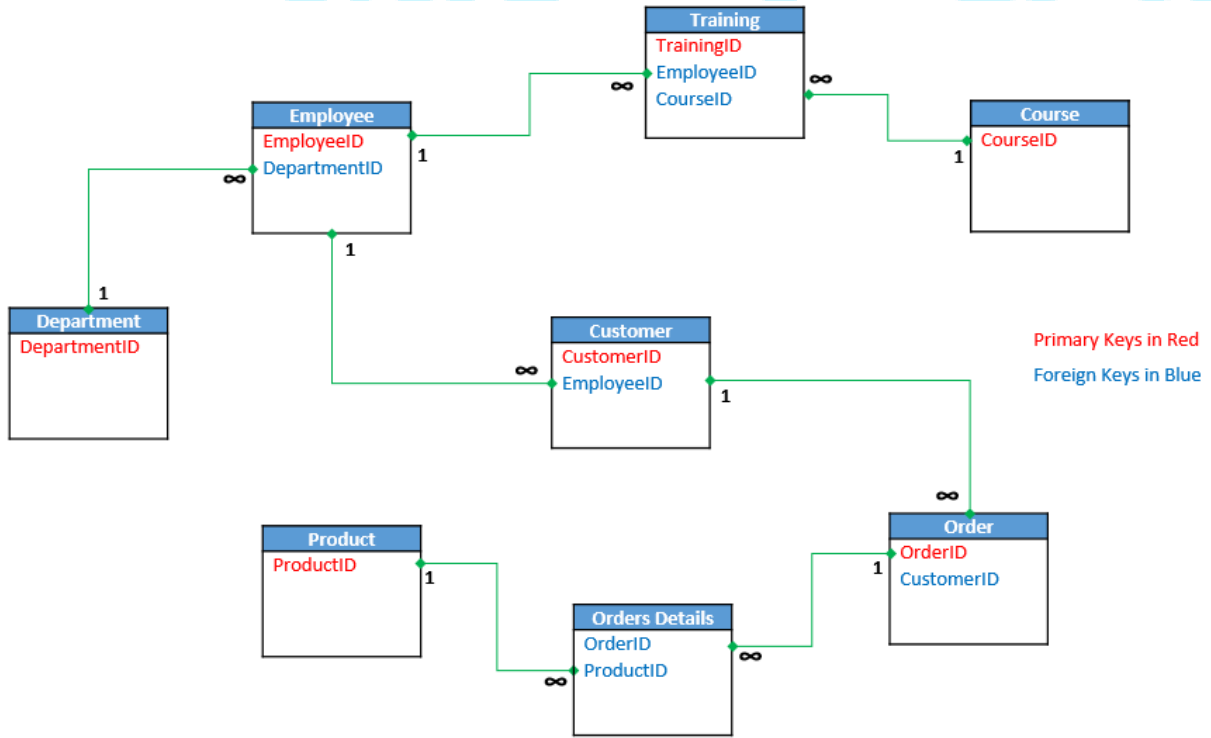
The third table — in this example, the *Order Details* table — contains primary keys from the *Orders* and *Products* tables. The *Order Details* table is the junction table for the other two.

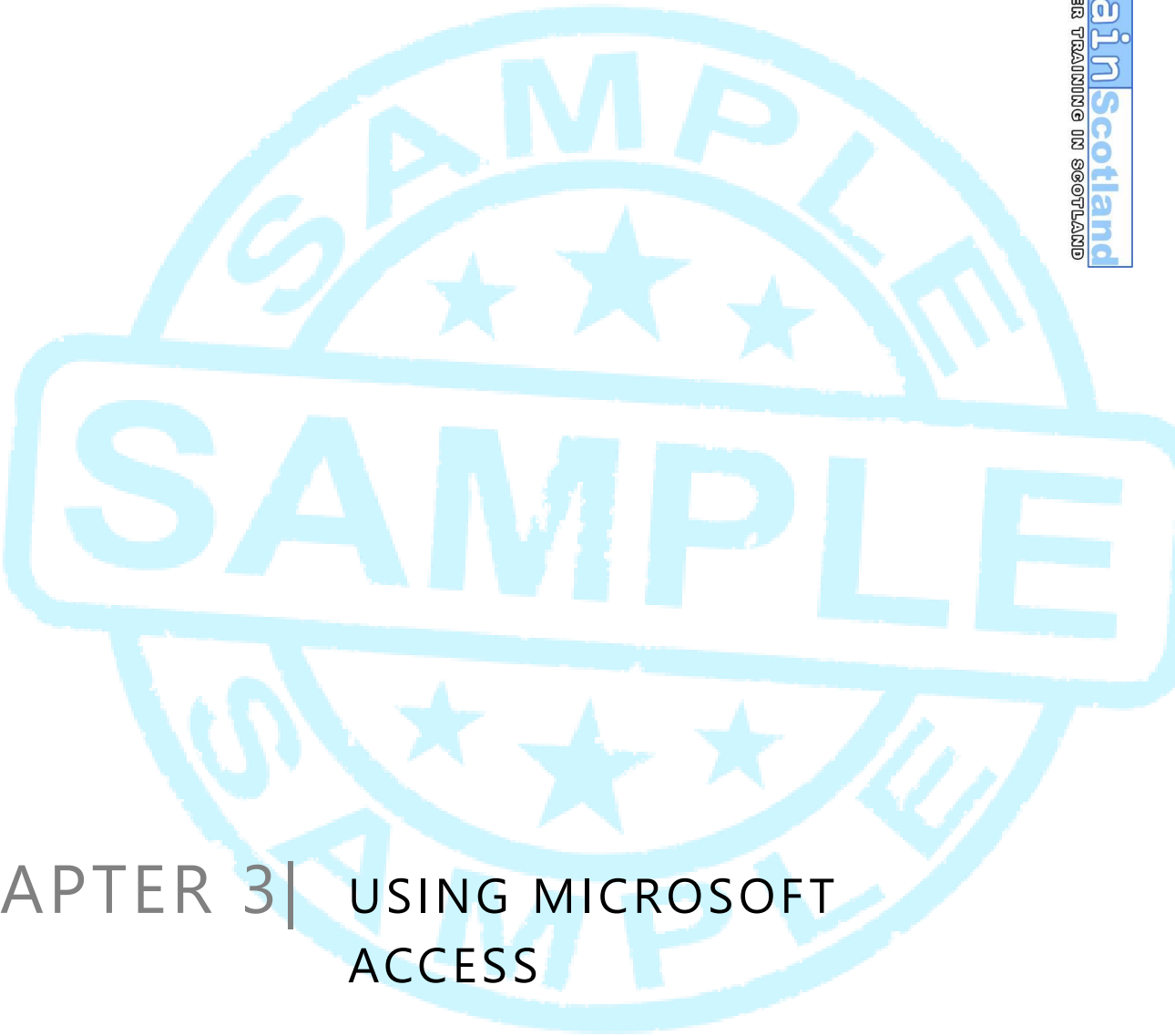
Because each single item in the *Orders* table and each single item in the *Products* table can appear many times in the *Order Details* table, each of those two tables has a one-to-many relationship with the *Order Details* table. All junction tables connect tables that have one-to-many relationships with the junction tables, and the primary keys of those connected tables are the foreign keys of the junction table.



## Creating a Relational Model

Once you have decided on all of your tables, fields, primary keys, and relationships it is now possible to put it all together in a **Relational Model**. This is a diagram of all of your tables, their primary keys and associated foreign keys as well as all the relationships between each table. Here is an example of a completed relational model:





# CHAPTER 3 | USING MICROSOFT ACCESS

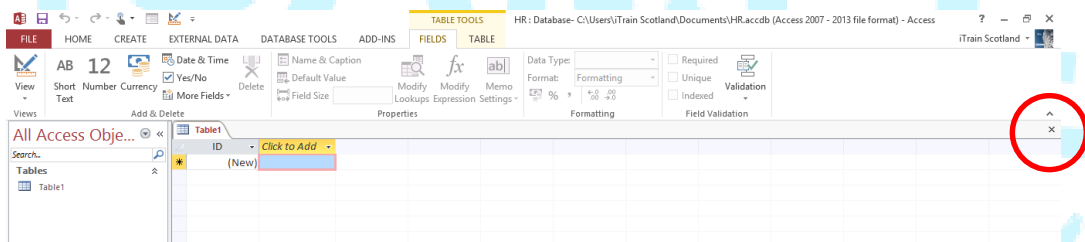


## CHAPTER 3 | USING MICROSOFT ACCESS

### Creating a new database

1. On the **Start Screen** either open an existing database from the **Recent** list or **Open Other Files** button, or click on **Blank Access Database** to create a new database.
2. It is necessary to save the new database with a filename and location before you start creating objects. An Access 2013 database will have the file extension .accdb. Choose a location from the **browse** button, choose a filename and press **Create**.

Access presents you with a new table with one existing field called *ID*. Although you could start using this table, it is recommended that you close this and create a table from scratch. Close the table with the **Close** cross in the top right corner of the table (**Not the Close cross in the top right of Access- as this will close Access altogether**).



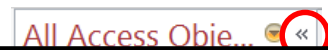
### Navigation Pane

The Navigation Pane is the primary means by which you view and access all your database objects. When you open a database in Access, by default the Navigation Pane appears along the left side of the workspace.

#### Adjusting the Navigation Pane

You can adjust the appearance of the Navigation Pane in the following ways:

1. To Change the width of the Navigation Pane, position the pointer over the right edge of the Navigation Pane and then, when it changes to a double-sided arrow, drag the edge to increase or decrease the width.
2. To open and close the Navigation Pane, click the **Shutter Bar**



This is a sample of the complete manual

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# APPENDICES |



# APPENDIX A | DATA TYPES & FIELD PROPERTIES

## Attachment

**Purpose** Used in a field that allows attaching files or images to a record. For example, if you have a job contacts database, you can use an attachment field to attach a photo of the contact, or attach documents such as a resume. For some file types, Access compresses each attachment as you add it.

You can attach many kinds of files to a record. However, some file types that may pose security risks are blocked. As a rule, you can attach any file that was created in one of the 2007 Microsoft Office system programs. You can also attach log files (.log), text files (.text, .txt), and compressed .zip files. For a list of supported image file formats, see the table later in this section.

This is a sample of the complete manual

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