

Databases 1: Tables

What is a Record?

A **record** is a group of related data about an entity e.g. the following is a record on a person:

ID No.	Name	Address	Mobile	Email
76761P	Micallef Joe	3, Trees Avenue, Mosta	8493770	jm@abc

This record has five **fields**. The names of the fields are ID No., Name, Address, Mobile and Email. The content inside the fields is, respectively, '76761P', 'Micallef Joe', '3, Trees Avenue, Mosta', '8493770' and 'jm@abc'.

What is a File?

A **file** is a container of information. It can hold, for example:

- A picture
- A video clip
- A letter
- A number of records
- Names of other files etc.

A File containing a Sequence of Records

A file can contain a sequence of records. In the simplest case the records will be of equal size i.e. all records will have the same number of fields and all corresponding fields will have the same size e.g. the second fields of each record will contain 15 characters whether the name is shorter than 15 and whether it is longer (in this case a number of characters will be left out – this is called **field overflow**). We say that these are **fixed-length records**.

We can also have **variable-length records**. In this case the corresponding fields can be of different length and/or the records can have a different number of fields.

Fields can have different **types** e.g.

- 'Our Nest', Konti Square, Fgura has type *text*.
- 65.8 has type *number*.
- 18th June 2003 has type *date*.

A type shows the nature of the value.

Exercise

Can you think of an advantage of having fixed-length records? Can you think of a disadvantage?

Tables

A **table** is a list of fixed-length records as shown in the following diagram.

ID No.	Bank Acc. No.	Name	Amount
657C	4662	Borg Paul	98,322
645V	9376	Zammit Albert	2,338
219X	9301	Portelli Mary	23,013
645V	2282	Zammit Albert	8,236

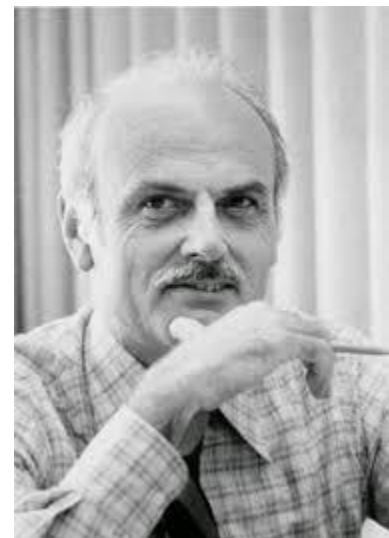
Database System

A **database** is a set of related files that is created and managed by a **database management system (DBMS)**.

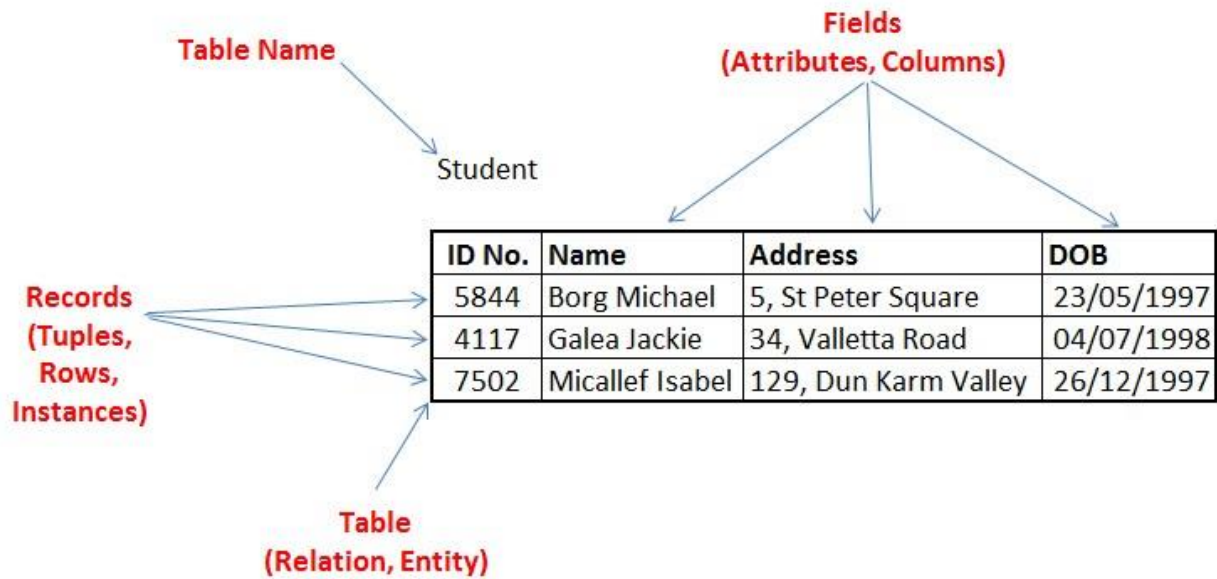
Relational Databases

There are many kinds of database models but one that is very frequently used today is called a **relational database**. A relational database is a collection related tables. The relational database was invented by E. F. Codd at IBM in 1970.

In addition to being relatively easy to create and access, a relational database has the important advantage of being easy to extend. After the original database creation, a new data category can be added without requiring that all existing applications (i.e. programs that make use of the database) be modified.



Below is a database that is simply made of one table.



Nomenclature of Relational Databases

A table is sometimes called a **relation**.

An item is a value within a database e.g. 4117 (in the table above).

Primary Key

A **primary key** or a key field, is a field that is **unique** i.e. all the records have a different value for this field. In the table above the primary key is the ID No.

Exercise

- a) A database in a library would hold books. Write two other environments where you would expect to find a database.
- b) Consider the following table again.

ID No.	Bank Acc. No.	Name	Amount
657C	4662	Borg Paul	98,322
645V	9376	Zammit Albert	2,338
219X	9301	Portelli Mary	23,013
645V	2282	Zammit Albert	8,236

Which field would you choose as the primary key?