# Database Concepts

A database is a logically coherent collection of related data. It should provide a single source of information, data independence, concurrency control, data integrity and security, a clear data model and a database management system.

There are four main types of database; Hierarchical, which represents data as hierarchical tree structures. Network, which represents data as record types, the network data model has an associative record-at-a-time language. Relational, which represents data as a collection of tables and most support a high-level query language such as SQL. Object-oriented, which represents info as objects which contain both data and operations to process the data.

The relational database model:

This model organises all data into a number of relations, each relation resembles a table. Data can thus be inserted, modified, deleted or queried easily. If a database organises the data in accordance with the relational data model it is termed a relational database.

A value is the intersection of a column and row in one of these relations (tables). A column is a set of same data type values. Columns are also called attributes. A column specification includes its types and integrity constraints. A row is a non-empty set of values, it also known as a tuple.

A relation is a special type of set where a collection of values is the same type, there is no implied ordering and there are no duplicate elements.

Relational database management systems (DBMS) conform to the 3-schema architecture which is a layering of different levels of information. The first layer is the external view, where data is presented to the user in such a form as to suit the intended use. The second, is the conceptual level. This is a description of the structure of the whole database, note this omits the details of physical storage structure. The third layer is the internal level which contains the internal schema which describes the physical storage structure of the database.