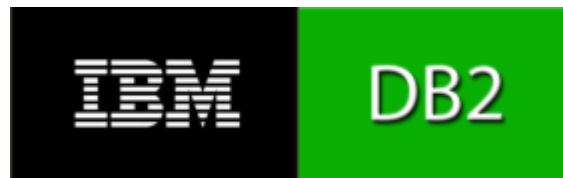# DATABASES

Basic Concepts

Data vs. Information

- Data are raw facts
  - e.g. Name, Date-of-Birth, Nationality, etc.
- Information is processed data e.g. from the data above we can calculate the following:
  - How many Irish students are under 21
  - How many mature students are French
  - The average age of English students
  - And so on…

What is a Database System ?

- A database management system (DBMS) is an organised collection of inter-related data and a set of programs to access those data.

- The primary goal of a DBMS is to provide an environment that is both convenient and efficient to use in retrieving and storing information.

- The management of data involves both the definition of structures for the storage of information and the provision of mechanisms for manipulating this information.

MySQL

Microsoft® SQL Server® 2008

PostgreSQL

ORACLE®

IBM DB2

A

SQLite

mongoDB

A DBMS provides :

- Safety and security for data;
- Increases data integrity by forcing users to obey rules (type, size, validation rules, etc.);
- Reduces data maintenance by having policies and procedures for database use;
- Increase data independence by designing database tables and relationships;
- Improves data access speeds by having organised data; and
- Allows for data sharing.

So what is a Database ?

Filing cabinet = Database (DB)

Physical key = Security

Drawer = Table (aka entity)

Message in one drawer about another drawer = Relationship

Folder = Record (aka row/tuple)

Tab = Primary Key

Data in Folder = Fields (aka attributes)