INT 306
Database Management Systems (DBMS)

Lecture 0

Course Outcomes

- CO1 :: develop skills and understanding in the database design and make use of database management systems for applications
- CO2 :: develop understanding about relational algebra, relational model and SQL for implementing and maintaining databases
- CO3 :: develop understanding about the different issues involved in the design and implementation of a database system
- CO4 :: develop skills and understanding about the real time transaction management systems and the concurrency control techniques
- CO5 :: compose programming constructs such as functions, stored procedures and triggers that can be shared by multiple forms, reports and data management applications

Book References

Text Books:

1. DATABASE SYSTEM CONCEPTS by HENRY F. KORTH, ABRAHAM SILBERSCHATZ, S. SUDARSHAN, MCGRAW HILL EDUCATION

References:

1. DATABASE SYSTEMS: MODELS, LANGUAGES, DESIGN AND APPLICATION PROGRAMMING by RAMEZ ELMASRI, SHAMKANT B. NAVATHE, PEARSON

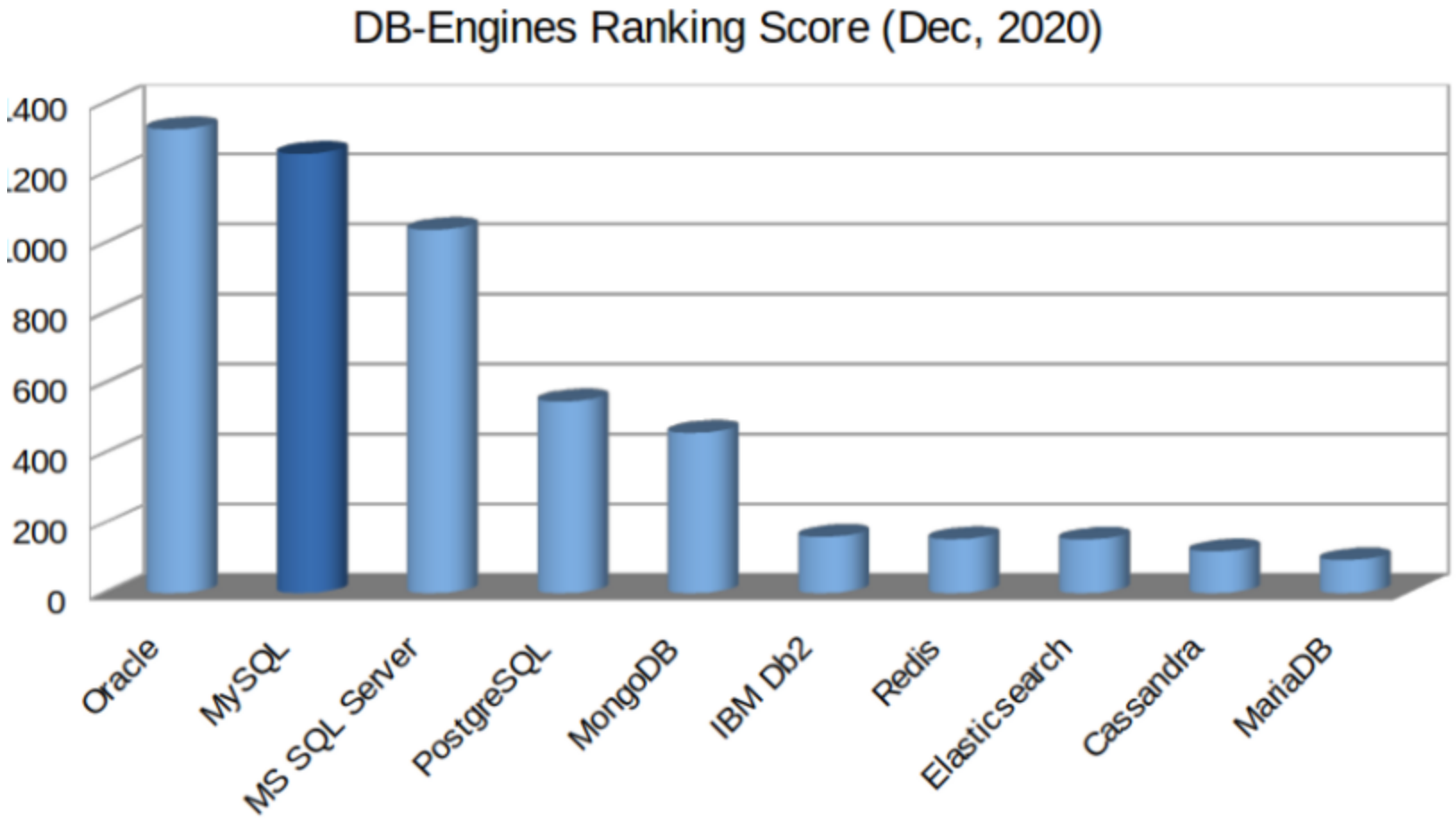
2. AN INTRODUCTION TO DATABASE SYSTEMS by C. J. DATE, S. SWAMYNATHAN, A. KANNAN, PEARSON

3. SQL, PL/SQL: THE PROGRAMMING LANGUAGE OF ORACLE by IVAN BAYROSS, BPB PUBLICATIONS

4. SIMPLIFIED APPROACH TO DBMS by PRATEEK BHATIA AND GURVINDER SINGH, KALYANI PUBLISHERS

Know about the Multiple Databases ??

Which are the popular DBMS ??



The three BURNING questions in mind…

1. Why are we learning databases, Is Excel not enough?
2. What operations we can perform and purpose it would solve ?
3. What will be the course outcome?

Let’s start off

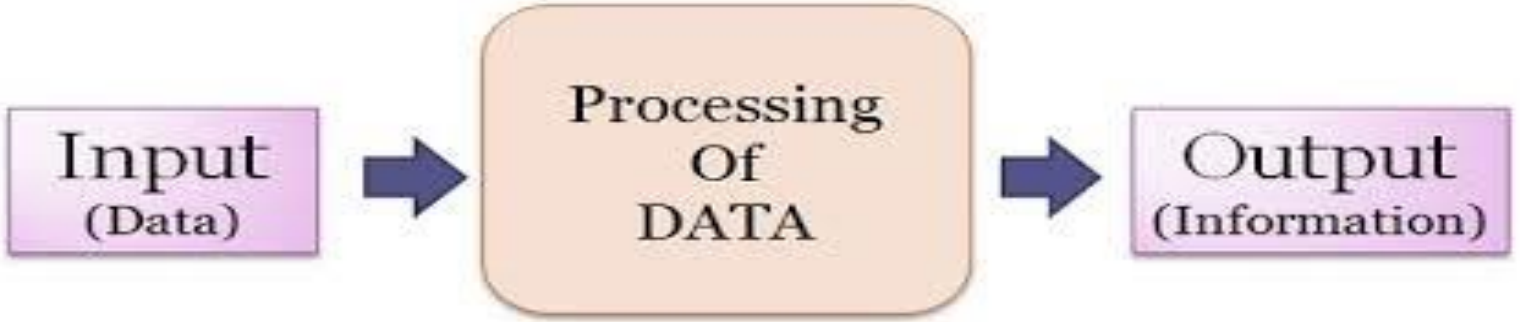
Data vs. Information
Aren't they Same ???

DATA

Un-organized

INFORMATION

Organized



Data	Information
Data is unorganised and unrefined facts	Information comprises processed, organised data presented in a meaningful context
Data is an individual unit that contains raw materials which do not carry any specific meaning.	Information is a group of data that collectively carries a logical meaning.
Data doesn't depend on information.	Information depends on data.
It is measured in bits and bytes.	Information is measured in meaningful units like time, quantity, etc.
Raw data alone is insufficient for decision making	Information is sufficient for decision making
An example of data is a student's test score	The average score of a class is the information derived from the given data.

Dataset vs. Database ??

- A *DATASET* is a structured collection of **data** generally associated **with a** unique body of work.
- A *DATABASE* is an organized collection of **data** stored as multiple datasets.

- **DATA**

Data means facts related to any object in consideration.

- **DATABASE**

Database is a systematic collection of data. Databases support storage and manipulation of data. Databases make data management easy.

For example

Facebook uses database to store, manipulate and present data related to members, their friends, member activities, messages, advertisements and lot more.

Is excel a Database ??

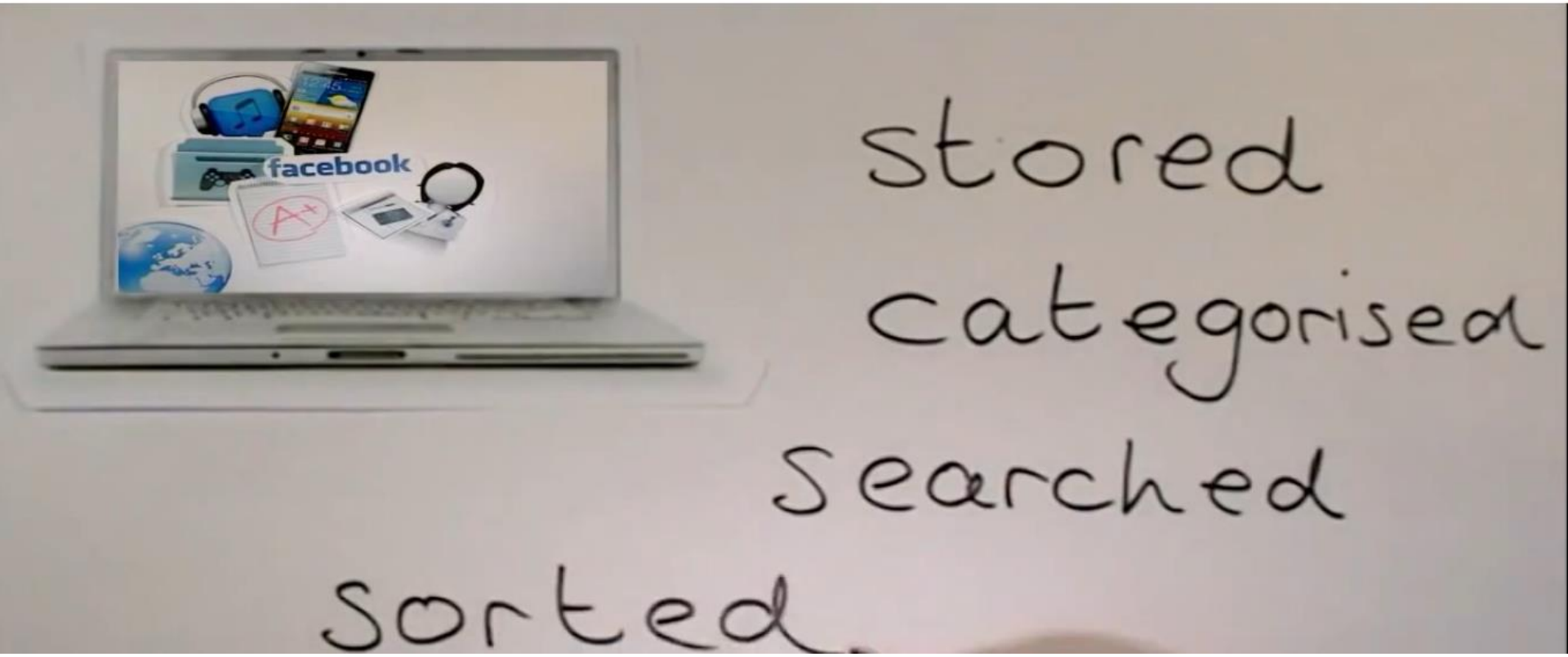
Definitely Not!!!

- A spreadsheet is an application for tabulating data while a database is where data is stored so that it can be retrieved by users
- The amount of data that is usually stored in a database is way more than what is contained in a spreadsheet
- A spreadsheet is edited directly by people while a database is accessed by applications that enter and modify data
- A spreadsheet is usually used for presentations and paperwork while databases are commonly used in cases where a lot of data needs to stored

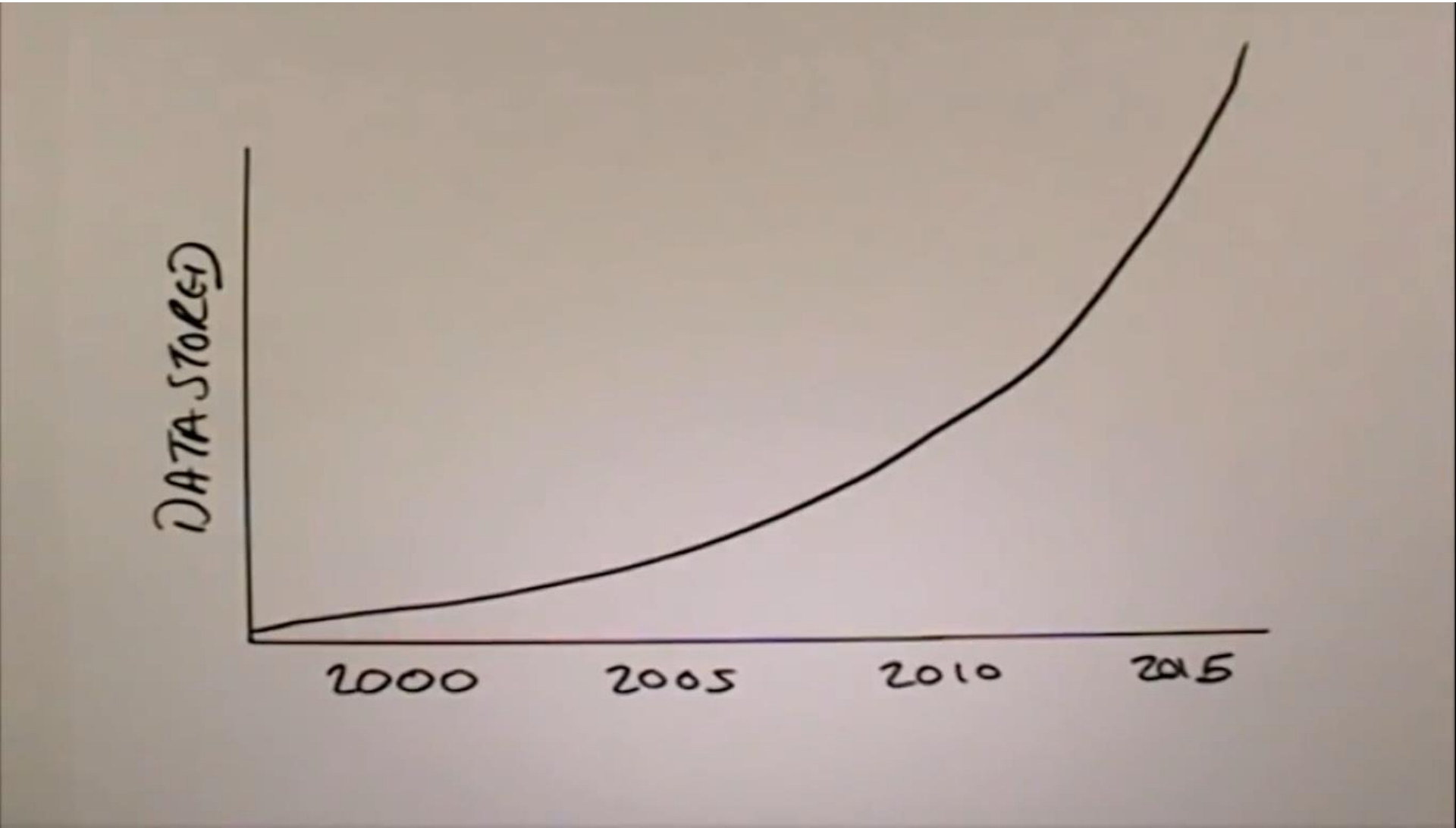
Introduction to DBMS

World is full of information!!

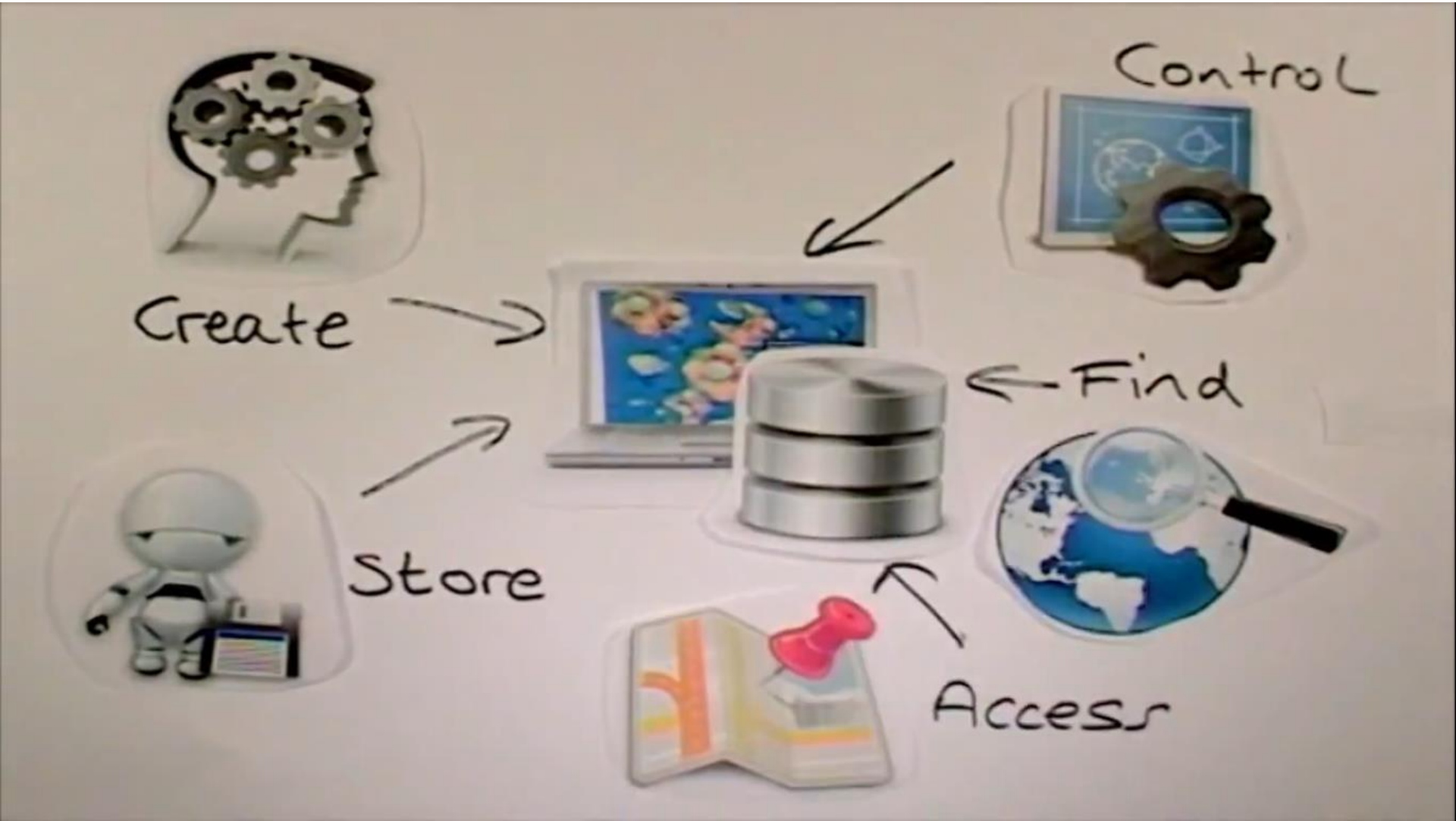
What needs to be done about the information?



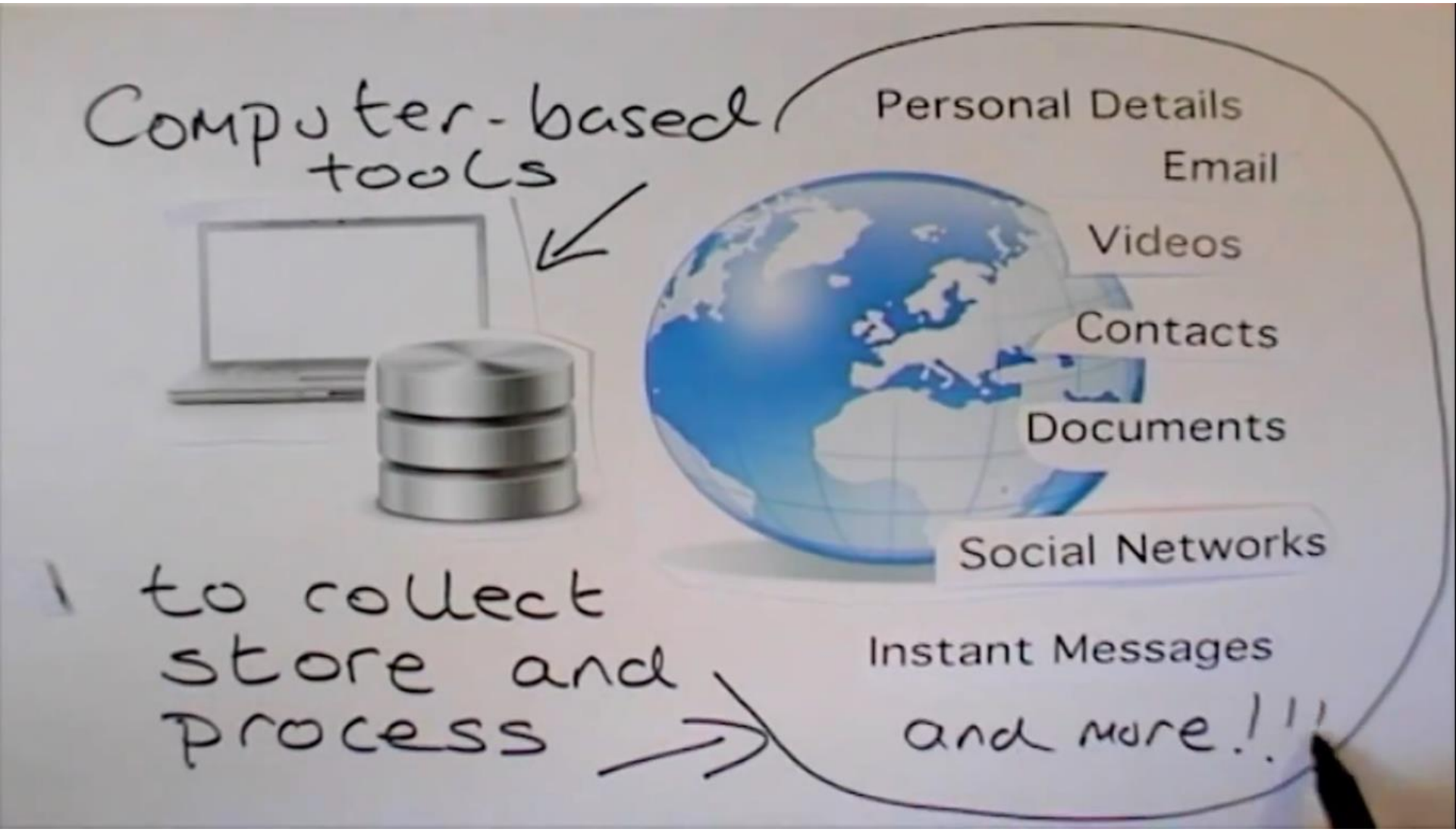
Data growth



How do we manage data?



What data can be stored or recorded ??



Who all uses Databases ??

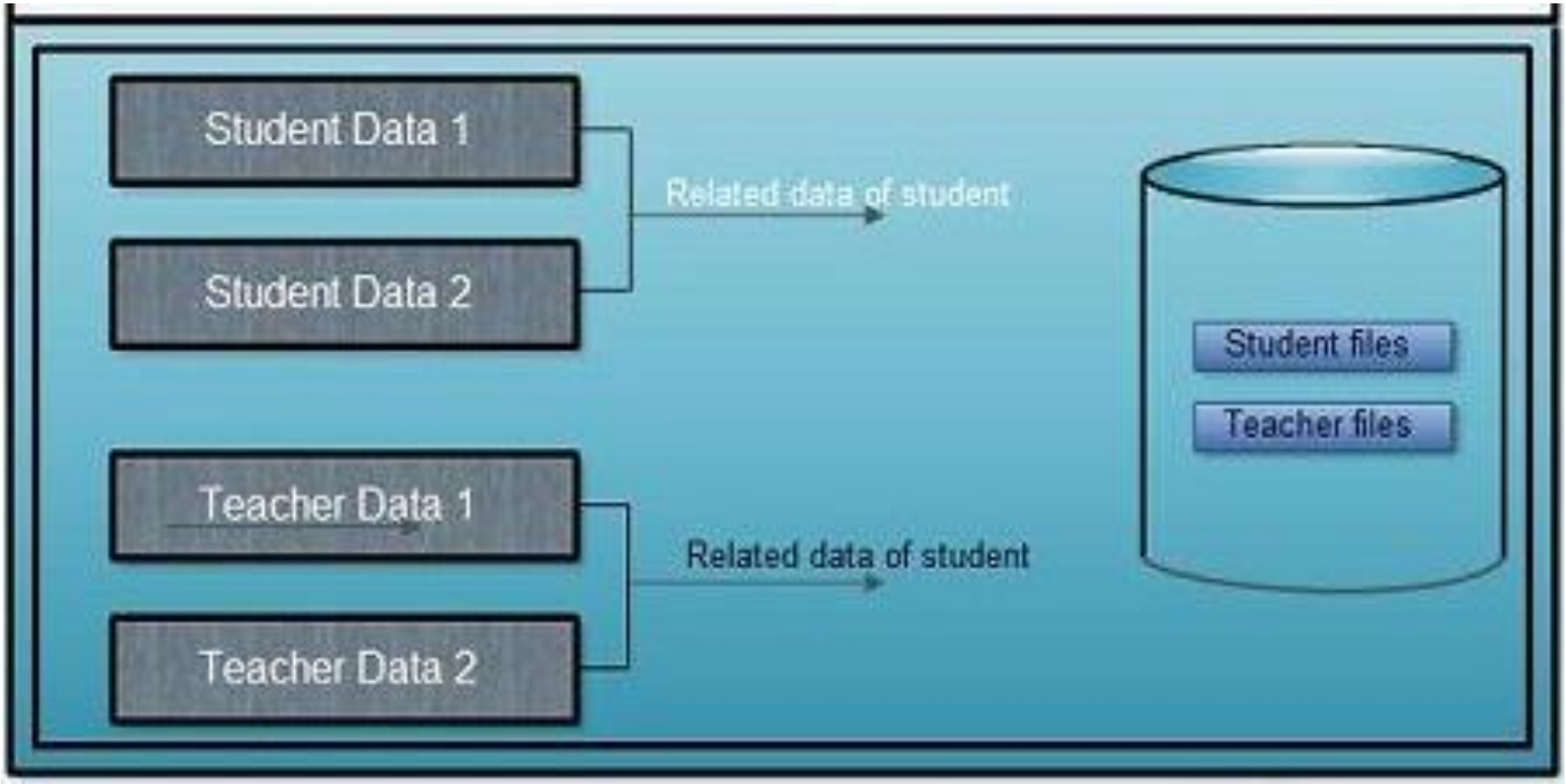
What is DBMS ??

- Database Management Systems is not a new concept.
- A database management system (DBMS) is system software for creating and managing databases. DBMS is a collection of programs which enables its users to access database, manipulate data, reporting / representation of data .
- The DBMS provides users with a systematic way to create, retrieve, update and manage data.

Why DBMS ??

- Data independence and efficient access.
- Reduced application development time.
- Data integrity and security.
- Uniform data administration.
- Concurrent access, recovery from crashes.

Database Depiction



Introduction to DBMS

- We know, DBMS stands for **D**ata**b**ase **M**anagement **S**ystem

Database + Management + System

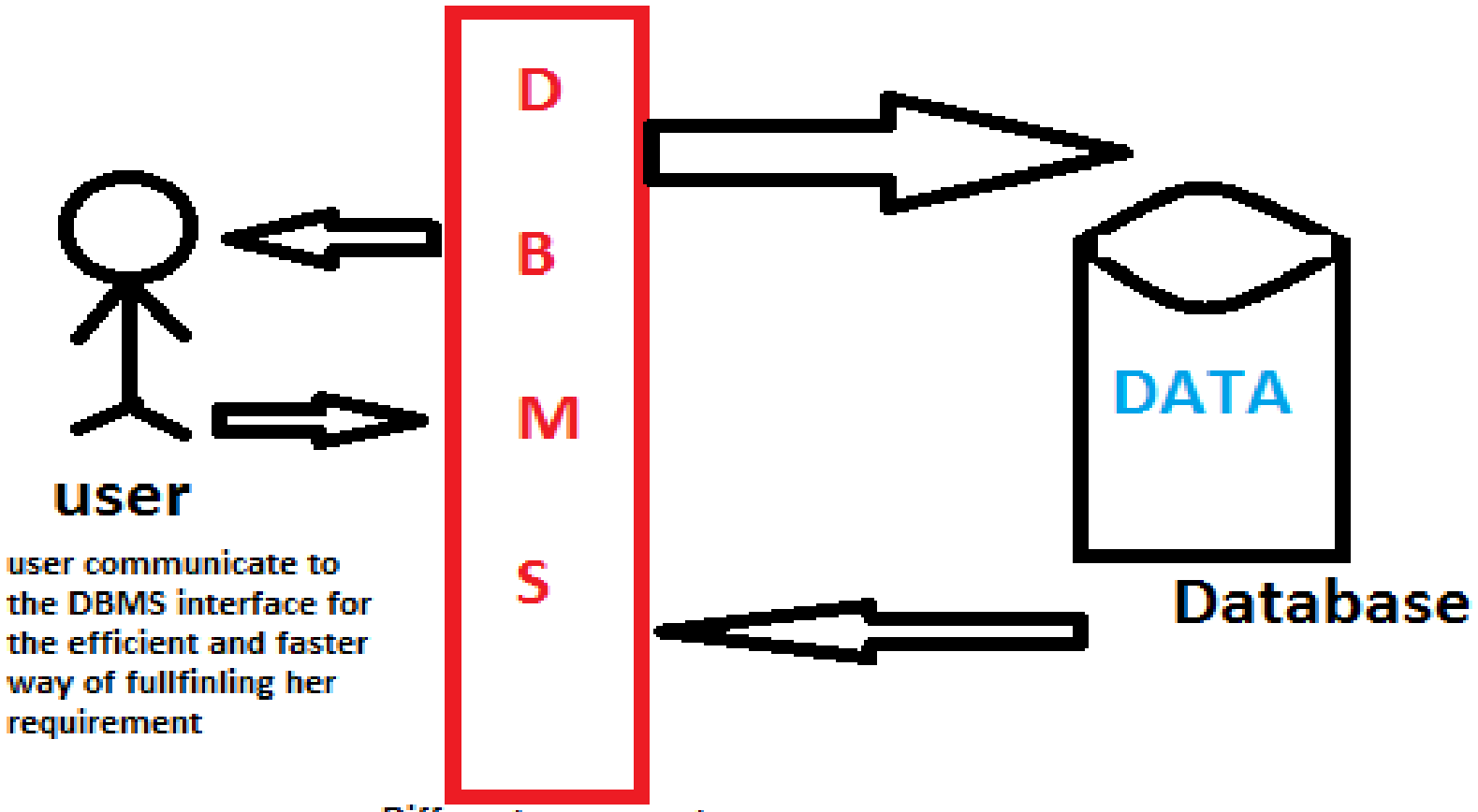
where, the database is managed by the system.

Database Management System

Database + Management System

collection of data a set of program to store & retrieve data.

Database Management Systems

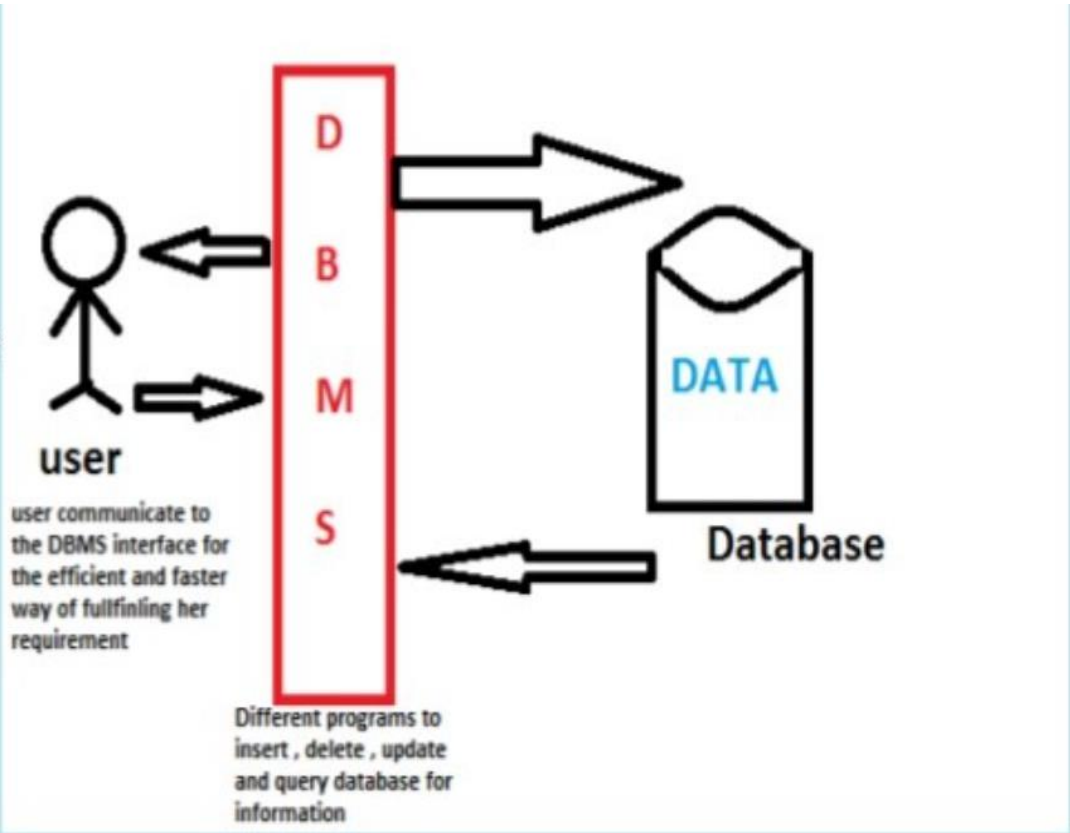


Applications of DBMS

- **Banking** - For customer information, account activities, payments, deposits, loans, etc.
- **Airlines** - For reservations and schedule information.
- **Universities** - For student information, course registrations, colleges and grades.
- **Telecommunications** - It helps to keep call records, monthly bills, maintaining balances, etc.
- **Sales** - Use for storing customer, product & sales information.
- **HR Management** - For information about employees, salaries, payroll, deduction, generation of paychecks, etc.

Manufacturing - It is used for the management of supply chain and for tracking production of items.

Finance - For storing information about stock, sales, and purchases of financial instruments like stocks and bonds.



Syllabus of INT306

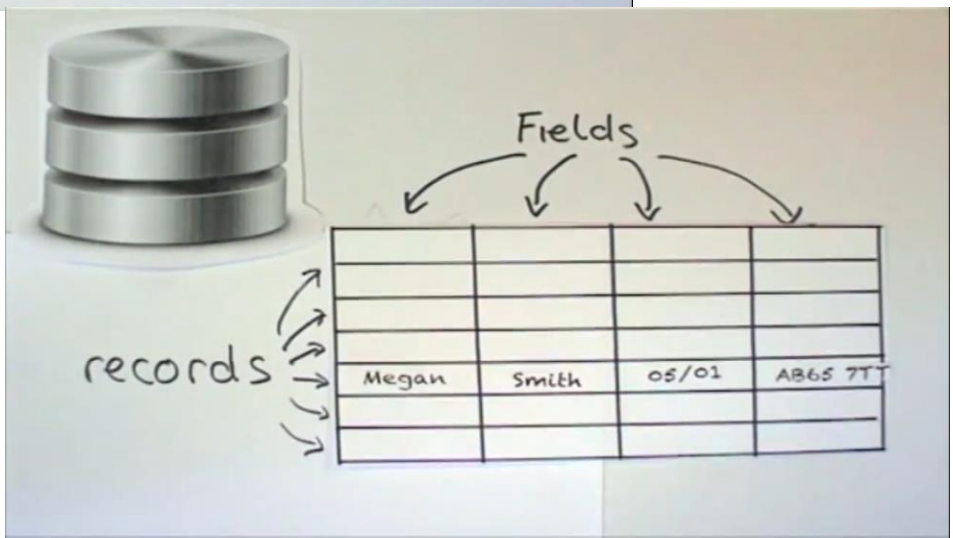
Unit 1: Introduction to Databases

- purpose of database systems
- components of dbms
- applications of dbms
- three tier dbms architecture
- data independence
- Database Schema, instance
- data modeling
- entity relationship model
- relational model

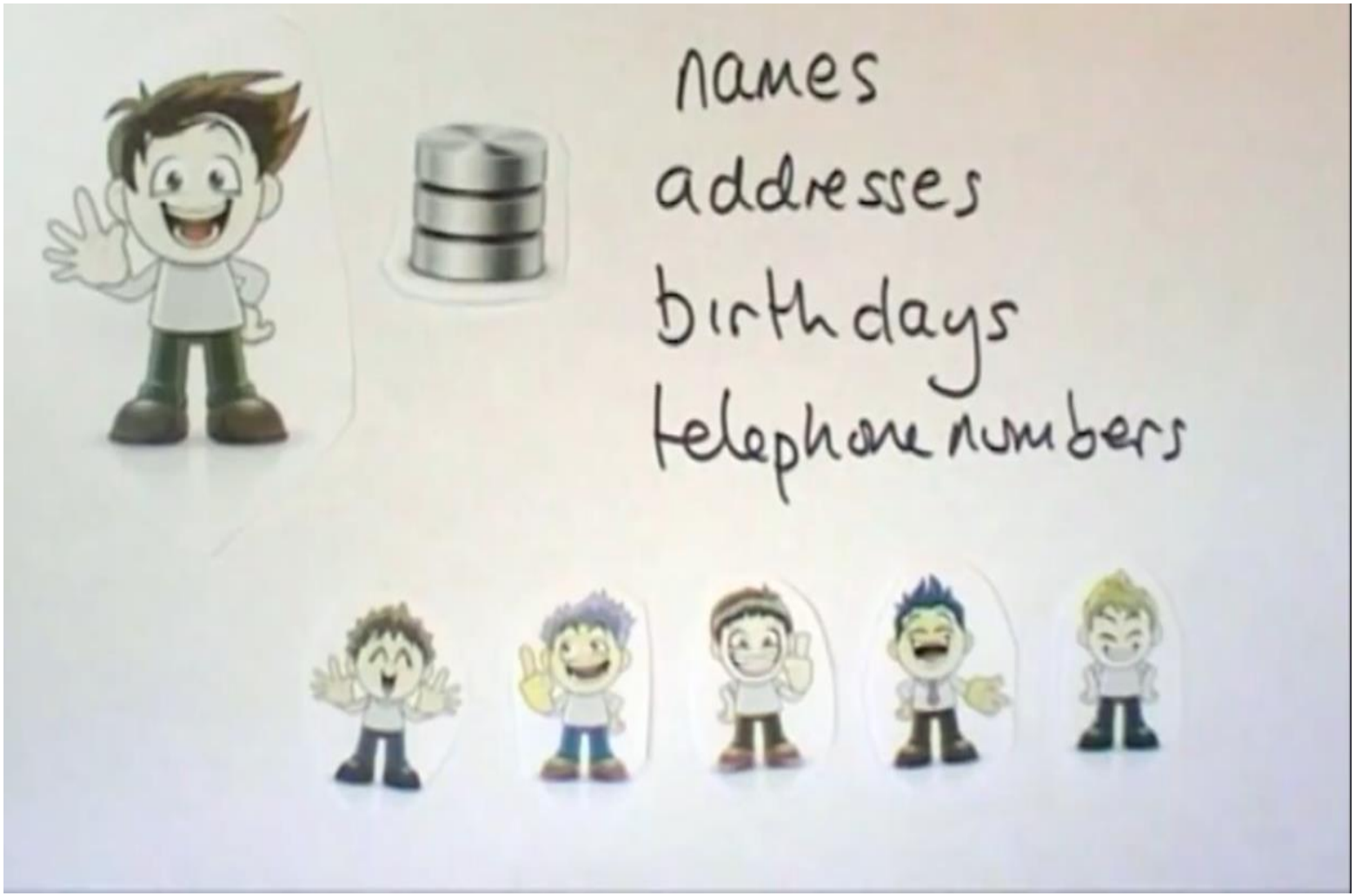
Relational Databases

UserID	First Name	Last Name	Email	Phone #
7500848	Stephen	Barrett	sbarrett@mail.com	555-222-3987
7500843	Derek	Clapton	derek@dominos.com	555-735-2406
7500843	John	Didsbury	jdisbury@mail.com	555-769-3987
7500847	Georgia	Grace	gg@mail.com	555-859-9876
7500841	Carly	Rose	crose@mail.com	555-403-1018

Structure of Relational Databases

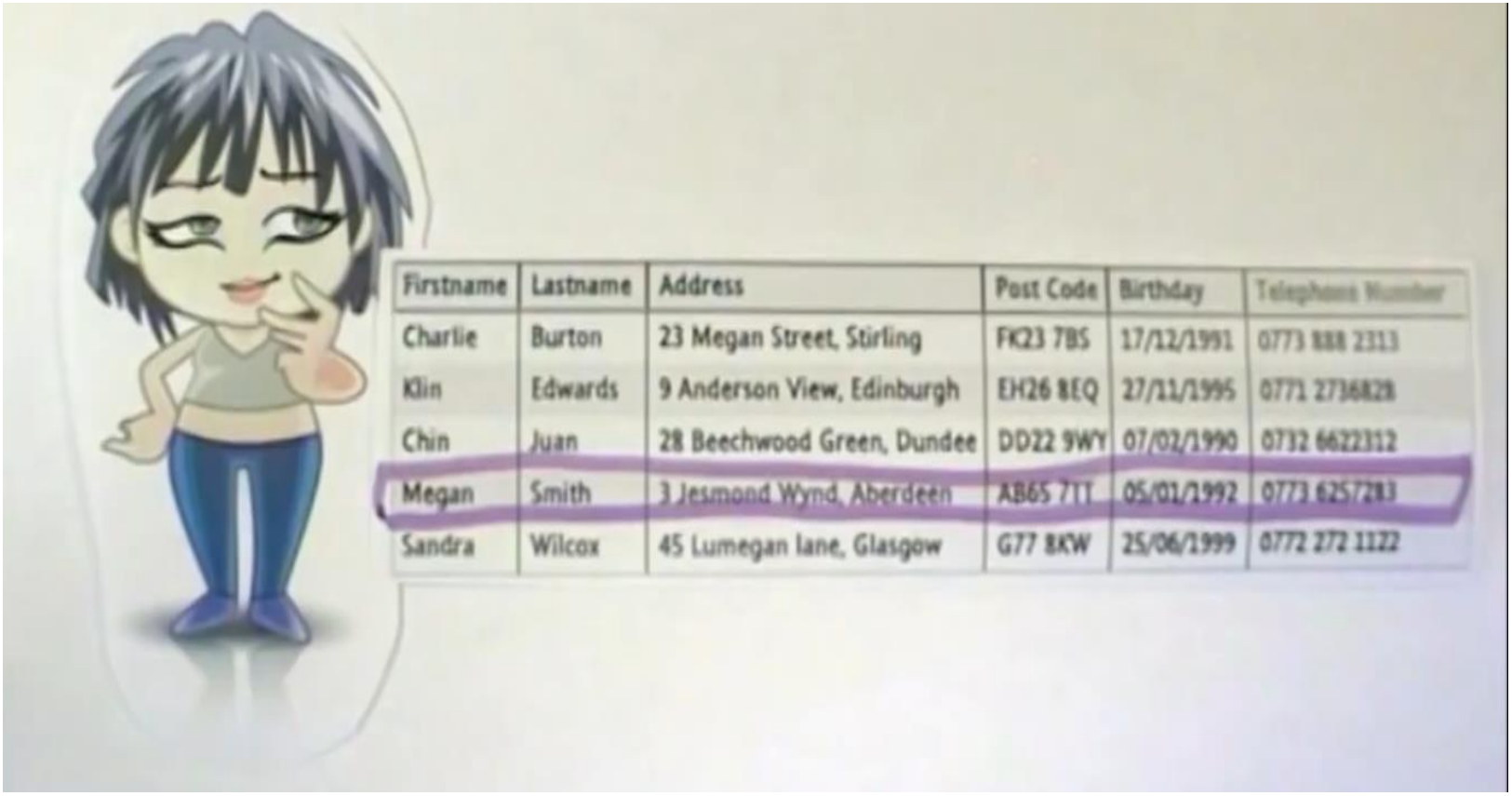


Bob's Address Book



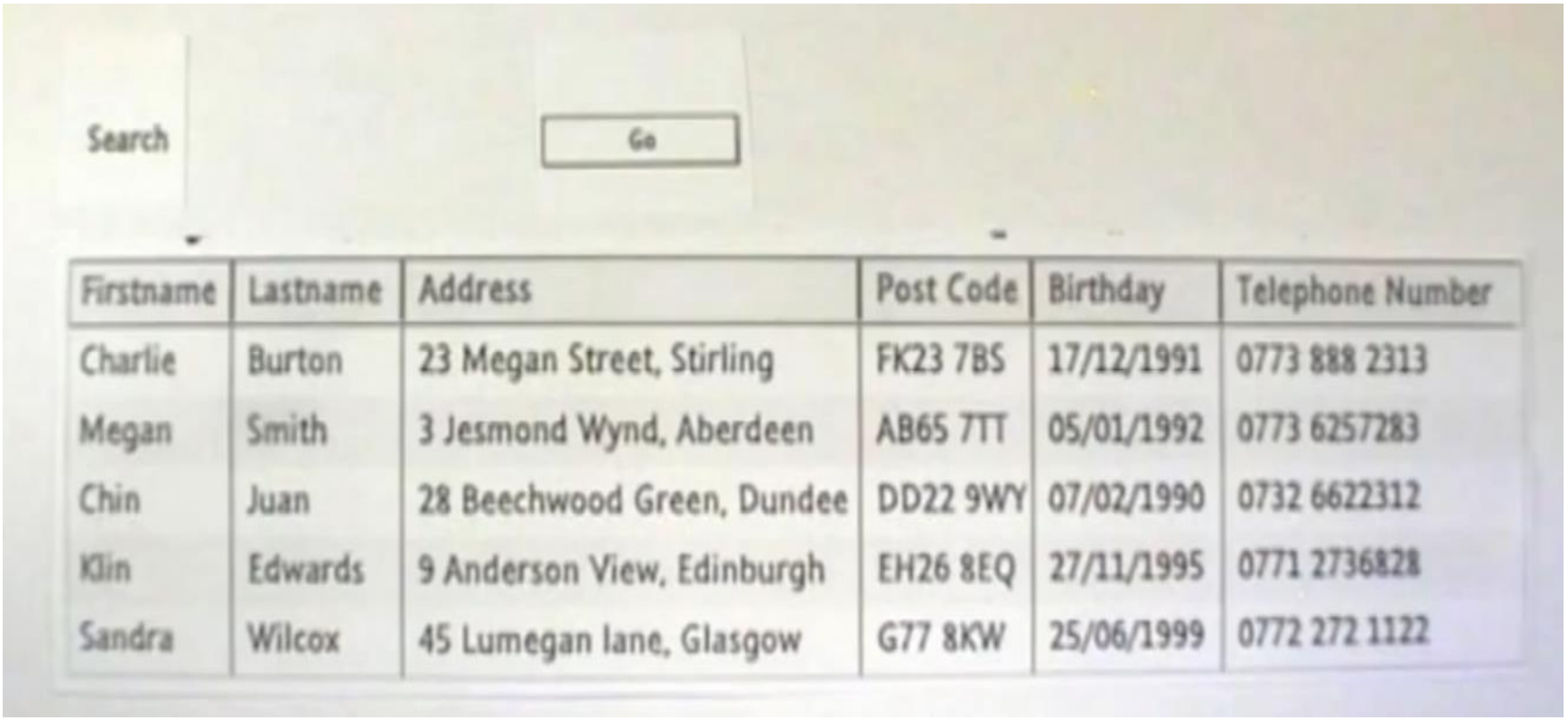
His friend Megan's Details

Database Design:
It's how they are stored!!!



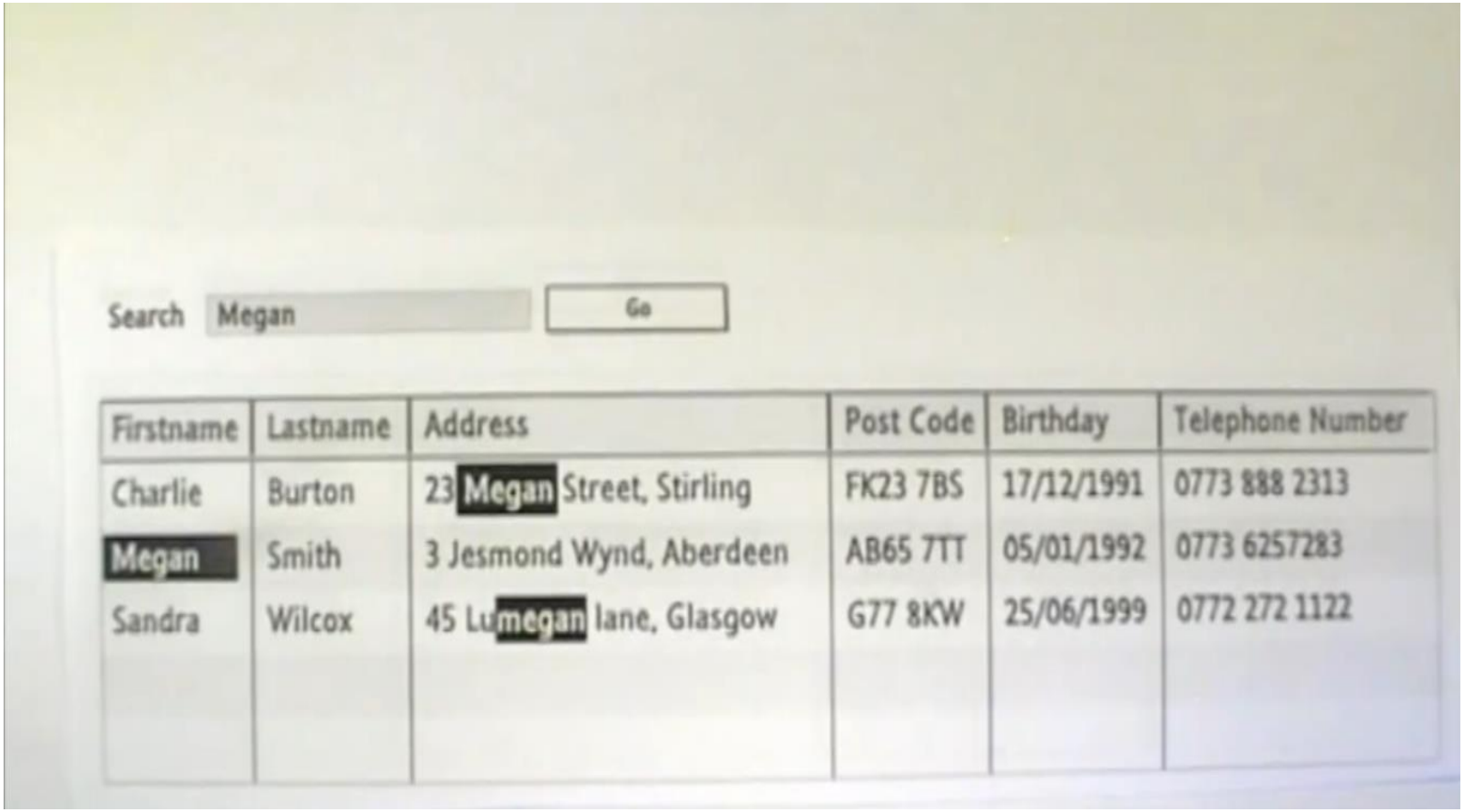
Firstname	Lastname	Address	Post Code	Birthday	Telephone Number
Charlie	Burton	23 Megan Street, Stirling	FK23 7BS	17/12/1991	0773 888 2313
Klin	Edwards	9 Anderson View, Edinburgh	EH26 8EQ	27/11/1995	0771 2736828
Chin	Juan	28 Beechwood Green, Dundee	DD22 9WY	07/02/1990	0732 6622312
Megan	Smith	3 Jesmond Wynd, Aberdeen	AB65 7TT	05/01/1992	0773 6257283
Sandra	Wilcox	45 Lumegan lane, Glasgow	G77 8KW	25/06/1999	0772 272 1122

Can we perform various operations ??

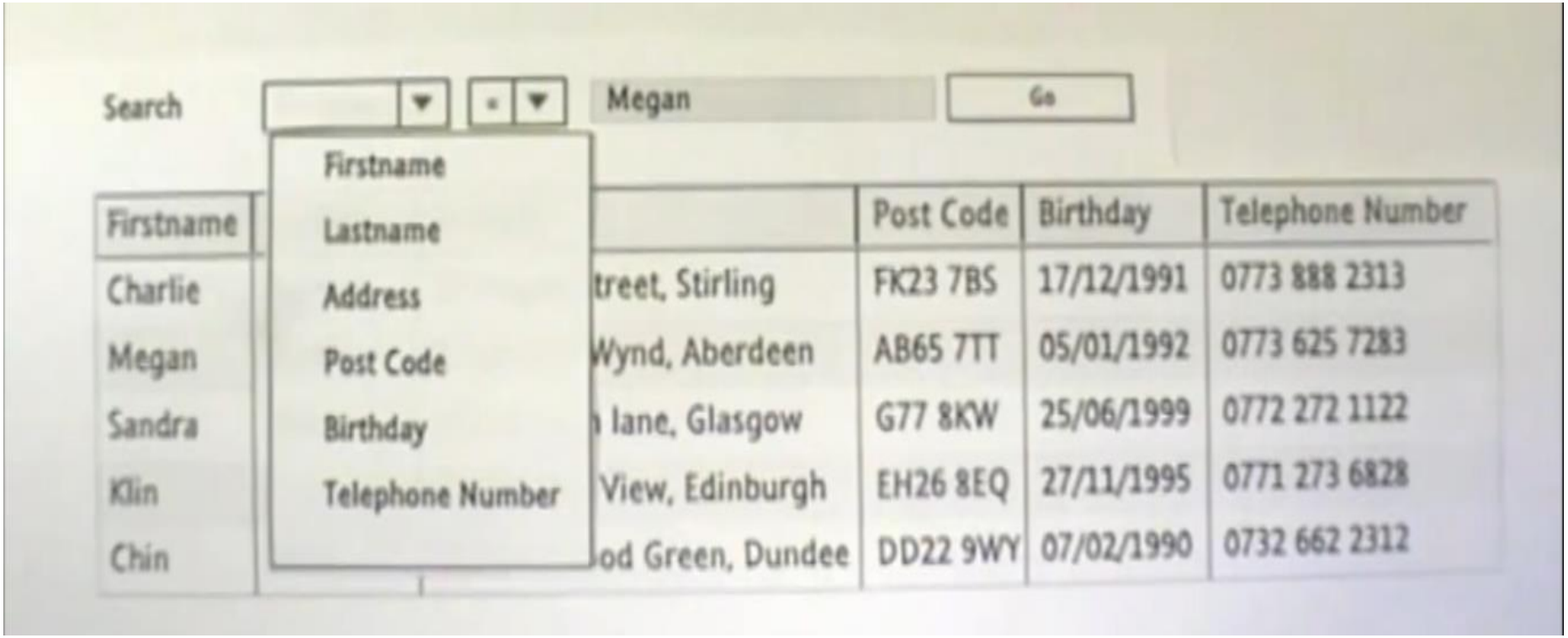


Firstname	Lastname	Address	Post Code	Birthday	Telephone Number
Charlie	Burton	23 Megan Street, Stirling	FK23 7BS	17/12/1991	0773 888 2313
Megan	Smith	3 Jesmond Wynd, Aberdeen	AB65 7TT	05/01/1992	0773 6257283
Chin	Juan	28 Beechwood Green, Dundee	DD22 9WY	07/02/1990	0732 6622312
Klin	Edwards	9 Anderson View, Edinburgh	EH26 8EQ	27/11/1995	0771 2736828
Sandra	Wilcox	45 Lumegan lane, Glasgow	G77 8KW	25/06/1999	0772 272 1122

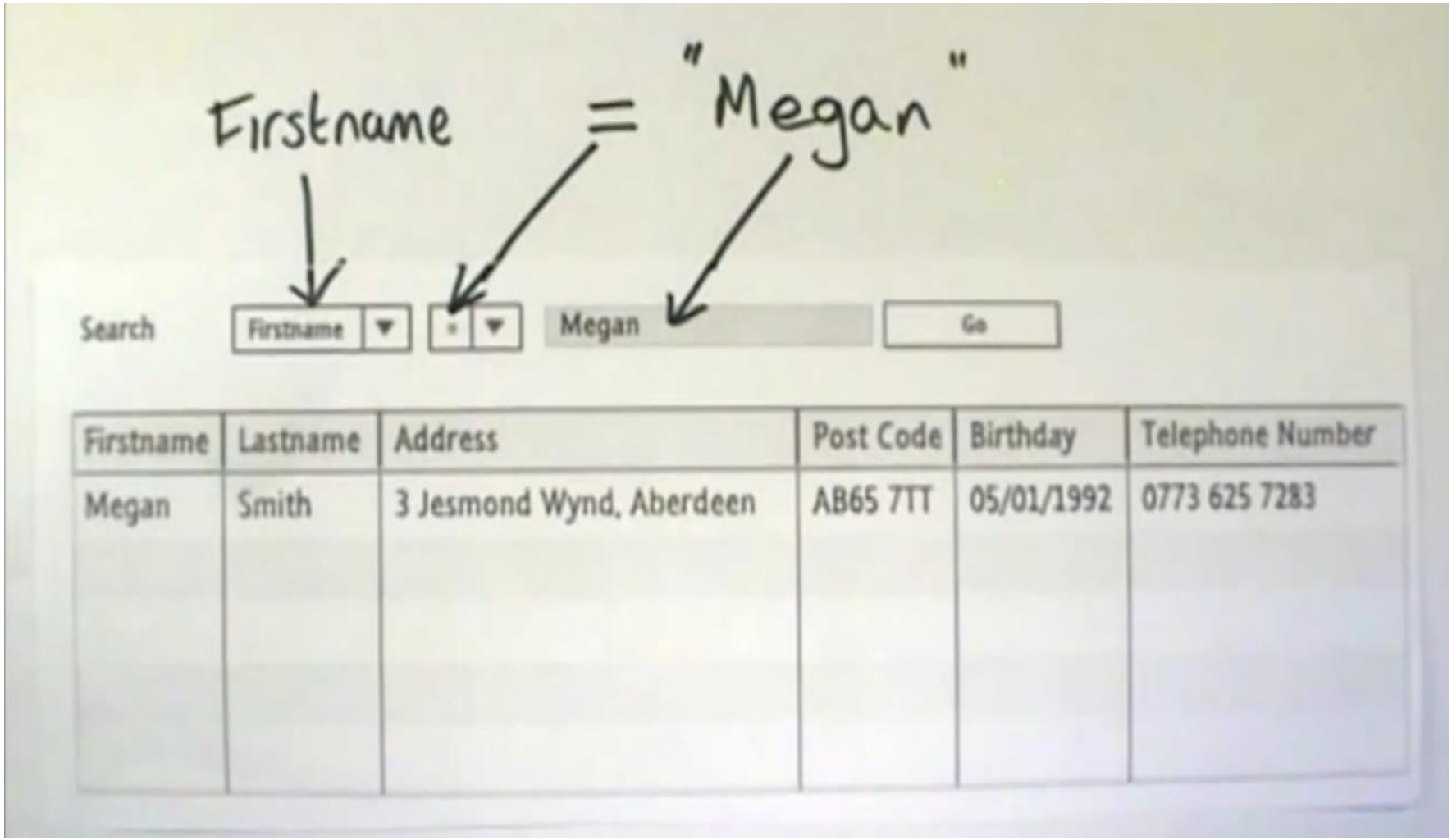
Lets Look for Megan



Search can be more accurate!!!

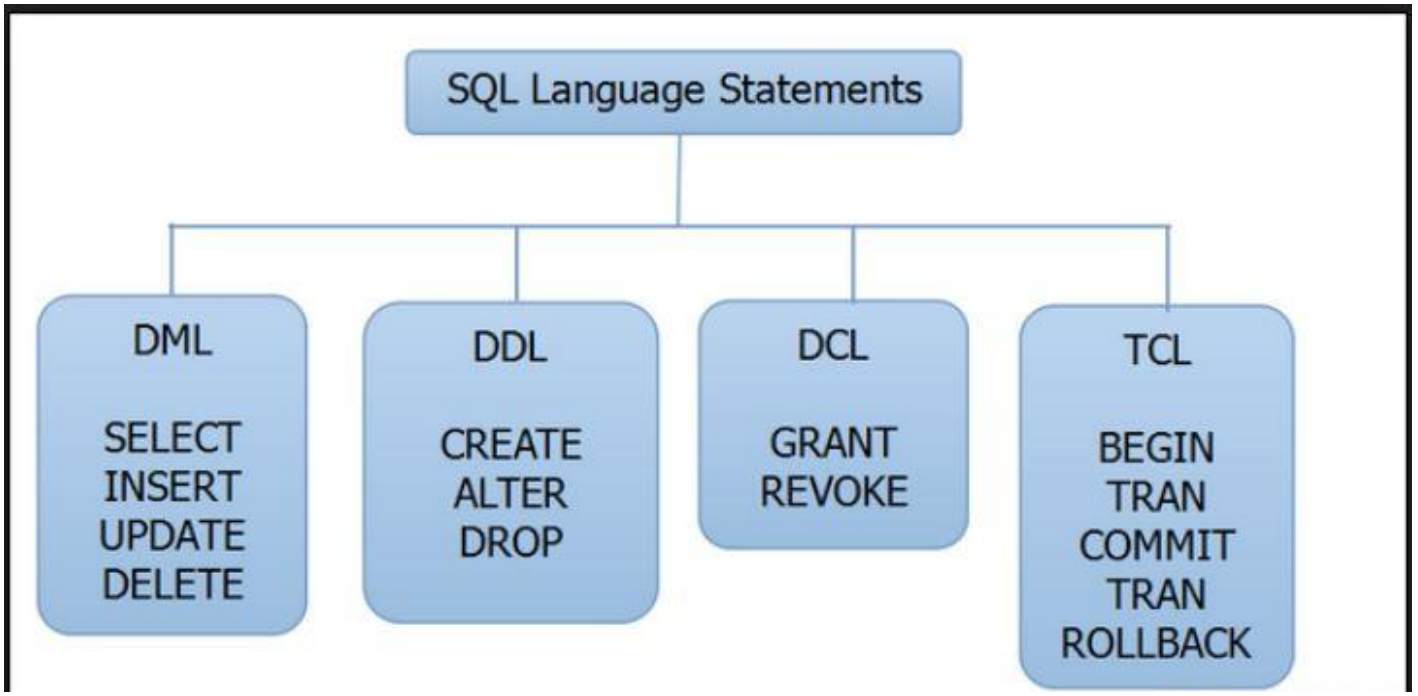


That's what we get!!!



Firstname	Lastname	Address	Post Code	Birthday	Telephone Number
Megan	Smith	3 Jesmond Wynd, Aberdeen	AB65 7TT	05/01/1992	0773 625 7283

Unit 2: Relational Query Languages

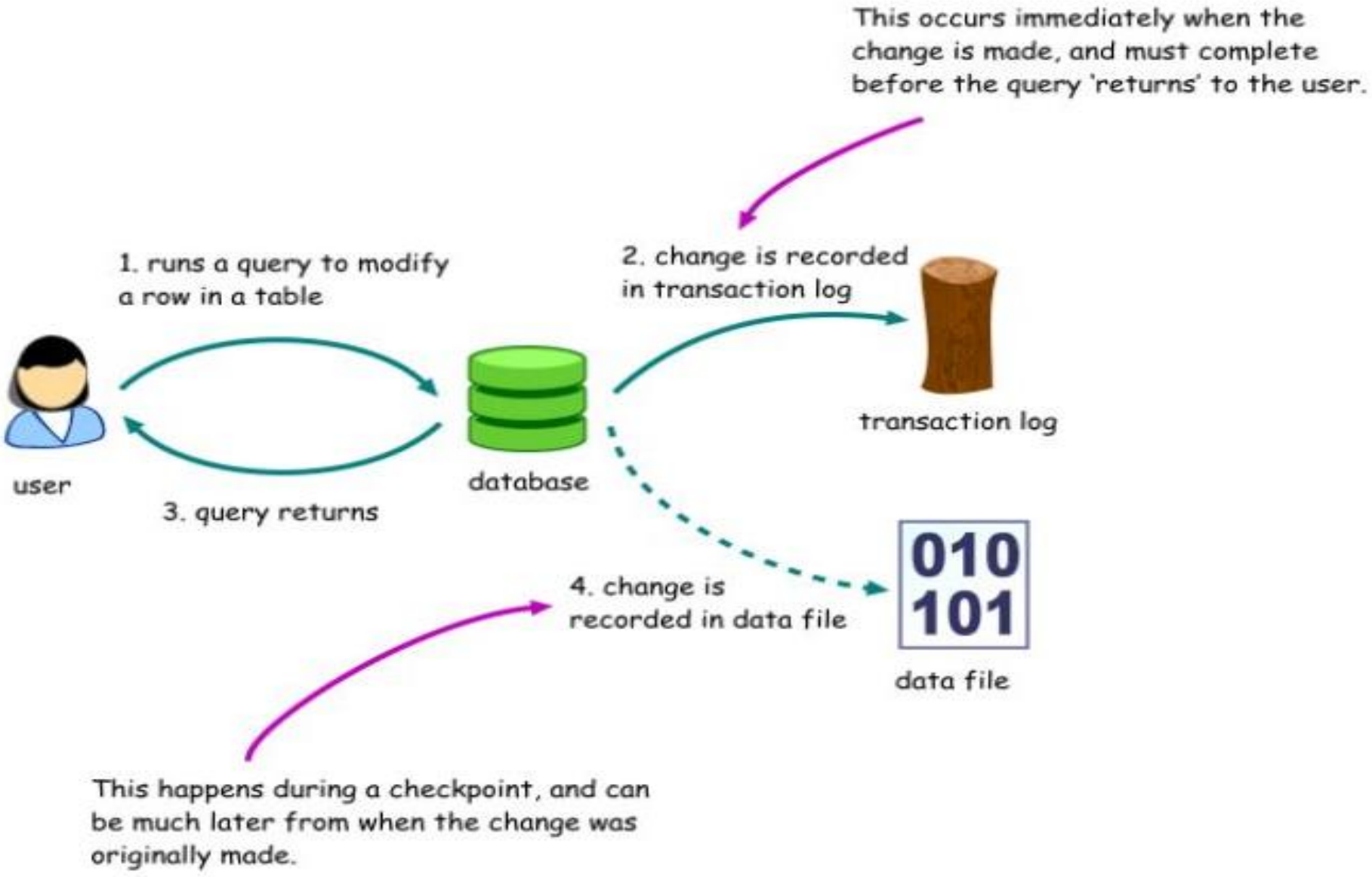


Unit 3: Relational Database Design

First Name	Last Name	Address	City	Age
Mickey	Mouse	123 Fantasy Way	Anaheim	73
Bat	Man	321 Cavern Ave	Gotham	54
Wonder	Woman	987 Truth Way	Paradise	39
Donald	Duck	555 Quack Street	Mallard	65
Bugs	Bunny	567 Carrot Street	Rascal	58
Wiley	Coyote	999 Acme Way	Canyon	61
Cat	Woman	234 Purrfect Street	Hairball	32
Tweety	Bird	543	Itotltaw	28

- Normalization
- Normal forms

Unit 4: Database Transaction Processing



Unit 5: Programming Constructs in Databases

- Cursors
- Triggers
- exception handling
- functions

Unit 6: File Organization and Trends in Databases