An Introduction to Database

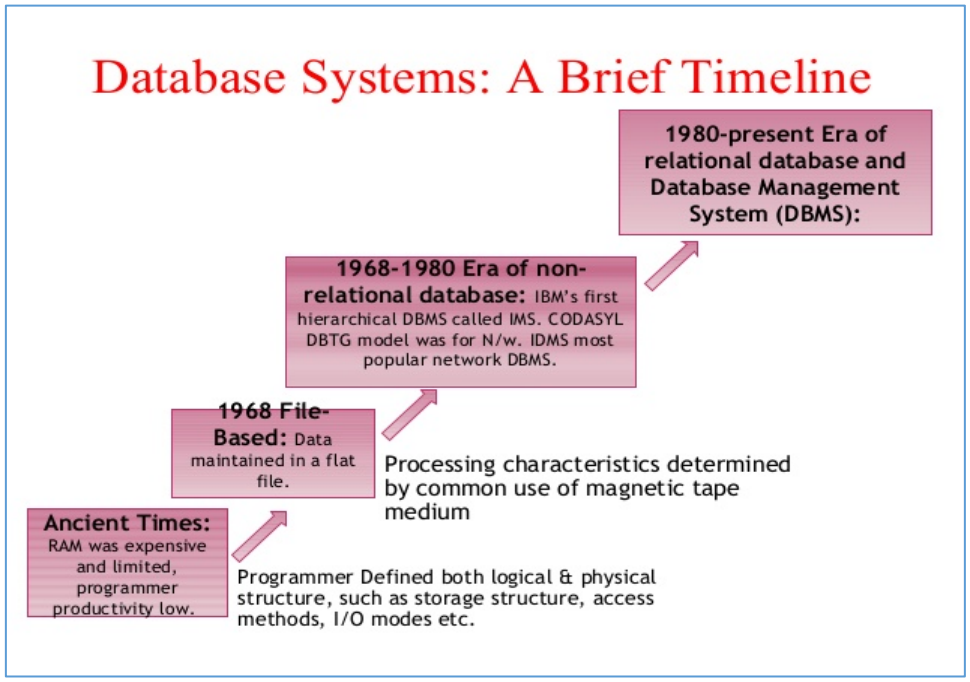
Introduction to Database for Undergraduate Study
Lecture 2

Database
Database Systems
Database Architecture

World of Database

Often abbreviated *DB,* a database is basically a collection of information organized in such a way that a computer program c an quickly select desired pieces of data. You can think of a database as an electronic filing system.

World of Database



VENDORS

IBM

Microsoft

Oracle

Reminder – Last Week

- How can you define Data ?
- What are sources of Data ?
- How can you generate Information ?
- How can Information be used ?

Agendas

- Definition
  - Database
  - Database Management System
- Database
  - Functions
  - Types/Models
  - Abstraction

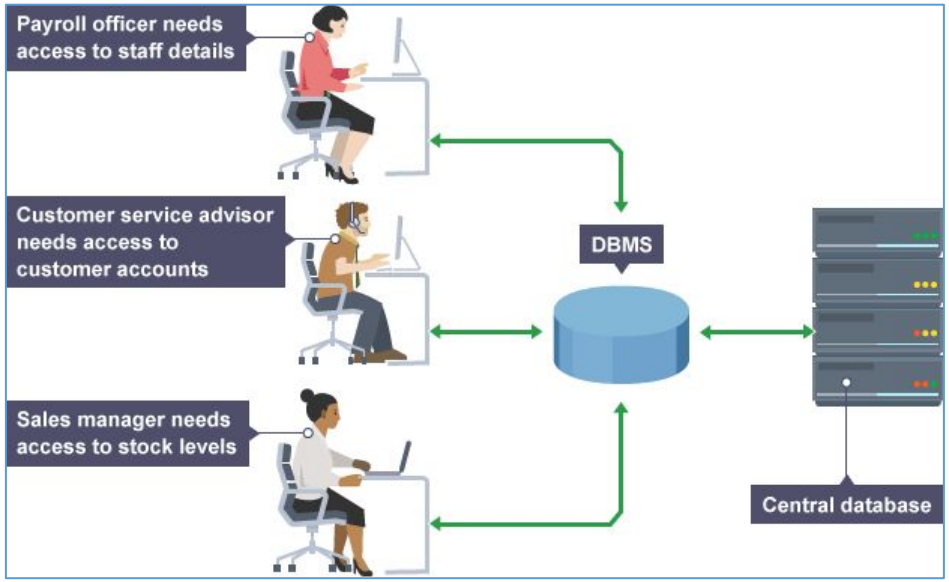
Database - Definition

- General
  - A database is any collection of related data
- Restrictive
  - A database is a persistent, logically coherent collection of inherently meaningful data, relevant to some aspects of real world.

Database Management Systems

A database management system (DBMS) is a collection of programs that enables users to create and maintain a database.

DBMS is a software that handles the storage, retrieval, and updating of data in a computer system



DBMS - Functions

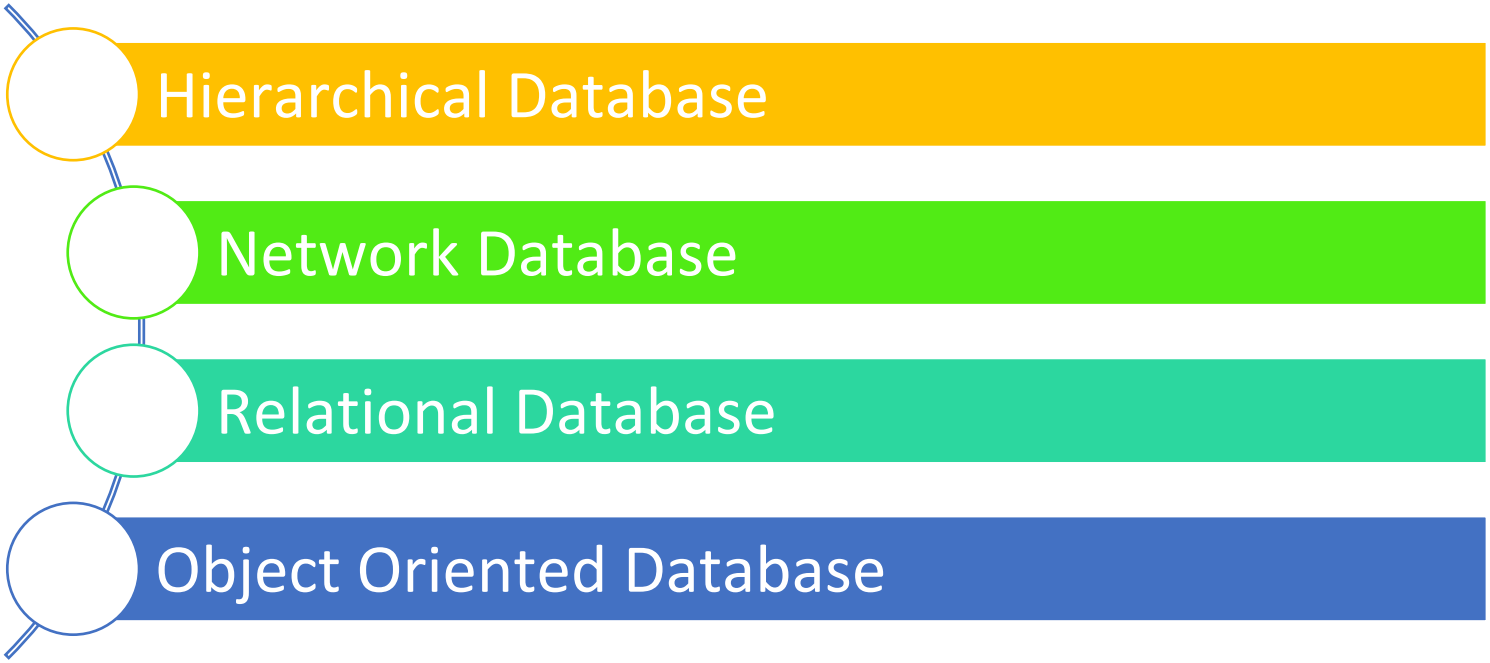
- Controls Security
- Allows Concurrency
- Maintains Data Integrity
- Provide Backup and Recovery Services
- Controls Data Redundancy
- Allows Data Independence

DBMS Query Vs Facebook Query

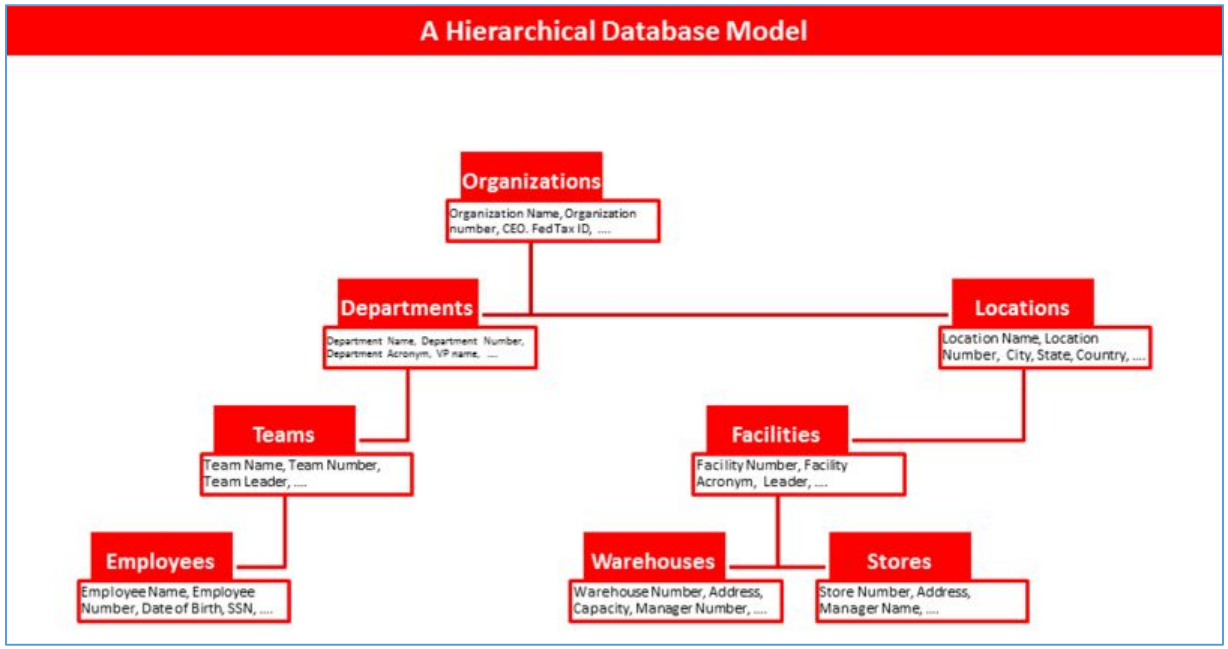
- You must remember ‘SYNTAX’ for placing QUERY

- You can just ‘LOGIN’ and facebook, EXECUTES QUERY for you.

Database – Types/Models

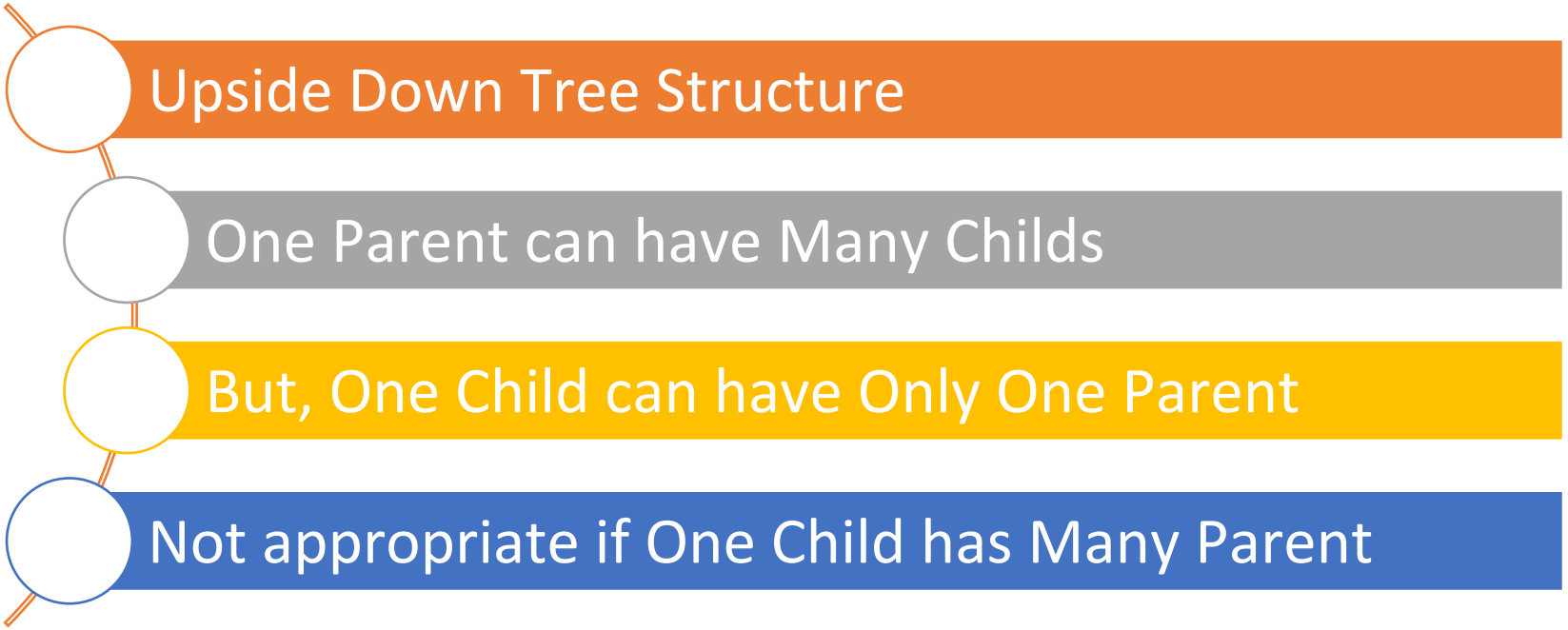


Hierarchical Database

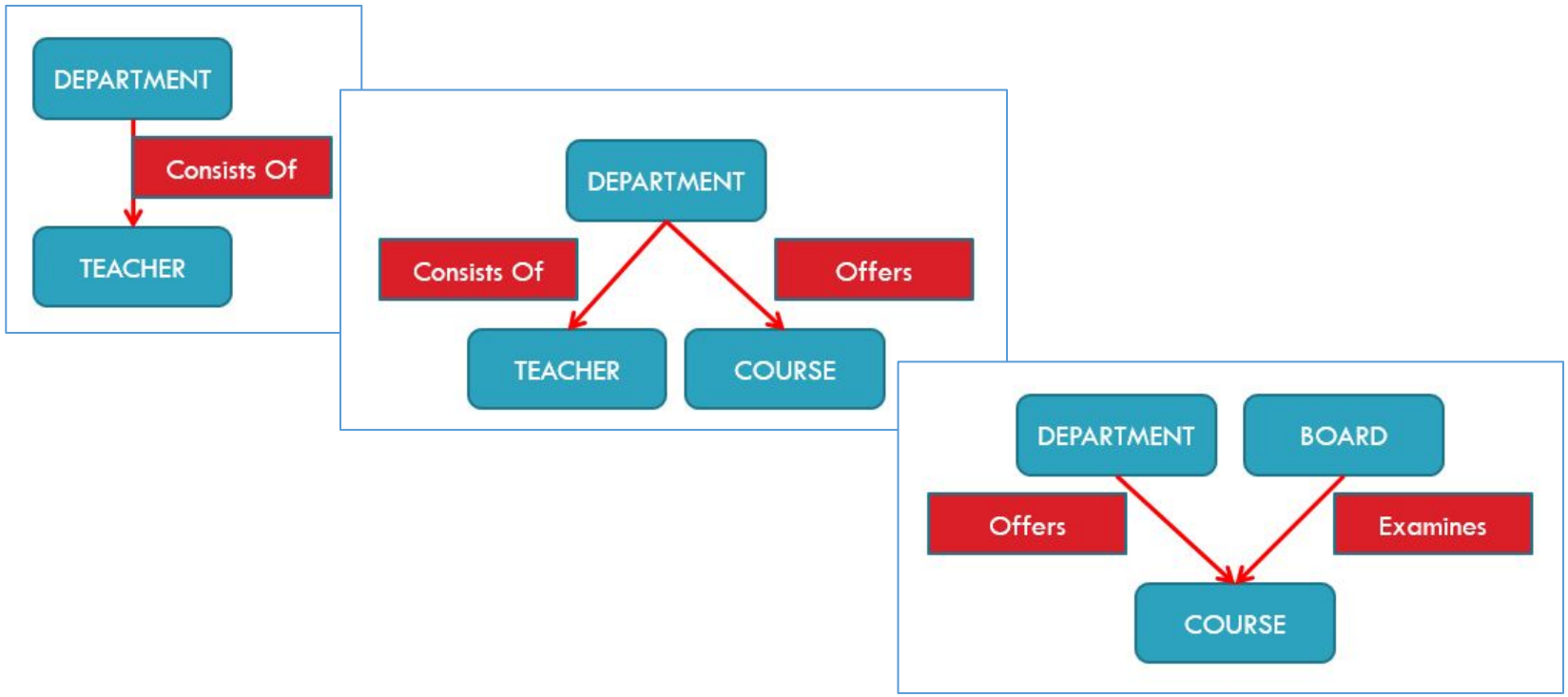


A DBMS is said to be hierarchical if the relationships among data in the database are established in such a way that one data item is present as the subordinate of another one.

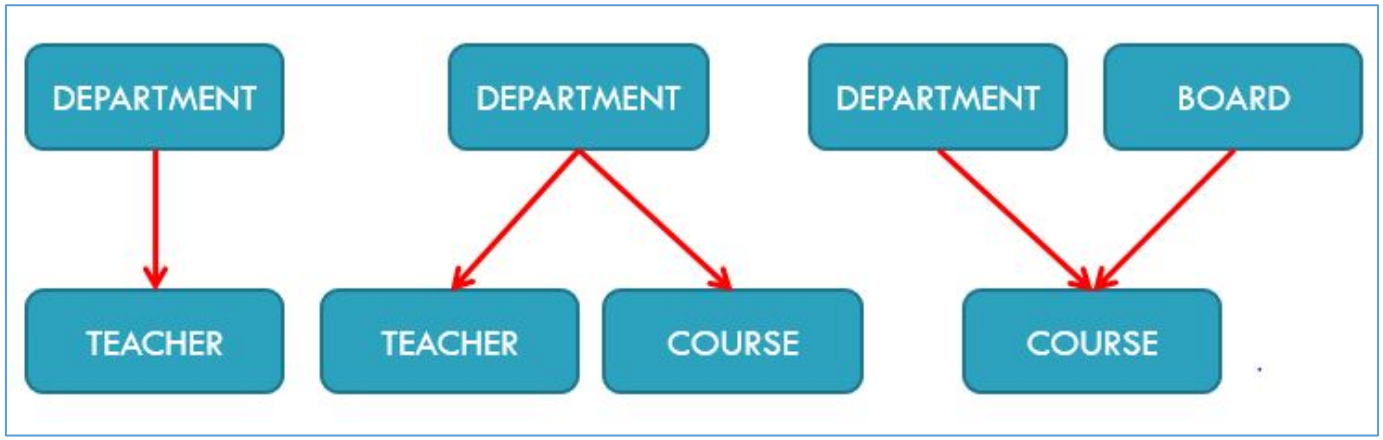
Hierarchical Data Model



Network Data Model

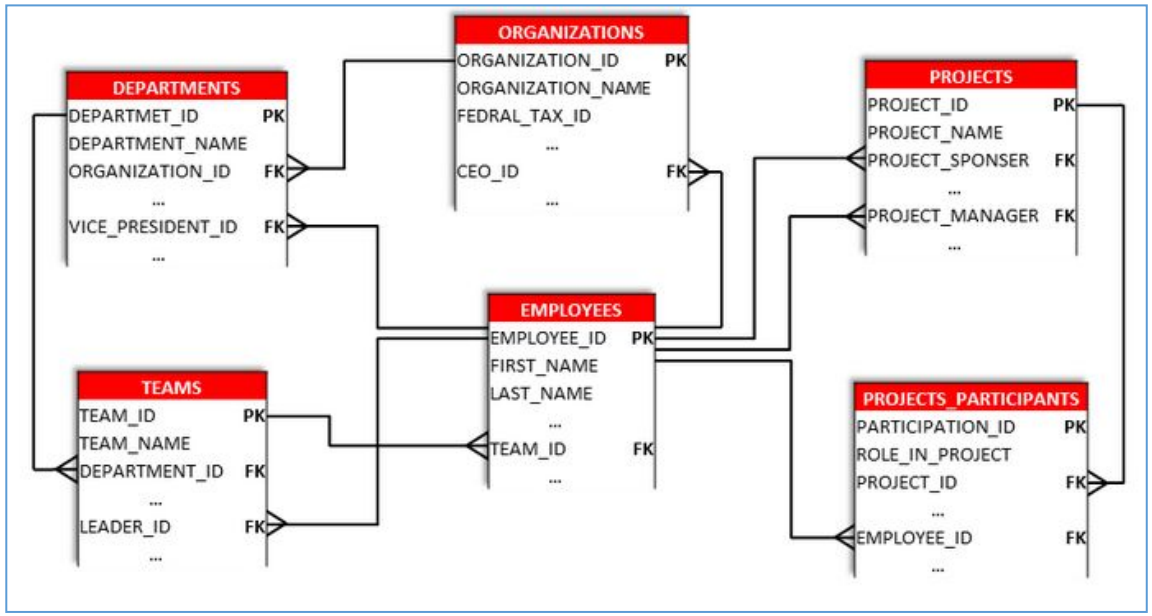


Network Data Model



Permits the Modelling of MANY-TO-MANY Relationships in Data

Relational Database



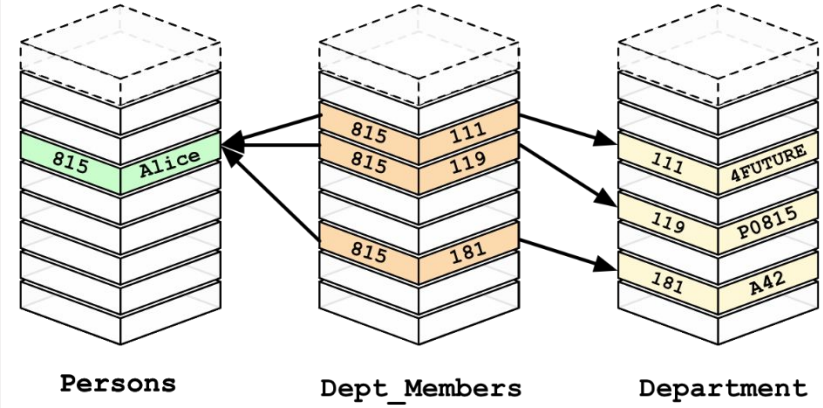
Relational Database introduces concept of Relation with KEY.

Relations are also known as entities

Relational Data Model

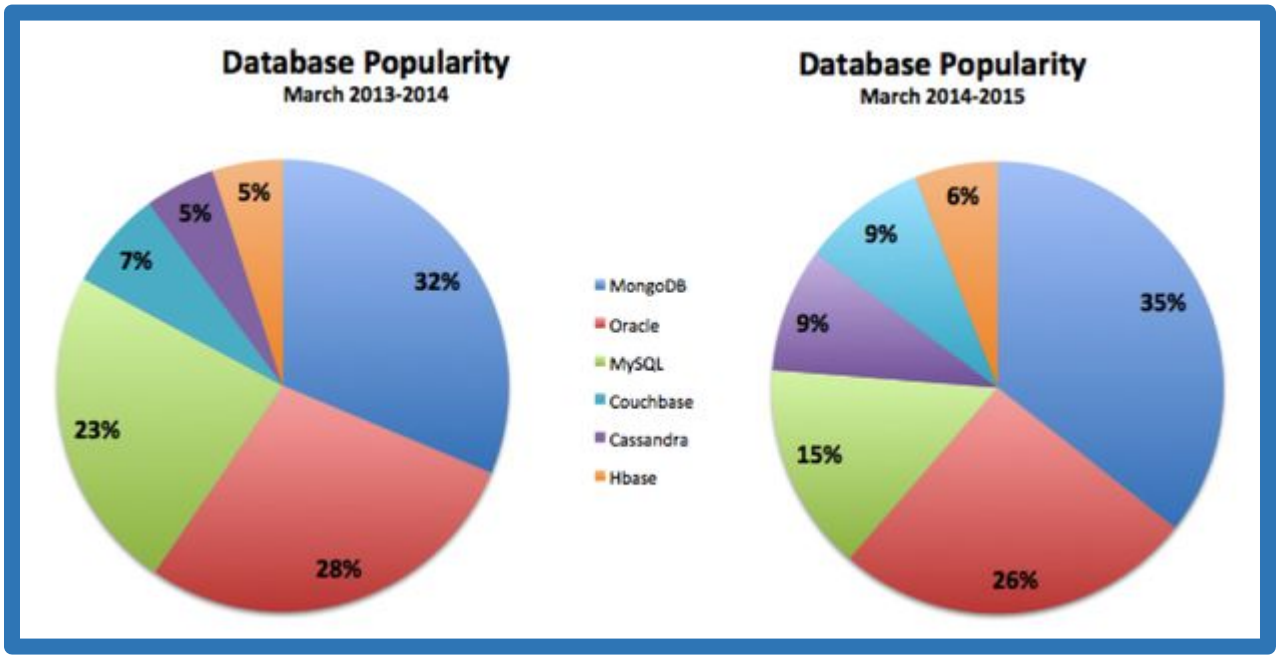
- Allows the definition of data structures, storage and retrieval operations and integrity constraints
- Data and relations between them are organized in Tables
- A Table is a collection of records and each record in a Table contains same fields.

Which is the Currently Used Model ?



RELATIONAL MODEL

Key Message

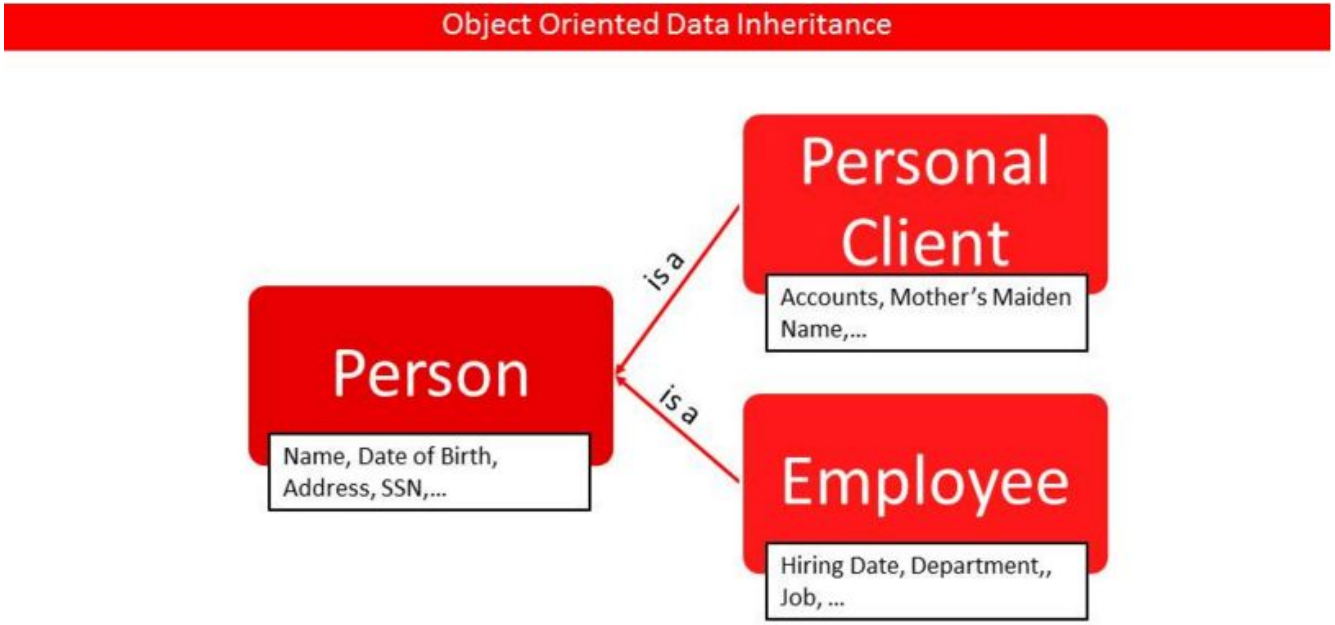


RELATIONAL MODEL is the most widely used Database Model

Reminder – Last Week

Define and Differentiate between
File Processing Systems
And
Database Systems

Object Oriented Database



Object Oriented Data Model

A “person/individual” has a Name, an Address, a date of birth, SSN, and so on. The Name and the Address can be other objects that have been defined previously. A “Personal Client” is a Person who inherits all the Person’s properties, which means he has a name, an address,… etc. As well, a Personal Client has accounts, a mother’s maiden name, security questions,… etc

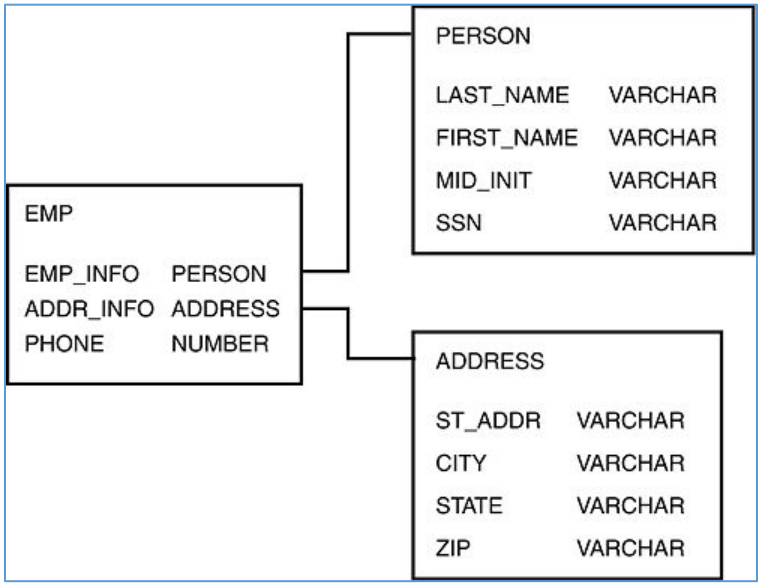
The golden rule when it comes to benefiting from objects inheritance to build databases is REUSABILITY.

Not widely used.

Examples: db40, smalltalk, cache etc.

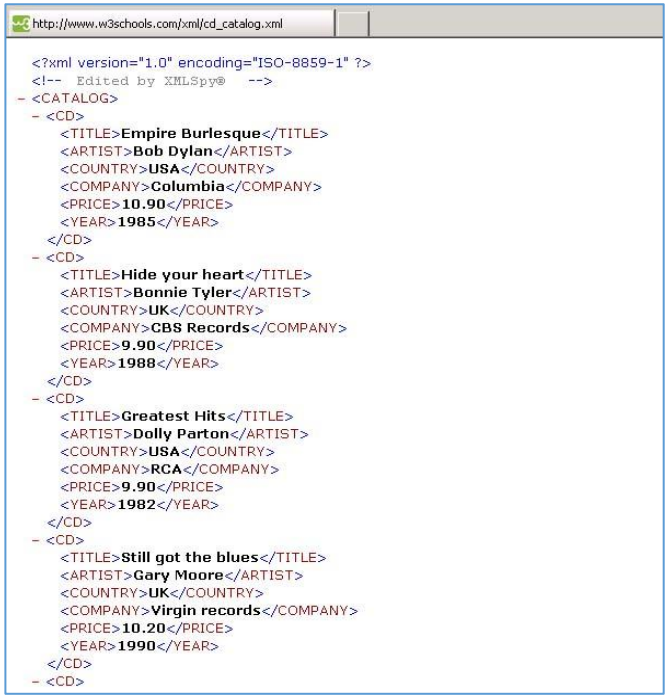
Object Relational Database

An object relational database management system (ORDBMS) is a database management system with that is similar to a relational database, except that it has an object-oriented database model. This system supports objects, classes and inheritance in database schemas and query language.



XML as Database

XML Database is used to store the huge amount of information in the **XML** format. As the use of **XML** is increasing in every field, it is required to have the secured place to store the **XML** documents.



Database – Levels of Abstraction

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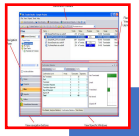


External Level

- End users work on view level
- Most used for VIEW purpose

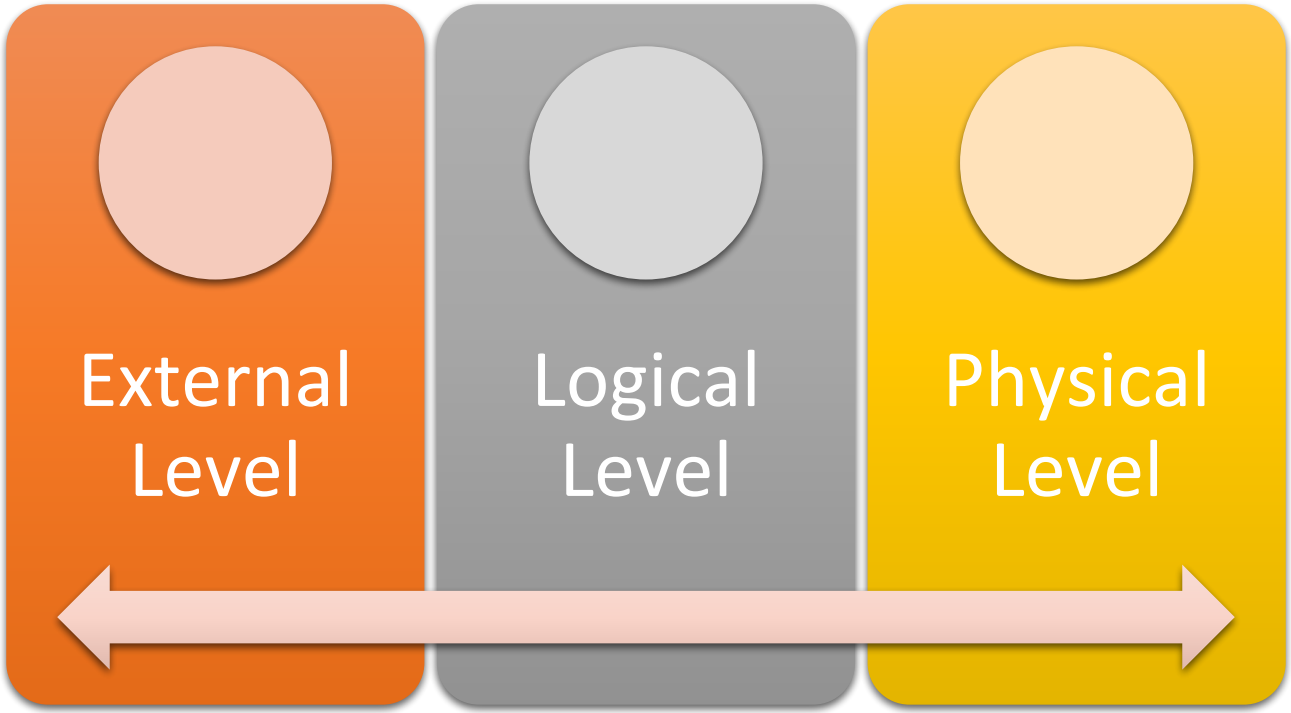
Logical Level

- What information or data is stored in the database

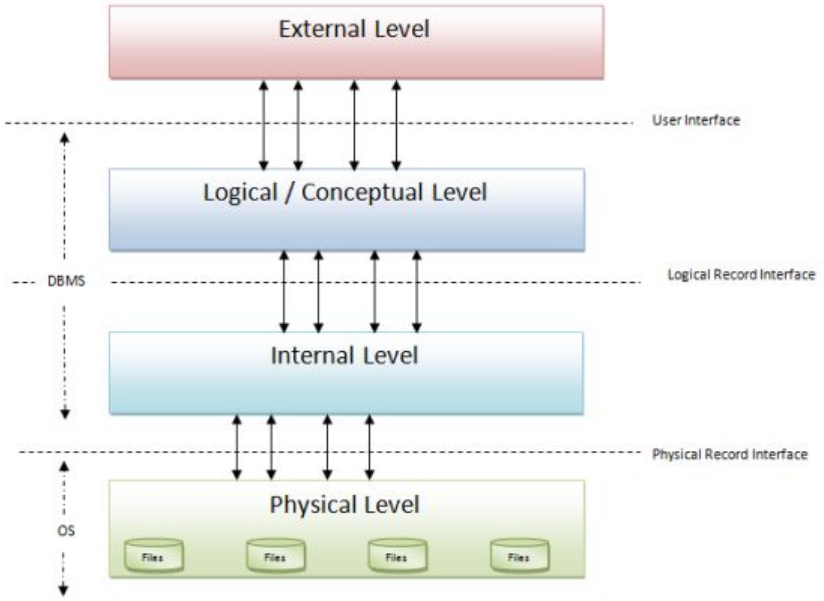
Physical Level

- How the data is stored physically and where is it stored in database

Database – Flow



Abstraction – Walk Through



users see the data in the form of rows and columns

describes the actual data stored in the database in the form of tables and relates them by means of mapping

In most of the cases this level is not mentioned and usually it is said that we have 3 levels of data abstraction

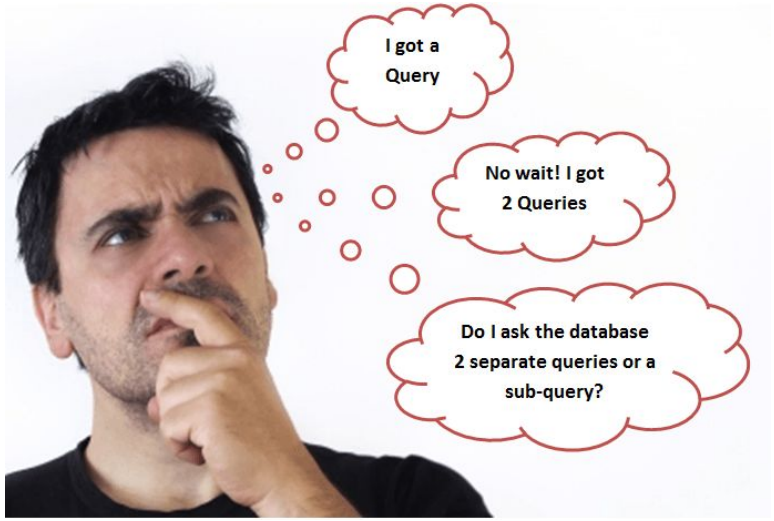
describes how the data is actually stored in the physical memory like magnetic tapes, hard disks etc

Key Message

Application Users are examples of External Level.
Users Need not Necessarily have elaborated knowledge on Database

Physical Level of Abstraction is created by Data Base Administrators

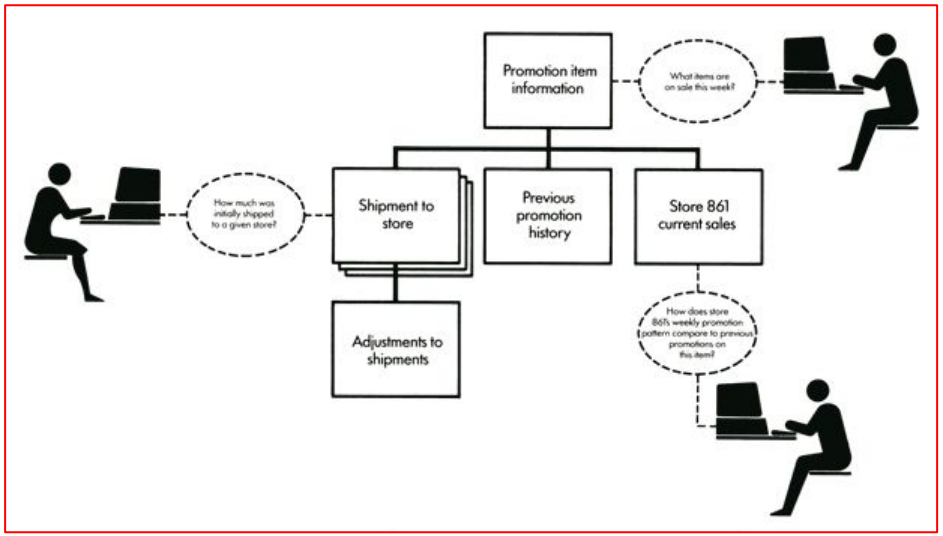
Questions ?



If you are using Google search, which Level of Abstraction are you working in ?

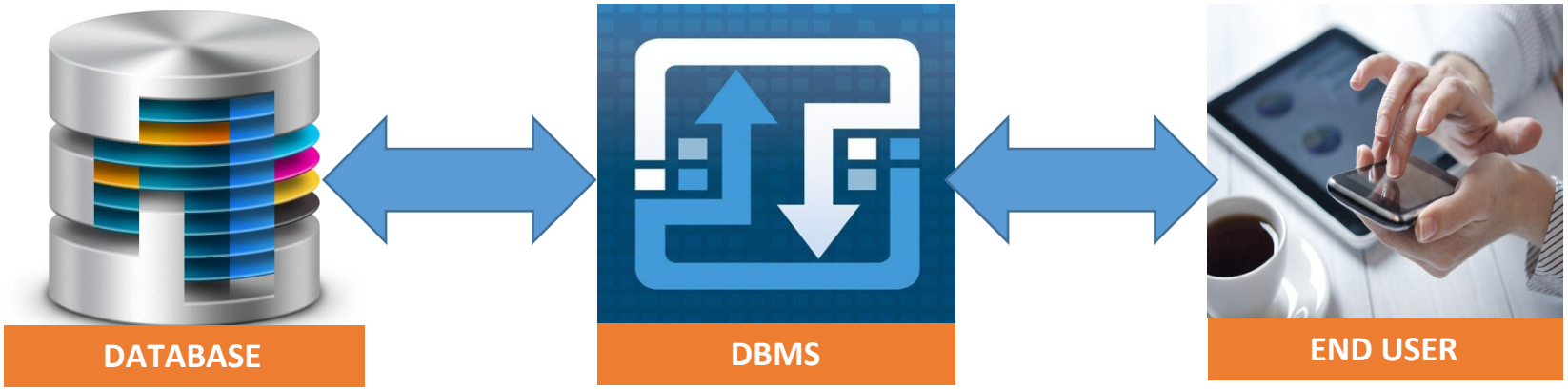
EXTERNAL

Database Management Systems



A suite of Programs to Manage Data

Key Message



DBMS acts as Facilitator/Interface for us to Interact with Database

Summary

- Definition
  - Database
  - Database Management System
- Database
  - Functions
  - Types/Models
  - Abstraction

Laugh


CARTOONSTOCK
.com
Search ID: aton1007
"Guide us, Oh Database Manager!"

End of Lecture for Week - 2