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Introduction To DBMS

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System Software

- Also known as Operating System
- Operating System is a vital link (like bridge) between lower level language (machine language) and application programs written in higher level languages(using Java, Python, C etc.)
- To boot and run successfully, computer system need MINIMUM ONE operating system like...
 - DOS
 - Windows
 - Linux
 - Sun Solaris
 - Unix

File System

- It is the system using which the files and folders are arranged by operating system
- Every Operating System has its own way of storing files and folders
- It defines how the files are named, stored and retrieved from storage devices
- Without file system, everything stored in computer is just big heap of data
- Every Operating System essentially partition the storage in a very specific way
E.g. FAT32, NTFS, Linux etc.
- You may have more than one File System (Operating System) on same computer. However at a given point of time, you use only one

Data

- Facts in the form of numbers or reports
- Values of qualitative or quantitative variable
- Often collected for references or analysis. E.g. Temperature of city collected over the years
- Used as a basis for discussion, reasoning or calculation
- In computing world, it's a information processed or stored by a computer.
- This information may be in the form of text documents, images, audio clips, software programs, or other types of *data*

Data Base

- Collection & Storage of Data
- Collection of facts and figures
- May be related or unrelated directly

DBMS & It's Need

- DataBae Management System
- System to manage the data in most ordered and friendly way
- Helps to retrieve , utilize , update, delete or add data
- Now a days, Software Applications are best utilized today for DBMS

Why DBMS?

- Better way to manage the data
- Storage, Retrieval, updating and deleting the data becomes easy
- Digital DBMS offer very high computational power
- Correlations becomes easy
- Helps in making quick business decisions
- Savings on Time , Energy & Money

DBMS software applications



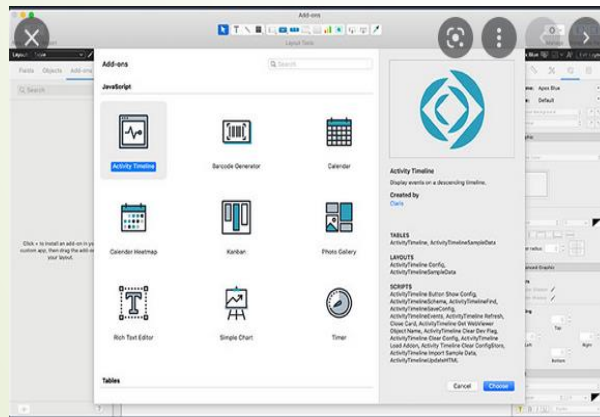
TITLE	AUTHOR	PUBLIS
The Prince	Machiavelli	Pocket
Peter Norton's Complete Guide to DOS 6.22	Peter Norton	SAMS
Fundamentals of Mathematics Vol. 1-3	Behnke et al	MIT
Graph Theory with Applications	Bondy & Murty	North-
The Giant Black Book of Computer Viruses	Mark Ludwig	Americ
The TeXbook: Computers and Typesetting	Donald Knuth	Addiso
The Definitive Guides to the X Window System	Adrian Nye	O'Reil
Modern Calculus and Analytic Geometry	Richard Silverman	Dover
The Iliad	Homer	Penguin
Wordstar on the IBM PC	Richard Curtis	McGraw
The World of Delacroix	Tom Prideaux	Time-L
The Best Guide to Eastern Philosophy and Religion	Diane Morgan	Renaiss
Ways of Seeing	John Berger	Penguin
Fortran IV with Watfor and Watfiv	Cress,Dirksen,Graham	Prenti
A History of Egypt	Breasted	Scribn
The New College Latin and English Dictionary	John C. Traupman	Bantam
Introduction to Algorithms	Rivest et al	MIT

dBase



CL_ID	CLI_SNAM	CLI_NAME	CLI_TLF
4	Gonzalez	Ambo	437-8473
5	Vinazzi	Amigo	394-5983
6	Samarbide	Armando	854-7873
7	Barriga	Carlos	394-9654
8	Pedemonti	Flavio	534-7984
9	Pedemonti	Flavio	000-0000
10	Mulder	Fox	324-6432
11	Batistuta	Gol	485-2843
12	Simpson	Homer	555-5555
13	Kirk	James	346-9873
14	Borges	Javier	326-9430
15	Parada	Javier	
16	Smith	John	123-1234
17	Gomez	Juan	583-4832
18	Smart	Max	432-5892
19	Reyes	Monica	432-5836
20	Flanders	Ned	435-3211
21	Grillo	Pepe	894-2332
22	Fernandez	Raul	321-4332
23	Viva	Zapata	RIP
24	Newly	Added	

Clipper



FileMaker



DBMS software applications



RDBMS

➤ Relational databases

- Most widely and commonly used model of database
- Data stored in the TABLES also known as RELATIONS
- Each table consists of rows & columns
- Each row is a record also known as tuple
- Introduced by E.F. Codd in 1970

➤ Examples

- Oracle
- MS SQL Server
- MySQL
- PostgreSQL
- MS Access

Student ID	First name	Last name
52-743965	Charles	Peters
48-209689	Anthony	Sondrup
14-204968	Rebecca	Phillips

ProviderID	Provider name
156-983	UnitedHealth
146-823	Blue Shield
447-784	Carefirst Inc.

Student ID	ProviderID	Type of plan	Start date
52-743965	156-983	HSA	04/01/2016
48-209689	146-823	HMO	12/01/2015
14-204968	447-784	HSA	03/14/2016

Codd's 12 rules for a Relational Database

➤ Rule 1: The *information rule*

➤ All Data must be stored in the form of **table Cell**

Codd's 12 rules for a Relational Database

- **Rule 2:** The *guaranteed access rule*
 - Each unique piece of data(atomic value) should be accessible ONLY by : **Table Name + Primary Key(Row) + Attribute(column)**
 - Ability to directly access via **POINTER** is **big NO**

Codd's 12 rules for a Relational Database

- **Rule 3:** Systematic treatment of null values
 - It should be handled consistently.
 - It should have only one of the following three meanings.
 - missing data, not applicable or no value
- **Primary key must not be null, ever**

Codd's 12 rules for a Relational Database (cont..)

➤ Rule 4: Active Online Catalog

- Database dictionary(catalog) is the structure description of the complete **Database** and it must be stored online.
- The Catalog must be governed by same rules as rest of the database.
- The same query language should be used on catalog as used to query database

Codd's 12 rules for a Relational Database (cont..)

- **Rule 5:** *The comprehensive data sublanguage rule*
 - A database can only be accessed using a language having linear syntax that supports data definition, data manipulation, and transaction management operations. E.g. SQL
 - If the database **allows** access to the data **without the use of this language**, then that is a **violation**

Codd's 12 rules for a Relational Database (cont..)

➤ Rule 6: View *Updation* Rule

- All the view that are theoretically updatable should be updatable by the system as well.

Codd's 12 rules for a Relational Database (cont..)

➤ Rule 7: Relational Level Operation

- There must be Insert, Delete, Update operations at each level of relations.
- Set operation like Union, Intersection and minus should also be supported.

Codd's 12 rules for a Relational Database (cont..)

➤ Rule 8: Physical Data Independence

- The physical storage of data should not matter to the system.
- If say, some file supporting table is renamed or moved from one disk to another, it should not effect the application

Codd's 12 rules for a Relational Database (cont..)

➤ Rule 9: Logical Data Independence

- If there is change in the logical structure (table structures) of the database the user view of data should not change.
- If a table is split into two tables, a new view should give result as the join of the two tables

Codd's 12 rules for a Relational Database (cont..)

➤ Rule 10: Integrity Independence

- The database should be able to enforce its own integrity rather than using other programs.
- Key and Check constraints, trigger etc, should be stored in Data Dictionary. This also make **RDBMS** independent of front-end

Codd's 12 rules for a Relational Database (cont..)

➤ Rule 11: Distribution Independence

- A database should work properly regardless of its distribution across a network.
- Even if a database is geographically distributed, with data stored in pieces, the end user should get an impression that it is stored at the same place.
- This lays the foundation of **distributed database**.

Codd's 12 rules for a Relational Database (cont..)

➤ Rule 12: Non subversion Rule

- If low level access is allowed to a system it should not be able to subvert or bypass integrity rules to change the data.
- This can be achieved by some sort of locking or encryption.