SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME : 19CS402 - DATABASE MANAGEMENT SYSTEMS

II YEAR / IV SEMESTER

Unit 2- Relational Model

Topic 1 : Relational Data Model

RDBMS

- RDBMS stands for **R**elational **D**atabase **M**anagement **S**ystem. RDBMS is the basis for SQL, and for all modern database systems like MS SQL Server, IBM DB2, Oracle, MySQL, and Microsoft Access.
- A Relational database management system (RDBMS) is a database management system (DBMS) that is based on the relational model as introduced by E. F. Codd.

Table

- The data in RDBMS is stored in database objects called **tables**. The table is a collection of related data entries and it consists of columns and rows.

ID	NAME	AGE	ADDRESS	SALARY
1	Ramesh	32	Ahmedabad	2000.00
2	Khilan	25	Delhi	1500.00
3	kaushik	23	Kota	2000.00
4	Chaitali	25	Mumbai	6500.00
5	Hardik	27	Bhopal	8500.00
6	Komal	22	MP	4500.00
7	Muffy	24	Indore	10000.00

Field

- Every table is broken up into smaller entities called fields. The fields in the CUSTOMERS table consist of ID, NAME, AGE, ADDRESS and SALARY.
- A field is a column in a table that is designed to maintain specific information about every record in the table.

Record or Row

- A record, also called a row of data, is each individual entry that exists in a table. For example there are 7 records in the above CUSTOMERS table

1	Ramesh	32	Ahmedabad	2000.00

Column

- A column is a vertical entity in a table that contains all information associated with a specific field in a table.
- For example, a column in the CUSTOMERS table is ADDRESS, which represents location description and would consist of the following:

ADDRESS
Ahmedabad
Delhi
Kota
Mumbai
Bhopal
MP
Indore

NULL value

- A NULL value in a table is a value in a field that appears to be blank, which means a field with a NULL value is a field with no value.
- It is very important to understand that a NULL value is different than a zero value or a field that contains spaces. A field with a NULL value is one that has been left blank during record creation.

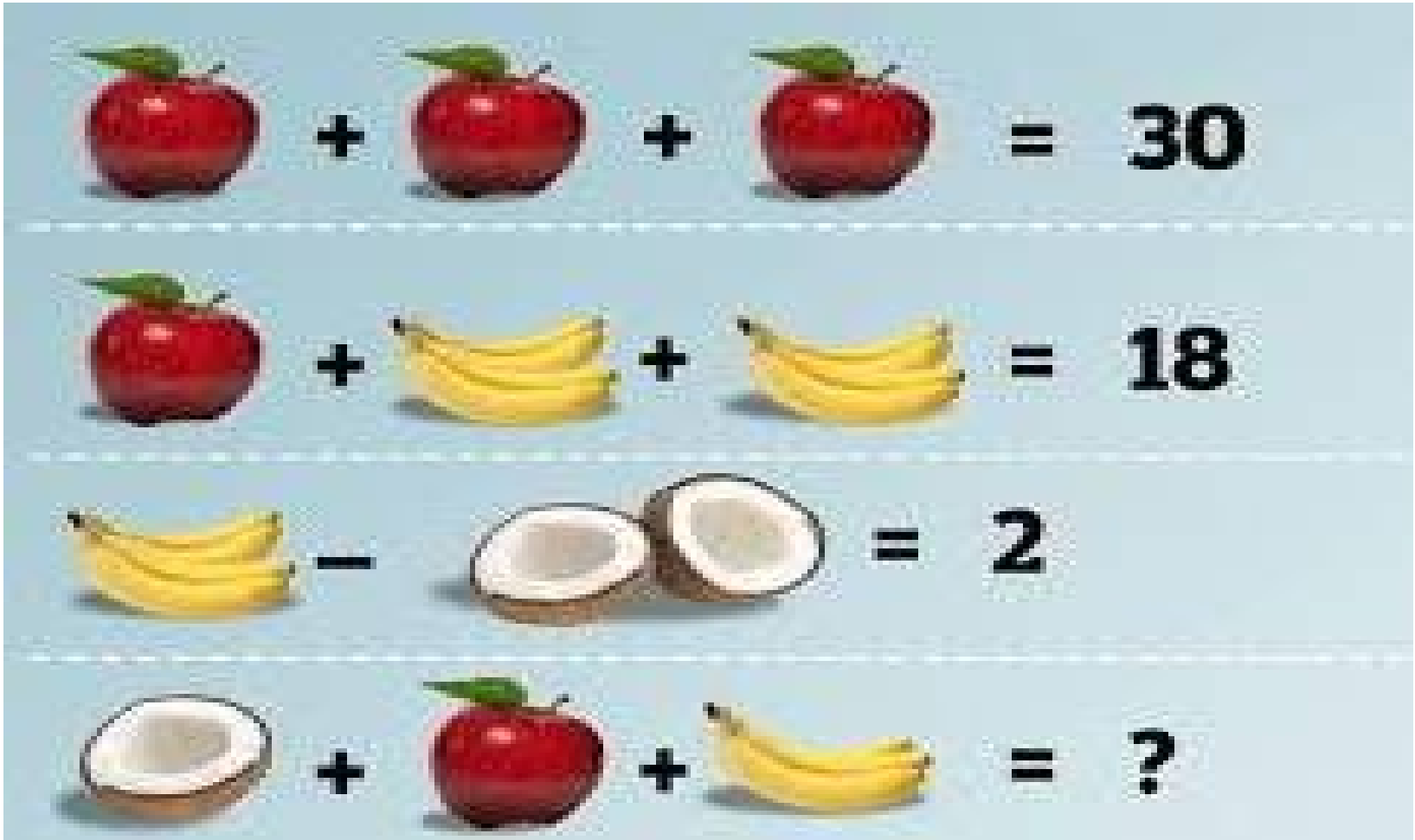
SQL Constraints

- Constraints are the rules enforced on data columns on table. These are used to limit the type of data that can go into a table. This ensures the accuracy and reliability of the data in the database.
- Constraints could be column level or table level. Column level constraints are applied only to one column where as table level constraints are applied to the whole table.

Data Integrity

- **Entity Integrity:** There are no duplicate rows in a table.
- **Domain Integrity:** Enforces valid entries for a given column by restricting the type, the format, or the range of values.
- **Referential integrity:** Rows cannot be deleted, which are used by other records.
- **User-Defined Integrity:** Enforces some specific business rules that do not fall into entity, domain or referential integrity.

BREAK



Codd's 12 Rule

- Dr Edgar F. Codd, after his extensive research on the Relational Model of database systems, came up with twelve rules of his own, which according to him, a database must obey in order to be regarded as a true relational database.
- These rules can be applied on any database system that manages stored data using only its relational capabilities. This is a foundation rule, which acts as a base for all the other rules.

Rule 1: Information Rule

The data stored in a database, may it be user data or metadata, must be a value of some table cell. Everything in a database must be stored in a table format.

Rule 2: Guaranteed Access Rule

Every single data element (value) is guaranteed to be accessible logically with a combination of table-name, primary-key (row value), and attribute-name (column value). No other means, such as pointers, can be used to access data.

Rule 3: Systematic Treatment of NULL Values

- The NULL values in a database must be given a systematic and uniform treatment. This is a very important rule because a NULL can be interpreted as one the following − data is missing, data is not known, or data is not applicable.

Rule 4: Active Online Catalog

- The structure description of the entire database must be stored in an online catalog, known as **data dictionary**, which can be accessed by authorized users. Users can use the same query language to access the catalog which they use to access the database itself.

Rule 5: Comprehensive Data Sub-Language Rule

A database can only be accessed using a language having linear syntax that supports data definition, data manipulation, and transaction management operations. This language can be used directly or by means of some application. If the database allows access to data without any help of this language, then it is considered as a violation.

Rule 6: View Updating Rule

All the views of a database, which can theoretically be updated, must also be updatable by the system

Rule 7: High-Level Insert, Update, and Delete Rule

A database must support high-level insertion, updation, and deletion. This must not be limited to a single row, that is, it must also support union, intersection and minus operations to yield sets of data records.

Rule 8: Physical Data Independence

The data stored in a database must be independent of the applications that access the database. Any change in the physical structure of a database must not have any impact on how the data is being accessed by external applications.

Rule 9: Logical Data Independence

The logical data in a database must be independent of its user's view (application). Any change in logical data must not affect the applications using it. For example, if two tables are merged or one is split into two different tables, there should be no impact or change on the user application. This is one of the most difficult rule to apply.

Rule 10: Integrity Independence

A database must be independent of the application that uses it. All its integrity constraints can be independently modified without the need of any change in the application. This rule makes a database independent of the front-end application and its interface

Rule 11: Distribution Independence

The end-user must not be able to see that the data is distributed over various locations. Users should always get the impression that the data is located at one site only. This rule has been regarded as the foundation of distributed database systems.

Rule 12: Non-Subversion Rule

If a system has an interface that provides access to low-level records, then the interface must not be able to subvert the system and bypass security and integrity constraints.

Assesment

HIDDEN WORDS

CODD'S RULE 1

FDEKIR
HGREOS
VBDZRA
JTDACU
ZLRSES

CODD'S RULE 2

QSEBGW
FLUYAX
NDFVQY
UVWXAU
GSECTOP
JKRAIMH

CODD'S RULE 3

GWSPMN
ABCQXY
FZXHKY
IVQSLR
DEBAVS
GMLTTP

CODD'S RULE 11

FTSWED
RXEINQ
TENESM
ENOGOF
WXYZAB
CDEFGN

CODD'S RULE 4

GVSGHN
SOBDEW
NBALRQ
KROTIS
IFTWAP
ROMSXZ

CODD'S RULE 5

TFGONP
BNULFV
AVKOME
TWQPDA
IXZWQO
HDEAUI

CODD'S RULE 6

HGSBMO
KBCDWH
SCEVOP
XZEIAE
HMIISA
ADRWCT

CODD'S RULE 12

RWXYQI
AIDFGM
PQRTUV
NETLAN
COTEAG
XEIARF

CODD'S RULE 7

EFNNSB
DVWQSL
RAQAEM
FZXEOA
TQCBEU
OUEIRT

CODD'S RULE 8

CODPMN
CVWEXD
GIQESW
DRHENQ
QSRENK
XWZOBN

CODD'S RULE 9

XZWMRQ
ICPMDS
RETUON
DRFHAV
QMLICZ
NETWRK

CODD'S RULE 10

PORMLD
FGVNSW
RAQRZE
TVRAIQ
PIGJTO
ONEUSE

Solution

1) Versatile 2)Uniquely

3) Systematic 4)Interrogation

5)Manipulation 6)Misbehave

7)Base relation 8)Independence

9)Impairment 10)Alteration

11)Environment 12)Integrity

REFERENCES

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THANK YOU