University of Central Florida
CGS 2545
Database Concepts

DEPARTMENT OF ELECTRICAL ENGINEERING & COMPUTER SCIENCE
COMPUTER SCIENCE DIVISION

RDBMS Concepts

- What is 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.

RDBMS Concepts

- What is a table?
  - The data in an RDBMS is stored in database objects which are called as **tables**.
  - This table is basically a collection of related data entries and it consists of numerous columns and rows.
  - IT is the most common and simplest form of data storage in a relational database

RDBMS Concepts

- What is a table?
  - example of a CUSTOMERS table

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

RDBMS Concepts

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

RDBMS Concepts

- What is a Record or a Row?
  - A record is also called as a row of data is each individual entry that exists in a table.
  - For example, there are 7 records in the above CUSTOMERS table
  - A record is a horizontal entity in a table.
  - Following is a single row of data or record in the CUSTOMERS table

```
+----+----------+-----+-----------+----------+
|  1 | Ramesh   |  32 | Ahmedabad |  2000.00 |
+----+----------+-----+-----------+----------+
```

RDBMS Concepts

- What is a 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 be as shown to the right

ADDRESS
Ahmedabad
Delhi
Kota
Mumbai
Bhopal
MP
Indore

RDBMS Concepts

- What is a 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 the one that has been left blank during a record creation.

RDBMS Concepts

- SQL Constraints
  - Constraints are the rules enforced on data columns on a 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 can either be column level or table level.
  - Column level constraints are applied only to one column whereas, table level constraints are applied to the entire table.

RDBMS Concepts

- SQL Constraints
  - Following are some of the most commonly used constraints available in SQL
    - NOT NULL – Ensures that a column cannot have a NULL value.
    - DEFAULT – Provides a default value for a column when none is specified.
    - UNIQUE – Ensures that all the values in a column are different.
    - PRIMARY Key – Uniquely identifies each row/record in a database table.
    - FOREIGN Key – Uniquely identifies a row/record in any another database table.
    - CHECK – The CHECK constraint ensures that all values in a column satisfy certain conditions.
    - INDEX – Used to create and retrieve data from the database very quickly.

RDBMS Concepts

- Data Integrity
  - The following categories of data integrity exist with each RDBMS
    - **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.