netlink
digital solutions

DATABASE

www.netlink.com

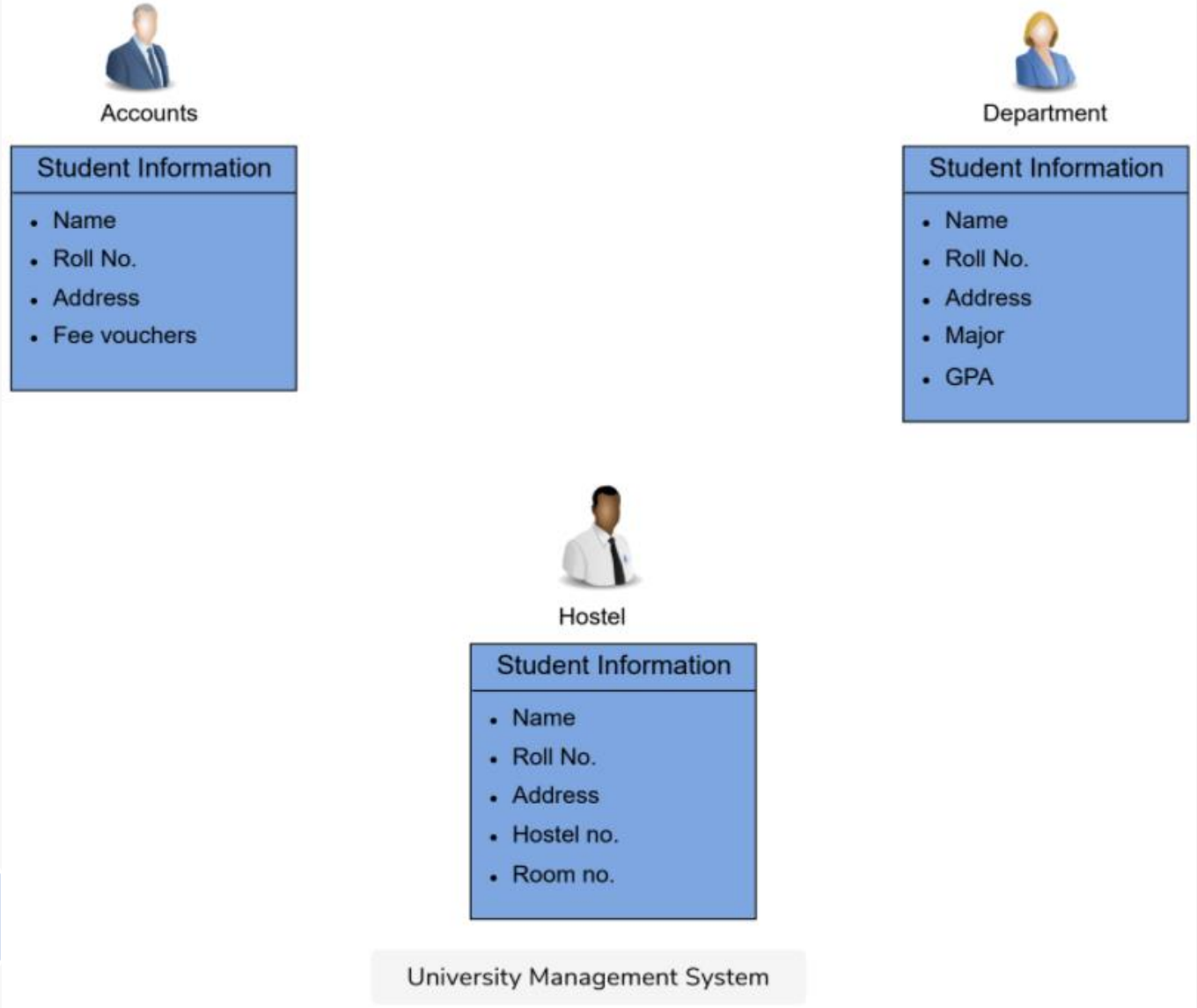
Before the advent of database systems

The File-based system

One way to keep information on a computer is to store it in permanent files.

Disadvantages of File-Based System

1. **Data redundancy :** A situation that occurs when the same data is present in many places (files).
2. **Data inconsistency :** Data is said to be inconsistent if multiple copies of the same data do not match with each other, which wastes storage space and duplicates effort.
3. **Difficult data access**
4. **Security problems**
5. **Difficult concurrent access**



What is Database ?

- A database is a shared collection of **data**, usually stored in electronic form.
- **By data,** we mean known facts that can be recorded and that have implicit meaning.
- **Example:** consider the names, telephone numbers, and addresses of the people you know.
- A database is typically designed so that it is easy to store and access information.

Manages Large Amount of data

Accurate

Easy to research

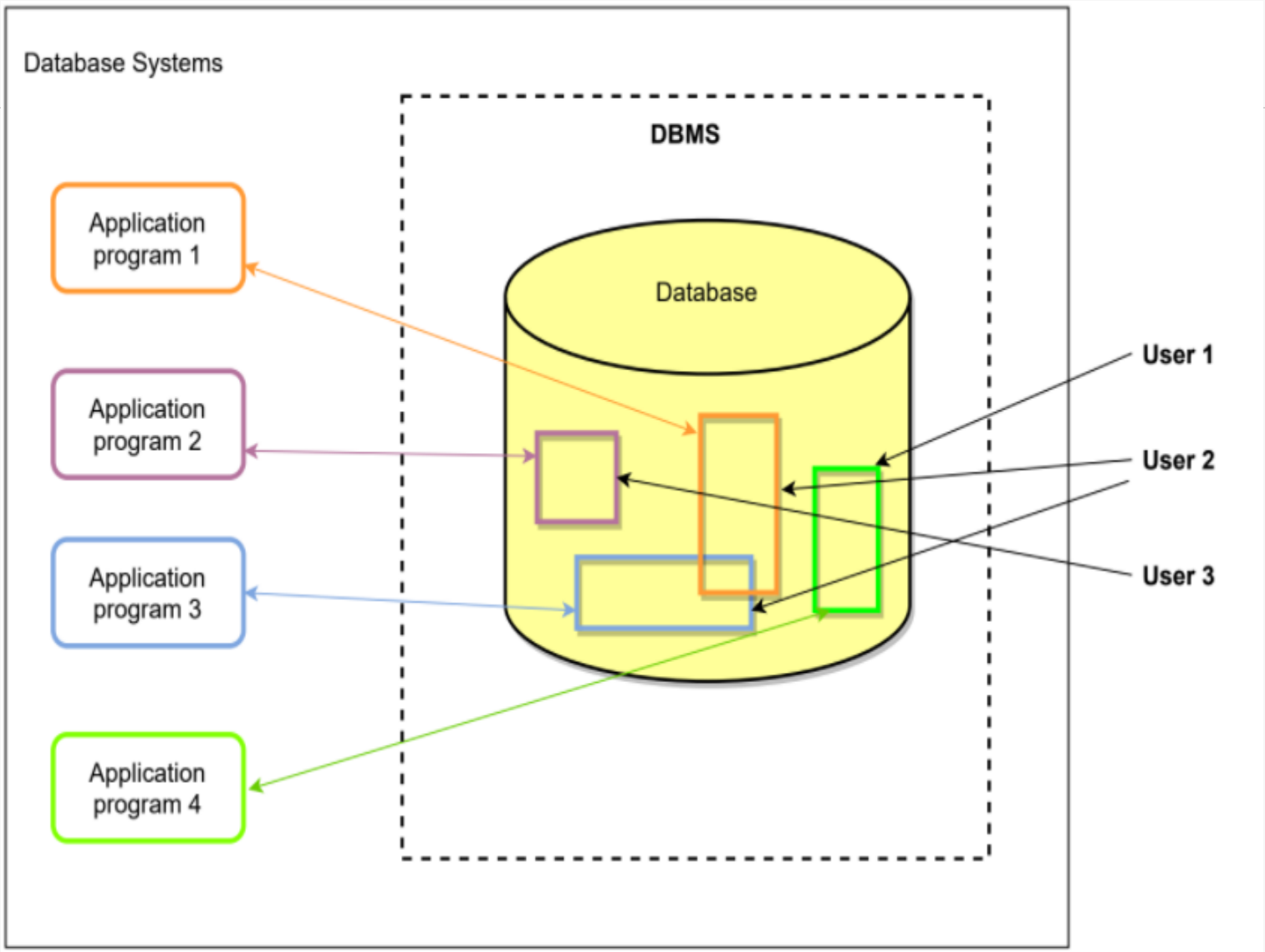
Data Integrity

Easy to update data

Security of data

Database

- A database can be viewed as a repository of data that is defined once and then accessed by various users as shown in the figure:



The application programs are nothing more than softwares that allow different users to send or retrieve data from the database.

Why is Database ?

Reasons Why Database Is Important :

1. **Database organizes the data:** Database organizes data and catalogs systematically.

2. **Database Stores Information Easily:** The database helps manage information more effectively than paper-based filing...

3. **Database is reliable:** It stores data consistently and reliably.

4. **Database Is Easy To Use :** Databases are easy to use. They can be accessed from any computer with an internet connection.

Vendor	Product
Oracle	Oracle
Microsoft	SQL Server Access
IBM	DB2 Informix
Open source	PostgreSQL
MySQL AB	MySQL


ORACLE


MySQL


PostgreSQL


IBM
DB2


Microsoft
SQL Server

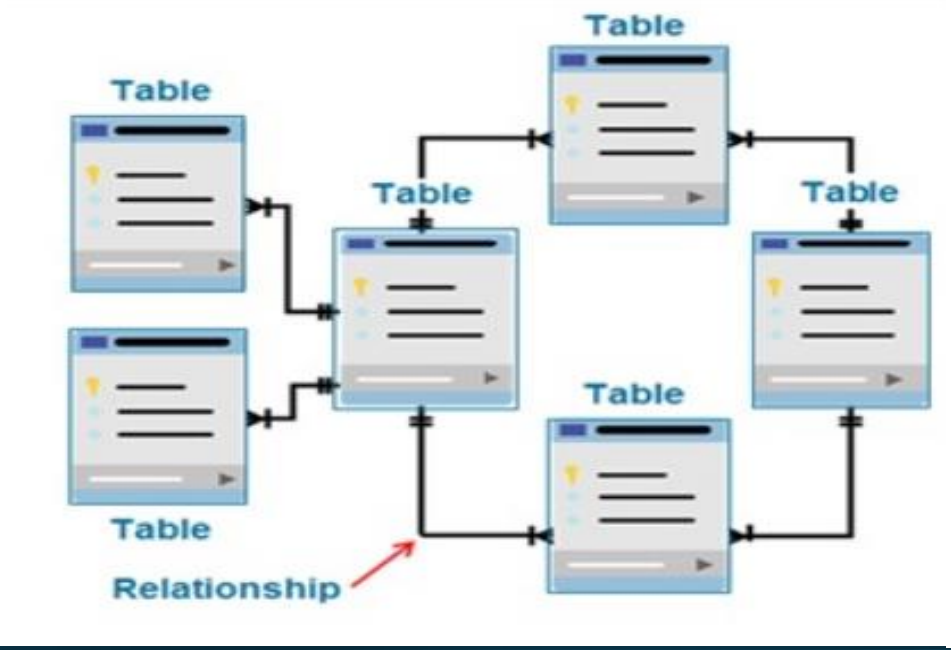

SYBASE


SQLite

RDBMS (**Relational Database Management System**)

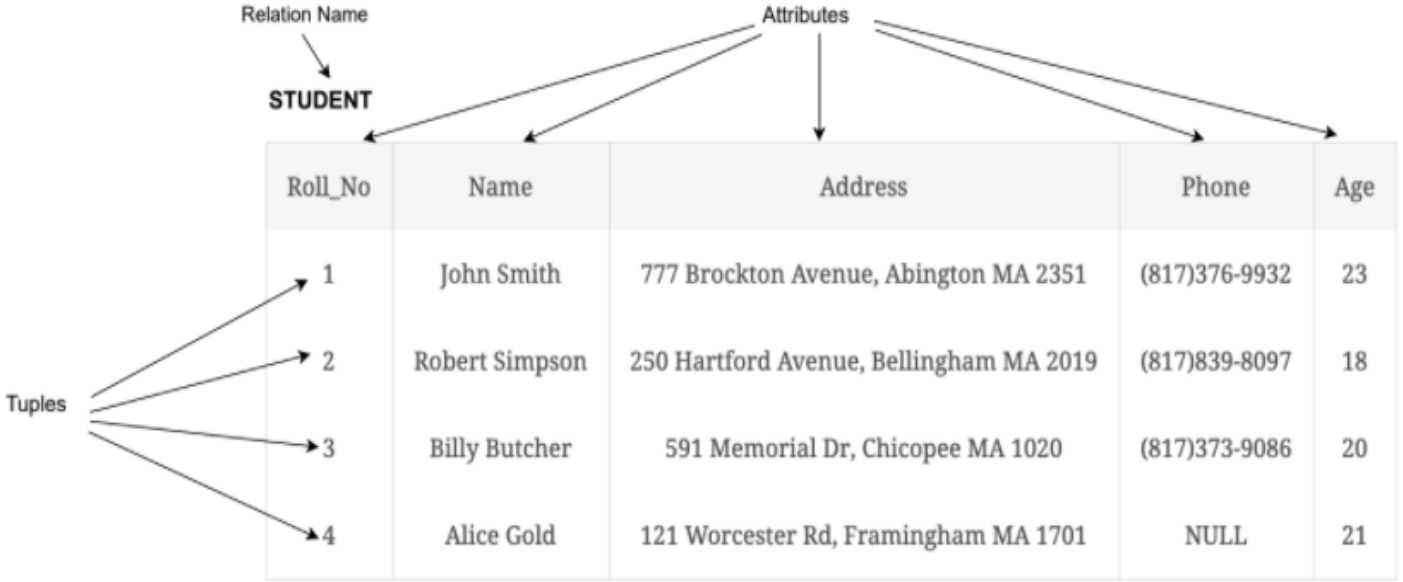
A relational database is a type of database that stores and provides access to data points that are related to one another.

Relational databases are based on the relational model, straightforward way of representing data in tables.



What is relational model? #

The relational model represents the database as a collection of relations. A relation is nothing but a table of values. Every row in the table represents a collection of related data values. These rows in the table denote a real-world entity or relationship. The table and column names are helpful to interpret the meaning of values in each row.



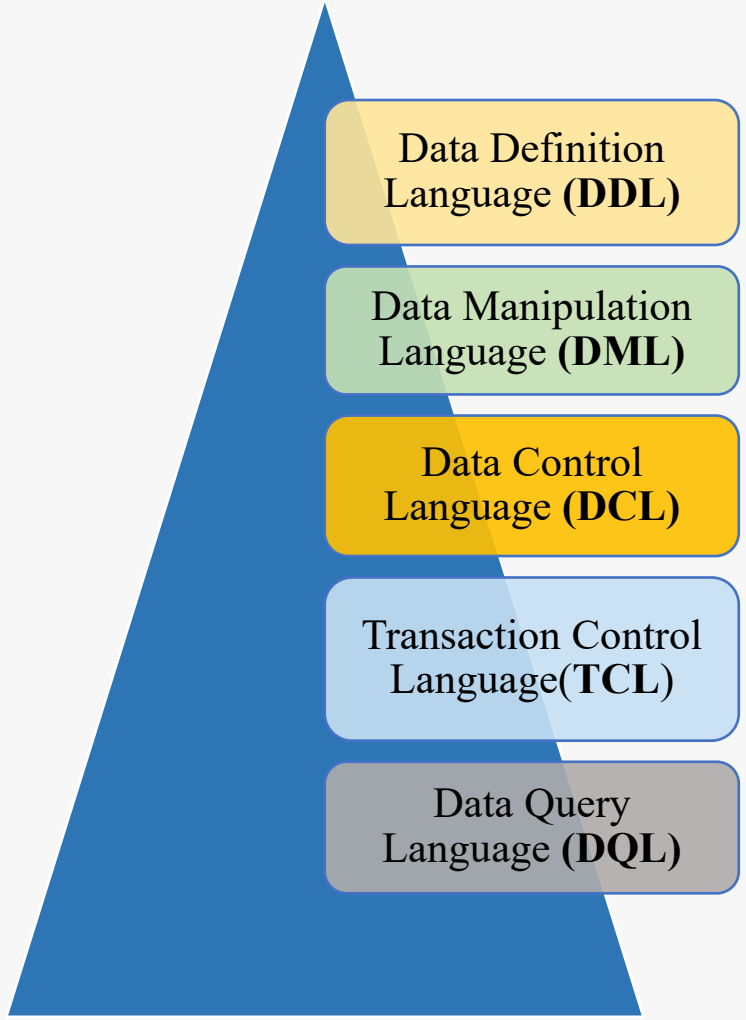
Roll_No	Name	Address	Phone	Age
1	John Smith	777 Brockton Avenue, Abington MA 2351	(817)376-9932	23
2	Robert Simpson	250 Hartford Avenue, Bellingham MA 2019	(817)839-8097	18
3	Billy Butcher	591 Memorial Dr, Chicopee MA 1020	(817)373-9086	20
4	Alice Gold	121 Worcester Rd, Framingham MA 1701	NULL	21

The STUDENT relation

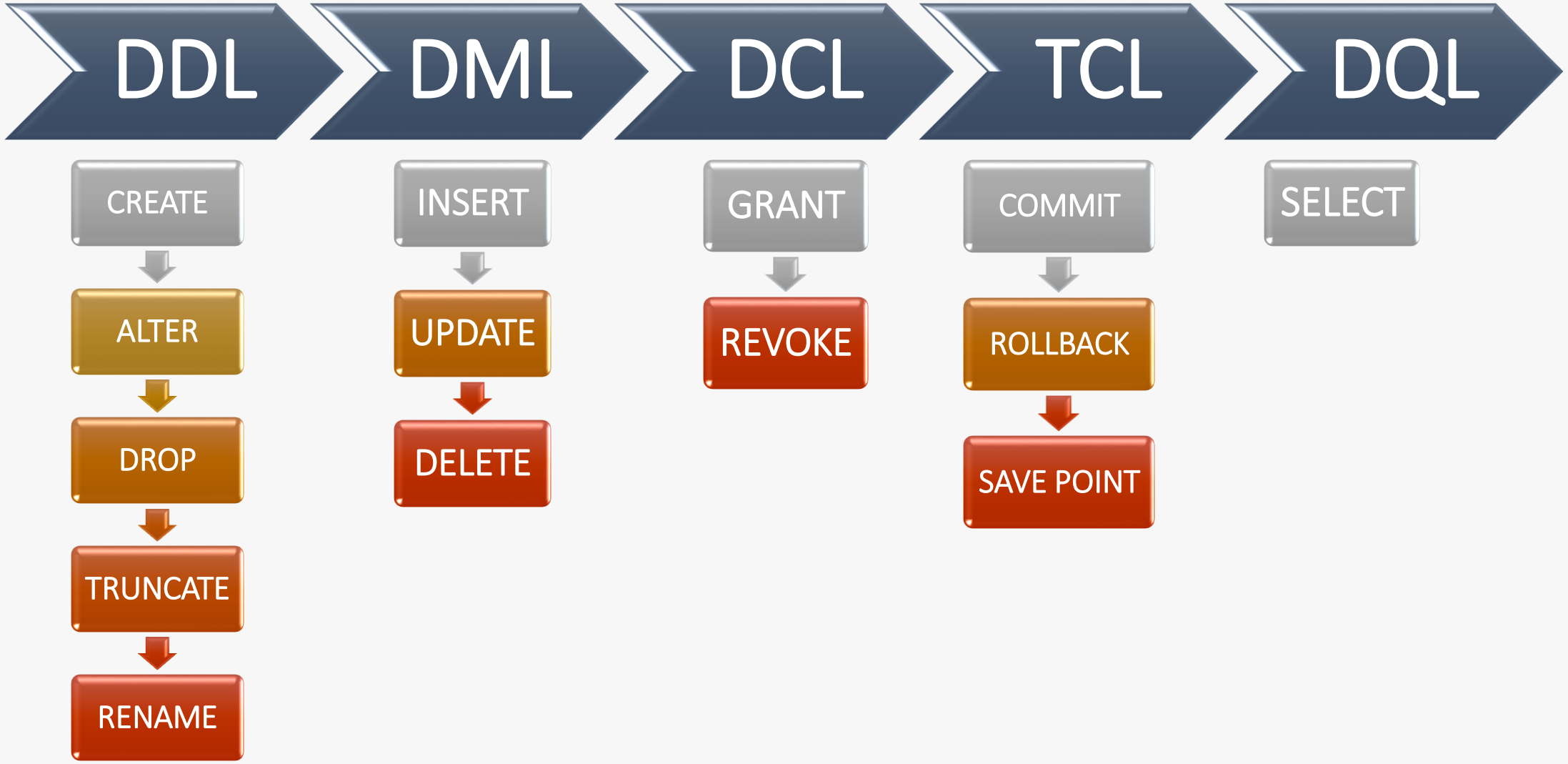
RDBMS (**Relational Database Management System**)

A relational database is a type of database that stores and provides access to data points that are related to one another.

- In a relational database, each row in the table is a record with a unique ID called the **key**.
- The columns of the table hold attributes of the data, and each record usually has a value for each attribute, making it easy to establish the relationships among data points.

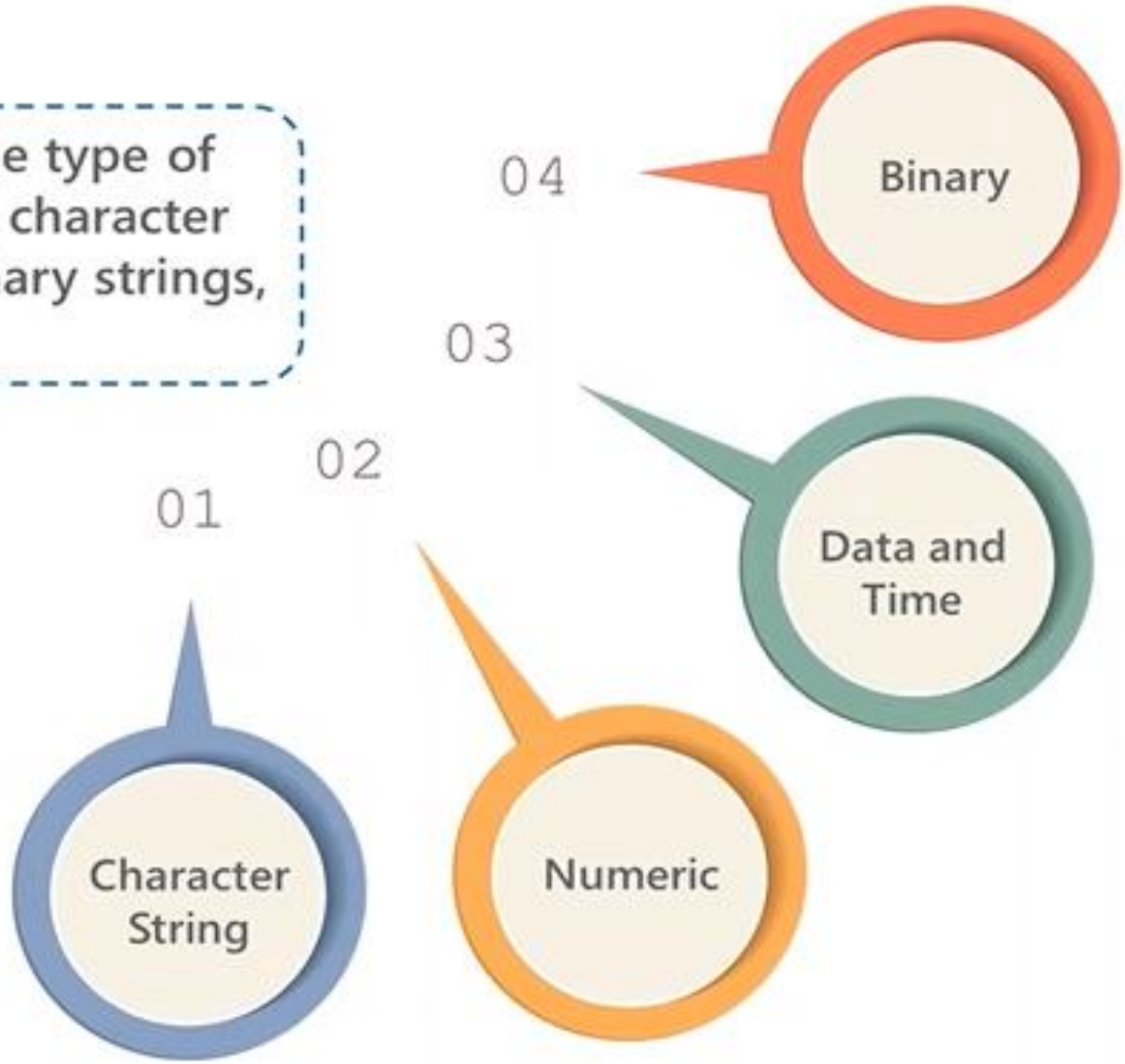


DBMS / SQL Language



Data Type in SQL

A data type is an attribute that specifies the type of data that the object can hold: integer data, character data, monetary data, date and time data, binary strings, and so on



SQL data types

Numeric Data Types :

Name	Storage Size	Description	Range
smallint	2 bytes	small-range integer	-32768 to +32767
integer	4 bytes	typical choice for integer	-2147483648 to +2147483647
bigint	8 bytes	large-range integer	-9223372036854775808 to 9223372036854775807
decimal	variable	user-specified precision,exact	up to 131072 digits before the decimal point; up to 16383 digits after the decimal point
numeric	variable	user-specified precision,exact	up to 131072 digits before the decimal point; up to 16383 digits after the decimal point
real	4 bytes	variable-precision,inexact	6 decimal digits precision
double precision	8 bytes	variable-precision,inexact	15 decimal digits precision
smallserial	2 bytes	small autoincrementing integer	1 to 32767
serial	4 bytes	autoincrementing integer	1 to 2147483647
bigserial	8 bytes	large autoincrementing integer	1 to 9223372036854775807

Date and Time Data Types :

Name	Storage Size	Description	Low Value	High Value
timestamp [(p)] [without time zone]	8 bytes	both date and time (no time zone)	4713 BC	294276 AD
TIMESTAMPTZ	8 bytes	both date and time, with time zone	4713 BC	294276 AD
date	4 bytes	date (no time of day)	4713 BC	5874897 AD
time [(p)] [without time zone]	8 bytes	time of day (no date)	00:00:00	24:00:00
time [(p)] with time zone	12 bytes	times of day only, with time zone	00:00:00+1459	24:00:00-1459
interval [fields] [(p)]	12 bytes	time interval	-178000000 years	178000000 years

SQL data types

Character Strings Data Types :-

S. No.	Name & Description
1	**character varying(n), varchar(n)** variable-length with limit
2	**character(n), char(n)** fixed-length, blank padded
3	**text** variable unlimited length

Boolean Data Types :-

Name	Storage Size	Description
boolean	1 byte	state of true or false


netlink
digital solutions
www.netlink.com
Thank you