

HELLO



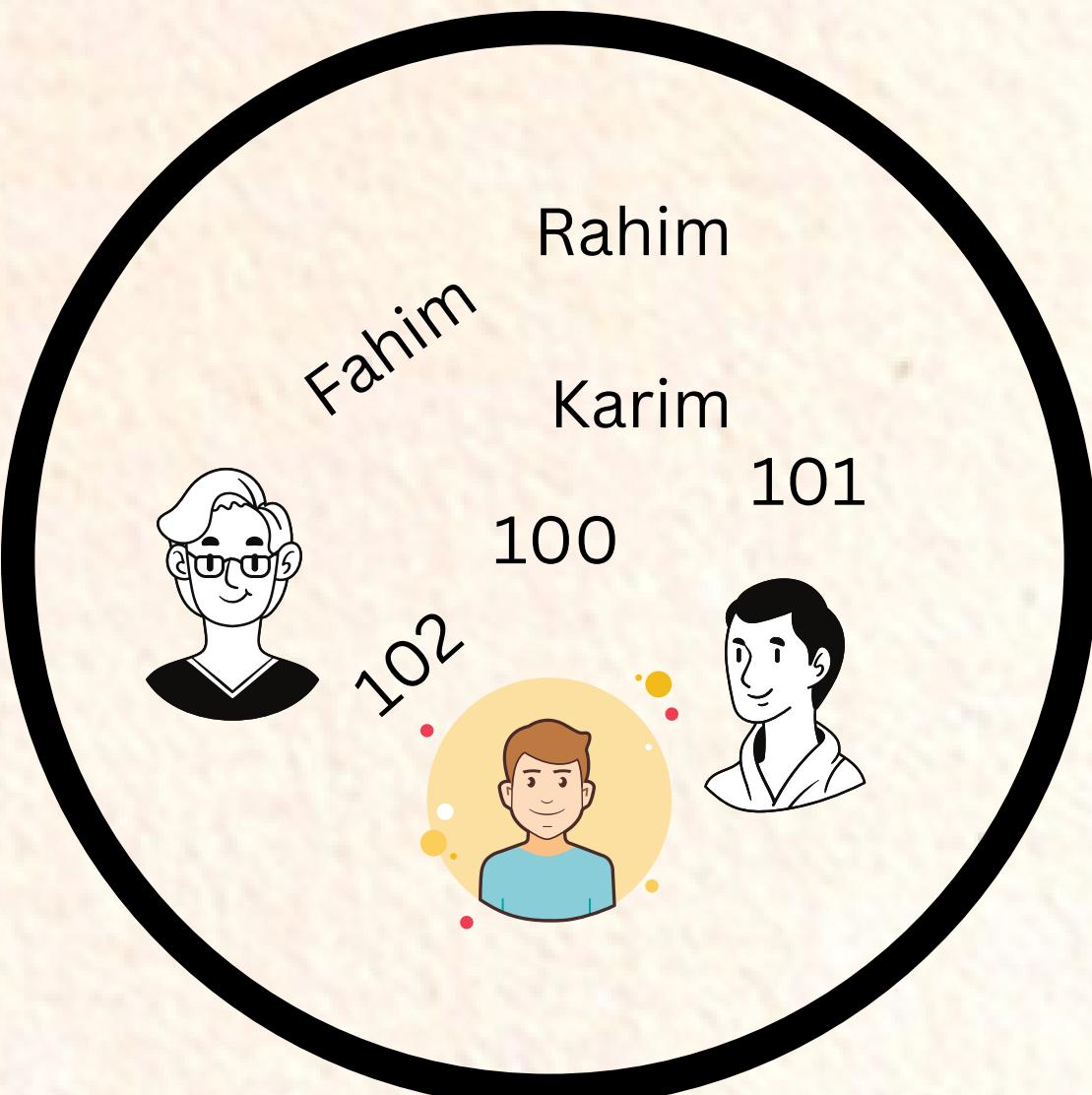
# OUTLINES



Database recap

# DATA VS INFORMATION

Data



Processing

information

Name	Roll	Image
Rahim	100	
Karim	101	
Fahim	102	

# **DATABASE**

**A database is an organized collection of structured information, or data, typically stored electronically in a computer system.**

**It is also used to organize the data in the form of a table, schema, views, and reports, etc.**

**For example:**

**The college Database organizes the data about the admin, staff, students and faculty etc.**

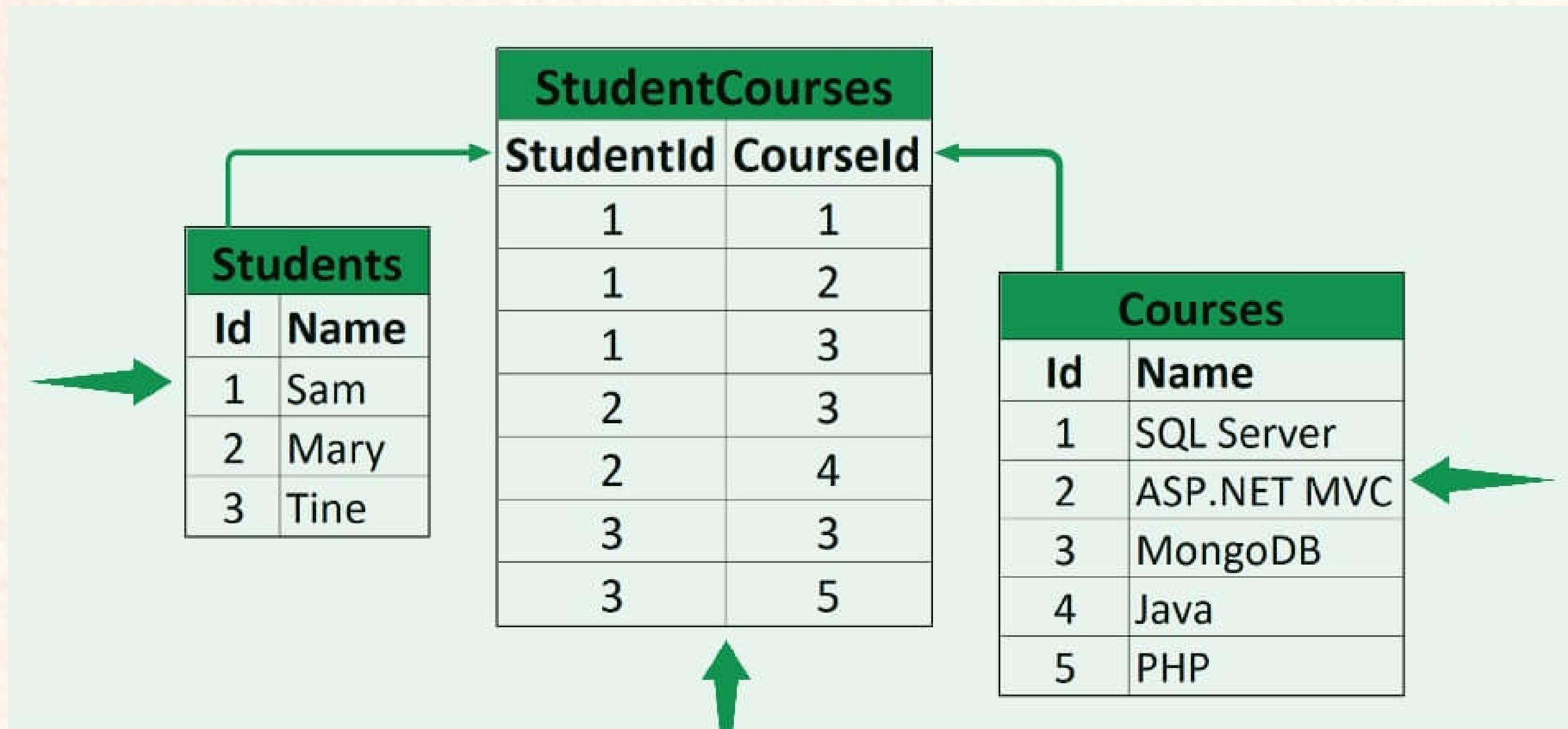
# **DATABASE**

## **Two types of Database**

- 1. Relational Database**
- 2. Non Relational Database**

# DATABASE

Relational Database :



# DATABASE

## Non Relational Database :



### Relational

Posts (id, Title)

1	Title	
Comments		
01	1	Comment 1
02	1	Comment 2

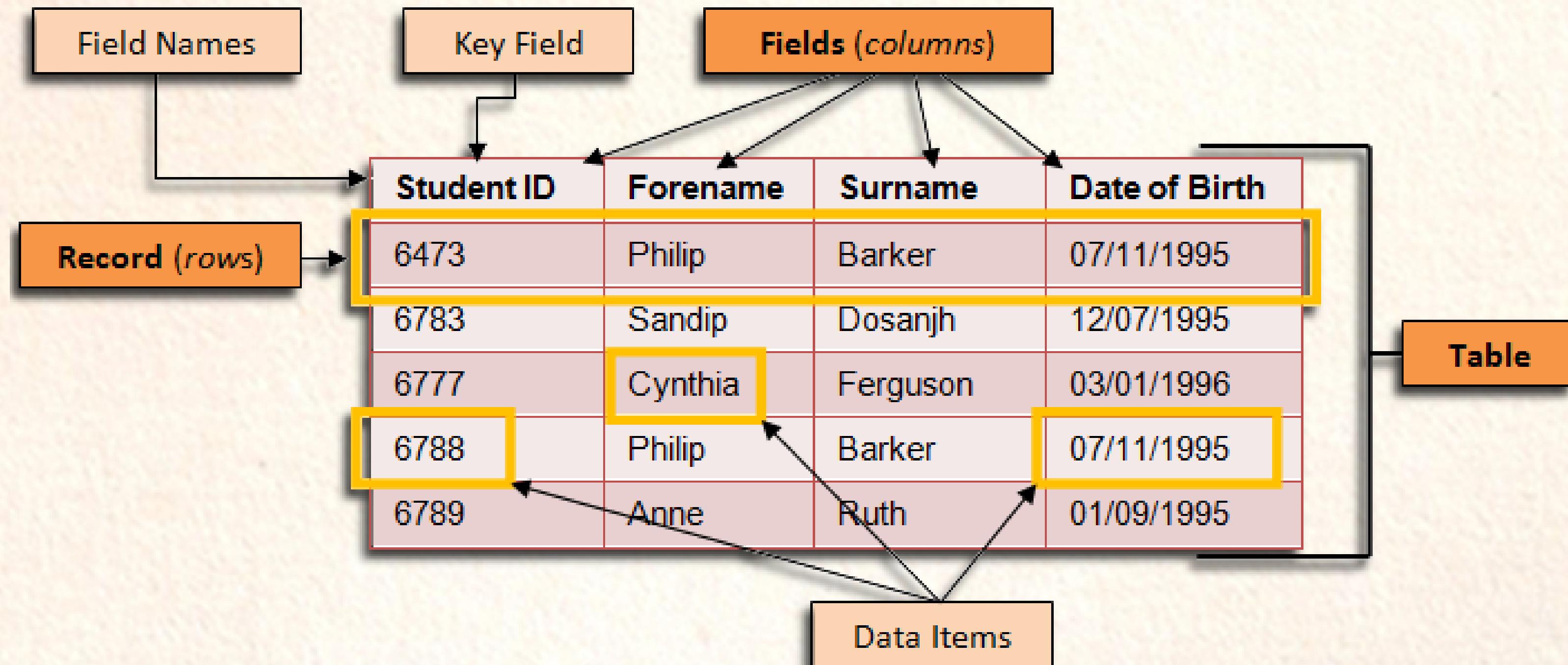
### Non-relational

Posts (id, Title, Comments/Image)

1	Title	Comment 1
		Comment 2
		Comment 3
2	Title 2	Image

# DATABASE

## Elements of Database :



# **DATABASE**

## **Keys :**

It is used to uniquely identify any record or row of data from the table.

It is also used to establish and identify relationships between tables.

## **Types of Keys :**

1. Primary key
2. Foreign key
3. Composite key

# DATABASE

## Primary Key :

A primary key is the column or columns that contain values that uniquely identify each row in a table. A database table must have a primary key for Optim to insert, update, restore, or delete data from a database table.

**STUDENT\_DETAILS**

Roll_no	Name	Marks
101	X	34
102	Y	46
103	Z	94

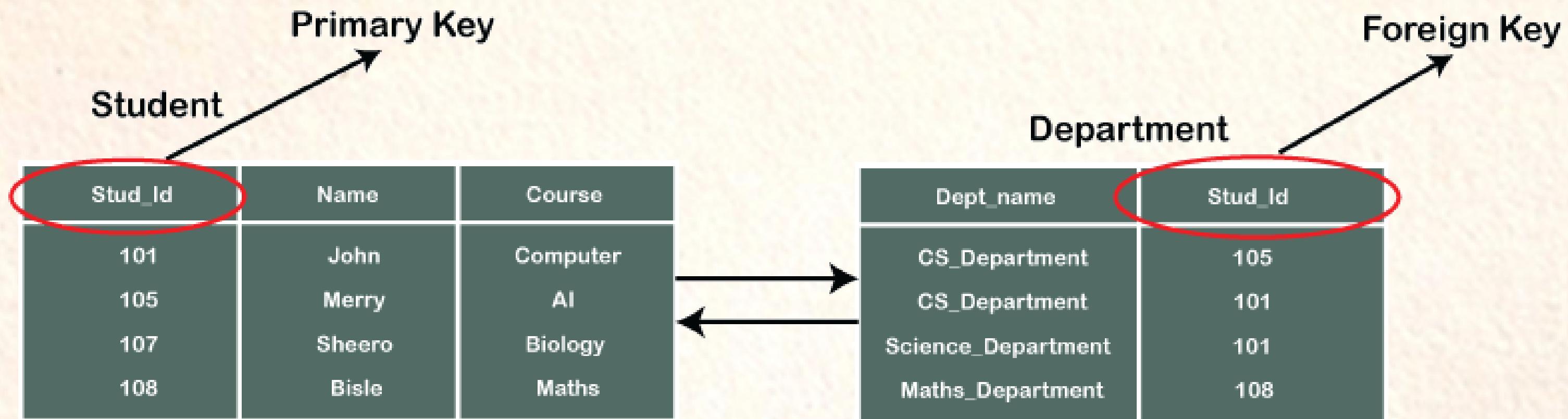
# DATABASE

## Foreign Key :

A FOREIGN KEY is a field (or collection of fields) in one table, that refers to the PRIMARY KEY in another table.

Child table --> The table with the foreign key

Parent table ---> The table with the primary key



# DATABASE

## Composite Key :

A composite key is a candidate key that consists of two or more fields that together uniquely identify a table.

**Composite Key**

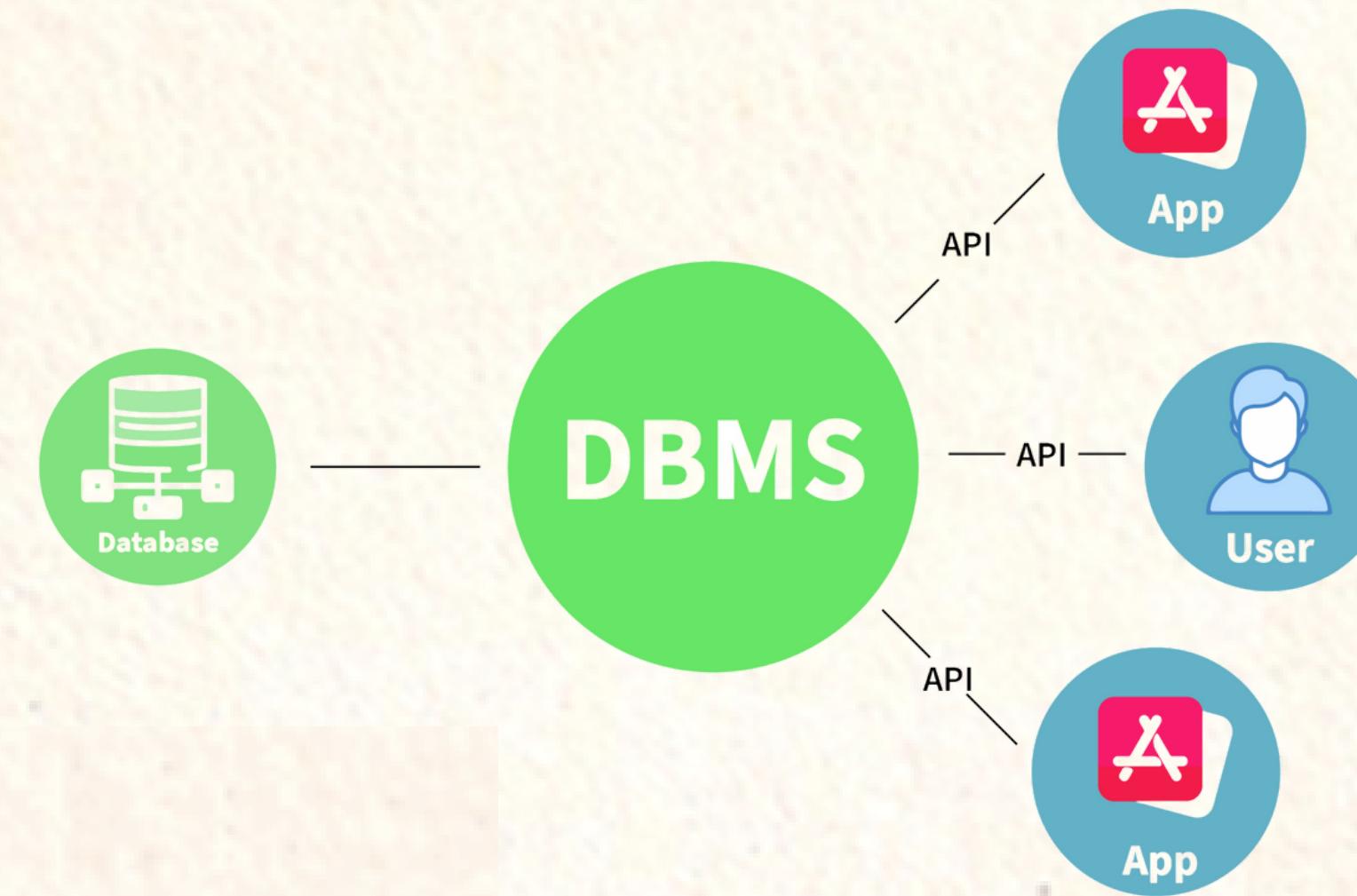
A

Cust_Id	Order_Id	Prod_code	Prod_name
001	121	P 12	P
003	123	P 10	Q
005	125	P 3	R

# DBMS

A database management system (DBMS) is a software tool that enables users to manage a database easily.

It allows users to access and interact with the underlying data in the database.



# DBMS

## Advantages :

1. Data modeling
2. Data storage and retrieval
3. Concurrency control
4. Data integrity and security
5. Backup and recovery:

# Difference between DBMS vs RDBMS

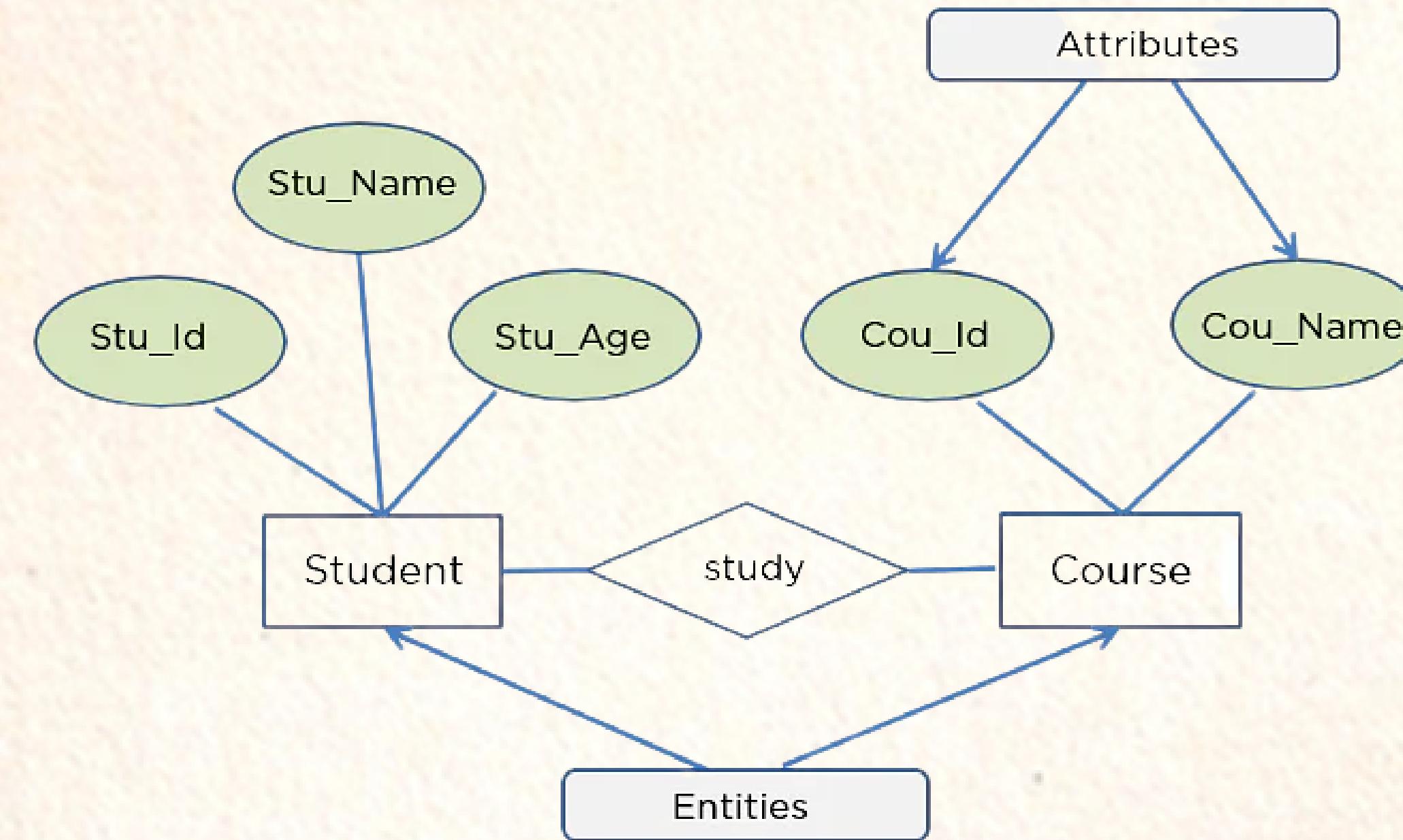
DBMS	RDBMS
DBMS stores data as a file.	RDBMS stores data in tabular form.
Data elements need to be accessed individually.	Multiple data elements can be accessed at the same time.
There is no relationship between data.	Data is stored in the form of tables which are related to each other.
Normalization is not present.	Normalization is present.
It deals with a small quantity of data.	It deals with a large amount of data.

# DBMS DESIGN STRATEGIES

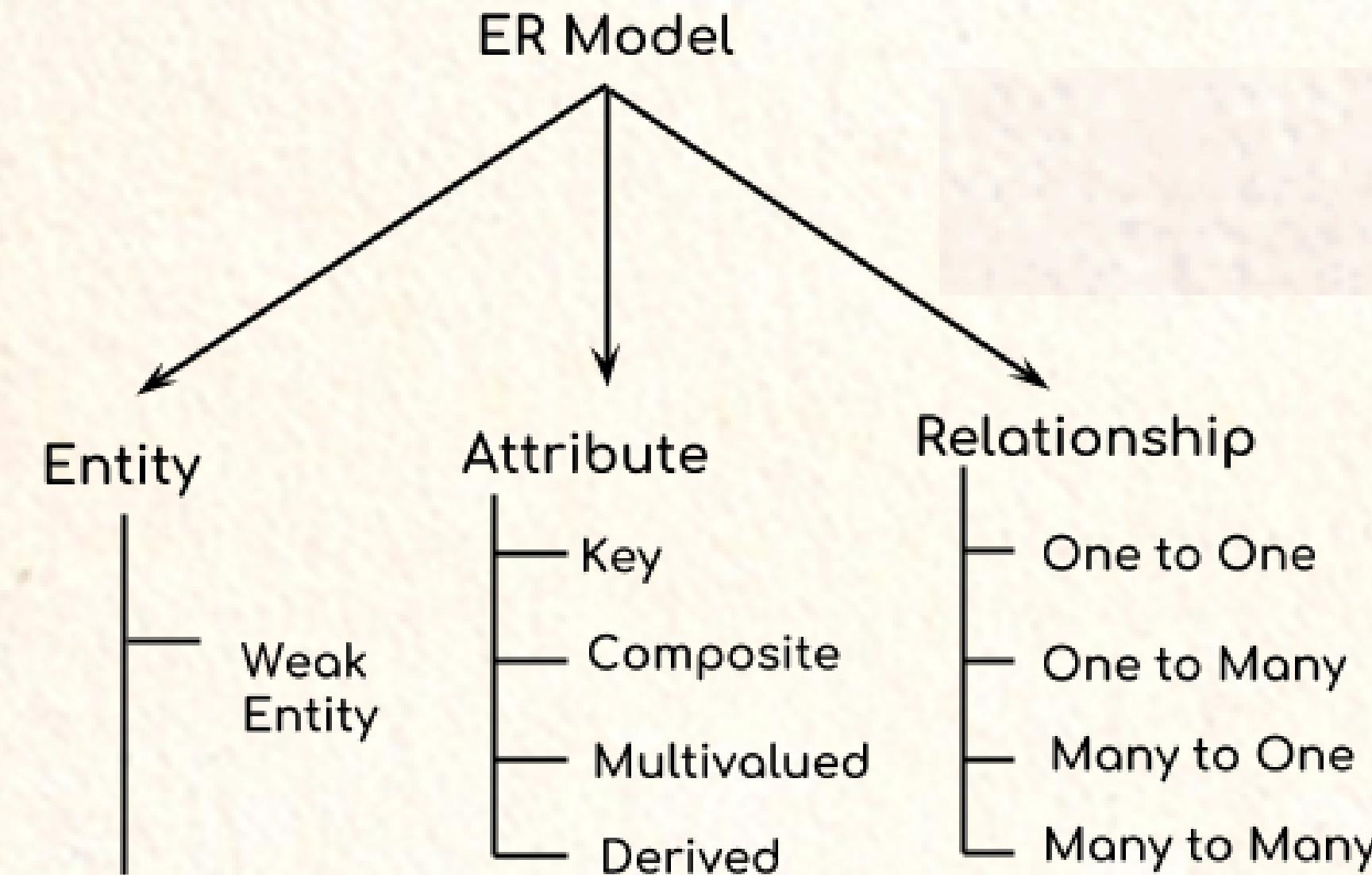
1. Top Down
2. Bottom Up
3. **Requirement Analysis :** Requirements Analysis is the stage in the design cycle when you find out everything you can about the data the client needs to store in the database and the conditions under which that data needs to be accessed.
4. Pitfalls to avoid :
  - Redundancy
  - Lack of Completeness

# ER DIAGRAM

An Entity Relationship Diagram is a diagram that represents relationships among entities in a database.

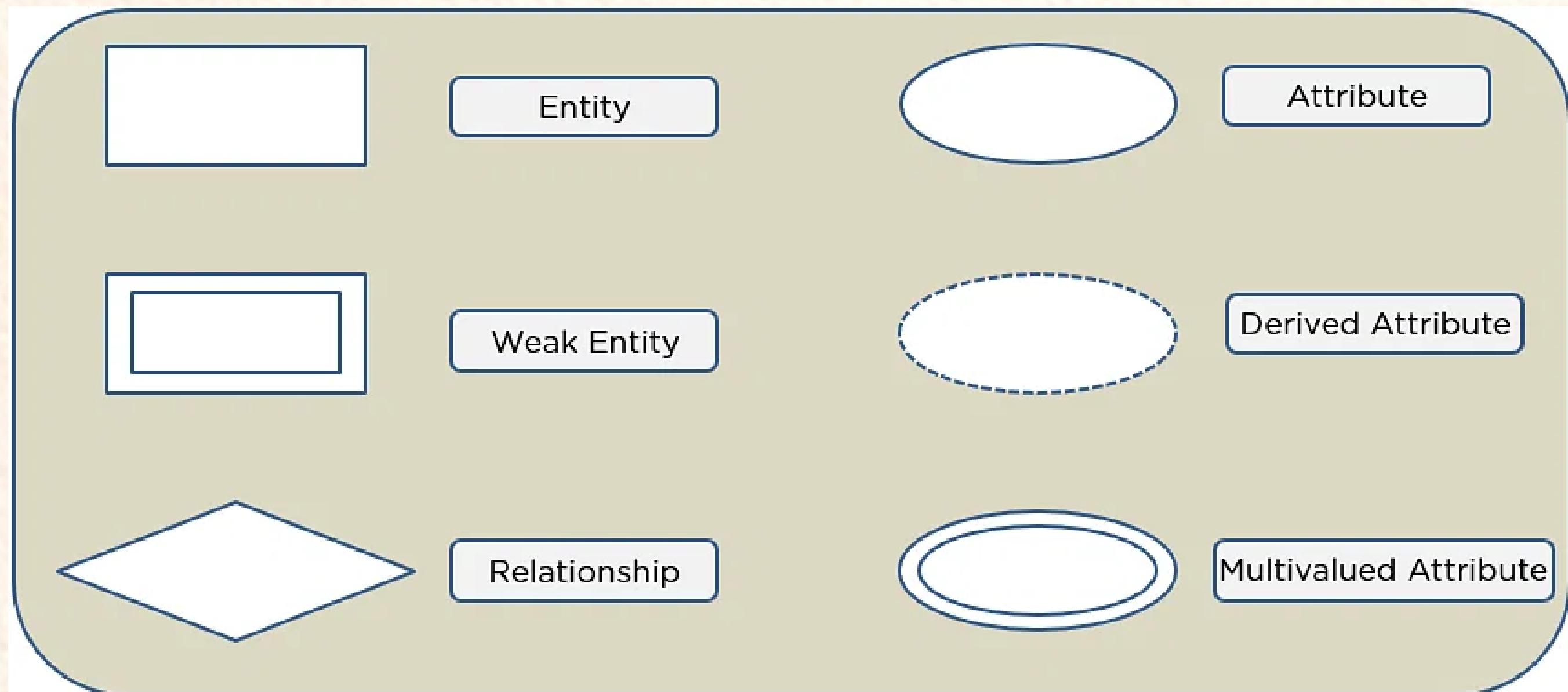


# ER DIAGRAM COMPONENTS



Components of ER Diagram

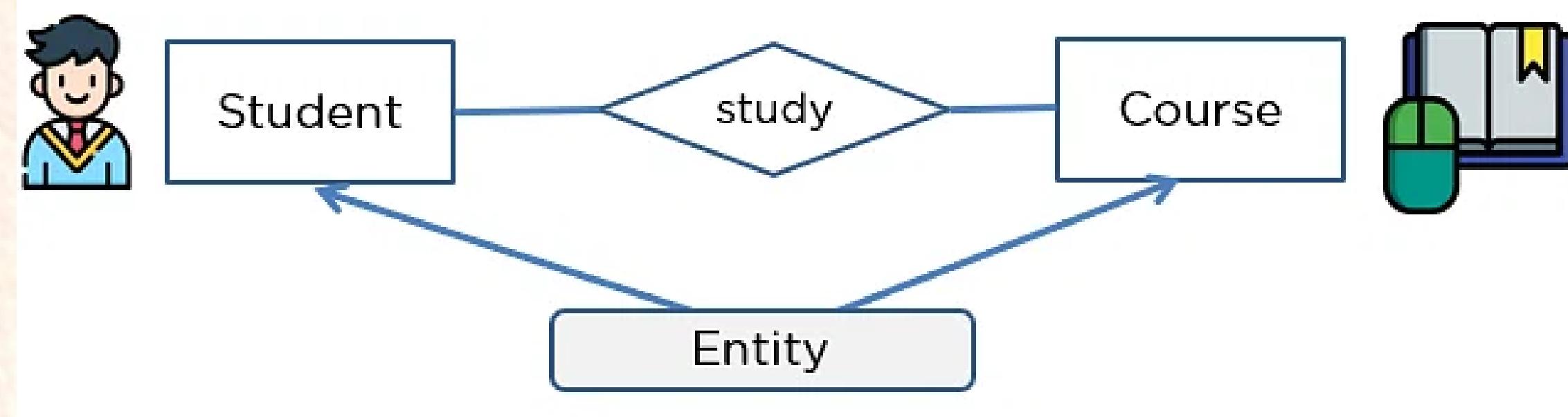
# ER DIAGRAM



# ER DIAGRAM

## 1. Entities

An entity can be either a living or non-living component.  
It showcases an entity as a rectangle in an ER diagram.

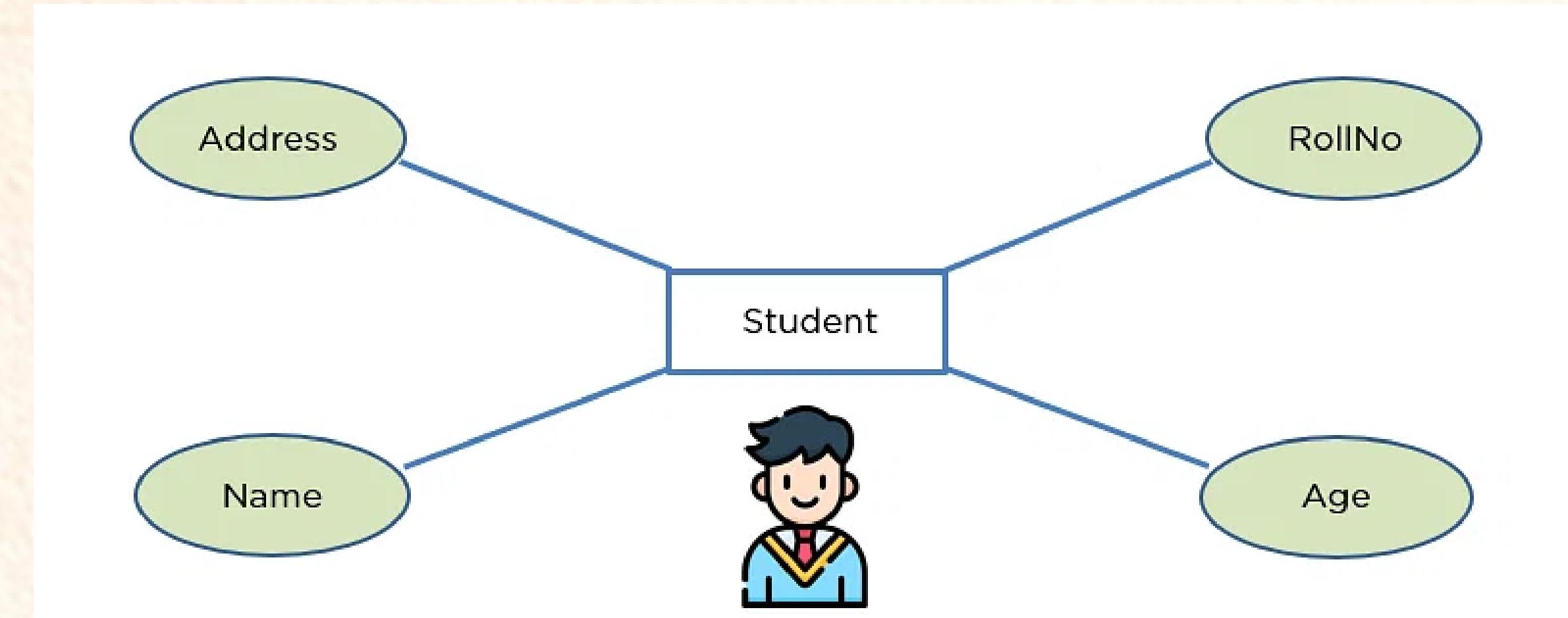


# ER DIAGRAM

## 2. Attribute

An attribute exhibits the properties of an entity.

You can illustrate an attribute with an oval shape in an ER diagram.

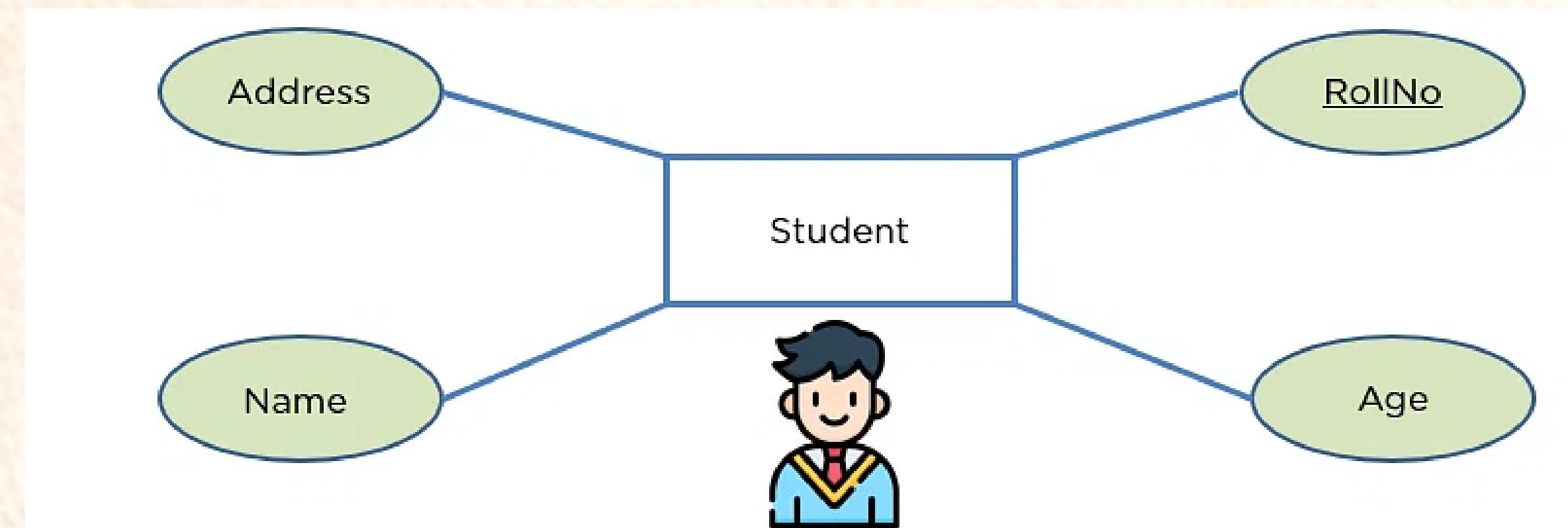


# ER DIAGRAM

## 2. Attribute

### i. Key Attribute

Key attribute uniquely identifies an entity from an entity set

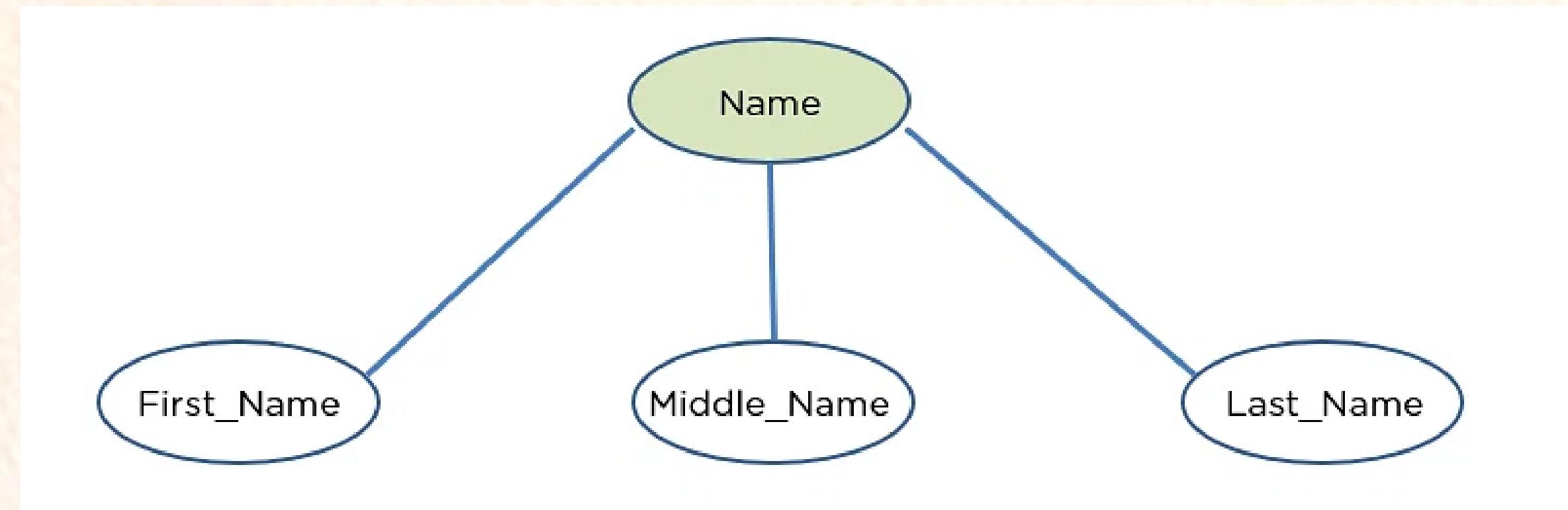


# ER DIAGRAM

## 2. Attribute

### ii. Composite Attribute

An attribute that is composed of several other attributes is known as a composite attribute.



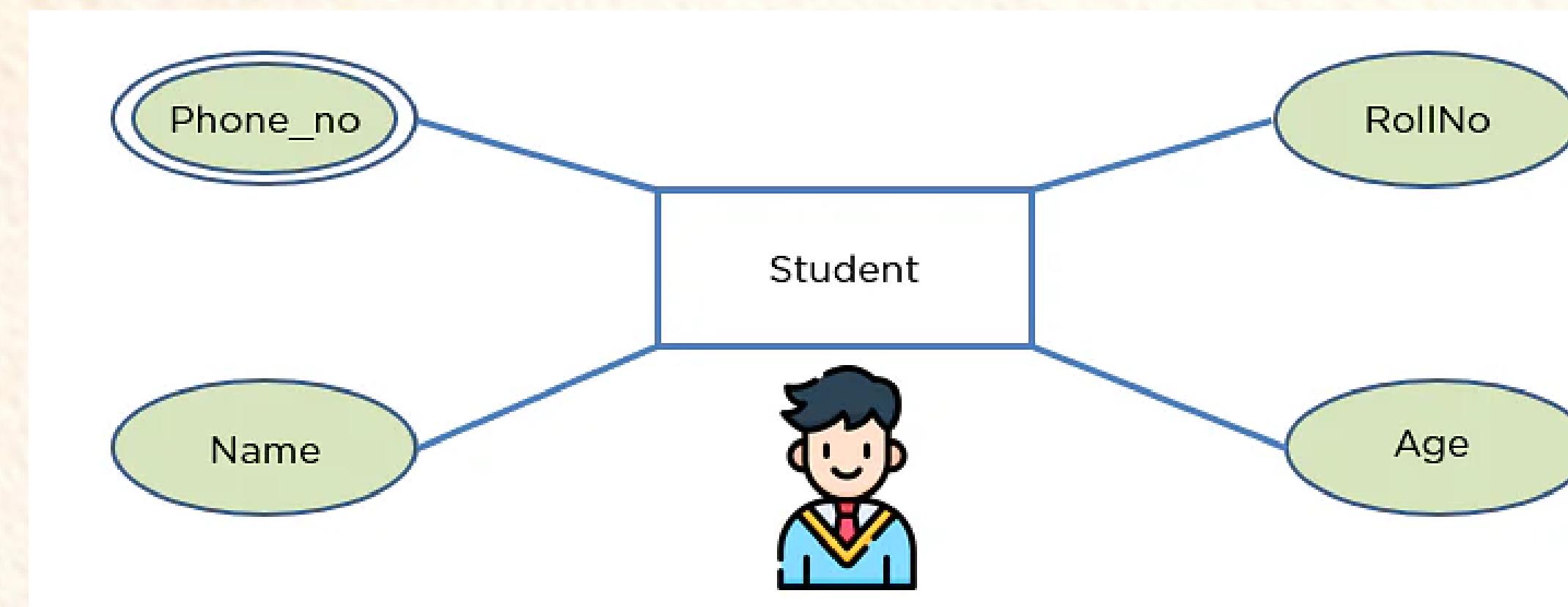
# ER DIAGRAM

## 2. Attribute

### iii. Multivalued Attribute

Some attributes can possess over one value, those attributes are called multivalued attributes.

The double oval shape is used to represent a multivalued attribute.



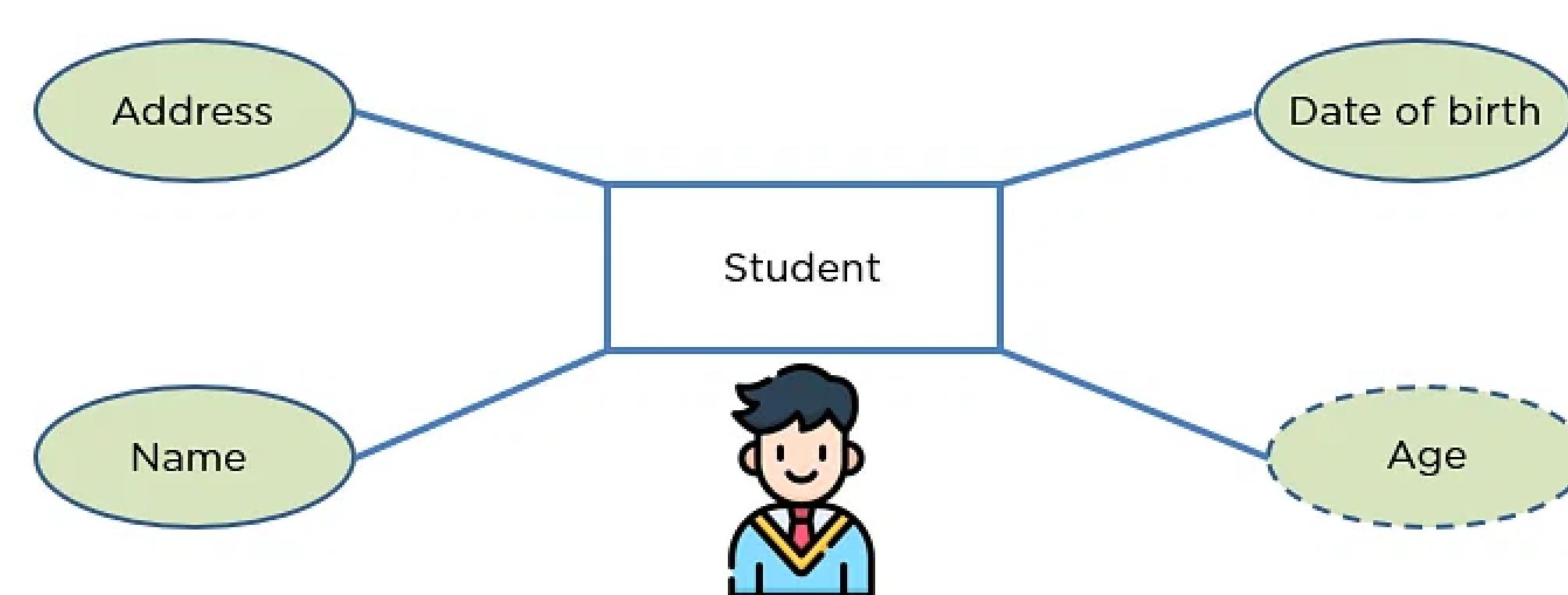
# ER DIAGRAM

## 2. Attribute

### iv. Derived Attribute

An attribute that can be derived from other attributes of the entity is known as a derived attribute.

In the ER diagram, the dashed oval represents the derived attribute.



# ER DIAGRAM

## 3. Relationship



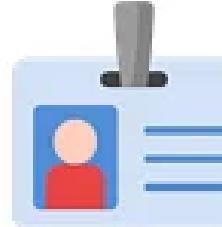
Student

1

has

1

Identification  
Card



One to One



Customer

1

placed

M

Order



One to Many



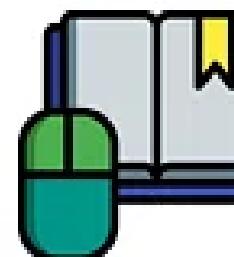
Student

M

enroll

1

Course



Many to One



Employee

M

is assigned

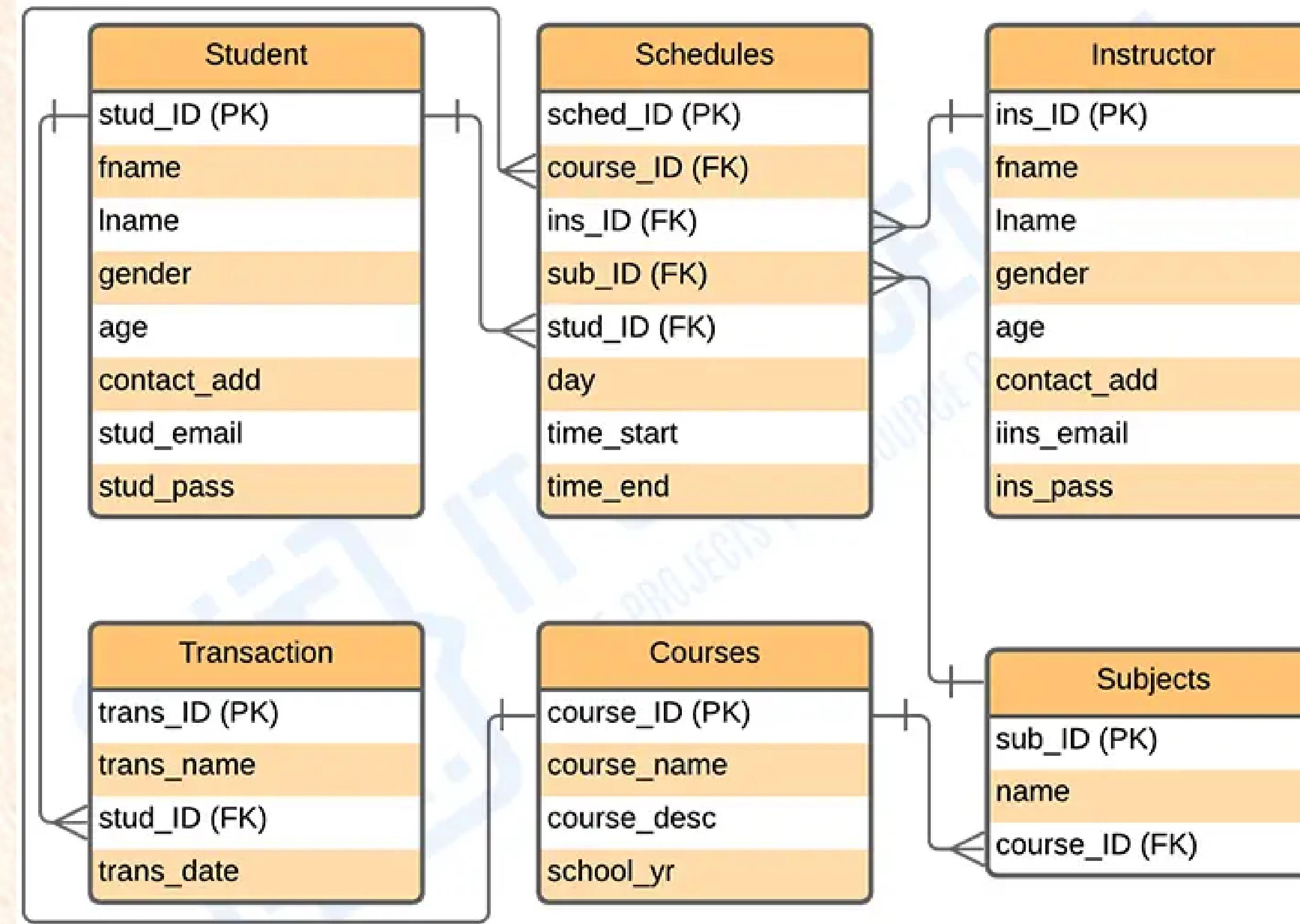
M

Project



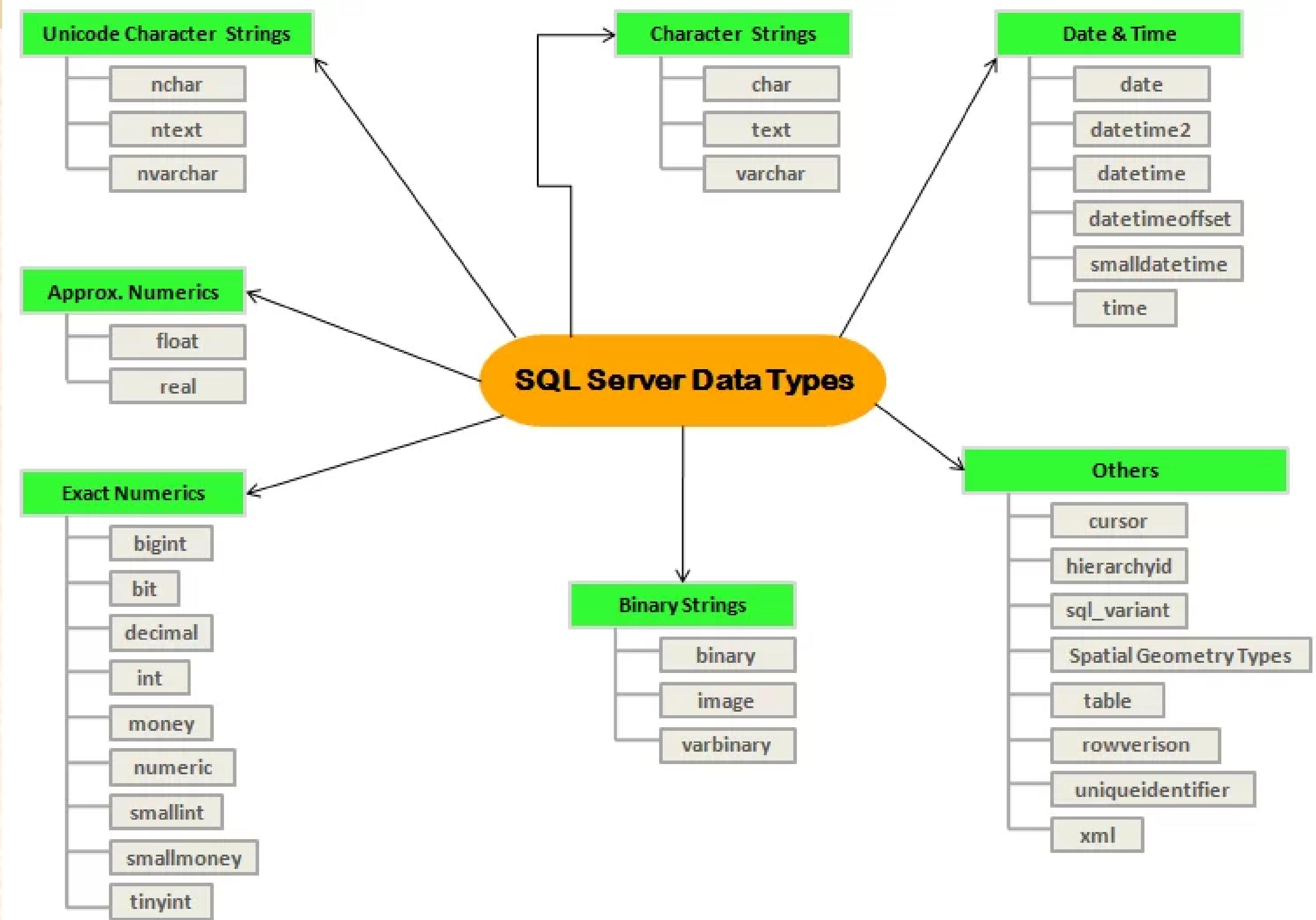
Many to Many

# SCHOOL MANAGEMENT SYSTEM



# SQL

Structured Query Language (SQL) is a standardized programming language that is used to manage relational databases and perform various operations on the data in them.



# SQL Syntax:

Some Important SQL commands:

- **SELECT** - extracts data from a database
- **UPDATE** - updates data in a database
- **DELETE** - deletes data from a database
- **INSERT INTO** - inserts new data into a database
- **CREATE DATABASE** - creates a new database
- **ALTER DATABASE** - modifies a database
- **CREATE TABLE** - creates a new table
- **ALTER TABLE** - modifies a table
- **DROP TABLE** - deletes a table
- **CREATE INDEX** - creates an index (search key)
- **DROP INDEX** - deletes an index

## Create

```
CREATE DATABASE MyDatabase;
```

```
CREATE INDEX IndexName  
ON TableName(col1);
```

```
CREATE TABLE OurTable (  
    id int,  
    name varchar(12)  
);
```

## Delete

```
DROP DATABASE OurDatabase;
```

```
DROP TABLE OurTable;
```

## Update Table

```
UPDATE OurTable  
SET col1 = 56  
WHERE col2 = 'something';
```

## Delete Records

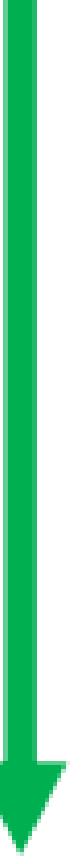
```
DELETE FROM OurTable  
WHERE col1 = 'something';
```

## Add/Remove Column

```
ALTER TABLE OurTable  
ADD col5 int;
```

```
ALTER TABLE OurTable  
DROP COLUMN col5;
```

# Order of Execution



FROM  
WHERE  
GROUP BY  
HAVING  
SELECT  
ORDER BY  
LIMIT

## Arithmetic Operators

Operator	Description
%	Modulous [A % B]
/	Division [A / B]
*	Multiplication [A * B]
-	Subtraction [A - B]
+	Addition [A + B]

## Bitwise Operators

Operator	Description
$\wedge$	Bitwise Exclusive OR (XOR) [A $\wedge$ B]
$ $	Bitwise OR [A   B]
$\&$	Bitwise AND [A & B]

## Comparison Operators

Operator	Description
<code>&lt; &gt;</code>	Not Equal to [A < > B]
<code>&lt;=</code>	Less than or equal to [A <= B]
<code>&gt;=</code>	Greater than or equal to [A >= B]
<code>&lt;</code>	Less than [A < B]
<code>&gt;</code>	Greater than [A > B]
<code>=</code>	Equal to [A = B]

## Compound Operators

Operator	Description
<code>  *=</code>	Bitwise OR equals [A   *= B]
<code>^-=</code>	Bitwise Exclusive equals [A ^-= B]
<code>&amp;=</code>	Bitwise AND equals [A &= B]
<code>%=</code>	Modulo equals [A %= B]
<code>/=</code>	Divide equals [A /= B]
<code>*=</code>	Multiply equals [A*= B]
<code>-=</code>	Subtract equals [A-= B]
<code>+=</code>	Add equals [A+= B]

## Logical Operators

The Logical operators present in SQL are as follows:

- AND
- OR
- NOT
- BETWEEN
- LIKE
- IN
- EXISTS
- ALL
- ANY

```
SELECT * FROM Employee_Info  
WHERE City='Dhaka' OR City='Khulna';
```

## **Resources :**

**<https://www.edureka.co/blog/sql-commands>**

