# Designing a Data model?

Learn How to choose the Right Key?🔑

Primary key

Vs🔐

Foreign key

DON'T FORGET

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# Primary Key and Foreign Key Relationship

**Primary Key:**

A primary key is a unique identifier for a record in a table. It ensures that each record can be uniquely identified by its primary key value. The primary key must contain unique values and **cannot** contain **NULL** values.

**Foreign Key:**

A foreign key is a field (or a collection of fields) in one table that uniquely identifies a row in another table. The foreign key establishes a **link** between the data in the two tables, ensuring referential integrity.

## How to Choose the Right Key?

Choosing the right primary key and foreign key is crucial for database integrity and performance. Here are some guidelines:

**Primary Key:**

1. **Uniqueness:** Ensure the primary key uniquely identifies each record.
2. **Non-nullability:** Primary keys cannot have NULL values.
3. **Immutability:** Choose a key that is unlikely to change over time.
4. **Simplicity:** Use a single, simple field whenever possible.

**Example:** In the Products table, product_id is chosen as the primary key because it uniquely identifies each product and is unlikely to change.

**Foreign Key:**

1. **Referential Integrity:** Ensure the foreign key **accurately references a primary key** in another table.
2. **Consistency:** Use foreign keys to maintain **consistency and integrity** between related tables.

**Example:** In the Sales table, product_id is chosen as the foreign key to link each sale to a specific product in the Products table.



# Business Use case

Imagine a retail company wants to generate a sales report that includes product details. By using primary and foreign keys, the company can easily join the Sales table with the Products table to retrieve the necessary data.

```
SELECT
    Sales.sales_id,
    Products.product_name,
    Sales.sale_date,
    Sales.quantity,
    Sales.total_amount
FROM
    Sales
JOIN
    Products ON Sales.product_id = Products.product_id;
```

## Product Table

Primary Key: product_id

Primary key

| Product_id | Product _name | Category | Price |
|---|---|---|---|
| 101 | Product A | Category 1 | 100.00 |
| 102 | Product B | Category 2 | 250.00 |
| 103 | Product C | Category 3 | 150.00 |

Join

## Sales Table

Primary key

Foreign key

| Sales_id | Product _id | Sales_date | quantity | total_amount |
|---|---|---|---|---|
| 1 | 101 | 2023-07-01 | 5 | 500.00 |
| 2 | 102 | 2023-07-02 | 3 | 750.00 |
| 3 | 103 | 2023-07-03 | 2 | 300.00 |

Primary Key: sales_id

Foreign Key: product_id (references product_id in the Products table)