Different keys in Databases

1- Super Key - A super key is a group of single or multiple keys which identifies rows in a table.

جمعلي بقي كل الـ unique identifiers اللى عندك في الجدول ... ده بقي الـ Super Key

2- Primary Key – is a column or group of columns in a table that uniquely identify every row in that table.

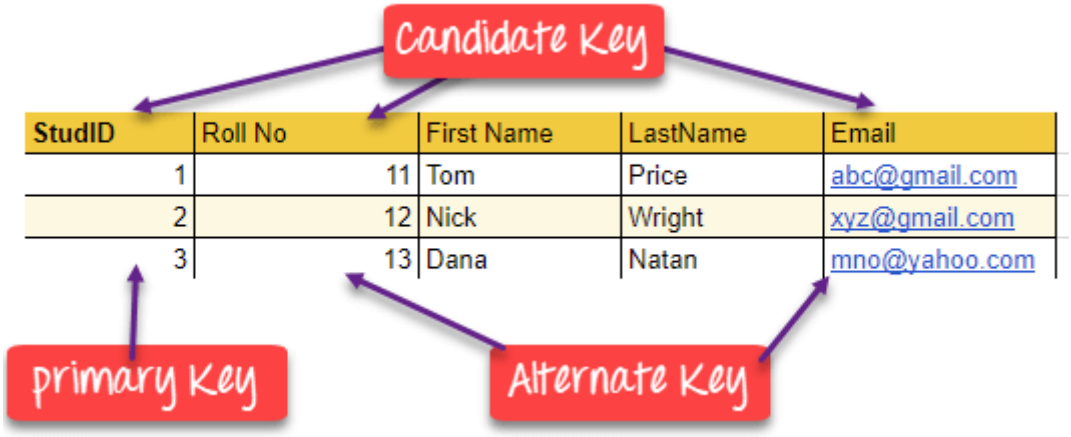
ده اللي ربنا وفقه واخترناه عشان نعرف بيه أي data عندي في الداتابيز ... لازم يكون unique و not null

3- Candidate Keys – is a set of attributes that uniquely identify tuples in a table. Candidate Key is a super key with no repeated attributes.

دول مجموعة الـ keys الـ unique identifiers الموجودين عندي واللى هختار منهم بعدين الـ PK ... ممكن يكون attribute واحد في الـ key ممكن يكون مجموعة attributes ... انت ورزقك

4- Alternate Key – is a column or group of columns in a table that uniquely identify every row in that table.

دول بقي اللى ربنا موفقهمش عشان يكونوا PK بس هما لا زالوا unique identifiers



5- Foreign Key – is a column that creates a relationship between two tables. The purpose of Foreign keys is to maintain data integrity and allow navigation between two different instances of an entity.

ده PK بتاع جدول، محطوط في جدول تاني عشان يبين العلاقة بين الجداول ... ممكن يبقي null و not unique مدام مش في جدوله عادي

6- Composite Key – has two or more attributes that allow you to uniquely recognize a specific record. It is possible that each column may not be unique by itself within the database.

هوا PK مكون من اتنين attributes لأن أي واحد فيهم لوحده مش هيضمن الـ uniqueness
بيظهر معايا في الحالات دي:

- لو عندي weak entity
- لو عندي many to many relationship
- لو عندي multi valued attribute
- لو عندي complex attribute

7- Partial Key - The set of attributes that are used to uniquely identify a weak entity set is called the Partial key.

بيكون موجود في الـ Weak entities وبيحتاج PK من جدول الـ Strong Entity عشان مجموعهم مع بعض يديني الـ PKey بتاعها (composite primary key)

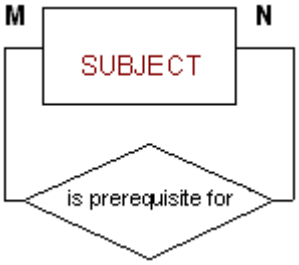
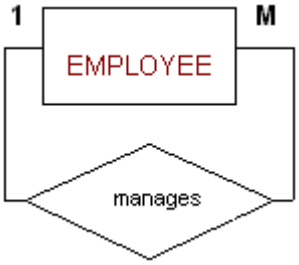
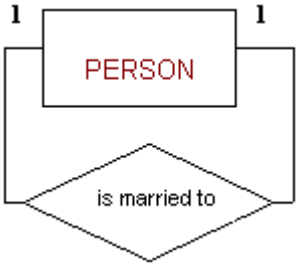
8- Surrogate Key – An artificial key which aims to uniquely identify each record is called a surrogate key. These kinds of key are unique because they are created when you don't have any natural primary key.

ده PK انا بعمله وملوش وجود في الداتا بيز أساسا. بس بحتاجه لما ملاقيش candidate keys
غالبا هيظهر معاك في في الـ Ternary Relationships

9- Natural Key – A key which aims to uniquely identify each record, is found by default in the database, and has a mapping to the real world (e.g., SSN)

ده PK موجود عندي في الداتابيز وله معني في المطلق زي رقم البطاقة

Unary Relationship

M:N unary relationship: A Subject may have many other Subjects as prerequisites and each Subject may be a prerequisite to many other Subjects	1:M unary relationship: An Employee may manage many Employees, but an Employee is managed by only one Employee.	1:1 unary relationship: A Person may be married to only one Person.
		
Subject [SubjectID, SubjectName] **Prerequisites** [SubID, PreID]	**Employee** [EID, MgrID]	**Person** [PID, MarriedTo]

Sql_variant

sql_variant can be used in columns, parameters, variables, and the return values of user-defined functions. **sql_variant** enables these database objects to support values of other data types.

A column of type **sql_variant** may contain rows of different data types. For example, a column defined as **sql_variant** can store **int**, **binary**, and **char** values.

sql_variant can have a maximum length of 8016 bytes. This includes both the base type information and the base type value. The maximum length of the actual base type value is 8,000 bytes.

GUID and UNIQUEIDENTIFIER

GUID is a 16 byte binary SQL Server data type that is globally unique across tables, databases, and servers. The term GUID stands for Globally Unique Identifier and it is used interchangeably with UNIQUEIDENTIFIER.

To create a GUID in SQL Server, the NEWID() function is used as shown below:

```
1  SELECT NEWID()
```

Execute the above line of SQL multiple times and you will see a different value every time. This is because the NEWID() function generates a unique value whenever you execute it.

To declare a variable of type GUID, the keyword used is UNIQUEIDENTIFIER as mentioned in the script below:

```
1 DECLARE @UNI UNIQUEIDENTIFIER
2 SET @UNI = NEWID()
3 SELECT @UNI
```

As mentioned earlier, GUID values are unique across tables, databases, and servers. GUIDs can be considered as global primary keys. Local primary keys are used to uniquely identify records within a table. On the other hand, GUIDs can be used to uniquely identify records across tables, databases, and servers.

Subquery with DML

1- Subquery + Update

```
UPDATE stock
SET unit_price *= 1.15
WHERE unit_price IN (
        SELECT unit_price
        FROM stock
        WHERE unit_price < 75)
```

2- Subquery + Insert

```
INSERT INTO prices (group, id, price)
SELECT 7, articleId, 1.50
FROM article
WHERE name like 'ABC%';
```

Joins with DML

1- Join + Update

عاوز ازود درجات الطلبة اللى عايشين في القاهرة (الدرجات في جدول والعنوان في جدول تاني)

```
UPDATE SC
SET grades *= 1.15
FROM Student S, St_Course SC
WHERE S.Sid = SC.Sid AND S.Address = 'Cairo'
```

2- Joins + Delete

```
DELETE w
FROM WorkRecord2 w INNER JOIN Employee e
 ON EmployeeRun = EmployeeNo
WHERE Company = '1' AND Date = '2013-05-06'
```

3- Joins + Insert

```
INSERT INTO user (id, name, username, opted_in)
 SELECT id, name, username, opted_in
 FROM user LEFT JOIN user_permission AS userPerm
 ON user.id = userPerm.user_id
```

Rank() Function

بتتصرف زي Dense Rank بس الفرق هنا ان في حالة التكرار, الرانك اللى هيجي مش هيبقي التالي على طول زي dense لكن هيكون نفس ترتيبه لو كان مترتب بـ row number ....

مثال أوضح ... أوائل الجمهورية مثلا, لو اتنين طلعوا الأول مكرر وجايبين 410 ... اللى هيبقي جايب 409.5 ده مش هيبقي المركز التاني! لأ هيبقي التالت لأن فيه اتنين جابوا درجة اعلى منه وهكذا

الـ syntax بتاعها هوا هوا بتاع الـ DenseRank مفيش اختلاف غير في الـ behavior

Eid	Ename	Salary	RowNum	D_Rank	Rank
1	Islam	10000	1	1	1
2	Ahmed	10000	2	1	1
3	Ali	10000	3	1	1
4	Mohamed	9000	4	2	4
5	Haifaa	9000	5	2	4
6	Sherin	6000	6	3	6
7	Katy Perry	5000	7	4	7