INTRODUCTION

What is Database?

A relational database is, simply, a database that stores related information across multiple tables and allows you to query information in more than one table at the same time

ADVANTAGES OF DATABASE

1. REDUCING DATA REDUNDANCY

Data redundancy is the repetition or superfluity of data. Data redundancy data is an common issue in computer data storage and database systems. Data redundancy definition. Data redundancy in database means that some data fields are repeated in the database.

ADVANTAGES OF DATABASE

2. CONTROLING DATA INCONSISTENCY

Data inconsistency is a condition that occurs between files when similar data is kept in different formats in two different files, or when matching of data must be done between files. As a result of the data inconsistency, these files duplicate some data such as addresses and names, compromising data integrity.

ADVANTAGES OF DATABASE

3. ENFORCING STANDARDS

DBAs can enforce standards depending on the company's IT policy. For e.g. standards for names, reports, data elements etc.

ADVANTAGES OF DATABASE

4. DATA SECURITY

Database security refers to the collective measures used to protect and secure a database or database management software from illegitimate use and malicious threats and attacks.

ADVANTAGES OF DATABASE

5. DATA SHARING

Company with several locations has important data distributed over a valid geographically area sharing.

A centralized database is physically contained to a single location controlled by a single computer that is Personal computer most function for which databases are created and accomplished more easily

Continued…

ADVANTAGES OF DATABASE

5. DATA SHARING

If the database is centralized and it is easily to update and back up , recovery and control access to a database . If we know database exactly where it is and what's software control it and identify the remote place where it is located.

DATA MODEL

What is Data Model?

Data models define how the logical structure of a database is modelled. Data Models are fundamental entities to introduce abstraction in a DBMS. Data models define how data is connected to each other and how they are processed and stored inside the system.

TYPES OF DATA MODEL

1

RELATIONAL DATA MODEL

2

NETWORK DATA MODEL

3

HIERARCHICAL DATA MODEL

1. RELATIONAL MODEL

Relational data model is the primary data model, which is used widely around the world for data storage and processing. This model is simple and have all the properties and capabilities required to process data with storage efficiency.

RELATIONAL MODEL

1. In the relational model, all data must be stored in relations (tables).

2. Each relation consists of rows and columns. Each relation must have a header and body.

3. The header is simply the list of columns in the relation. The body is the set of data that actually populates the relation, organized into rows.

RELATIONAL MODEL

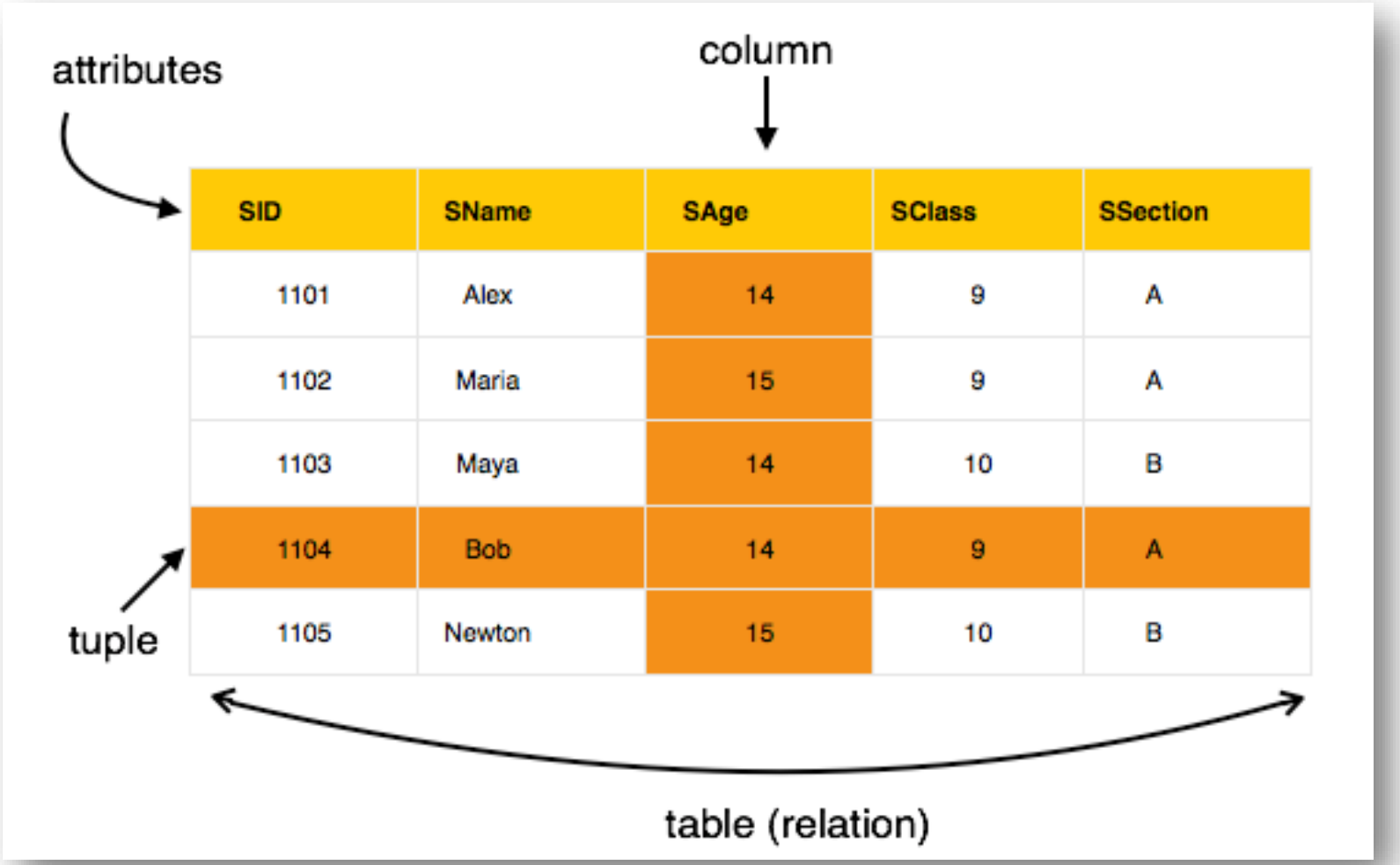
4 The second major characteristic of the relational model is the usage of keys.

5 These are specially designated columns within a relation, used to order data or relate data to other relations.

6 One of the most important keys is the primary key, which is used to uniquely identify each row of data

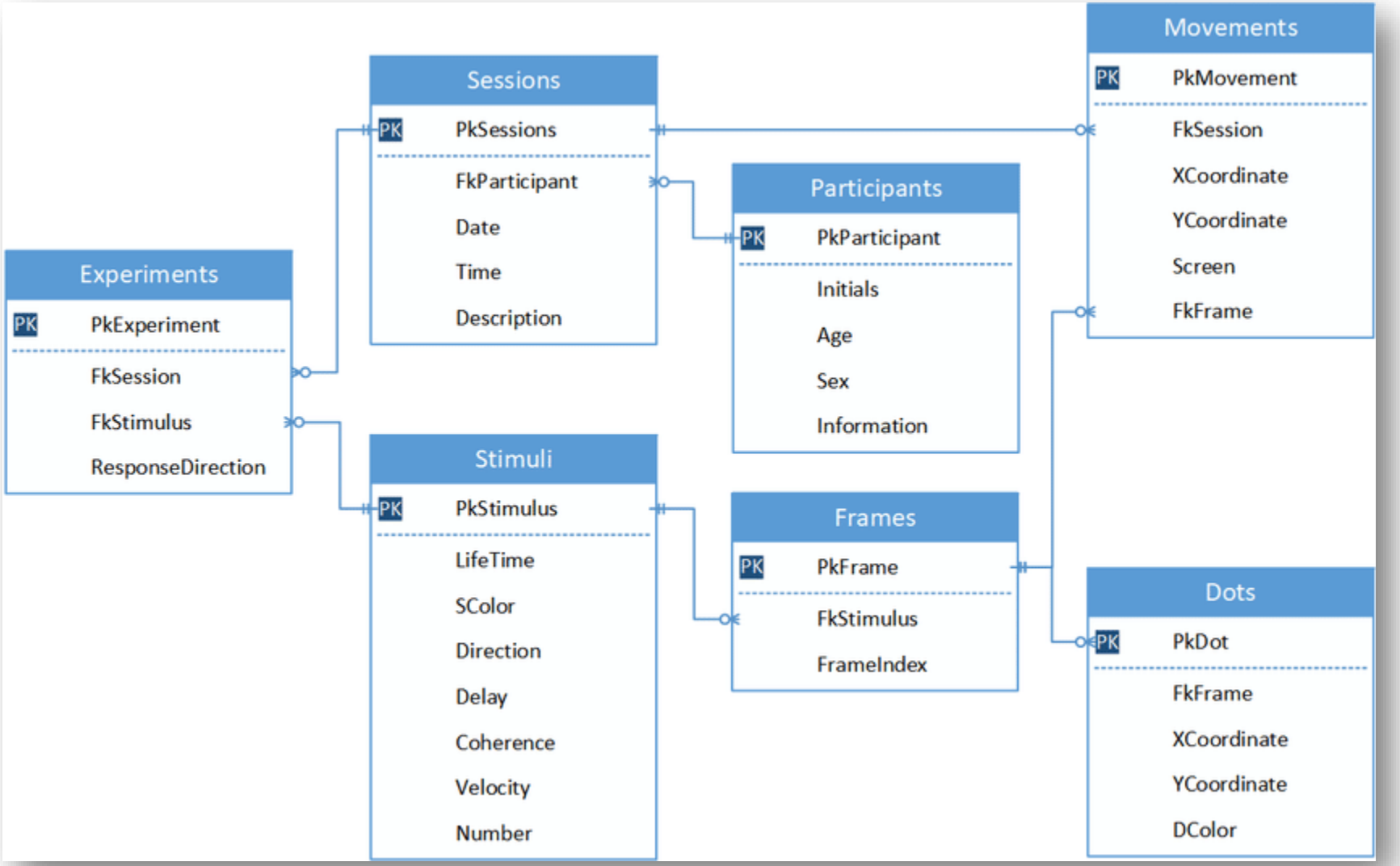
7 Foreign keys relate data in one relation to the primary key of another relation

RELATIONAL MODEL

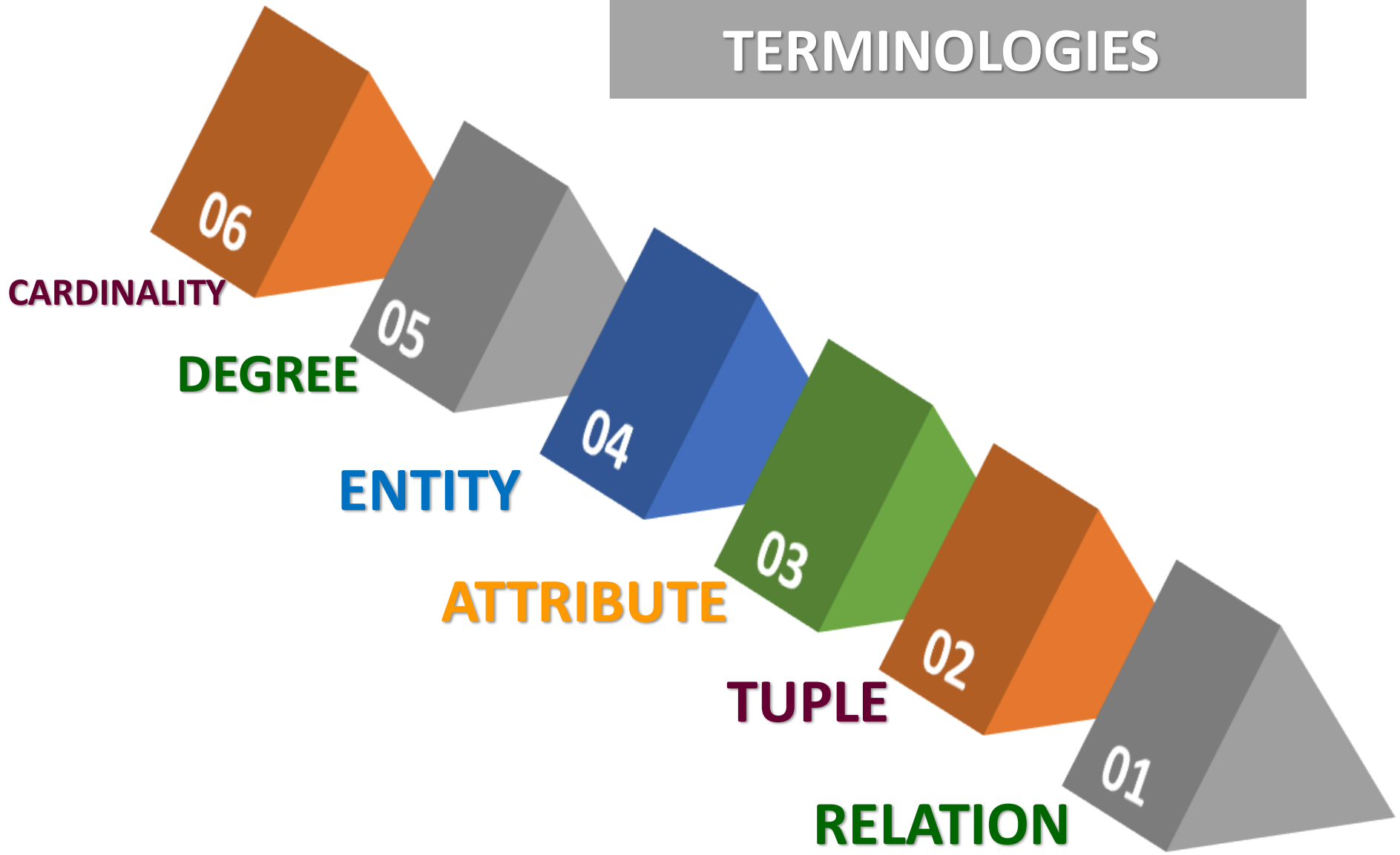


SID	SName	SAge	SClass	SSection
1101	Alex	14	9	A
1102	Maria	15	9	A
1103	Maya	14	10	B
1104	Bob	14	9	A
1105	Newton	15	10	B

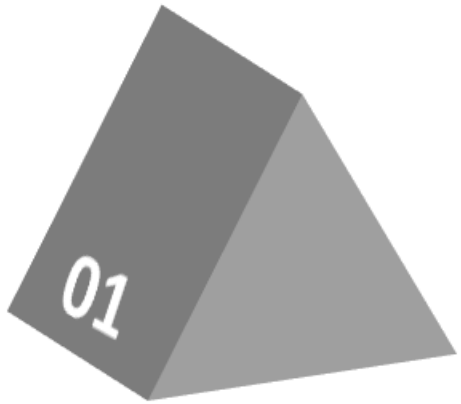
RELATIONAL MODEL



RELATIONAL MODEL TERMINOLOGIES



RELATION



Relation is sometimes used to refer to a table in a relational database but is more commonly used to describe the relationships that can be created between those tables in a relational database.

TUPLE

A table has rows and columns, where rows represents records and columns represent the attributes. Tuple – A single row of a table, which contains a single record for that relation is called a tuple. Relation instance – A finite set of tuples in the relational database system represents relation instance.

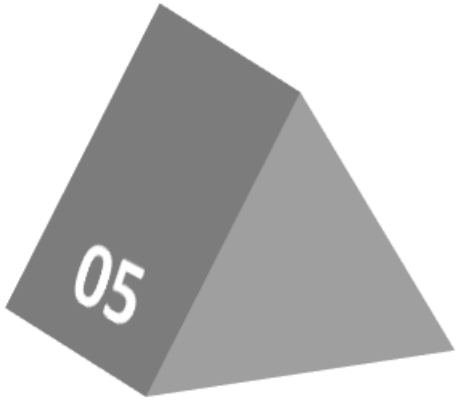
ATTRIBUTE

The columns of table are known as attributes.

ENTITY

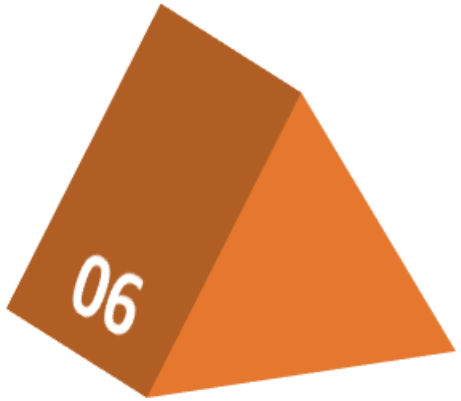
An entity is a real-world object that are represented in database. It can be any object, place, person or class. Data are stored about such entities. In DBMS we store data in the form of table containing information about entity type like students, teachers, employees etc..

DEGREE



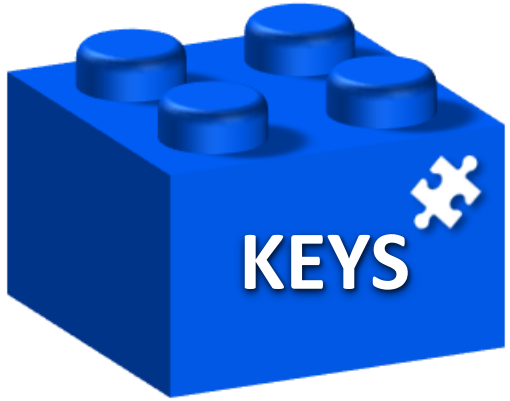
The degree of relationship (also known as cardinality) is the number of occurrences in one entity which are associated (or linked) to the number of occurrences in another.

CARDINALITY



It is also called as Degree of relation Cardinality refers to the relationship between a row of one table and a row of another table. There are three degrees of relationship and they are:-

1. One to One (1:1)
2. One to Many (1:M)
3. Many to Many (M:M)



A key is a field, or combination of fields, in a database table used to retrieve and sort rows in the table based on certain requirements. Keys are defined to speed up access to data and, in many cases, to create links between different tables.

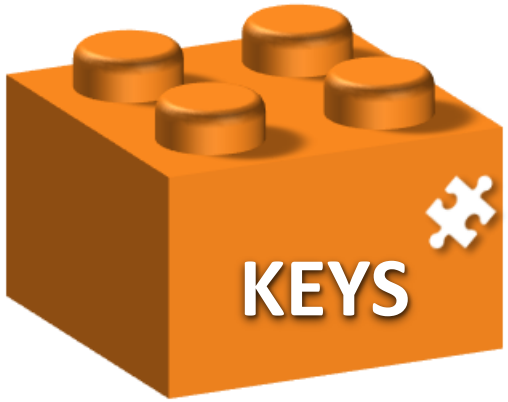
TYPES OF KEYS

Primary Key

A column or group of columns in a table which helps us to uniquely identifies every row in that table is called a primary key. This DBMS can't be a duplicate. The same value can't appear more than once in the table

StudID	Roll No	First Name	LastName
1	11	Rajesh	M
2	12	Mohan	P

Student ID is the Primary Key



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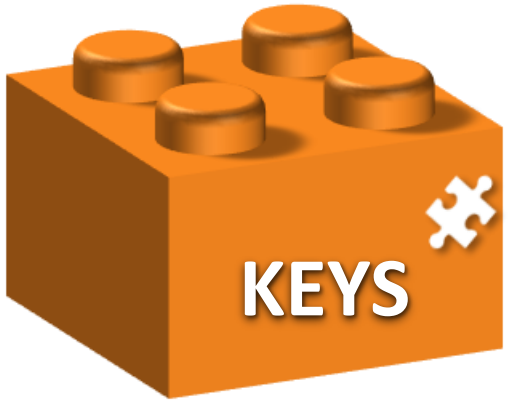
Candidate Key



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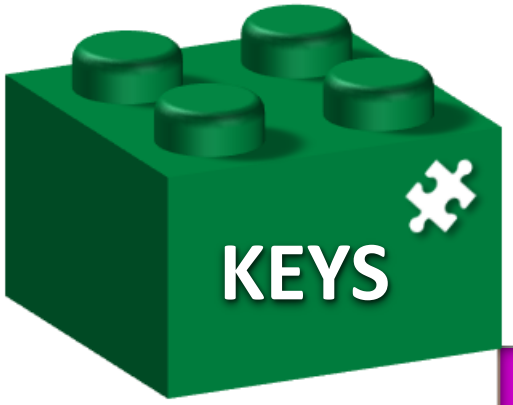
Candidate Key

A super key with no repeated attribute is called candidate key. The Primary key should be selected from the candidate keys. Every table must have at least a single candidate key.

For Example:

Continued…

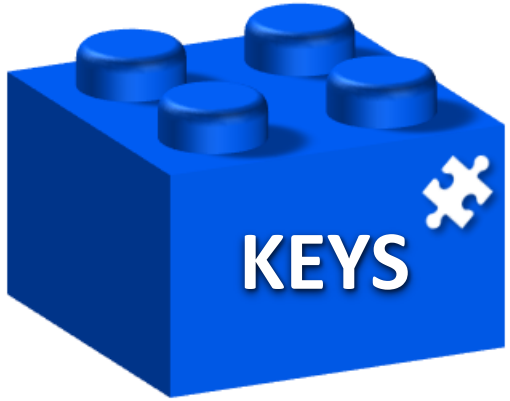


3

Candidate Key

StudID	Roll No	First Name	LastName
1	11	Krishna	M
2	12	James	W
3	13	Bolt	N

Stud ID, Roll No, are candidate keys which help us to uniquely identify the student record in the table



4

Alternate Key

All the keys which are not primary key are called an alternate key. It is a candidate key which is currently not the primary key. However, A table may have single or multiple choices for the primary key.

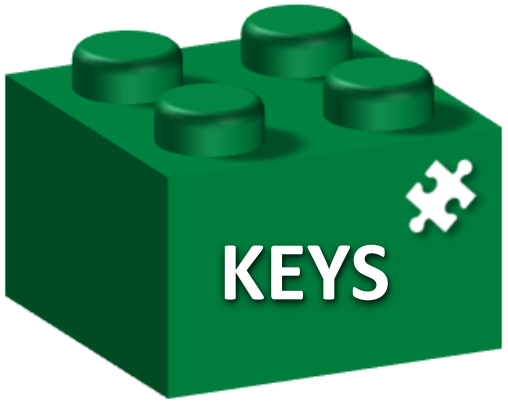
For Example:

Continued…

4 Alternate Key

StudID	Roll No	FName	LName	Email
1	11	Ram	Price	abc@gmail.com
2	12	Azar	Wright	xyz@gmail.com

StudID, Roll No, Email are qualified to become a primary key. But since StudID is the primary key, Roll No, Email becomes the alternative key.



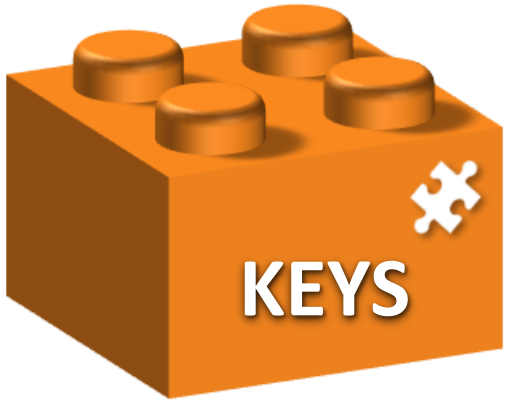
EXAMPLES

Candidate Key

StudID	Roll No	First Name	LastName	Email
1	11	Tom	Price	abc@gmail.com
2	12	Nick	Wright	xyz@gmail.com
3	13	Dana	Natan	mno@yahoo.com

primary Key

Alternate Key



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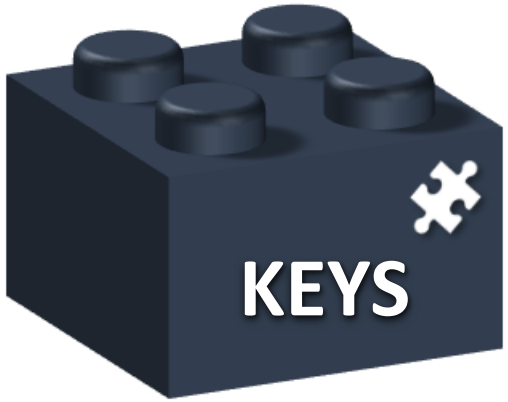
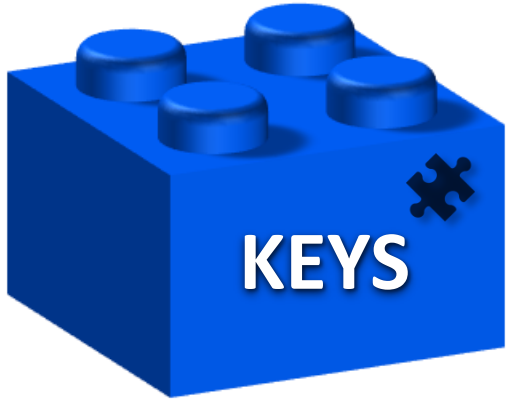
Foreign Key



5

Foreign Key

A foreign key is a column which is added to create a relationship with another table. Foreign keys help us to maintain data integrity and also allows navigation between two different instances of an entity. Every relationship in the model needs to be supported by a foreign key.



5

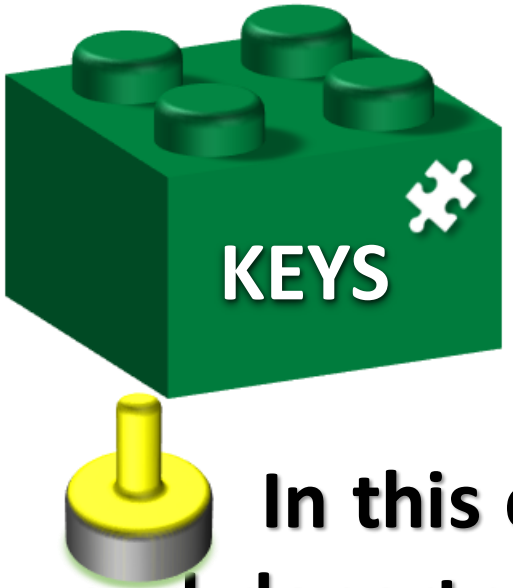
Foreign Key

DEPT TABLE

DeptCode	DeptName
001	Science
002	English
005	Computer

TEACHER TABLE

Teacher ID	Fname	Lname
B002	David	Warner
B017	Sara	Joseph
B009	Mike	Brunton



5 Foreign Key

In this example, we have two table, teach and department in a school. However, there is no way to see which search work in which department.

In this table, adding the foreign key in Deptcode to the Teacher name, we can create a relationship between the two tables.

5

Foreign Key

In this table, adding the foreign key in Deptcode to the Teacher name, we can create a relationship between the two tables.

TEACHER TABLE

Teacher ID	DeptCode	Fname	Lname
B002	002	David	Warner
B017	002	Sara	Joseph
B009	001	Mike	Brunton