RDB&SQL Session 1 (RDB Concepts)

Pear Deck Session
Training Clarusway
Pear Deck - April 23, 2024 at 9:45AM

Part 1 - Summary

Use this space to summarize your thoughts on the lesson

Part 2 - Responses

Slide 1

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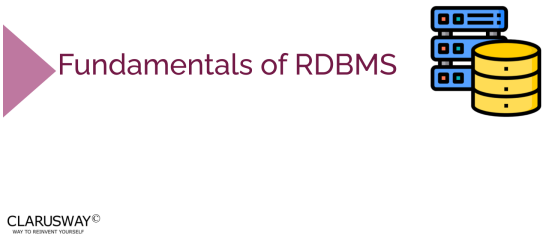
Slide 2



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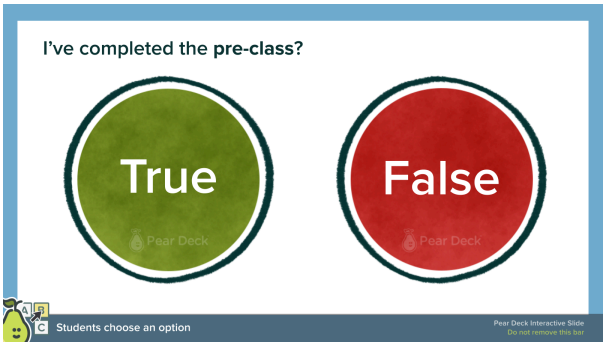
Slide 3	Your Response
	You Chose • **True** Other Choices • False

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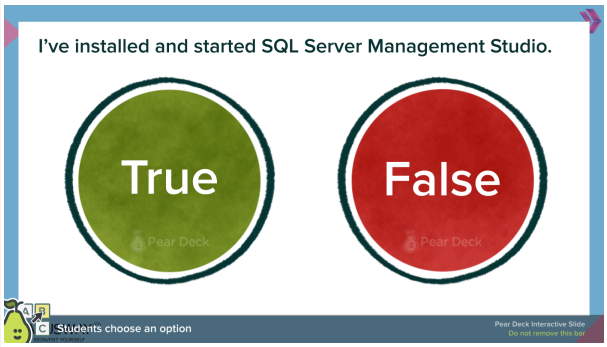
Slide 4	Your Response
 Link(s) on this slide: •	You Chose • **True** Other Choices • False

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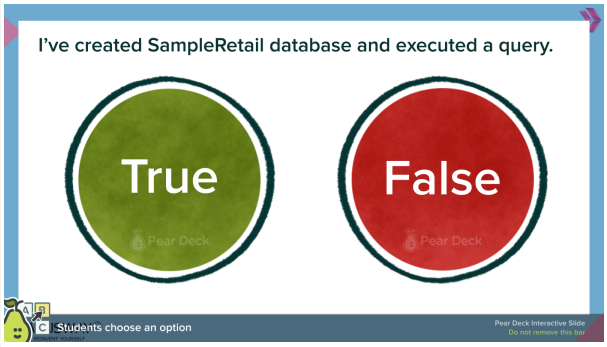
Slide 5	Your Response
 Link(s) on this slide: •	You Chose • **True** Other Choices • False

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- Relational Database Concepts
- ER-Diagram
- Data Types
- Constraints

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Relational Database Concepts

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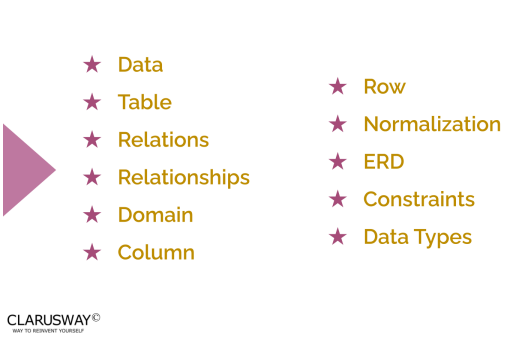

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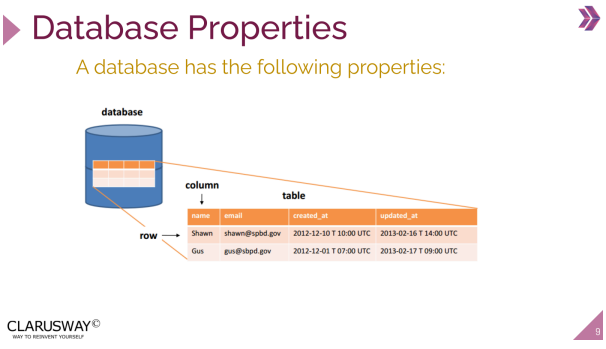

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Data (Structured)

sale.orders

	order_id	customer_id	order_status	order_date	required_date	shipped_date	store_id	staff_id
1	1	259	4	2018-01-01	2018-01-03	2018-01-03	1	2
2	2	1212	4	2018-01-01	2018-01-04	2018-01-03	2	6
3	3	523	4	2018-01-02	2018-01-05	2018-01-03	2	7
4	4	175	4	2018-01-03	2018-01-04	2018-01-05	1	3
5	5	1324	4	2018-01-03	2018-01-06	2018-01-06	2	6
6	6	94	4	2018-01-04	2018-01-07	2018-01-05	2	6
7	7	324	4	2018-01-04	2018-01-07	2018-01-05	2	6
8	8	1204	4	2018-01-04	2018-01-05	2018-01-05	2	7
9	9	60	4	2018-01-05	2018-01-08	2018-01-08	1	2
10	10	442	4	2018-01-05	2018-01-06	2018-01-06	2	6
11	11	1326	4	2018-01-05	2018-01-08	2018-01-07	2	7

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Metadata

A set of data that describes and gives information about data.

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Data vs Metadata

	Name	Owner	Type	Created_datetime
1	orders	dbo	user table	2024-01-10 20:59:31.997

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	order_id	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	customer_id	int	no	4	10	0	yes	(n/a)	(n/a)	NULL
3	order_status	tinyint	no	1	3	0	no	(n/a)	(n/a)	NULL
4	order_date	date	no	3	10	0	no	(n/a)	(n/a)	NULL
5	required_date	date	no	3	10	0	no	(n/a)	(n/a)	NULL
6	shipped_date	date	no	3	10	0	yes	(n/a)	(n/a)	NULL
7	store_id	int	no	4	10	0	no	(n/a)	(n/a)	NULL
8	staff_id	int	no	4	10	0	no	(n/a)	(n/a)	NULL

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Column

The principal storage units are called columns.

column 1 column 2 column 3

sale.orders

	order_id	customer_id	order_status	order_date	required_date	shipped_date	store_id	staff_id
1	1	259	4	2018-01-01	2018-01-03	2018-01-03	1	2
2	2	1212	4	2018-01-01	2018-01-04	2018-01-03	2	6
3	3	523	4	2018-01-02	2018-01-05	2018-01-03	2	7
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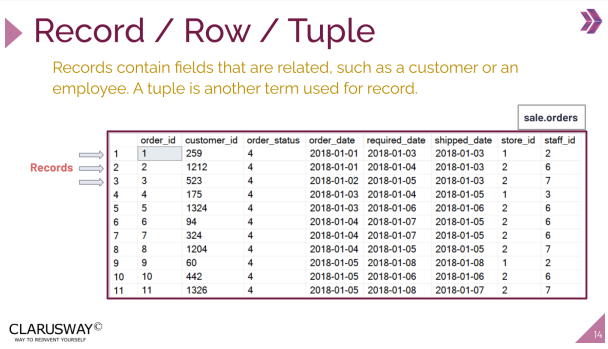

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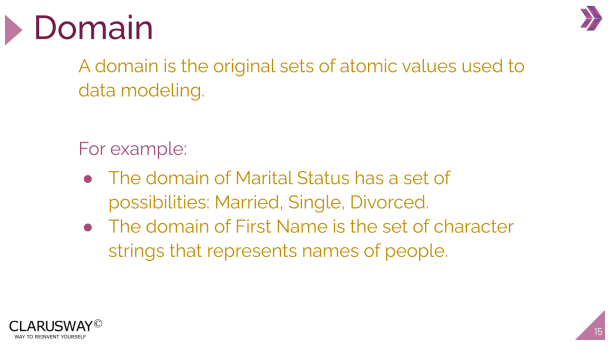

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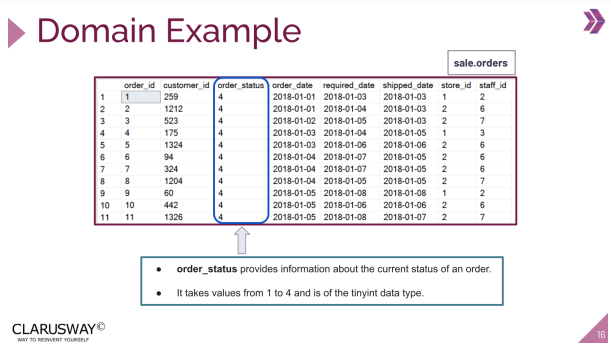

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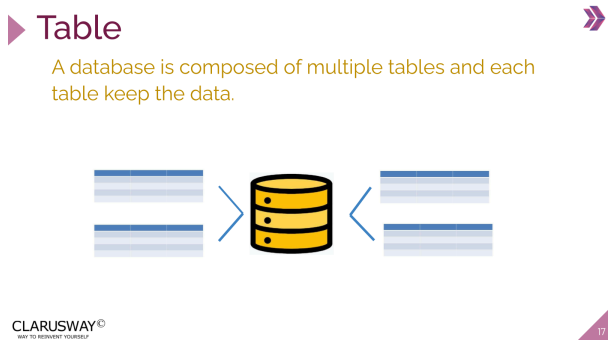

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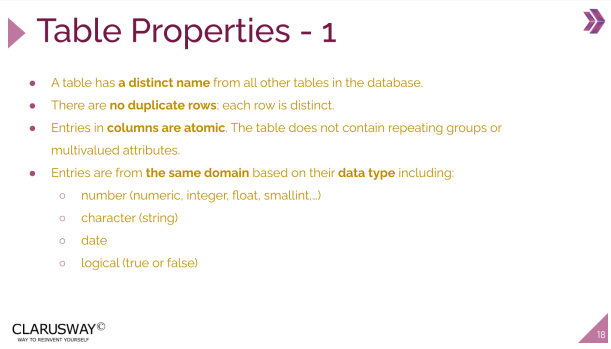

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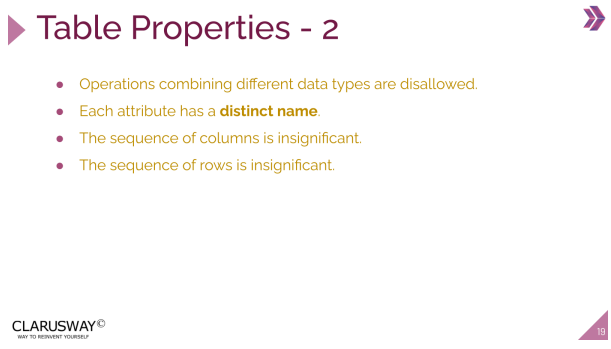

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Relation

A relation, also known as a table or file, is **a subset of the Cartesian product** of a list of domains characterized by a name.

product.stock

	store_id	product_id	quantity
1	1	1	27
2	1	2	5
3	1	3	6
4	1	4	23
5	1	5	22
6	1	6	0
7	1	7	8
8	1	8	0
9	1	9	11
10	1	10	15
11	1	11	8

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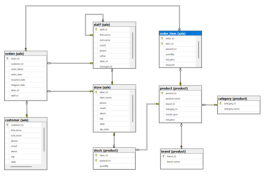
What is Relational Data Model?

The relational data model describes the world as "a collection of **interrelated relations** (or tables)."



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Let's look up Sample Retail DB

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Entity Relationship Diagram

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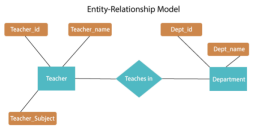
Entity-Relationship Model

- An entity–relationship model (or ER model) describes interrelated things of interest in a specific domain of knowledge.
- A basic ER model is composed of **entity types** (which classify the things of interest) and specifies **relationships** that can exist between entities (instances of those entity types).



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Entity

An entity is **an object** in the real world with an independent existence that can be differentiated from other objects.

An entity might be;

- **physical existence** (e.g., a lecturer, a student, a car)
- **conceptual existence** (e.g., a course, a job, a position)

a student

a course

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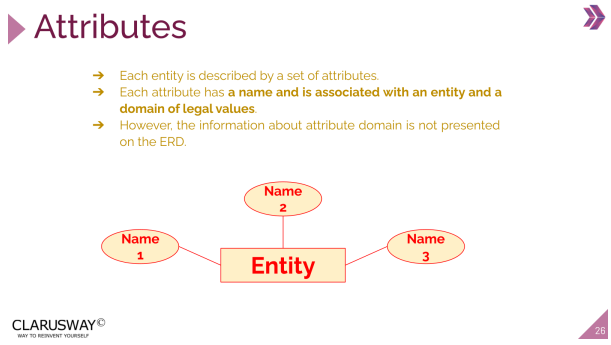

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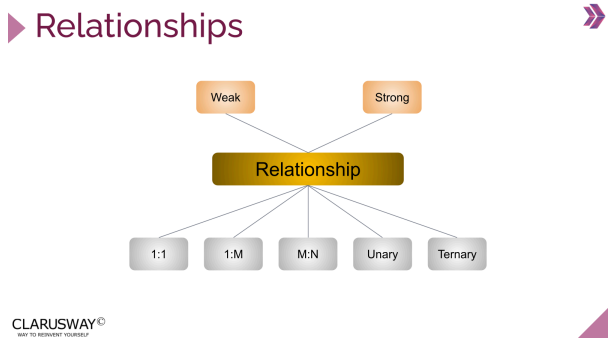

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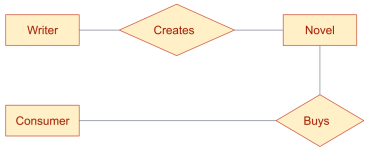
What is ER diagram?

An Entity Relationship Diagram (ERD) is a **visual representation of different entities** within a system and how they **relate to each other**.

For example, the elements **writer**, **novel**, and a **consumer** may be described using ER diagrams the following way:



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ERD Notations

The two of notations most widely used for creating Entity Relationship Diagrams are:

- Chen's notation
- Crow's foot notation

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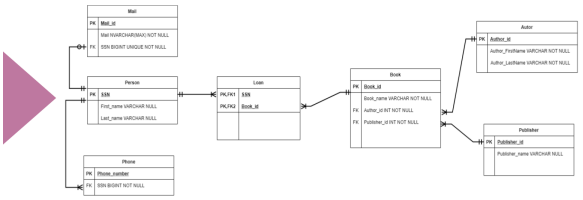

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How to Draw ER Diagrams

draw.io

- **Identify all the entities** in the system. An entity should appear only once in a particular diagram.
- **Identify relationships** between entities. Connect them using a line and add a diamond in the middle describing the relationship.
- **Add attributes** for entities. Give meaningful attribute names so they can be understood easily.

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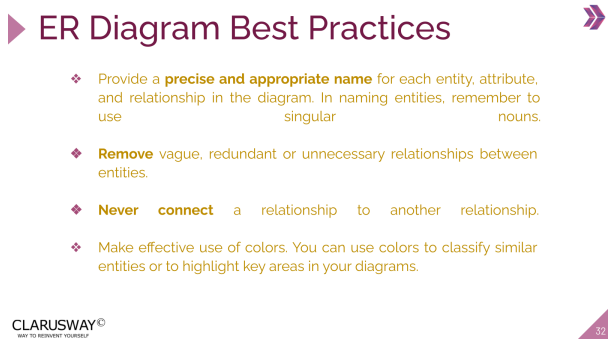

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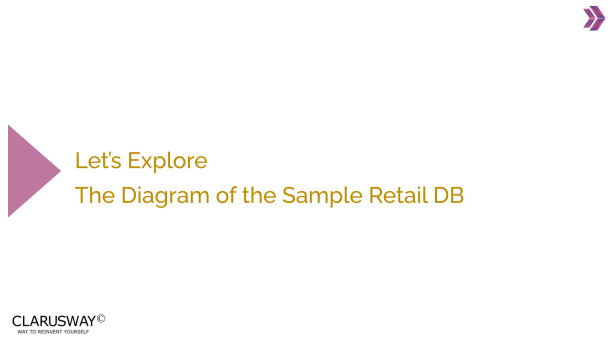

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String Data Types

Data Type	Lower Limit	Upper Limit	Memory
char	0 chars	8000 chars	n bytes
varchar	0 chars	8000 chars	n bytes + 2 bytes
text	0 chars	2.147.483.647 chars	n bytes + 4 bytes
nchar	0 chars	4000 chars	2 times n bytes
nvarchar	0 chars	4000 chars	2 times n bytes + 2 bytes
ntext	0 chars	1.073.741.823 chars	2 times the string length

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Date and Time Data Types

Data Type	Format
time	hh:mm:ss[.nnnnnnn]
date	YYYY-MM-DD
smalldatetime	YYYY-MM-DD hh:mm:ss[.nnn]
datetime	YYYY-MM-DD hh:mm:ss[.nnnnnnn]
datetime2	YYYY-MM-DD hh:mm:ss[.nnnnnnn]
datetimeoffset	YYYY-MM-DD hh:mm:ss[.nnnnnnn] [+|-]hh:mm

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Numeric Data Types

Data Type	Lower Limit	Upper Limit	Memory
Tinyint	0	255	1 bytes
Smallint	-32.000	32.000	2 bytes
Int	-2.000.000.000	2.000.000.000	4 bytes
Bigint	-9,223,372, 036,854,775,808	9,223,372, 036,854,775,808	8 bytes
Decimal (precision,scale)	-10^38+1	10^381-1	5 to 17 bytes
Numeric (precision,scale)	-10^38+1	10^381-1	5 to 17 bytes
Money	-9,223,372, 036,854,775,808	9,223,372, 036,854,775,808	8 bytes
Smallmoney	-214.478,3648	214.478,3648	4 bytes
Float	1 digit	38 digits	4 bytes

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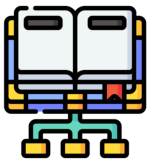
Constraints



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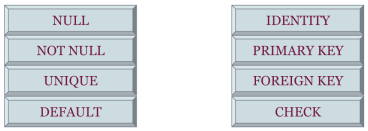
Constraints



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Example

```
USE SW;
CREATE TABLE EMPLOYEES
(EmployeeNo CHAR(10) NOT NULL UNIQUE,
DepartmentName CHAR(30) NOT NULL DEFAULT "Human Resources",
FirstName CHAR(25) NOT NULL,
LastName CHAR(25) NOT NULL,
Category CHAR(20) NOT NULL,
HourlyRate CURRENCY NOT NULL,
TimeCard LOGICAL NOT NULL,
HourlySalaried CHAR(1)NOT NULL,
EmpType CHAR(1) NOT NULL,
Terminated LOGICAL NOT NULL,
ExemptCode CHAR(2) NOT NULL,
Supervisor LOGICAL NOT NULL,
SupervisorName CHAR(50) NOT NULL,
BirthDate DATE NOT NULL,
CollegeDegree CHAR(5) NOT NULL,
CONSTRAINT Employee_PK PRIMARY KEY(EmployeeNo)
);
```

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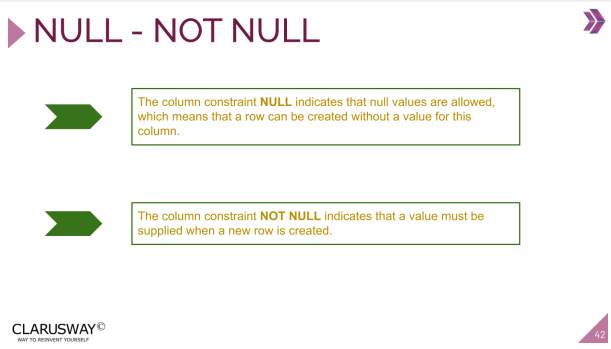

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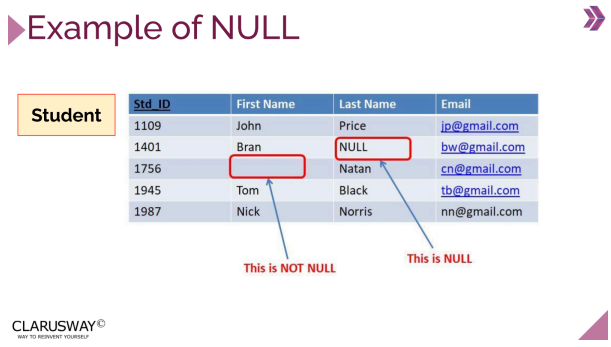

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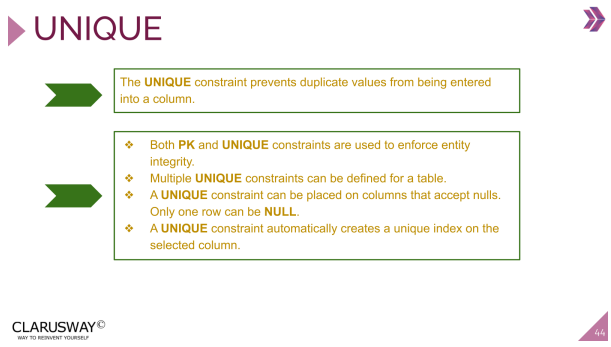

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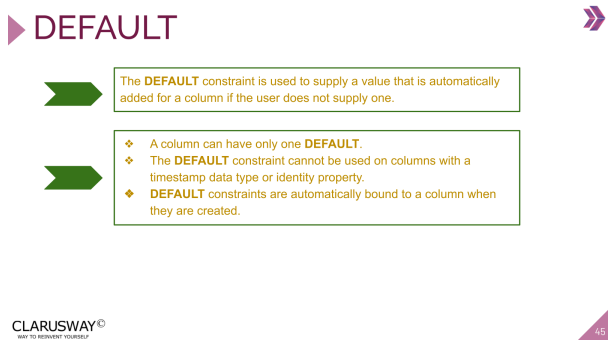

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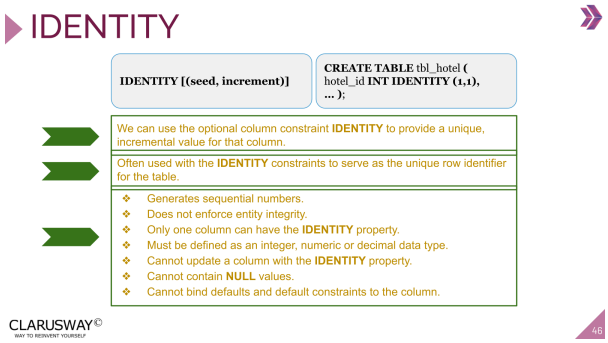

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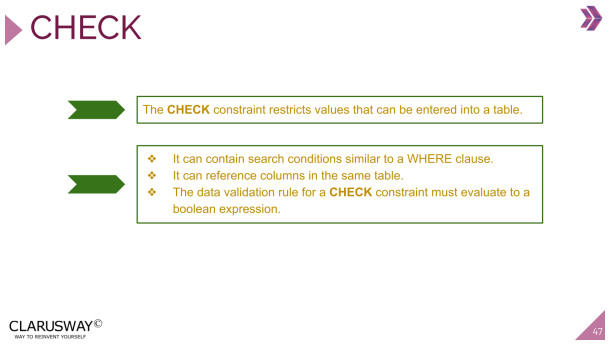

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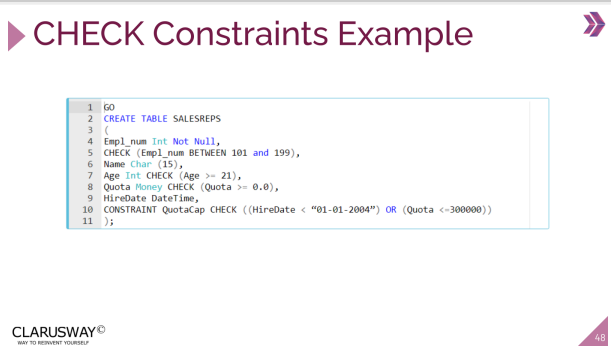

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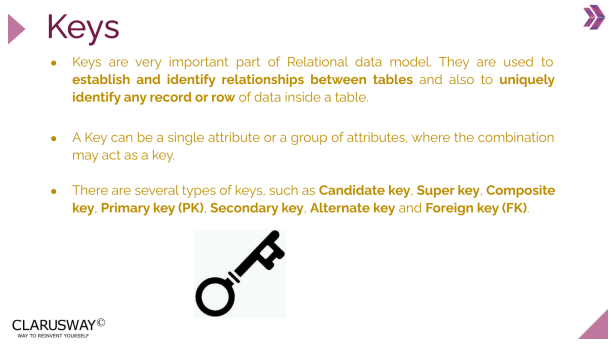

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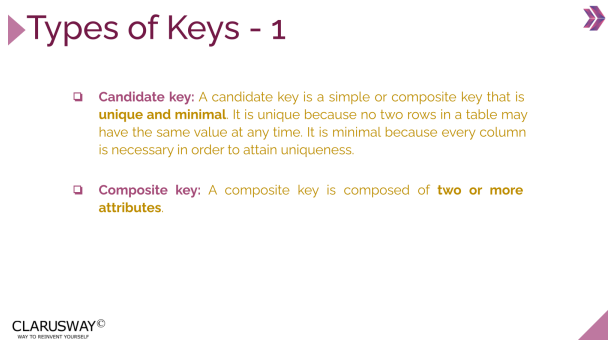

Link(s) on this slide:

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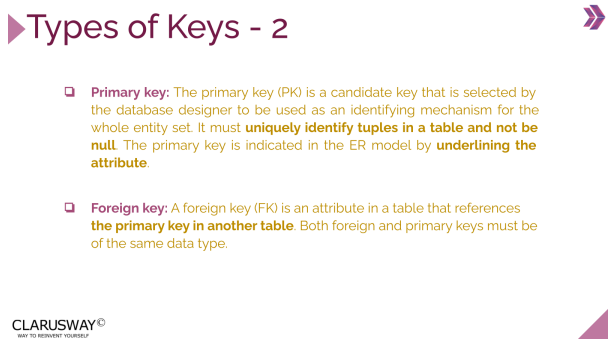
Use this space to take notes:

Slide 52



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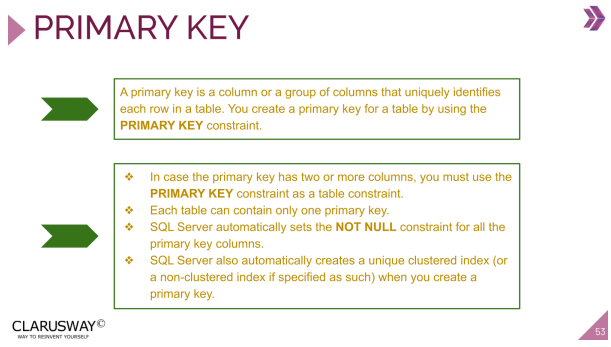
Use this space to take notes:

Slide 53



Link(s) on this slide:

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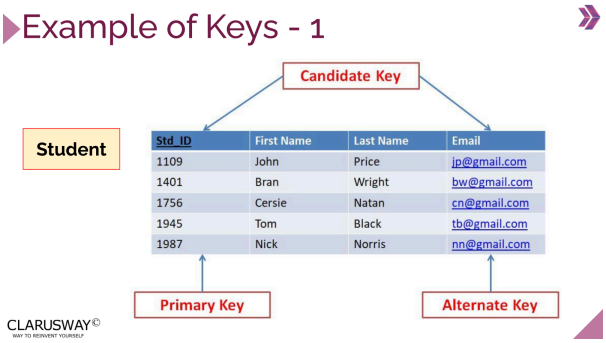
Slide 54



Link(s) on this slide:

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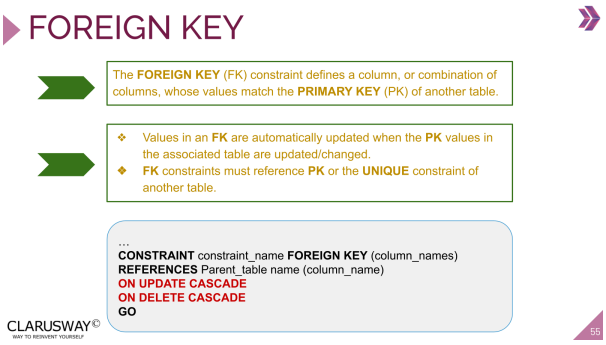
Use this space to take notes:

Slide 55



Link(s) on this slide:

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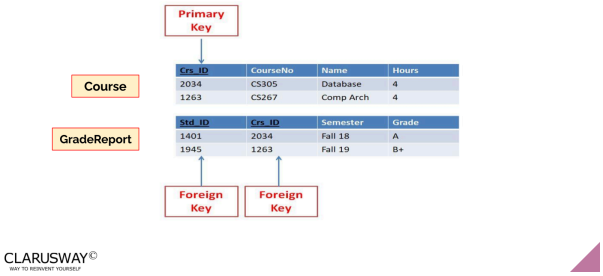
Slide 56

Example of Keys - 2



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Link(s) on this slide:

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Slide 57

Foreign Key Rules

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57

Link(s) on this slide:

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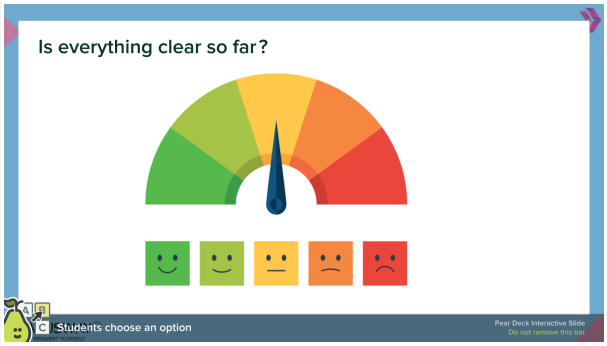
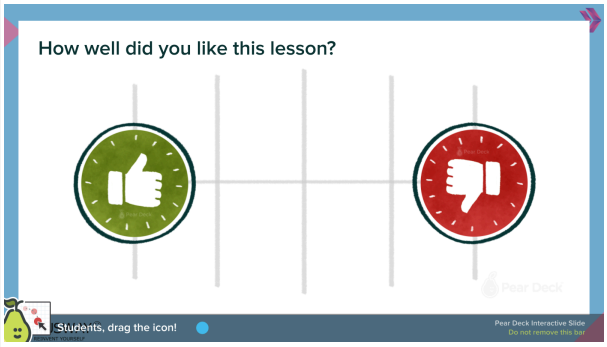
Slide 58	Your Response
 Link(s) on this slide: •	You Chose • **so so** Other Choices • clear • confused

Use this space to take notes:

Slide 59	Your Response
 Link(s) on this slide: •	

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Slide 60

Link(s) on this slide:

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