

MySQL Constraints

A modern conference room with large windows and a long table. The room is empty, with several office chairs arranged around the table. The view outside the windows shows a cityscape. The text "PRIMARY KEY Constraint" is overlaid in the center of the image.

PRIMARY KEY Constraint

PRIMARY KEY Constraint

So far:

PRIMARY KEY Constraint

So far:

- Theory of Relational Databases

PRIMARY KEY Constraint

So far:

- Theory of Relational Databases
- SQL Theory

PRIMARY KEY Constraint

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- Theory of Relational Databases
- SQL Theory
- Creating a Database

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In this section:

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In this section:

- Constraints

PRIMARY KEY Constraint

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In this lesson:

PRIMARY KEY Constraint

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- Constraints

In this lesson:

- the PRIMARY KEY Constraint

PRIMARY KEY Constraint

constraints

specific rules, or limits, that we define in our tables

PRIMARY KEY Constraint

constraints

specific rules, or limits, that we define in our tables

- the role of constraints is to outline the existing relationships between different tables in our database

PRIMARY KEY Constraint

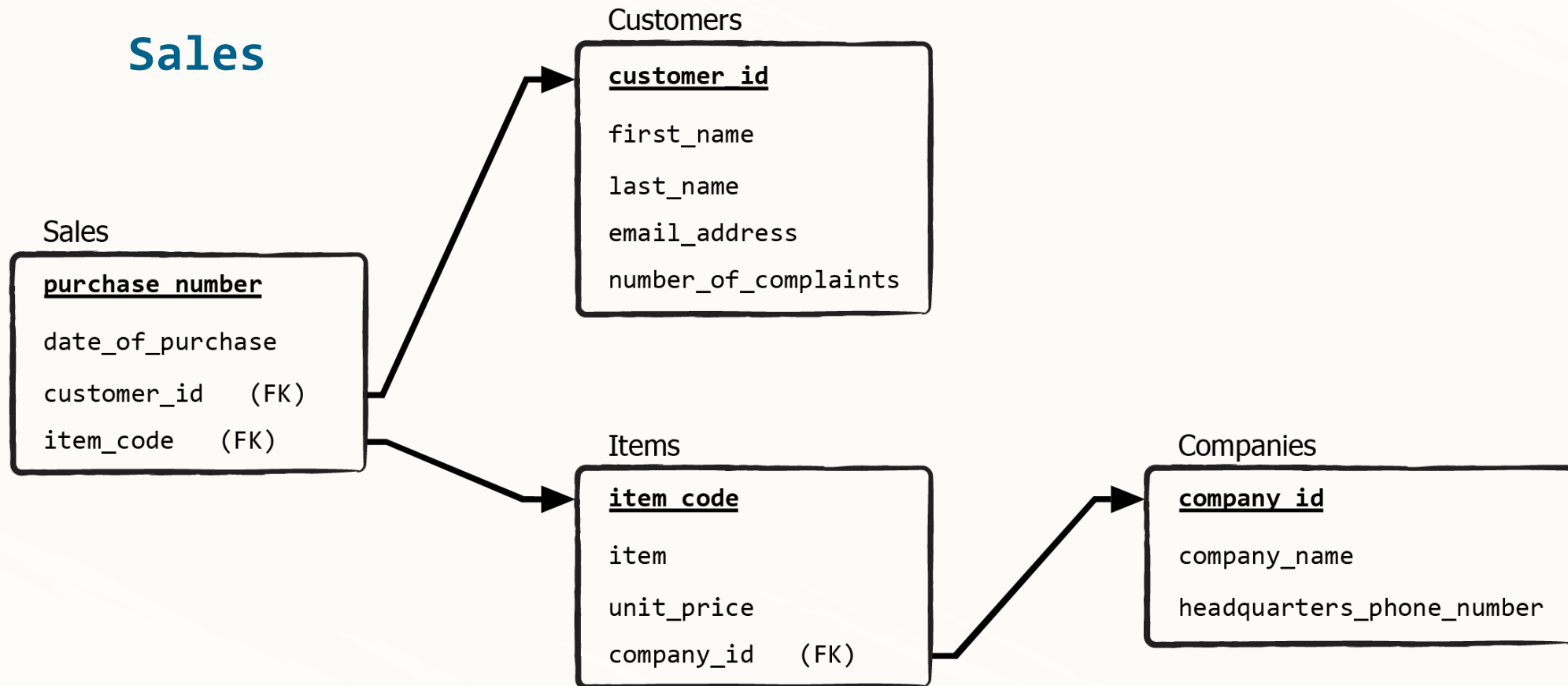
constraints

specific rules, or limits, that we define in our tables

- the role of constraints is to outline the existing relationships between different tables in our database

e.g. **NOT NULL**

PRIMARY KEY Constraint



A modern conference room with large windows and a blue tint. The room features a long table, several chairs, and a laptop on the table. The text "FOREIGN KEY Constraint" is overlaid in the center.

FOREIGN KEY Constraint

FOREIGN KEY Constraint

Sales

Sales

purchase number

date_of_purchase

customer_id (FK)

item_code (FK)

Customers

customer id

first_name

last_name

email_address

number_of_complaints

Items

item code

item

unit_price

company_id (FK)

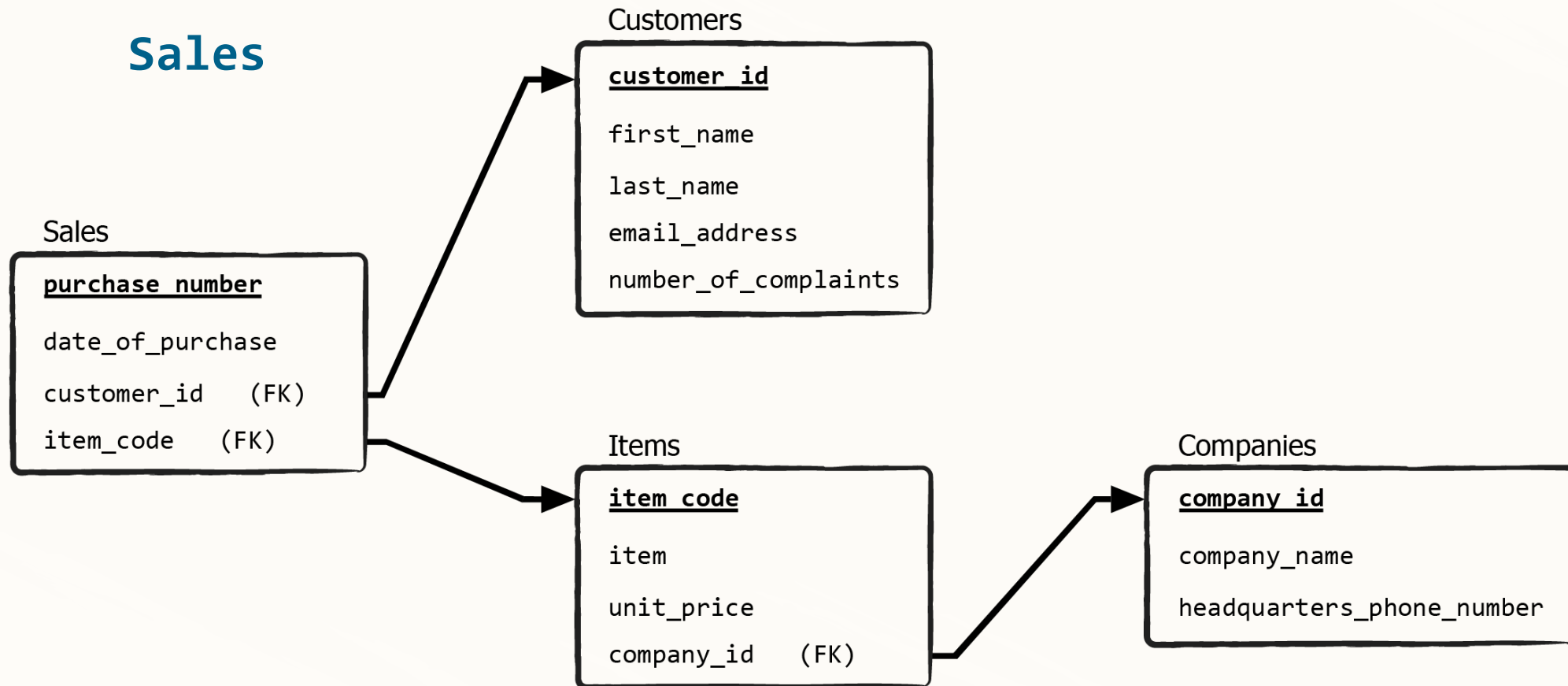
Companies

company id

company_name

headquarters_phone_number

FOREIGN KEY Constraint



FOREIGN KEY Constraint

foreign key

points to a column of another table and, thus, links the two tables

FOREIGN KEY Constraint

Table 1

column_name

Table 2

column_name

FOREIGN KEY Constraint

Table 1

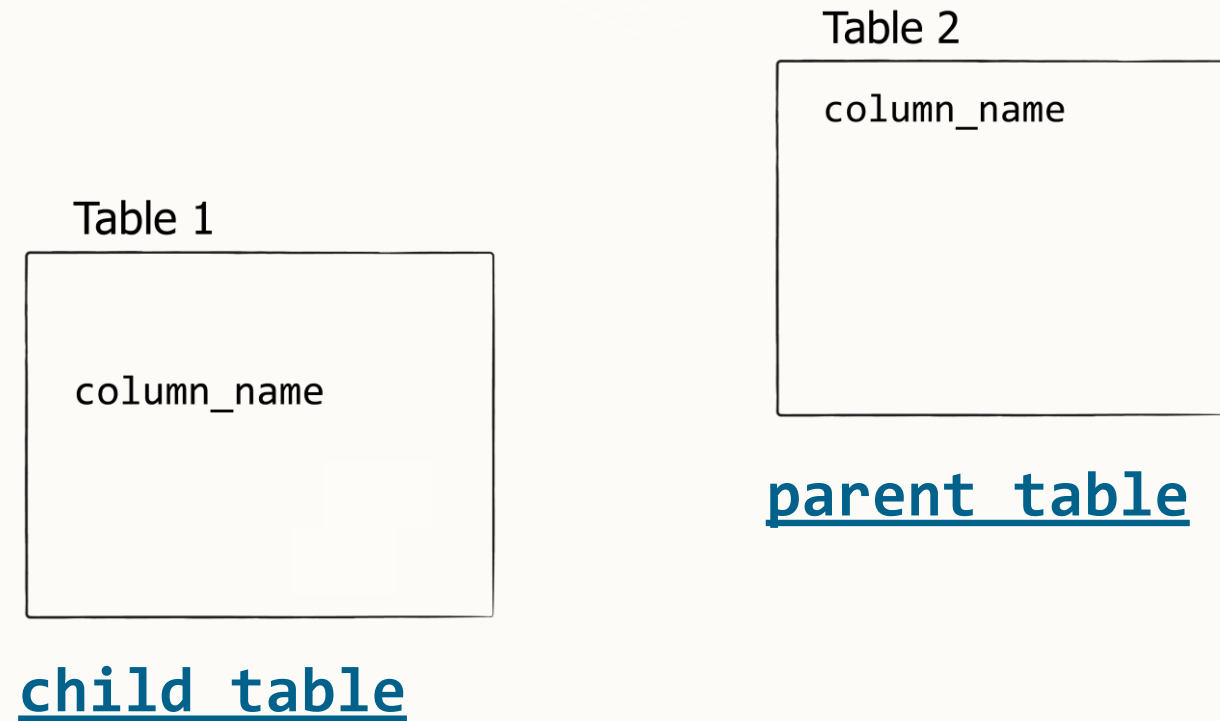
column_name

child table

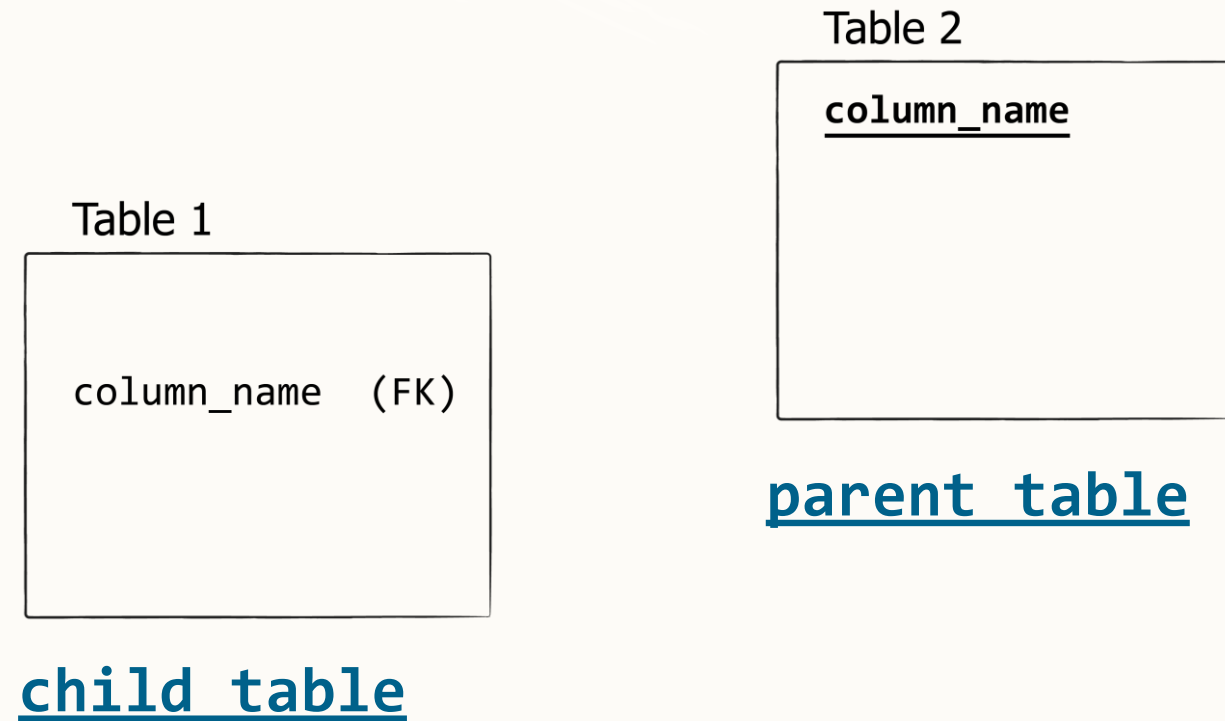
Table 2

column_name

FOREIGN KEY Constraint



FOREIGN KEY Constraint



FOREIGN KEY Constraint

Table 1

column_name (FK)

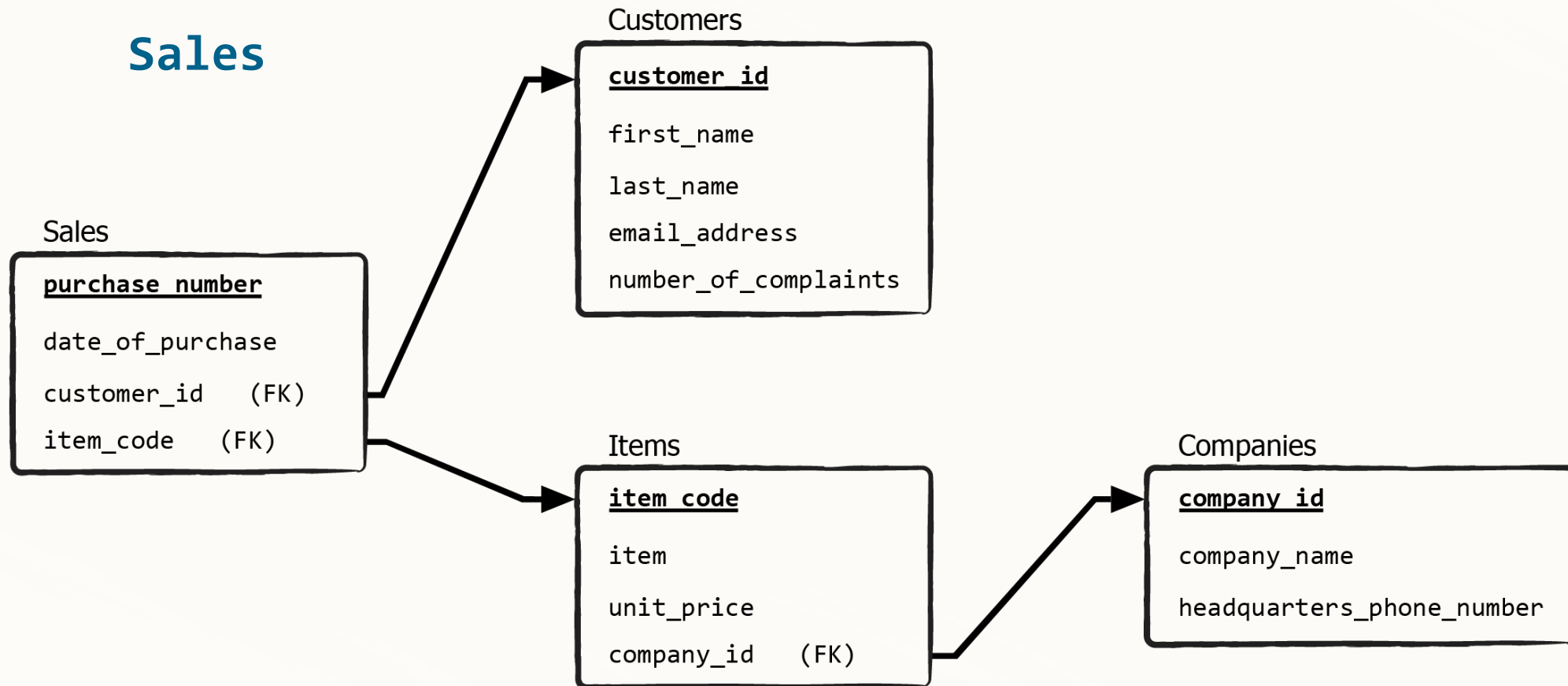
Table 2

column_name

parent table = referenced table

child table = referencing table

FOREIGN KEY Constraint



FOREIGN KEY Constraint

Sales

Sales

purchase number

date_of_purchase

customer_id

item_code

Customers

customer id

first_name

last_name

email_address

number_of_complaints

FOREIGN KEY Constraint

Sales

Sales

purchase number

date_of_purchase

customer_id (FK)

item_code

Customers

customer id

first_name

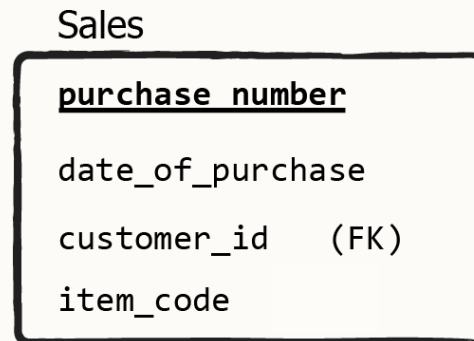
last_name

email_address

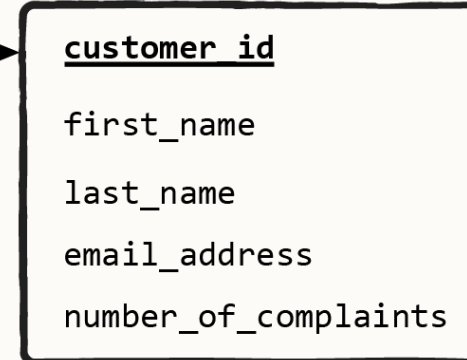
number_of_complaints

FOREIGN KEY Constraint

Sales

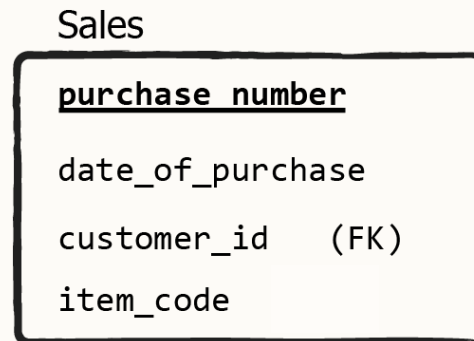


Customers

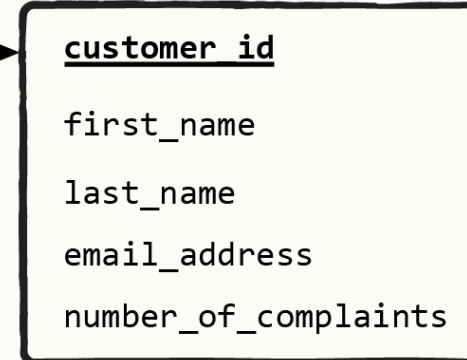


FOREIGN KEY Constraint

Sales



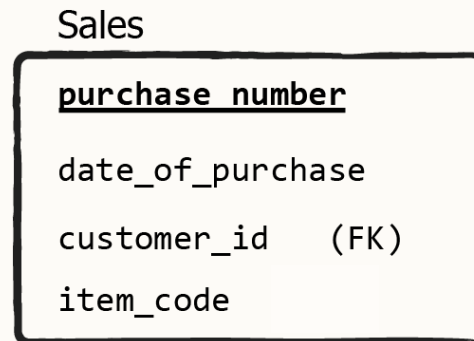
Customers



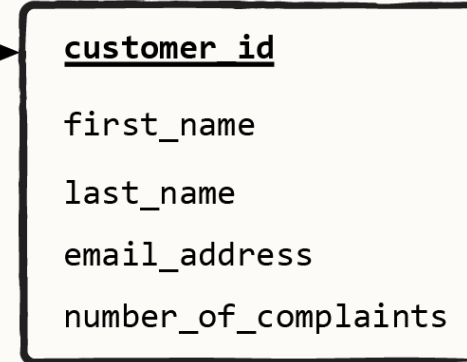
Remember, this is not an obligatory requirement – these two keys may have two completely different names. What's important is that the data types and the information match! It's just common practice to use, if not the same, then similar names for both keys.

FOREIGN KEY Constraint

Sales



Customers



parent table = referenced table

child table = referencing table

FOREIGN KEY Constraint

- a *foreign key* in SQL is defined through a foreign key constraint

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- a *foreign key* in SQL is defined through a foreign key constraint

the foreign key maintains the *referential integrity* within the database

FOREIGN KEY Constraint

● ON DELETE CASCADE

if a specific value *from the parent table's primary key* has been deleted, all the records *from the child table* referring to this value will be removed as well

FOREIGN KEY Constraint

Customers				
customer_id	first_name	last_name	email_address	number_of_complaints
1	John	McKinley	john.mackinley@365careers.com	0
2	Elizabeth	McFarlane	e.mcfarlane@365careers.com	2
3	Kevin	Lawrence	kevin.lawrence@365careers.com	1
4	Catherine	Winnfield	c.winnfield@365careers.com	0

Sales			
purchase_number	date_of_purchase	customer_id	item_code
1	9/3/2016	1	A_1
2	12/2/2016	2	C_1
3	4/15/2017	3	D_1
4	5/24/2017	1	B_2
5	5/25/2017	4	B_2
6	6/6/2017	2	B_1
7	6/10/2017	4	A_2
8	6/13/2017	3	C_1
9	7/20/2017	1	A_1
10	8/11/2017	2	B_1

FOREIGN KEY Constraint

Customers				
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purchase_number	date_of_purchase	customer_id	item_code
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3	4/15/2017	3	D_1
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5	5/25/2017		B_2
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FOREIGN KEY Constraint

Customers				
customer_id	first_name	last_name	email_address	number_of_complaints
1	John	McKinley	john.mackinley@365careers.com	0
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FOREIGN KEY Constraint

Customers				
customer_id	first_name	last_name	email_address	number_of_complaints
1	John	McKinley	john.mackinley@365careers.com	0
2	Elizabeth	McFarlane	e.mcfarlane@365careers.com	2
3	Kevin	Lawrence	kevin.lawrence@365careers.com	1

ON DELETE CASCADE

Sales				
purchase_number	date_of_purchase	customer_id	item_code	
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4	5/24/2017	1	B_2	
6	6/6/2017	2	B_1	
8	6/10/2017	3	C_1	
9	7/20/2017	1	A_1	
10	8/11/2017	2	B_1	

A modern conference room with large windows and a long table. The room is empty, with several chairs arranged around the table. The text "UNIQUE Constraint" is overlaid in the center.

UNIQUE Constraint

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unique key

used whenever you would like to specify that you don't want to see duplicate data in a given field

UNIQUE Constraint

unique key

used whenever you would like to specify that you don't want to see duplicate data in a given field

- ensures that all values in a column (or a set of columns) are different

UNIQUE Constraint

- *unique keys* are implemented in SQL through a constraint - the UNIQUE Constraint

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if you attempt to insert an already existing, duplicate value in the unique column, SQL will display an error

UNIQUE Constraint

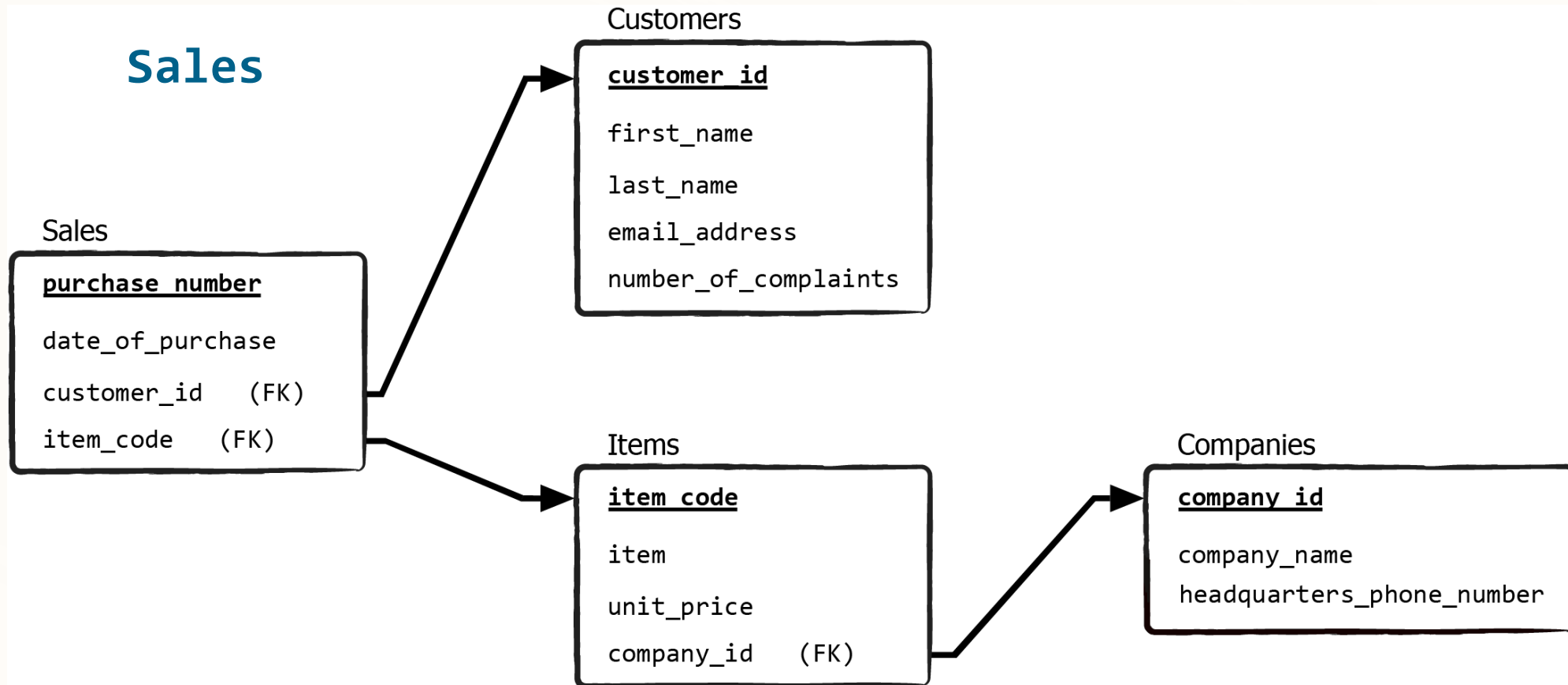
- *unique keys* are implemented in SQL through a constraint - the UNIQUE Constraint

if you attempt to insert an already existing, duplicate value in the unique column, SQL will display an error

A red octagonal sign with rounded corners and a white border, containing the word "ERROR" in white capital letters.

ERROR

UNIQUE Constraint



UNIQUE Constraint

Customers				
customer_id	first_name	last_name	email_address	number_of_complaints
1	John	McKinley	john.mackinley@365careers.com	0
2	Elizabeth	McFarlane	e.mcfarlane@365careers.com	2
3	Kevin	Lawrence	kevin.lawrence@365careers.com	1
4	Catherine	Winnfield	c.winnfield@365careers.com	0

UNIQUE Constraint



Indexes

UNIQUE Constraint

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unique keys in MySQL have the same role as *indexes*

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index of a table

an organizational unit that helps retrieve data more easily

UNIQUE Constraint

● Indexes

unique keys in MySQL have the same role as *indexes*

the reverse isn't true !!!

index of a table

an organizational unit that helps retrieve data more easily

- it takes more time to update a table because indexes must be updated, too, and that's time consuming

UNIQUE Constraint

Customers				
customer_id	first_name	last_name	email_address	number_of_complaints
1	John	McKinley	john.mackinley@365careers.com	0
2	Elizabeth	McFarlane	e.mcfarlane@365careers.com	2
3	Kevin	Lawrence	kevin.lawrence@365careers.com	1
4	Catherine	Winnfield	c.winnfield@365careers.com	0

UNIQUE Constraint



SQL

```
ALTER TABLE table_name  
DROP INDEX unique_key_field;
```

A modern conference room with large windows and a long table. The room is empty, with several chairs arranged around the table. The text "DEFAULT Constraint" is overlaid in the center.

DEFAULT Constraint

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helps us assign a particular default value to every row of a column

DEFAULT Constraint

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helps us assign a particular default value to every row of a column

- a value different from the default can be stored in a field where the DEFAULT constraint has been applied, *only if specifically indicated.*

DEFAULT Constraint

Customers				
customer_id	first_name	last_name	email_address	number_of_complaints
1	John	McKinley	john.mackinley@365careers.com	0
2	Elizabeth	McFarlane	e.mcfarlane@365careers.com	2
3	Kevin	Lawrence	kevin.lawrence@365careers.com	1
4	Catherine	Winnfield	c.winnfield@365careers.com	0

DEFAULT Constraint



SQL

```
CREATE TABLE customers
(
    customer_id INT,
    first_name VARCHAR(255),
    last_name VARCHAR(255),
    email_address VARCHAR(255),
    number_of_complaints INT DEFAULT 0,
    PRIMARY KEY (customer_id)
);
```

DEFAULT Constraint

Customers					
customer_id	first_name	last_name	gender	email_address	number_of_complaints
1	John	McKinley	M	john.mackinley@365careers.com	0

DEFAULT Constraint

Customers					
customer_id	first_name	last_name	gender	email_address	number_of_complaints
1	John	McKinley	M	john.mackinley@365careers.com	0
2					

DEFAULT Constraint

Customers					
customer_id	first_name	last_name	gender	email_address	number_of_complaints
1	John	McKinley	M	john.mackinley@365careers.com	0
2	Peter	Figaro	M		

Data Definition Language

Data Definition Language (DDL)

- CREATE
- ALTER
- DROP

NOT NULL Constraint

NOT NULL Constraint

	primary key	unique key
NULL VALUES	no	yes

NOT NULL Constraint

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the “not null” restriction is applied through the NOT NULL Constraint

NOT NULL Constraint

	primary key	unique key
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the “not null” restriction is applied through the NOT NULL Constraint

- when you insert values in the table, you cannot leave the respective field *empty*

NOT NULL Constraint

	primary key	unique key
NULL VALUES	no	yes

the “not null” restriction is applied through the NOT NULL Constraint

- when you insert values in the table, you cannot leave the respective field *empty*
- if you leave it *empty*, MySQL will signal an error

ERROR

NOT NULL Constraint

Companies		
company_id	headquarters_phone_number	company_name
1	+1 (202) 555-0196	Company A
2	+1 (202) 555-0152	Company B
3	+1 (229) 853-9913	Company C
4	+1 (618) 369-7392	Company D

NOT NULL Constraint

Companies		
company_id	headquarters_phone_number	company_name
1	+1 (202) 555-0196	Company A
2	+1 (202) 555-0152	Company B
3	+1 (229) 853-9913	Company C
4	+1 (618) 369-7392	Company D

NOT NULL

NOT NULL Constraint



SQL

```
CREATE TABLE companies
(
    company_id INT AUTO_INCREMENT,
    headquarters_phone_number VARCHAR(255),
    company_name VARCHAR(255),
    PRIMARY KEY (company_id)
);
```

NOT NULL Constraint



SQL

```
CREATE TABLE companies
(
    company_id INT AUTO_INCREMENT,
    headquarters_phone_number VARCHAR(255),
    company_name VARCHAR(255) NOT NULL,
    PRIMARY KEY (company_id)
);
```

NOT NULL Constraint

- Don't confuse a NULL value with the value of 0 or with a "NONE" response!

Think of a null value as a missing value.

0	NONE	NULL
assigned by the <u>user</u>		assigned by the <u>computer</u>

NOT NULL Constraint

Customers					
customer_id	first_name	last_name	gender	email_address	number_of_complaints
1	John	McKinley	M	john.mackinley@365careers.com	0
2	Elizabeth	McFarlane	F	e.mcfarlane@365careers.com	2
3	Kevin	Lawrence	M	kevin.lawrence@365careers.com	1
4	Catherine	Winnfield	F	c.winnfield@365careers.com	0

~~NULL~~
the value
of 0,
NOT NULL

NOT NULL Constraint

Customers					
customer_id	first_name	last_name	gender	email_address	number_of_complaints
1	John	McKinley	M	john.mackinley@365careers.com	
2	Elizabeth	McFarlane	F	e.mcfarlane@365careers.com	2
3	Kevin	Lawrence	M	kevin.lawrence@365careers.com	1
4	Catherine	Winnfield	F	c.winnfield@365careers.com	0

NULL

NOT NULL Constraint

Customers						
customer_id	first_name	last_name	gender	email_address	number_of_complaints	feedback
1	John	McKinley	M	john.mackinley@365careers.com	0	<i>I think...</i>
2	Elizabeth	McFarlane	F	e.mcfarlane@365careers.com	2	<i>Great service!</i>
3	Kevin	Lawrence	M	kevin.lawrence@365careers.com	1	<i>Great service!</i>
4	Catherine	Winnfield	F	c.winnfield@365careers.com	0	NONE

~~NULL~~

NOT NULL Constraint

Customers						
customer_id	first_name	last_name	gender	email_address	number_of_complaints	feedback
1	John	McKinley	M	john.mackinley@365careers.com	0	<i>I think...</i>
2	Elizabeth	McFarlane	F	e.mcfarlane@365careers.com	2	<i>Great service!</i>
3	Kevin	Lawrence	M	kevin.lawrence@365careers.com	1	<i>Great service!</i>
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NULL