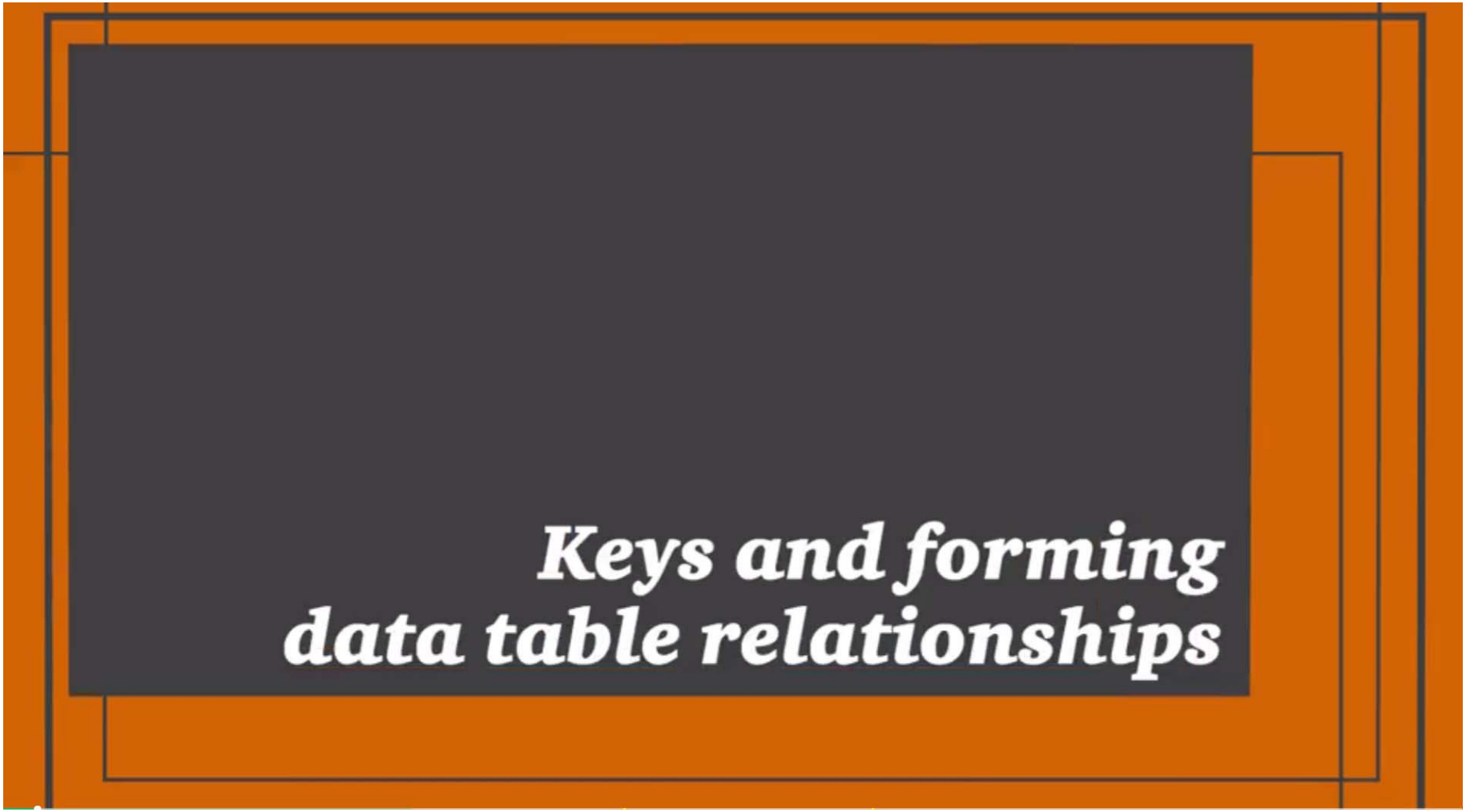
Data visualization with advanced Excel

Keys and forming data table relationships


Keys and forming
data table relationships

Keys and forming data table relationships

- **How the data is stored**
- **The relationships between the data stored in a database**

Keys and forming data table relationships

Architecture of a database:

- **Tables**
- **Rows**
- **Functions**
- **Columns**

Keys and forming data table relationships

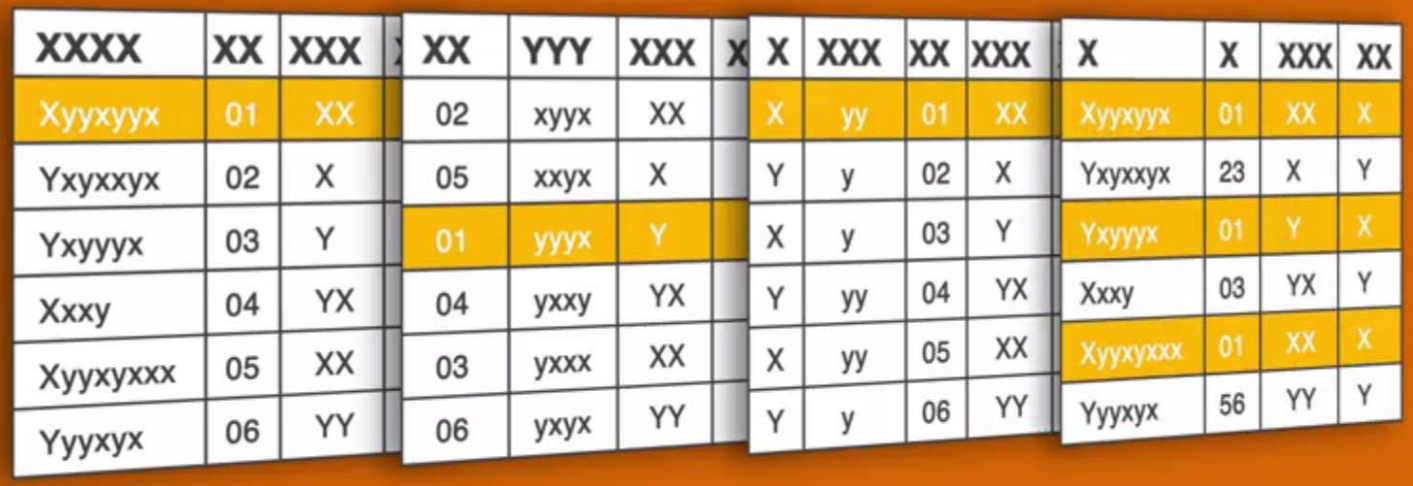
Tables

What are tables and how are they used within a relational database?

A table is used to store data within a database and should be thought of as a dataset.

Keys and forming data table relationships

Tables



XXXX	XX	XXX
Xyyxyyx	01	XX
Yxyxxyx	02	X
Yxyyyx	03	Y
Xxxy	04	YX
Xyyxyxxx	05	XX
Yyyxyx	06	YY

XX	YYY	XXX
02	xyyx	XX
05	xxyx	X
01	yyyx	Y
04	yxxy	YX
03	yxxx	XX
06	yxyx	YY

X	XXX	XX	XXX
X	yy	01	XX
Y	y	02	X
X	y	03	Y
Y	yy	04	YX
X	yy	05	XX
Y	y	06	YY

X	X	XXX	XX
Xyyxyyx	01	XX	X
Yxyxxyx	23	X	Y
Yxyyyx	01	Y	X
Xxxy	03	YX	Y
Xyyxyxxx	01	XX	X
Yyyxyx	56	YY	Y

Keys and forming data table relationships

Rows

What is a row and what is its function within a relational database?

A row is an entry of data into a table.

Keys and forming data table relationships

Rows

XXXX	XX	XXX	XX
Xyyxyyx	01	XX	X
Yxyxxyx	02	X	Y
Yxyyyx	03	Y	X
Xxxy	04	YX	Y
Xyyxyxxx	05	XX	X
Yyyxyx	06	YY	Y

XXXX	XX	XXX	XX
Xyyxyyx	01	XX	X
Yxyxxyx	02	X	Y
Yxyyyx	03	Y	X
Xxxy	04	YX	Y
Xyyxyxxx	05	XX	X
Yyyxyx	06	YY	Y

X	XXX	XX	XXX	XX
X	yy	01	XX	Xy
Y	y	02	X	Yx
X	y	03	Y	Yx
Y	yy	04	YX	Xx
X	yy	05	XX	Xy
Y	y	06	YY	Yy

Keys and forming data table relationships

Rows

XXXX	XX	XXX	XX
Xyyxyyx	01	XX	X
Yxyxxyx	02	X	Y
Yxyyyx	03	Y	X
Xxxy	04	YX	Y
Xyyxyxxx	05	XX	X
Yyyxyx	06	YY	Y

Keys and forming data table relationships

Rows

XXXX	XX	XXX	XX
Xyyxyyx	01	XX	X
Yxyxxyx	02	X	Y
Yxyyyx	03	Y	X
Xxxy	04	YX	Y
Xyyxyxxx	05	XX	X
Yyyxyx	06	YY	Y

XXXX	XX	XX	X
Yyxyyx	01	y	0
Xyxxx	02	y	0
Yyyyyyx	03	y	2
Xxxy	04	y	3
Xxxxyxxx	05	x	1
Xyxxxyx	06	x	0

Keys and forming data table relationships

Columns

What is a column and what is its function within a relational database?

A column is an element within a row. In the table setup, the column dictates what type of information is stored within all rows within the table.

Keys and forming data table relationships

Columns

HOSPITAL PATIENT DATA

NAME	AGE	ADDRESS
Robert Murphy	24	153 North Hill Field Road San Pedro, CA 90731
Anna Kowalsky	67	379 Lawrence Dr. Lynwood, CA 90262
Samantha Baker	85	1 West Woodsman Ave. Carmichael, CA 95608
Kevin Smith	34	8077 Cherry St. Hawthorne, CA 90250

Keys and forming data table relationships

Databases ➡ **Tables** ➡ **Rows** ➡ **Columns**
(attributes)

Keys and forming data table relationships

CUSTOMER ID	DATE	FIRST NAME	LAST NAME	ITEM PURCHASED	AMOUNT
CI12345	10/4/16	Robert	Murphy	Soft Drink	$2.61
CI67890	10/4/16	Anna	Kowalsky	Toothpaste	$4.17
CI13579	10/5/16	Samantha	Baker	Protein Bar	$3.06
CI24680	10/5/16	Kevin	Smith	Bread	$4.50

Keys and forming data table relationships

CUSTOMER ID	DATE	FIRST NAME	LAST NAME	ITEM PURCHASED	AMOUNT
CI12345	10/4/16	Robert	Murphy	Soft Drink	$2.61
CI67890	10/4/16	Anna	Kowalsky	Toothpaste	$4.17
CI13579	10/5/16	Samantha	Baker	Protein Bar	$3.06
CI24680	10/5/16	Kevin	Smith	Bread	$4.50

Keys and forming data table relationships

Keys

- **We use keys to establish the relationships**

Keys and forming data table relationships

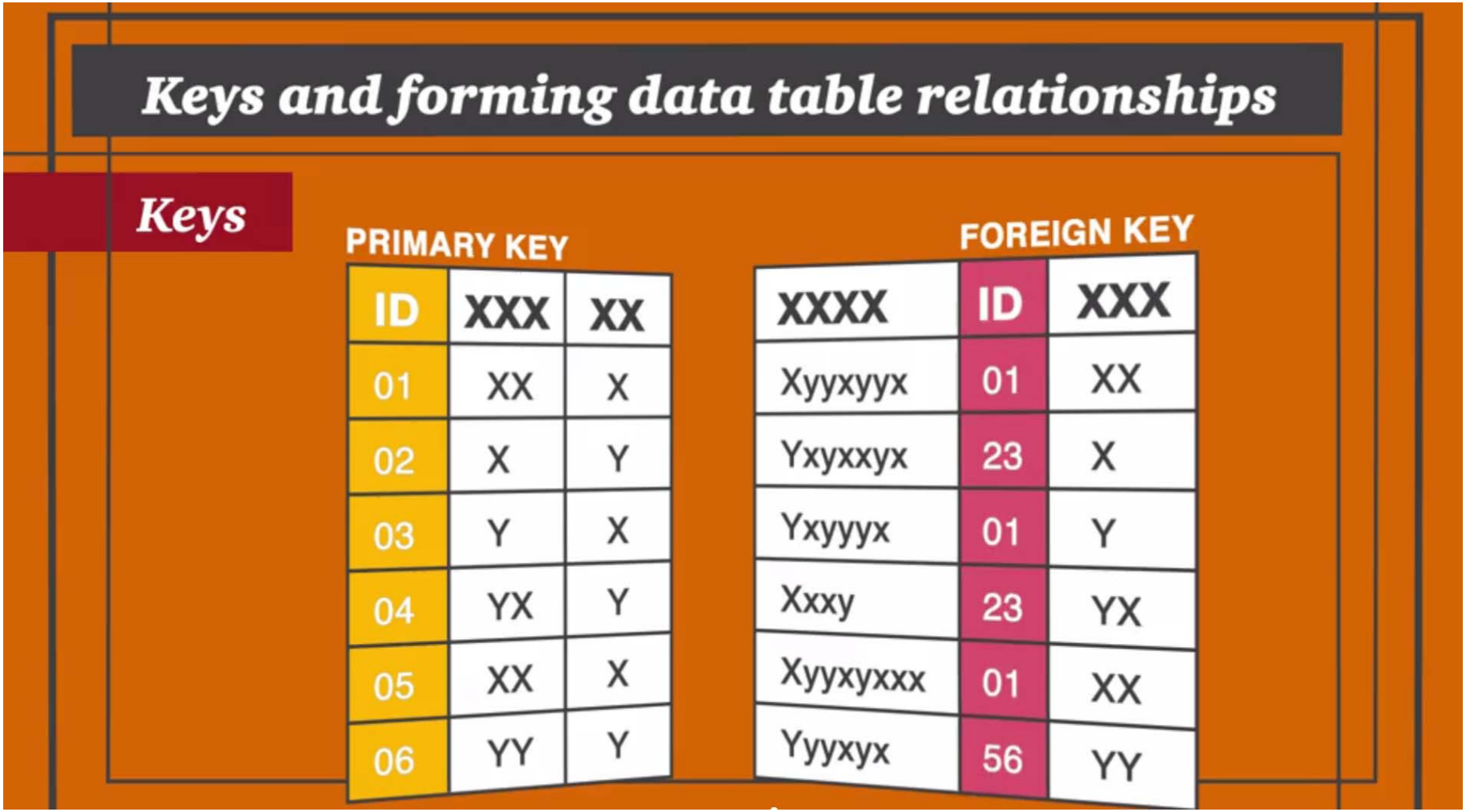
Keys

- **We use keys to establish the relationships**
- **Unlock further information about a matching key within a new table**
- **Two types of keys to unlock these relationships: primary keys and foreign keys**

Keys and forming data table relationships

Keys

Primary key is an attribute that mandates a value will be unique throughout the entire table.


Keys and forming data table relationships
Keys
PRIMARY KEY
ID XXX XX
01 XX X
02 X Y
03 Y X
04 YX Y
05 XX X
06 YY Y
FOREIGN KEY
XXXX ID XXX
Xyyxyyx 01 XX
Yxyxxyx 23 X
Yxyyyx 01 Y
Xxxy 23 YX
Xyyxyxxx 01 XX
Yyyxyx 56 YY

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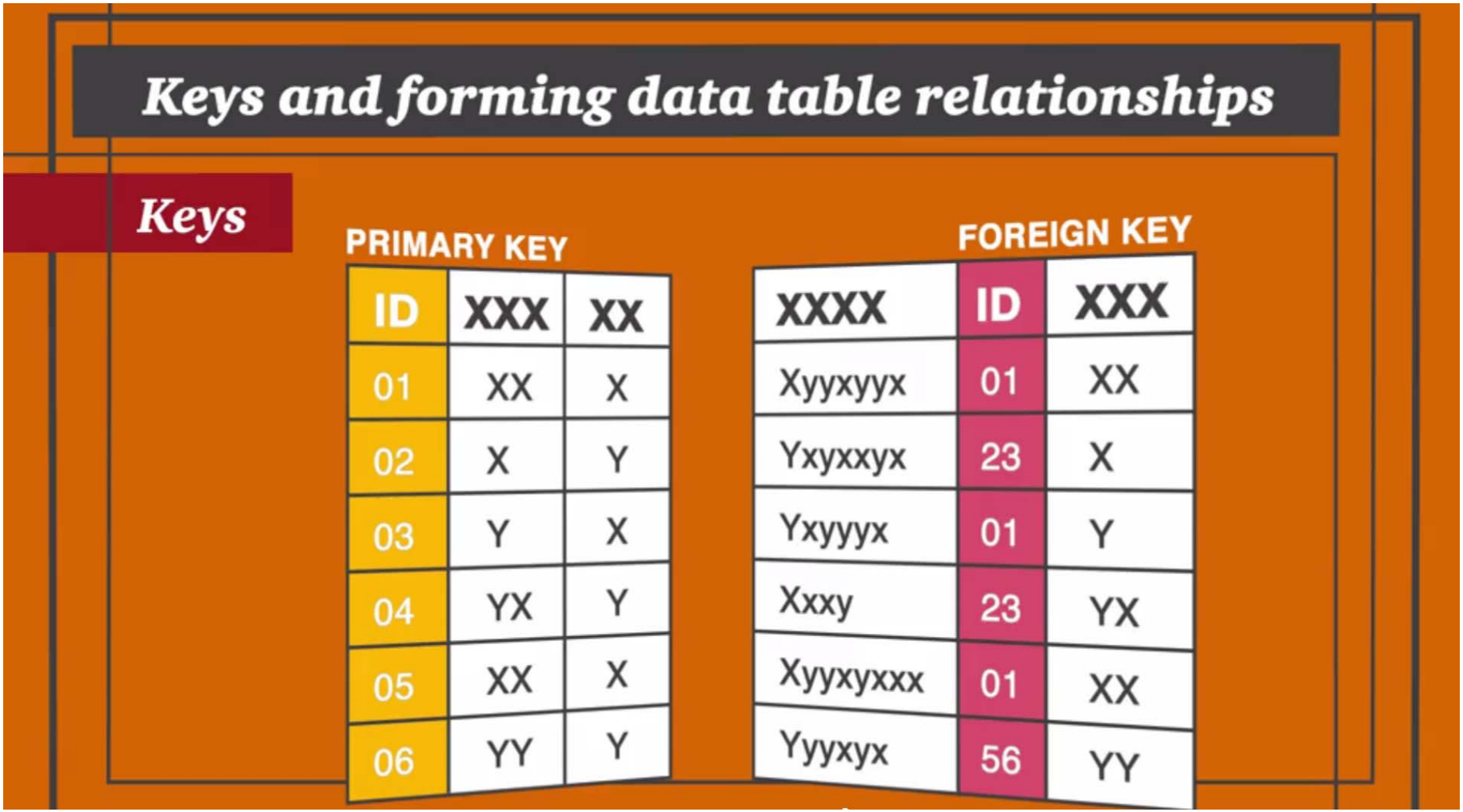
Keys and forming data table relationships

Keys

A foreign key is an attribute within a table that provides a link between data in two tables.


Keys and forming data table relationships
Keys
PRIMARY KEY
ID XXX XX
01 XX X
02 X Y
03 Y X
04 YX Y
05 XX X
06 YY Y
FOREIGN KEY
XXXX ID XXX
Xyyxyyx 01 XX
Yxyxxyx 23 X
Yxyyyx 01 Y
Xxxy 23 YX
Xyyxyxxx 01 XX
Yyyxyx 56 YY

Keys and forming data table relationships

Keys

Flight ID	Route ID	Aircraft ID	Month	Year	Flight Time	Occ Seats	Fares
9	ORD-ATL	1012	1	2015	6:15	158	20382
103	ORD-LAX	987	1	2015	7:30	175	15750
16	ORD-DFW	456	1	2015	7:42	139	21823
7	ORD-JFK	125	1	2015	8:05	160	32000

Keys and forming data table relationships

Keys

There are three main types of relationships:

- **1 to 1 or 1 : 1**

For each key (foreign or primary) we would expect one match in another table.

Keys and forming data table relationships

Keys

There are three main types of relationships:

- **1 to 1 or 1 : 1**

Driver	ID#
John	01
Peter	02
Cindy	03

Vehicle license	ID#
5348908	01
9348450	02
2349824	03

Keys and forming data table relationships

Keys

There are three main types of relationships:

- **1 to many or 1:many**

For each value identified in one table, you may find multiple values in another table.

Keys and forming data table relationships

Keys

There are three main types of relationships:

- **1 to many or 1:many**

Driver	ID#
John	01
Peter	02
Cindy	03

Vehicle license	ID#
5348908	01
9348450	01
2349824	03

Keys and forming data table relationships

Keys

There are three main types of relationships:

- **Many to many or many : many**

Neither of the keys can be primary keys as both sets have multiple matches.

Keys and forming data table relationships

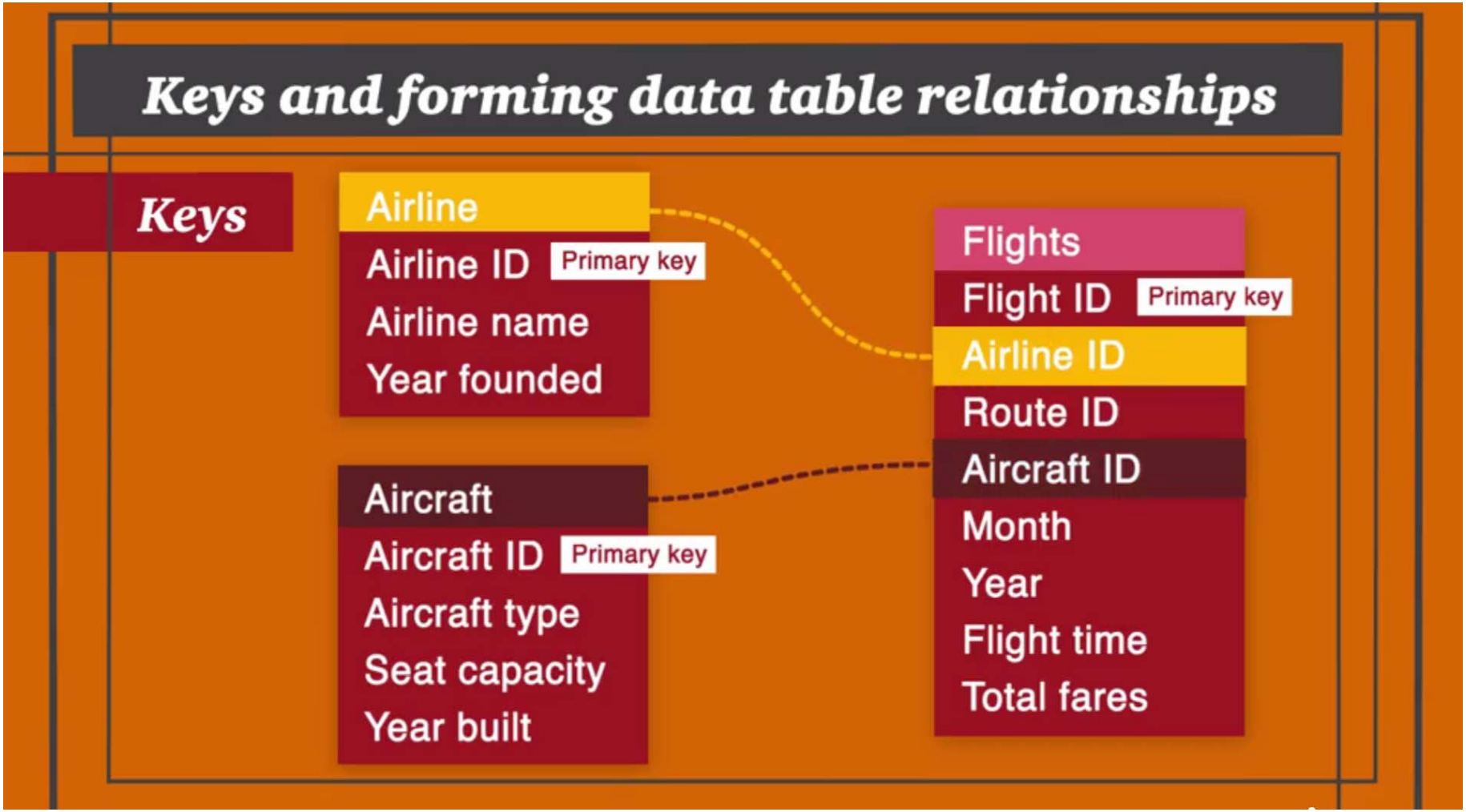
Keys

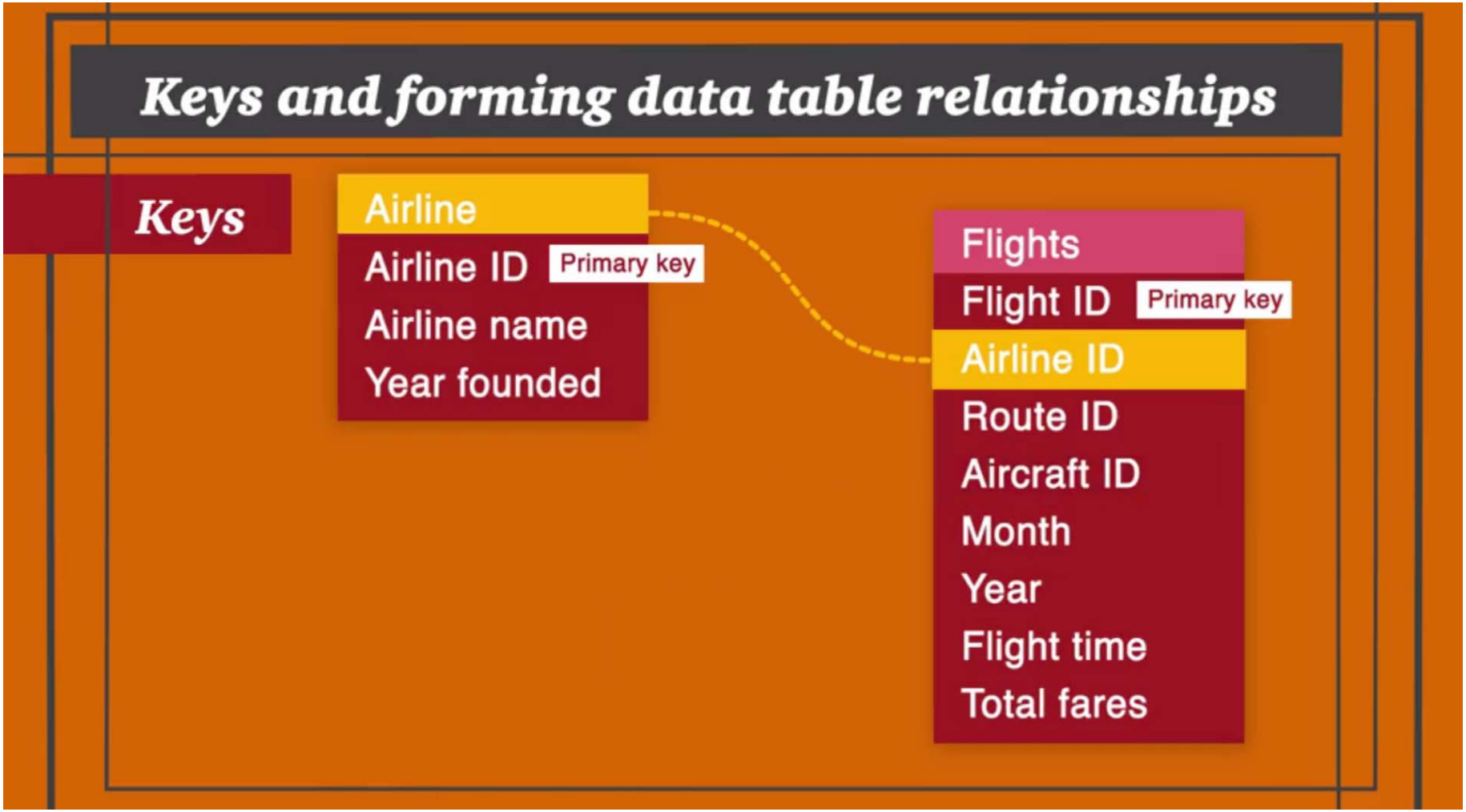
There are three main types of relationships:

- **Many to many or many : many**

Driver	Gender
John	M
Patty	F
Cindy	F

Vehicle license	Driver gender
5348908	M/F
9348450	F
2349824	M


Keys and forming data table relationships
Keys
Airline
Airline ID
Primary key
Airline name
Year founded
Aircraft
Aircraft ID
Primary key
Aircraft type
Seat capacity
Year built
Flights
Flight ID
Primary key
Airline ID
Route ID
Aircraft ID
Month
Year
Flight time
Total fares


Keys and forming data table relationships
Keys
Airline
Airline ID
Primary key
Airline name
Year founded
Flights
Flight ID
Primary key
Airline ID
Route ID
Aircraft ID
Month
Year
Flight time
Total fares

Keys and forming data table relationships

Keys

In this video:

- **How data is stored in a database**
- **How it can be referenced in the database using primary and foreign keys**
- **The different relationships within the database**