



SQL Beginner to Guru

MySQL Edition

Relational Database Principles



Relational Databases

- Relational Databases store data in tables which have relations to other tables.
- The Relational Model was first proposed by Edgar F. Codd in 1969.
- Nearly all modern Relational Databases use SQL for data definition and manipulation.
 - SQL - Structured Query Language
 - Much more to come on SQL in the course!
- Relational Databases are the most widely used database in the world.
 - Used in smart phones, desktops, automobiles, and highly popular in businesses



Database Table

- A database table is a lot like a spreadsheet.
- Data is kept in **Columns** and **Rows**.
- Each **Column** is assigned:
 - A Unique **Name**, identifying a human readable name of the column. (ie FIRST_NAME, LAST_NAME)
 - A **Data Type** (ie - String, Date, Time, Number, etc)
 - Optionally, constraints (ie - Is a value required?, Length of String, etc)
- Each **Row** is a distinct database **Record**.



Example Database Table

	A	B	C	D	E	F
1	FIRST_NAME	LAST_NAME	ADDRESS	CITY	STATE	ZIP_CODE
2	Michael	Weston	123 Brickel	Miami	FL	33135
3	Fiona	Glenanne	123 Brickel	Miami	FL	33135
4	Sam	Axe	222 Taimiami	Miami	FL	33109
5	Madeline	Weston	945 Sunset Lane	Miami	FL	33114
6	Jesse	Porter	9973 A1A	Miami	FL	33132
7	Barry	Burkowski	3838 Orange Grove St	Miami	FL	33314





Primary Key

- A **Primary Key** is an optional special database column or columns used to identify a database record. Note: Optional - *but not recommended!*
- Unique - There can be only one! Like Highlander!
- Could be FIRST_NAME, LAST_NAME, or FIRST_NAME and LAST_NAME.

	A	B	C	D	E	F
1	FIRST_NAME	LAST_NAME	ADDRESS	CITY	STATE	ZIP_CODE
2	Michael	Weston	123 Brickel	Miami	FL	33135
3	Fiona	Glenanne	123 Brickel	Miami	FL	33135
4	Sam	Axe	222 Taimiami	Miami	FL	33109
5	Madeline	Weston	945 Sunset Lane	Miami	FL	33114
6	Jesse	Porter	9973 A1A	Miami	FL	33132
7	Barry	Burkowski	3838 Orange Grove St	Miami	FL	33314





Surrogate Key

- A **Surrogate Key** is a type of **Primary Key** which used a unique generated value.
- Should have no business value, and should never change.
- Typically a system generated self incrementing number. Can be a unique string (UUID).
- Considered a **best practice** in Relational Database Design.

ID	FIRST_NAME	LAST_NAME	ADDRESS	CITY	STATE	ZIP_CODE
1234	Michael	Weston	123 Brickel	Miami	FL	33135
1235	Fiona	Glenanne	123 Brickel	Miami	FL	33135
1236	Sam	Axe	222 Taimiami	Miami	FL	33109
1237	Madeline	Weston	945 Sunset Lane	Miami	FL	33114
1238	Jesse	Porter	9973 A1A	Miami	FL	33132
1239	Barry	Burkowski	3838 Orange Grove St	Miami	FL	33314



Database Table Relations

- Defined through **Foreign Key Constraints** in conjunction with Primary Keys.
- Types of Relations:
 - **One to One** - Record in Table A matches exactly one record in Table B
 - **One to Many** - Record in Table A matches many in Table B, but Table B matches only one record in Table A. (Think - An Order with multiple items)
 - **Many to Many** - Record in Table A matches many in Table B, and Table B matches many records in Table A.



Entity Relationship Diagram

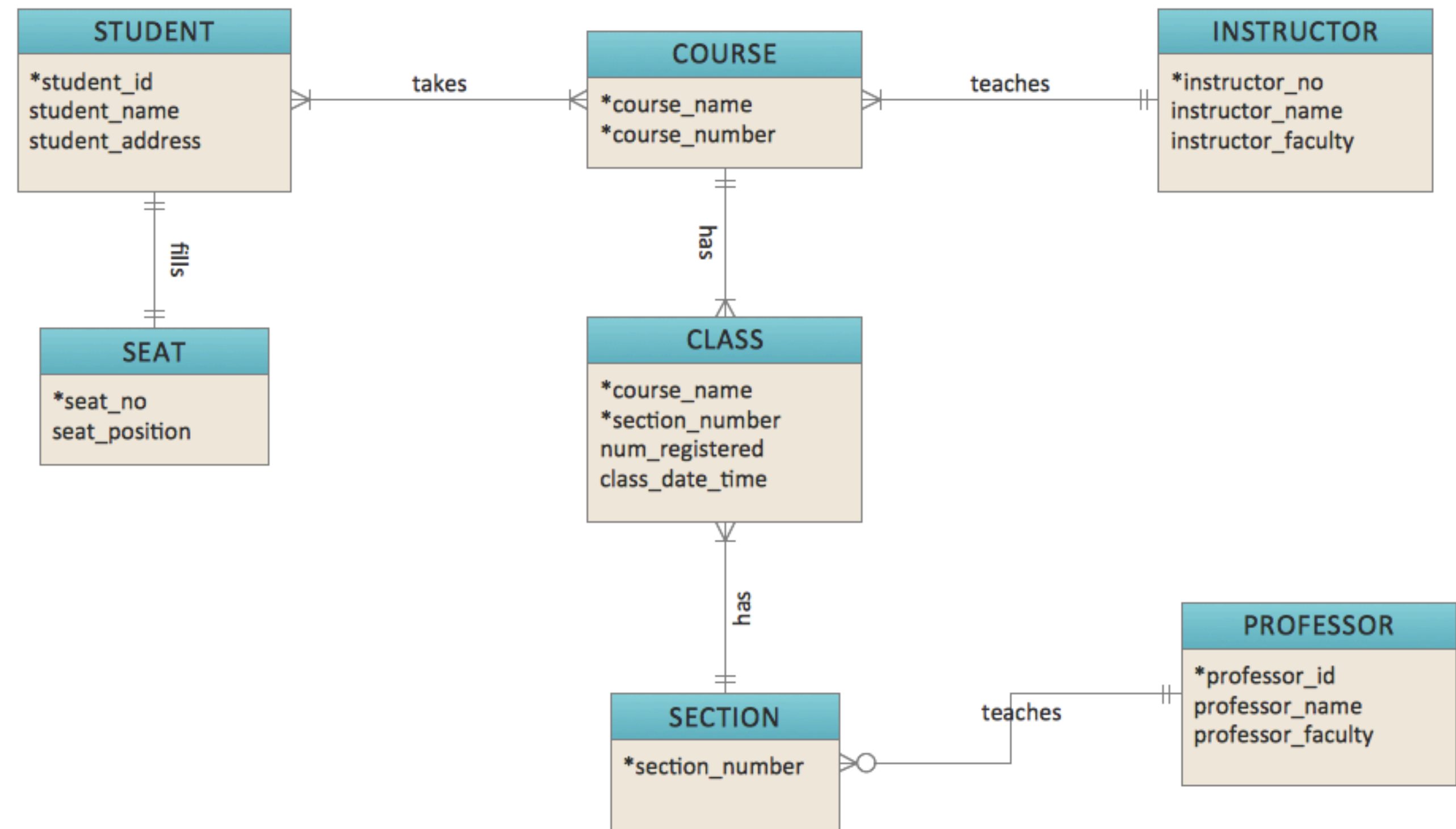
▣ one to one:



▣ one to many:



▣ many to many:





Example One to Many Relationship

ID	FIRST_NAME	LAST_NAME	ADDRESS	CITY	STATE	ZIP_CODE
1234	Michael	Weston	123 Brickel	Miami	FL	33135
1235	Fiona	Glenanne	123 Brickel	Miami	FL	33135
1236	Sam	Axe	222 Taimiami	Miami	FL	33109
1237	Madeline	Weston	945 Sunset Lane	Miami	FL	33114
1238	Jesse	Porter	9973 A1A	Miami	FL	33132
1239	Barry	Burkowski	3838 Orange Grove St	Miami	FL	33314

Table: CUSTOMER



ID	CUSTOMER_ID	DRINK_DESCRIPTION
122249	1234	Scotch
122250	1235	Pina Colada
122251	1236	Budwiser
122252	1237	White Wine
122253	1238	Stone IPA
122254	1239	Tequila Sunrise
122255	1234	Scotch
122256	1235	Pina Colada
122257	1236	Budwiser
122258	1237	Old Fashioned
122259	1238	Corona
122260	1239	Pina Colada

Table: DRINK_ORDER

