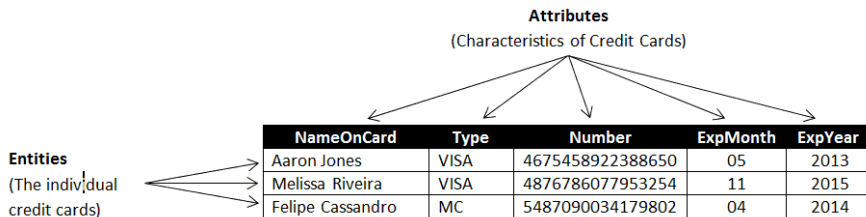




Week 4 - Relational Databases

Entities vs Attributes



Relational vs Flat File

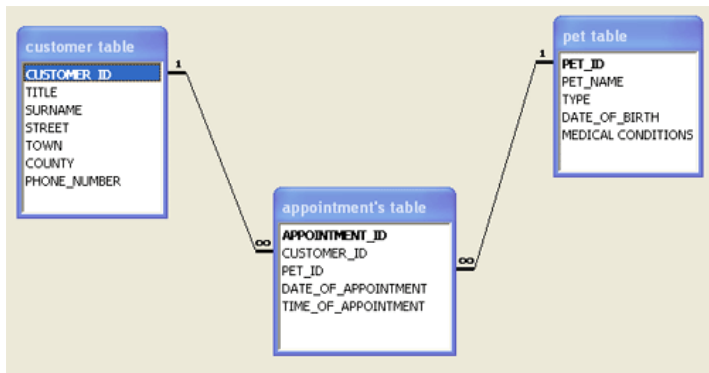


What is a Relational Database?

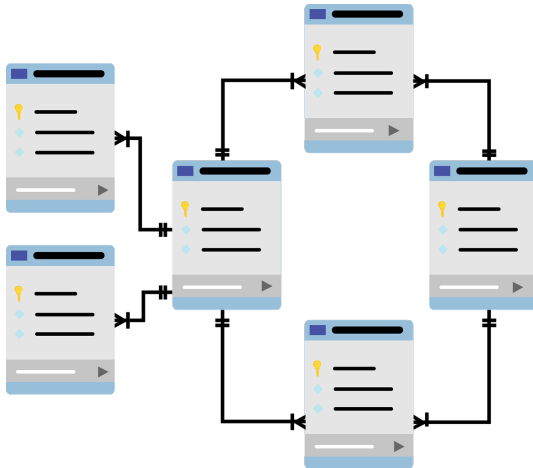
Flat File Structure

Date	Time	Pet Name	Type	Medical Conditions	Owner Title	Owner Surname	Owner Street	Owner Town	Owner Phone
20.09.2020	15:00	Meowy	Cat	Heartworm	Mr	Smith	Beethovenstr. 20	Berlin	01766262678
20.09.2020	16:00	Woof	Dog	Broken Leg	Ms	Jane	Goethe Str. 54	Berlin	01756272909
21.09.2020	12:00	Meowy	Cat	Heartworm	Mr	Smith	Beethovenstr. 20	Berlin	01766262678

Relational Structure



Relational Structure



Why Data Normalization?

Date	Time	Pet Name	Type	Medical Conditions	Owner Title	Owner Surname	Owner Street	Owner Town	Owner Phone
20.09.2020	15:00	Meowy	Cat	Heartworm	Mr	Smith	Beethovenstr. 20	Berlin	01766262678
20.09.2020	16:00	Woof	Dog	Broken Leg	Ms	Jane	Goethe Str. 54	Berlin	01756272909
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Primary Keys and Foreign Keys

Primary Keys

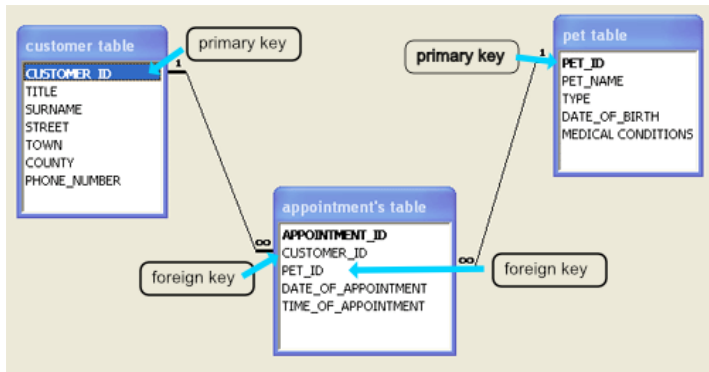
- Unique identify a record in the table.
- Can't have null values and cannot have repeated values.
- Determine the default sorting of the table.
- Each table can only have ONE primary key.

Primary Keys and Foreign Keys

Foreign Keys

- Field in a table which is primary key in another table.
- Equally can't have null values but can have repeated values.
- There can be more than one foreign key in a table (this is how the different tables are linked together!).

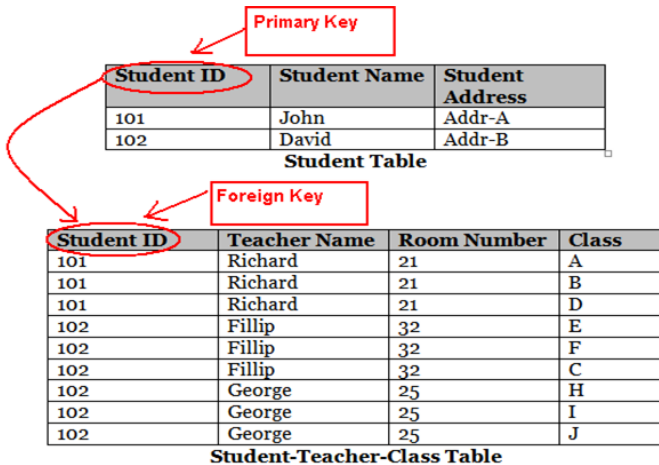
Primary Keys vs Foreign Keys



Referential Integrity

- Imagine we delete a record from the customer table. What happens?
- Breaking referential integrity!
- Defined foreign key constraints will prevent you from doing this! No changes to data in the primary key table if they break links to data in a foreign key table.

Primary Keys vs Foreign Keys (Another Example)



Advantages of Normalized Tables

- Avoid data redundancy
- Group data logically
- Enforces integrity of relationships

Types of Relationships

One-to-one:



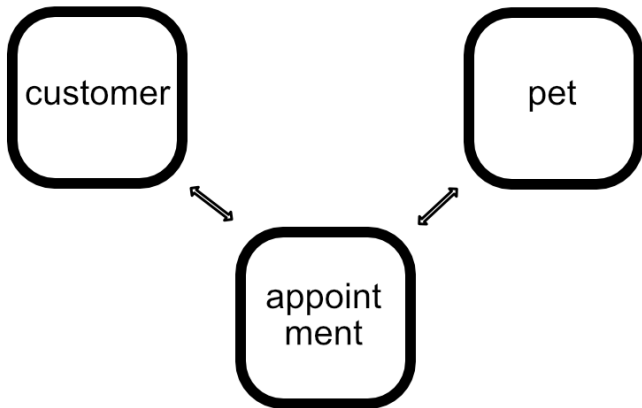
One-to-many:



Many-to-many:



Types of Relationships



A specific entity can have, or belong to, only one other specific entity and vice versa.

- Citizen - Social Security Number

One-to-Many

A specific entity can have, or belong to, only one other specific entity, but the same is not true vice versa.

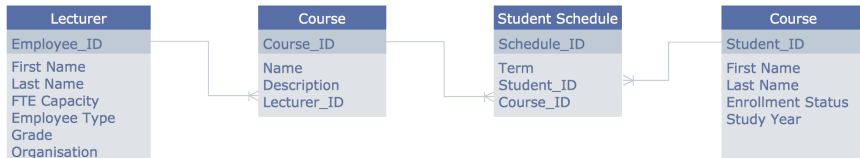
- Child - Birth Mother

Many-to-Many

A specific entity can have, or belong to, many other entities and vice versa.

- Movies - Actors
- Books - Authors

Designing Relational Databases



Entity-Relationship Diagram

Designing Relational Databases

Patient Id	Name	D.o.B	Gender	Phone	Doctor Id	Doctor	Room
134	Jeff	4-Jul-1993	Male	7876453	01	Dr Hyde	03
178	David	8-Feb-1987	Male	8635467	02	Dr Jekyll	06
198	Lisa	18-Dec-1979	Female	7498735	01	Dr Hyde	03
210	Frank	29-Apr-1983	Male	7943521	01	Dr Hyde	03
258	Rachel	8-Feb-1987	Female	8367242	02	Dr Jekyll	06

Please turn this flat file structure into a relational one, and design and ERD for it!