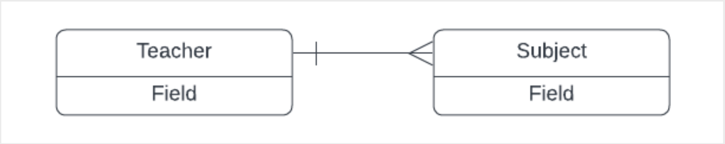
Second Normal Form

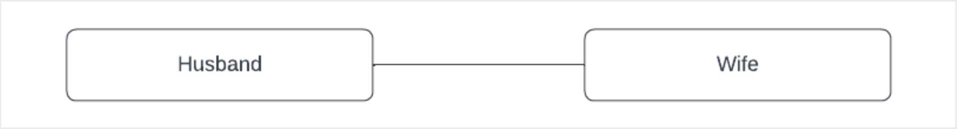
Relationships

- A way of describing how two tables are related or joined to each other
- Tables can also be created without being related to each other - FYI

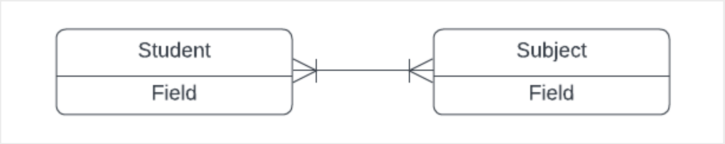
- **One to many**
    - One X has many Ys
    - A teacher can have many subjects but one subject has only 1 teacher



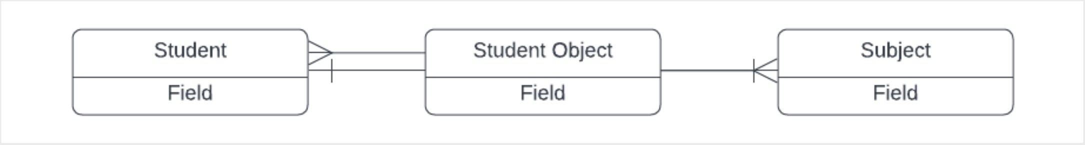
- **One to one relationship**
    - One X has many Y
    - Husband a Wife
    - Not very common



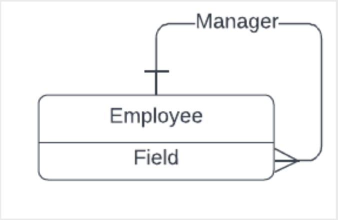
- **Many to Many Relationship**
    - Many Xs has many Ys
    - Not ideal in Database design, but common



    - A student has many subjects and many subjects has many students
    - How to store effectively? -> we use a joining table



- Self relationship
  - A table joins to itself
  - It defines the relationship between two records in the one table
  - An employee has a manager but a manager also has a manger and managers are employees as well

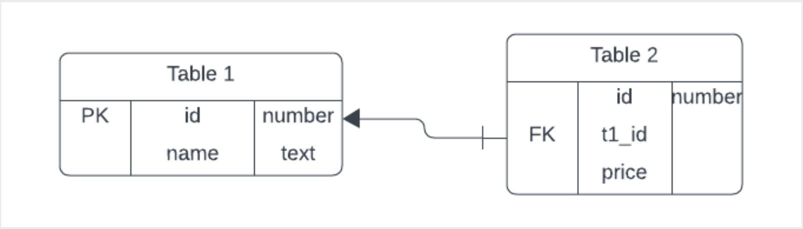


Second Normal Form

- Second stage of normalisation process
- Definition: “Fulfil the requirements of the first normal form”
  - Each non-key attribute must be functionally dependent on the primary key
  - non-key attribute - An attribute that is not the primary key
  - Functionally dependent - attribute is determined by the primary key

Foreign Key

- A foreign key in a table that is related to primary ket in another table.
- Used to link two tables together to link the unique record



Second Normal Form: Student and Subject

- In Table subject, there is afield called “category” which is not dependent on the Primary Key and can change over time, needs to be updated in multiple records

- Lets move category to a new table
- We need to add the Primary Key from one table to the other table, which is then the foreign key
- Used to identify the row in other table

- Questions to ask?
- Does subject has many categories or categories has many subjects?
- Eg: science -> chemistry, physics, bio
- A category has many subjects
- Add the Primary Key of the second table into the first table as Foreign Key
- Category ID into the subject table

- A joining table converts a many to many relationships into two one to many relationships
- A student can have many subjects and a subject can have many students

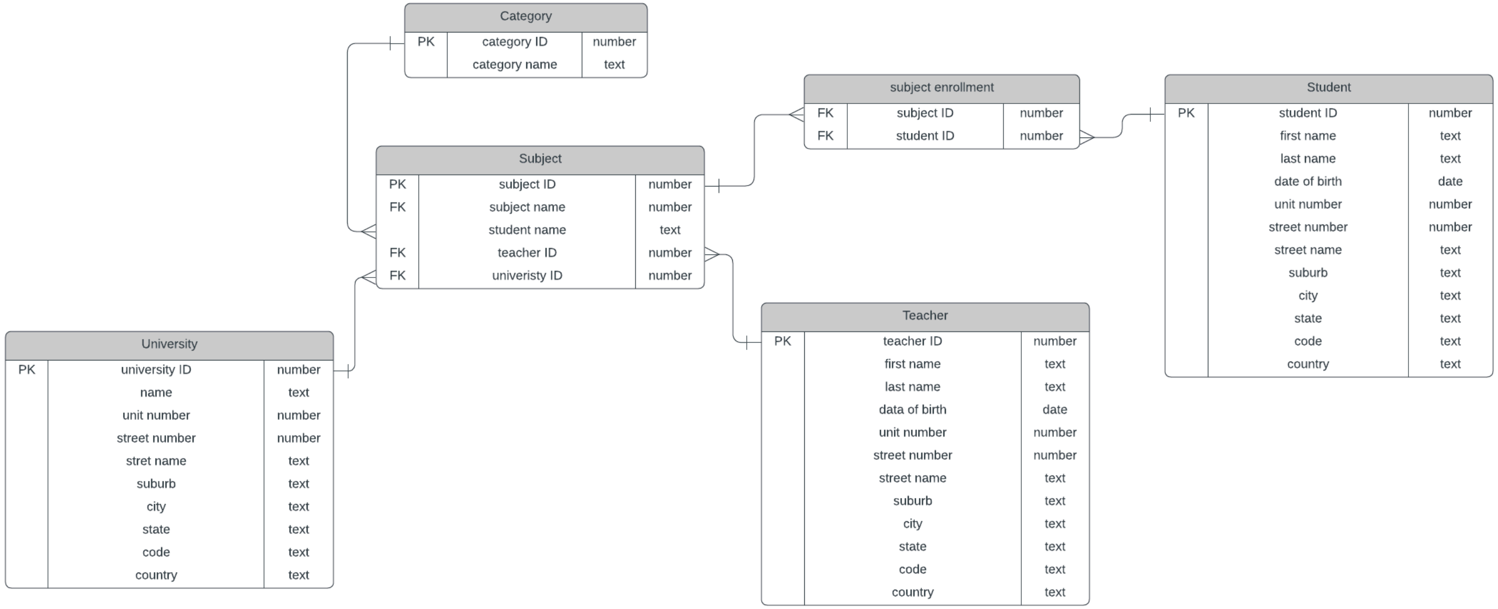
- Second Normal Form: Teacher

- We should not repeat data
- We shouldn't have subject names in ***Teacher*** table because they are already present in the ***Subject*** table
- We need to work out the relationship between teacher and subject
- Does the teacher has many subjects or the subjects has many teachers? - First one
- Need to add the Primary Key of the first table (teacher table) to the second table (subject)

- Second Normal Form: University

- How does university table related to other tables
- Subjects are taught at university
- A university has many subjects or a subject has many universities?

- Look at each of your table
- See if there are nay attributes that dont rely on the Primary Key, and move them to a new table
- Determine how these tables are related
- Add Foreign Key to these tables



Category

PK	category ID	number
	category name	text

subject enrollment

FK	subject ID	number
FK	student ID	number

Student

PK	student ID	number
	first name	text
	last name	text
	date of birth	date
	unit number	number
	street number	number
	street name	text
	suburb	text
	city	text
	state	text
	code	text
	country	text

Subject

PK	subject ID	number
FK	subject name	number
	student name	text
FK	teacher ID	number
FK	univeristy ID	number

University

PK	university ID	number
	name	text
	unit number	number
	street number	number
	stret name	text
	suburb	text
	city	text
	state	text
	code	text
	country	text

Teacher

PK	teacher ID	number
	first name	text
	last name	text
	data of birth	date
	unit number	number
	street number	number
	street name	text
	suburb	text
	city	text
	state	text
	code	text
	country	text