Introduction to Database and SQL

Database

> A "structured" collection of data

Beginning of a semester

```
McGill
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│   │   └── Readings/
│   │
...
```

Database (+ Database Management System DBMS)

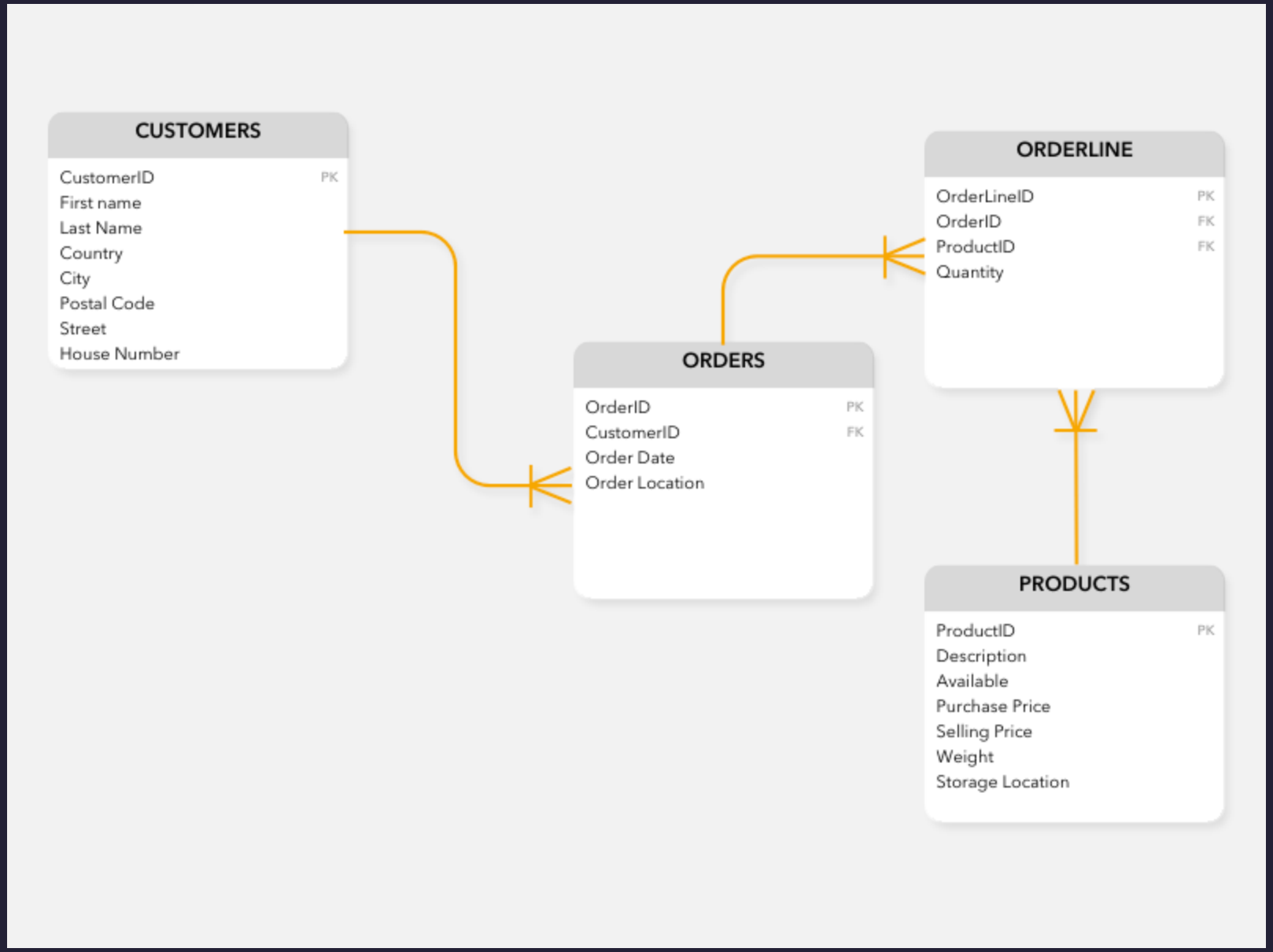
> A "structured" collection of data
>
> that adheres to predefined rules, ensuring organized and efficient access.

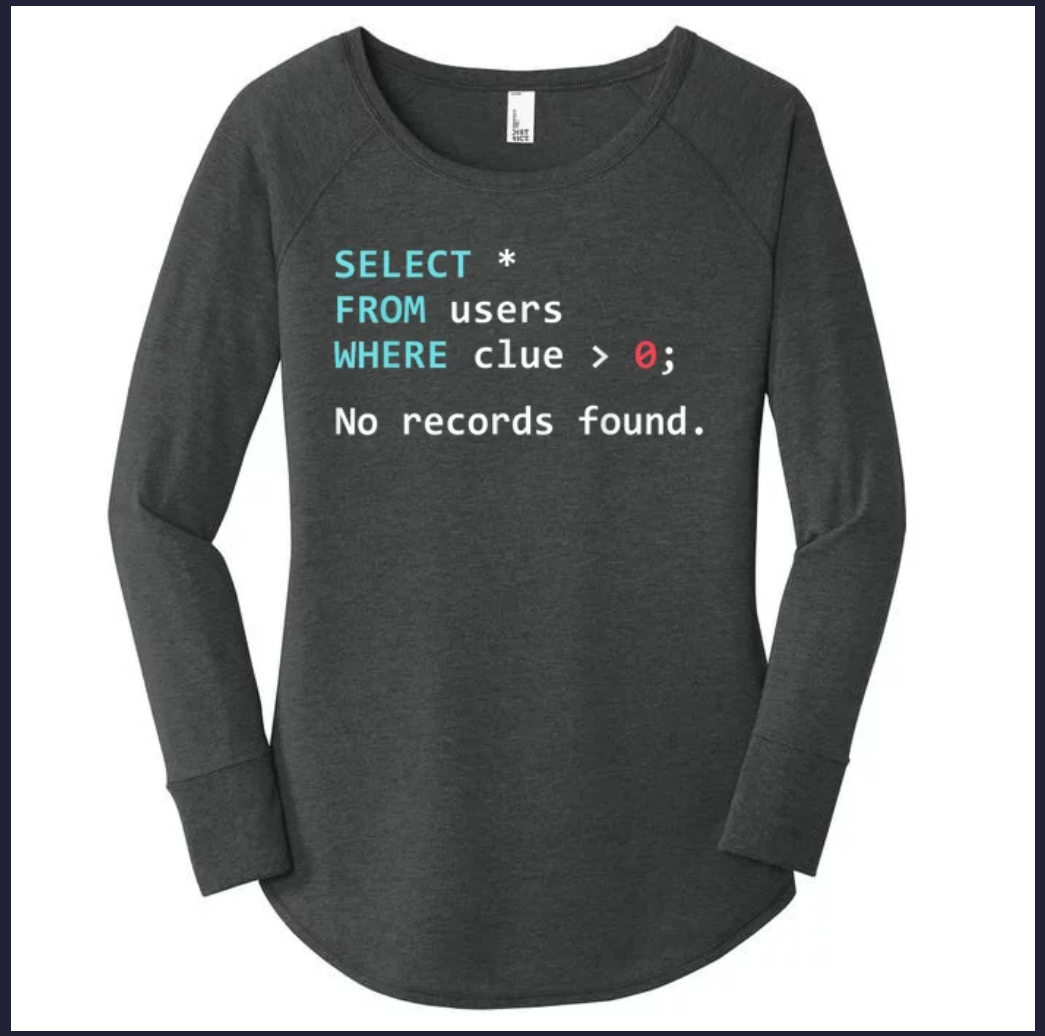
Why Databases?

- Scalability
- Data integrity
- Data security
- Data retrieval and analysis

Entity Relationship Diagram (ERD)

- Blueprint of a database
- How “entities” such as people, objects or concepts relate to each other within a system
  - Entity: A thing that can have data stored about it (Nouns)
  - Relationship: How entities are associated with each other (Verbs)

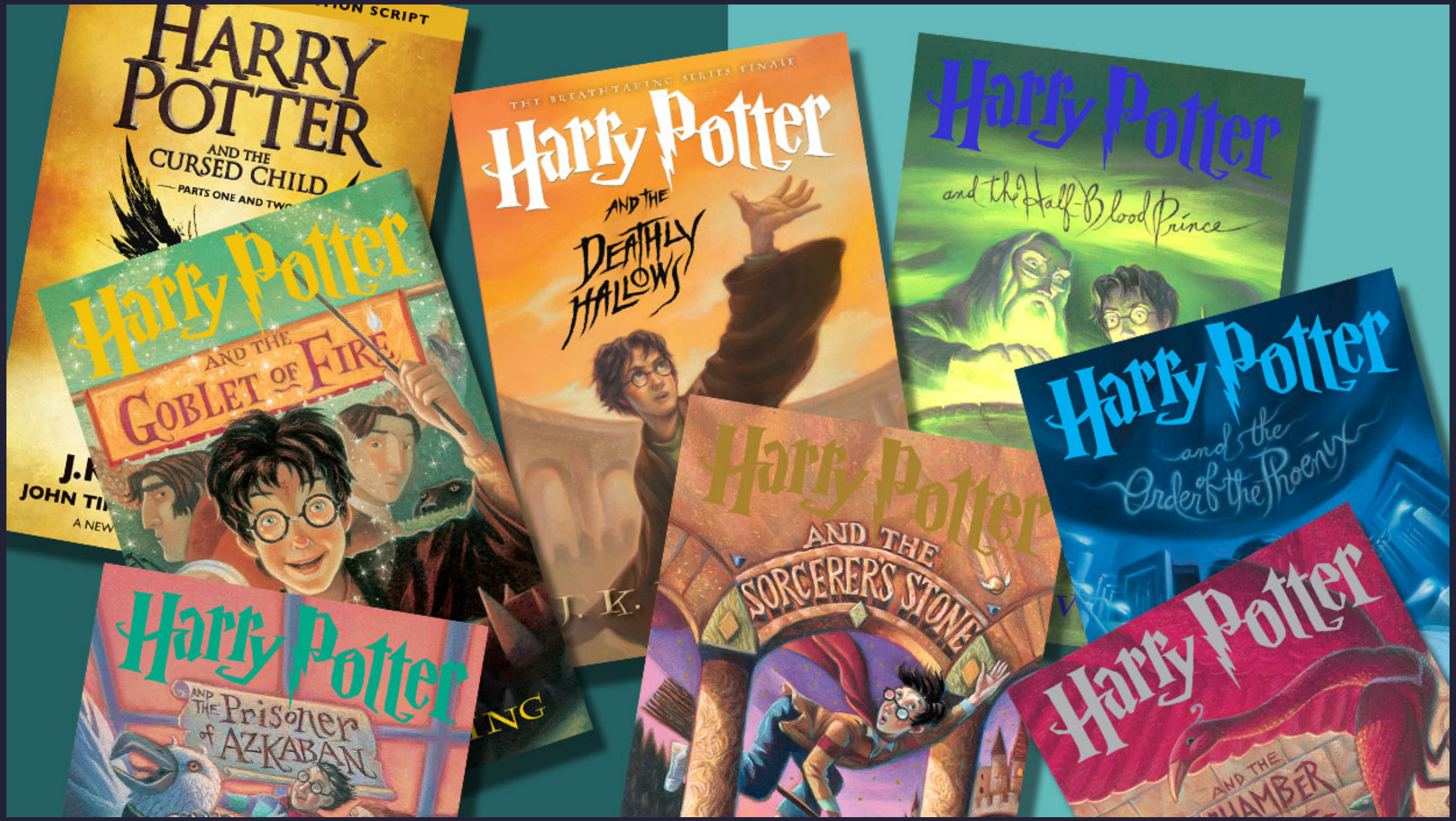

CUSTOMERS
CustomerID PK
First name
Last Name
Country
City
Postal Code
Street
House Number
ORDERLINE
OrderLineID PK
OrderID FK
ProductID FK
Quantity
ORDERS
OrderID PK
CustomerID FK
Order Date
Order Location
PRODUCTS
ProductID PK
Description
Available
Purchase Price
Selling Price
Weight
Storage Location



Structured Query Language (SQL)

SELECT [ALL/DISTINCT] column_list
FROM table_list
[**WHERE** conditional expression]
[**GROUP BY** group_by_column_list]
[**HAVING** conditional expression]
[**ORDER BY** order_by_column_list]

Essentials of Database Management, 1st ed., Pearson.

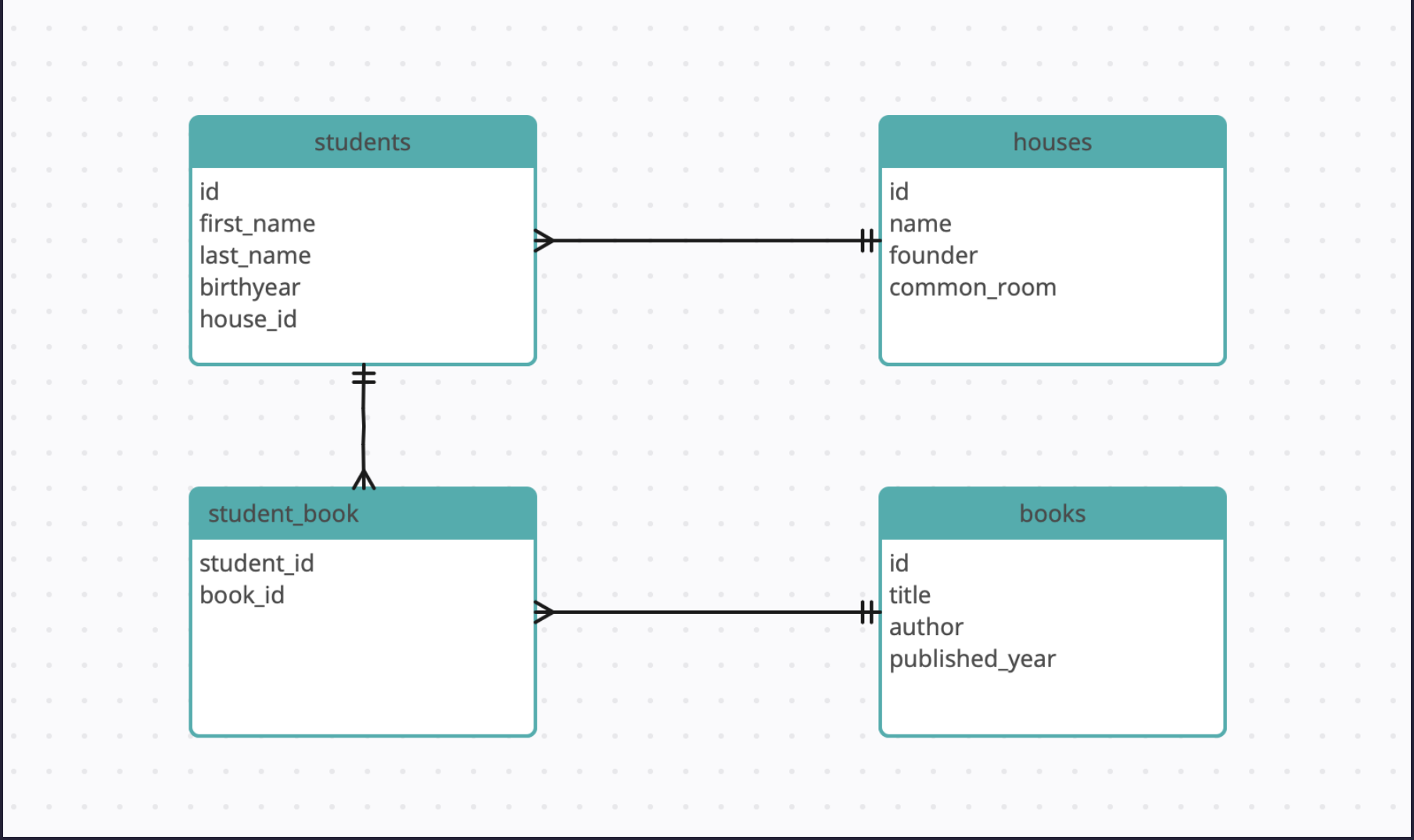

HARRY POTTER
AND THE CURSED CHILD
PARTS ONE AND TWO
Harry Potter
AND THE GOBLET OF FIRE
Harry Potter
AND THE DEATHLY HALLOWS
Harry Potter
and the Half-Blood Prince
Harry Potter
and the Order of the Phoenix
Harry Potter
AND THE SORCERER'S STONE
Harry Potter
AND THE Prisoner of AZKABAN
Harry Potter
AND THE

To build a database:

1. What do you want to store data about?

2. How are they related to each other?

Harry Potter Database - ERD



`SELECT` columns `FROM` a table

SELECT `column_name` FROM `table_name`

```
SELECT first_name FROM students;
SELECT first_name, last_name FROM students;
SELECT * FROM students;
```

`LIMIT` the number of records returned

SELECT `column_name` FROM `table_name` LIMIT `number`

```
SELECT * FROM students LIMIT 10;
```

`--` is used to add comments in SQL. The space after the two dashes is required

`;` is used to indicate the end of a SQL statement

`SELECT` columns `FROM` a table `WHERE` conditions are true

SELECT `column_name` FROM `table_name` WHERE `condition`

```sql
-- select all students with house_id = 1
SELECT first_name, last_name FROM students WHERE house_id = 1;
-- select all students with birthyear = 1980
SELECT first_name, last_name FROM students WHERE birthyear = 1980;
-- select all students with birthyear >= 1980
SELECT first_name, last_name FROM students WHERE birthyear >= 1980;
```

💻 Write SQL queries to answer the following questions

1. What year was Harry Potter born?
2. What is the name of the student who was born in 1980?
3. Who is the founder of Gryffindor?

💻 Write SQL queries to answer the following questions - SQL (solution)

```sql
SELECT birthyear FROM students WHERE first_name = "Harry";

SELECT first_name, last_name FROM students WHERE birthyear = 1980;

SELECT founder FROM houses WHERE house_id = 1;
```