

Introduction to Database and SQL

Database

| A "structured" collection of data

Beginning of a semester

```
McGill
|
├── Winter 2023
├── Fall 2023/
│   ├── INSY336 /
│   │   ├── Syllabus.pdf
│   │   ├── Lecture Notes/
│   │   ├── Assignments/
│   │   │   └── Assignment 1.docx
│   │   └── Readings/
│   └── ...
└── ...
```

Database (+ DataBase Management System DBMS)

| A "structured" collection of data

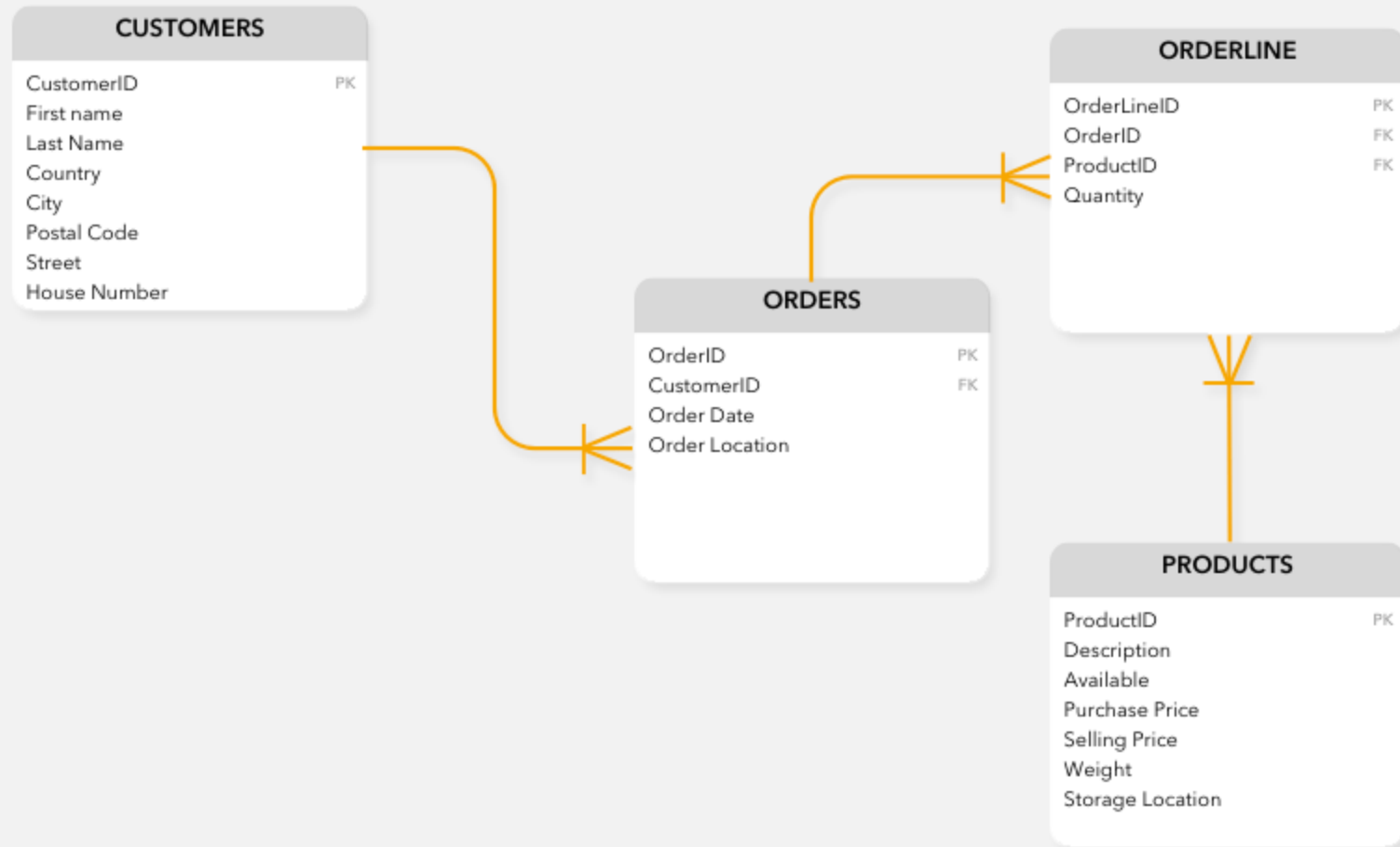
| that adheres to predefined rules, ensuring organized and efficient access.

Why Databases?

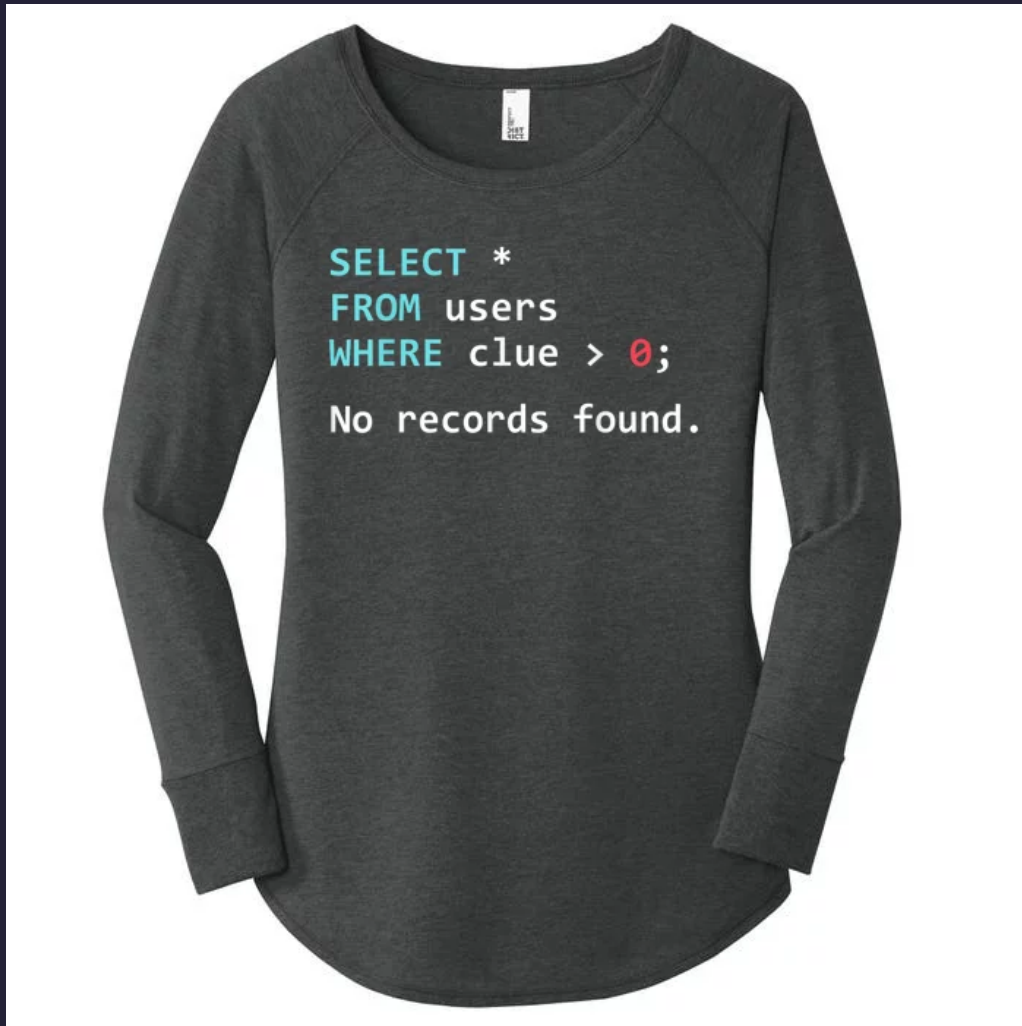
- Scalability
- Data integrity
- Data security
- Data retrieval and analysis

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)



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]
```

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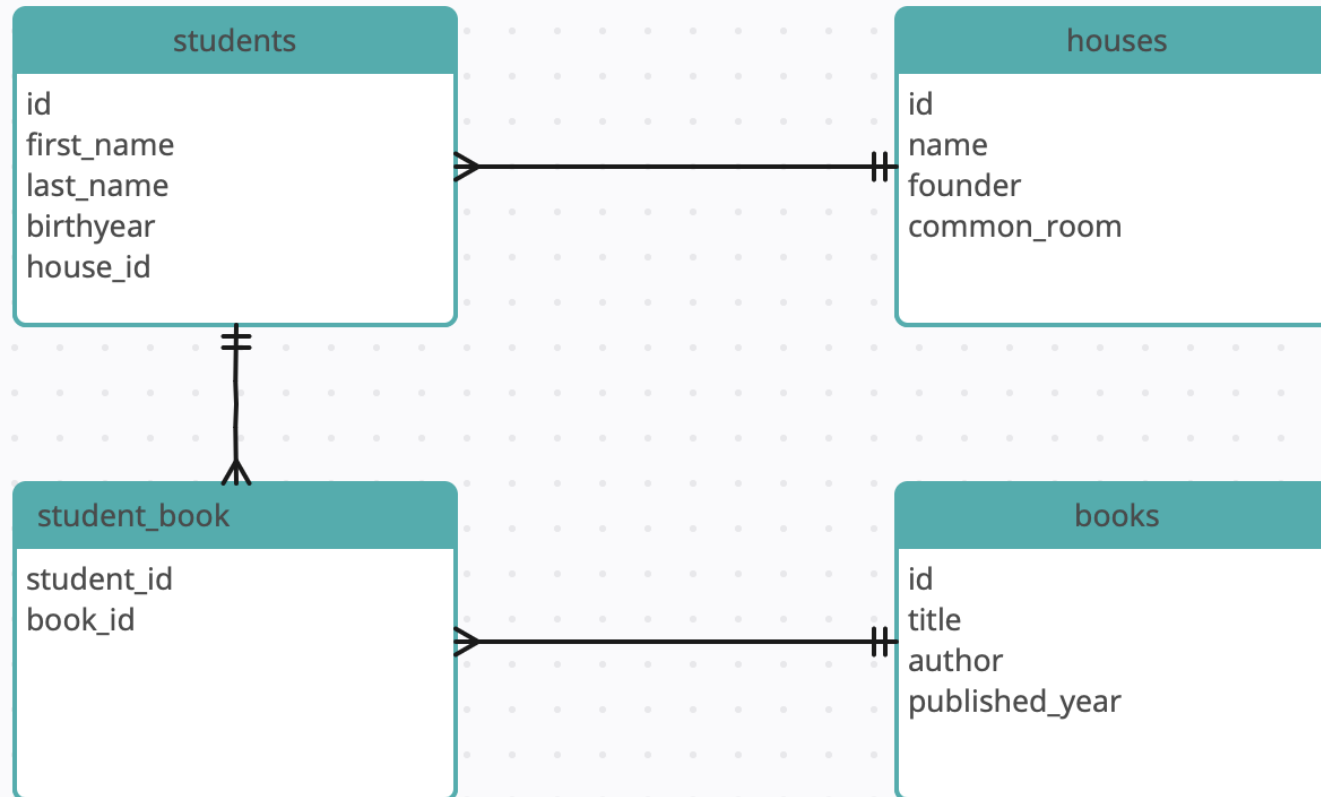
Essentials of Database Management, 1st ed.,
Pearson.



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

```
-- 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?