Databases

INTRODUCTION TO SQL

SQL

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datacamp

Course goals

1. Understand databases and their structure → Chapter 1

2. Extract information from databases using SQL → Chapter 2

Introducing databases

patrons

card_num	name	member_year	total_fine
54378	Izzy	2012	9.86
94722	Maham	2020	0
45783	Jasmin	2022	2.05
90123	James	1989	0

books

id	title	author	genre	pub_year
638	Being Mortal	Atul Gawande	Non-Fiction	2015
912	Educated	Tara Westover	Non-Fiction	2018
322	Night	Elie Wiesel	Non-Fiction	1956
156	Where the Wild Things Are	Maurice Sendak	Childrens	1963

checkouts

id	start_date	due_date	card_num	book_id
567	2022-05-13	2022-05-27	54378	638
568	2022-06-10	2022-06-24	54378	322
569	2022-06-27	2022-07-11	45783	156
570	2022-08-14	2022-08-28	90123	912

Introducing databases

patrons

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Relational databases

- Define relationships between tables of data inside the database

patrons

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Database advantages

- More storage than spreadsheet applications
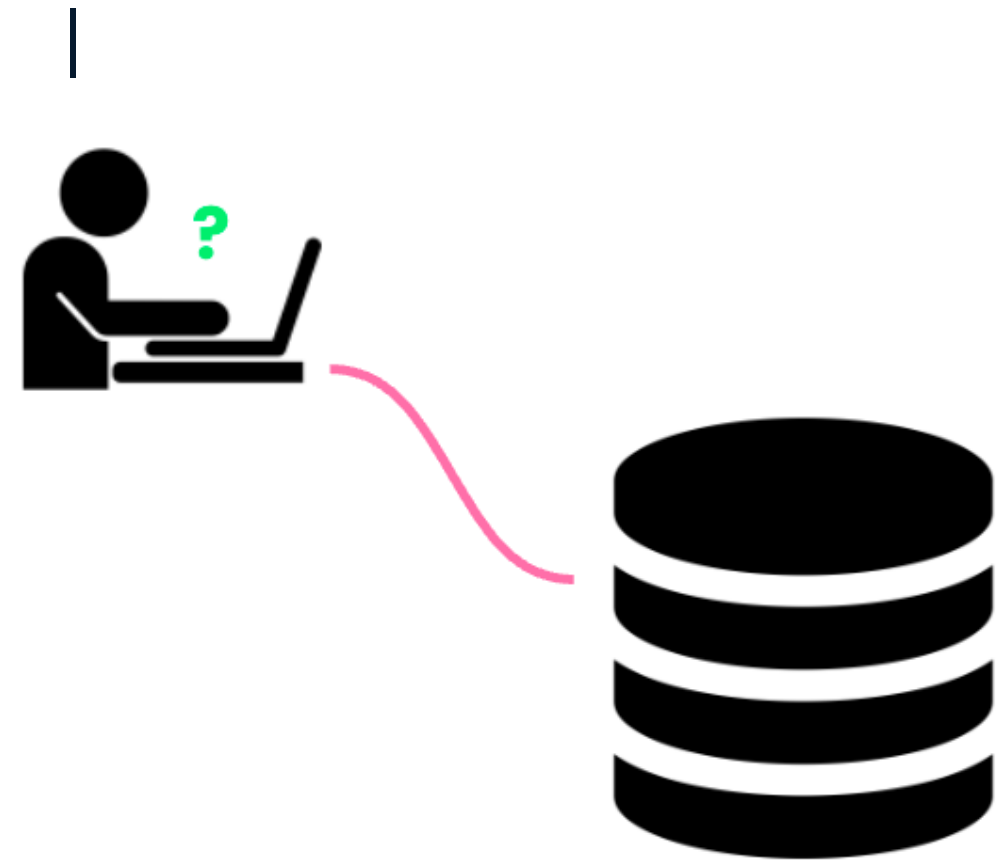
- Storage is more secure
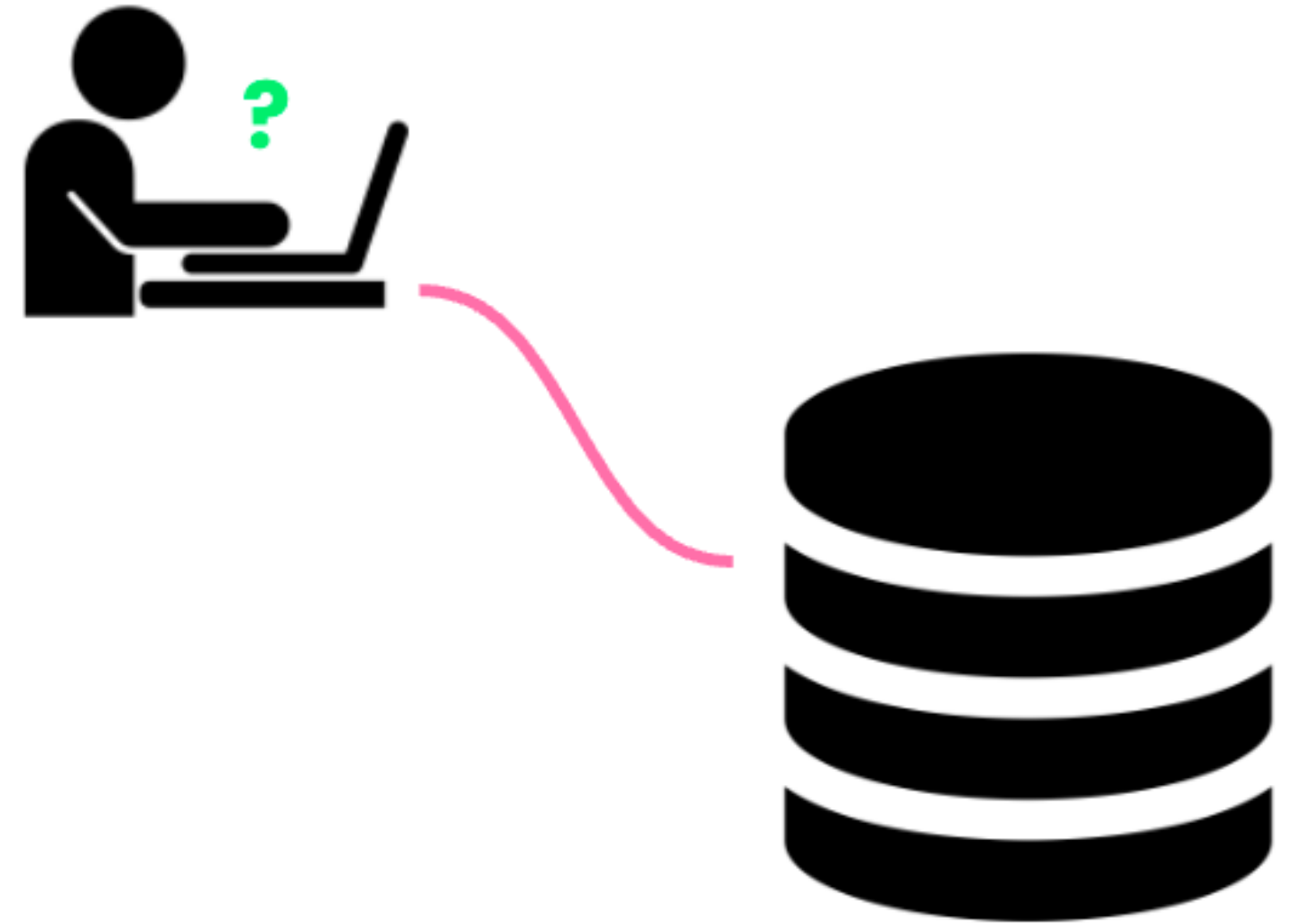
Database advantages

SQL

- Short for Structured Query Language

- The most widely used programming language for databases

```sql
SELECT *
FROM patrons
LIMIT 30
```

Let's practice!

INTRODUCTION TO SQL

A seat at the table

- Table rows and columns are referred to as *records* and *fields*

- Fields are set at database creation; there is no limit to the number of records

patrons

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Good table manners

Table names should...

- be lowercase

- have no spaces—use underscores instead

- refer to a collective group or be plural

Patrons

library patrons

patron

patrons

card_num	name	member_year	total_fine
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Laying the table: records

A record is a row that holds data on an individual observation

patrons

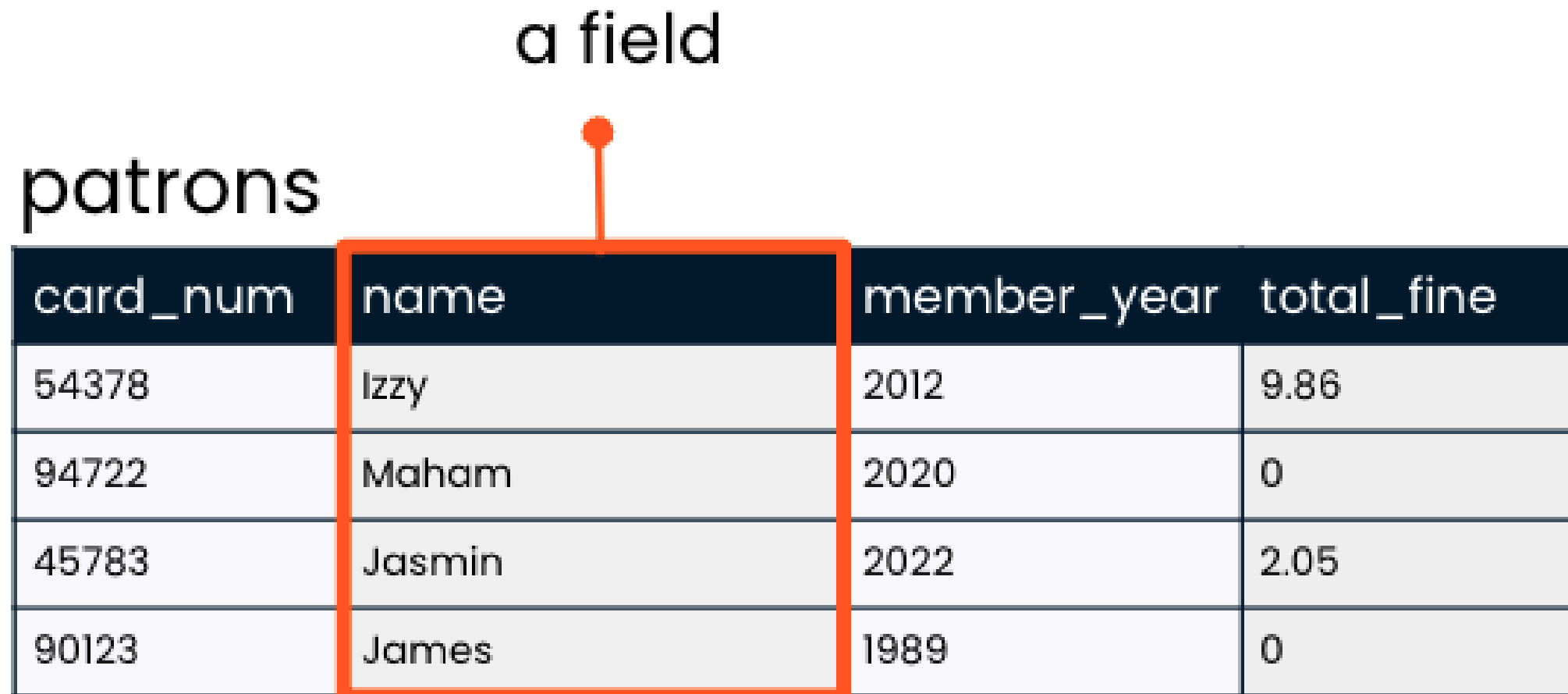| card_num	name	member_year	total_fine
54378	Izzy	2012	9.86
94722	Maham	2020	0
45783	Jasmin	2022	2.05
90123	James	1989	0

a record ●——

Laying the table: fields

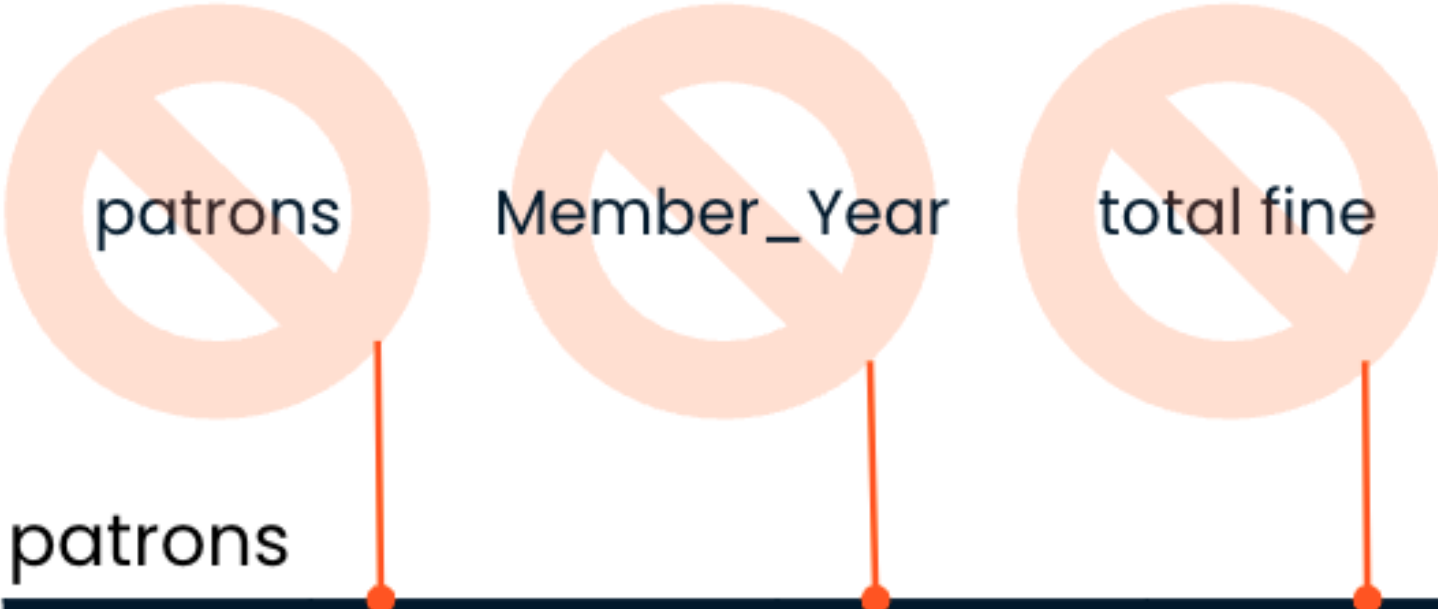A field is a column that holds one piece of information about all records

a field

patrons

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90123	James	1989	0

More table manners

Field names should...

- be lowercase

- have no spaces

- be singular

- be different from other field names

- be different from the table name

Assigned seats

- *Unique identifiers* are used to identify records in a table

- They are unique and often numbers

patrons

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unique identifier

The more the merrier

patrons

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569	2022-06-27	2022-07-11	45783	156
570	2022-08-14	2022-08-28	90123	912

patron_checkouts

card_num	name	member_year	total_fine	checkout_id	start_date	due_date	book_id
54378	Izzy	2012	9.86	567	2022-05-13	2022-05-27	638
54378	Izzy	2012	9.86	568	2022-06-10	2022-06-24	322
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Let's practice!

INTRODUCTION TO SQL

SQL data types

all one
data type

all one
data type

all one
data type

all one
data type

patrons

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- Different types of data are stored differently and take up different space

- Some operations only apply to certain data types

Strings

a string field

patrons

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- A string is a sequence of characters such as letters or punctuation

- `VARCHAR` is a flexible and popular string data type in SQL

Integers

an integer field

patrons

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- Integers store whole numbers

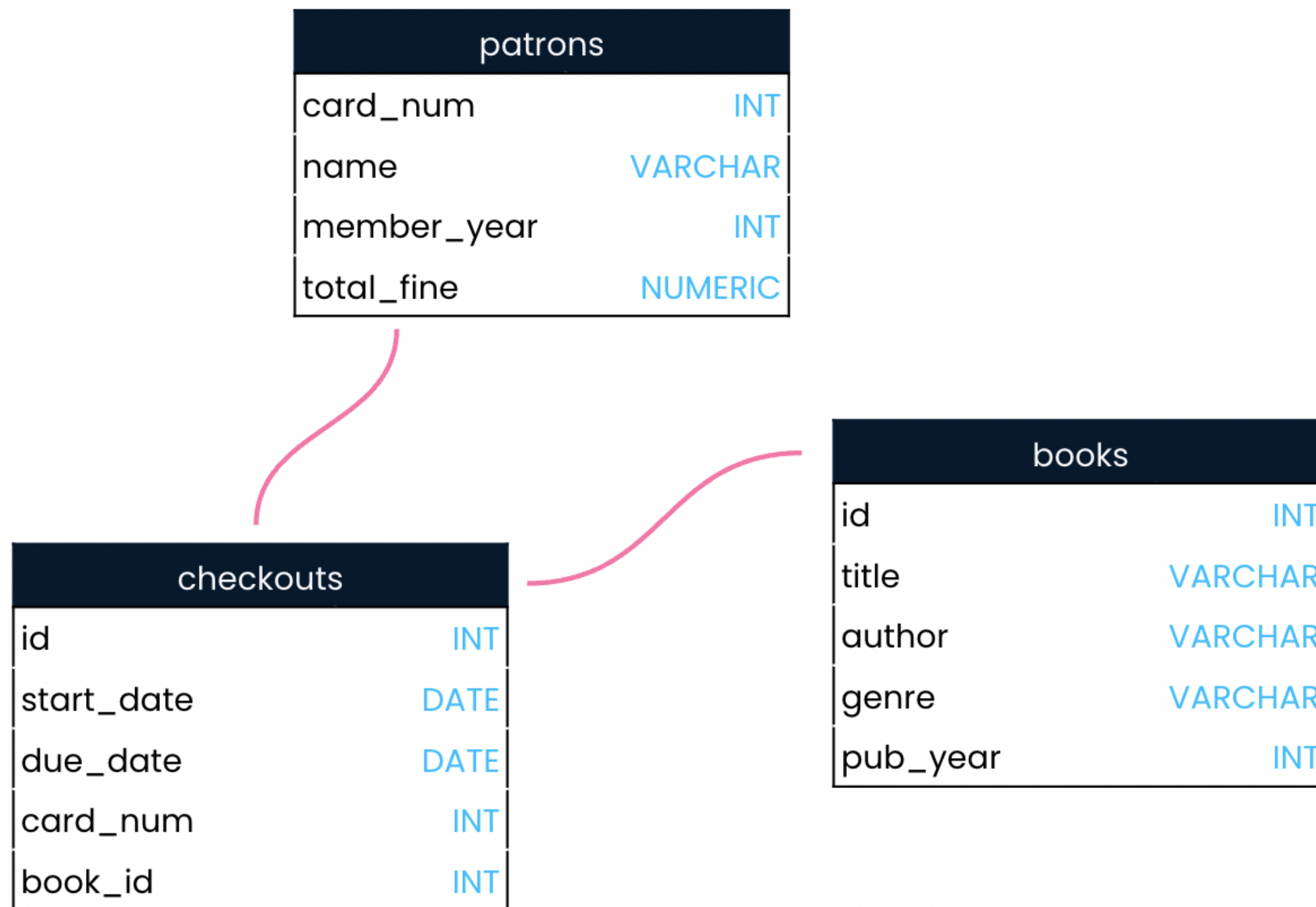- `INT` is a flexible and popular integer data type in SQL
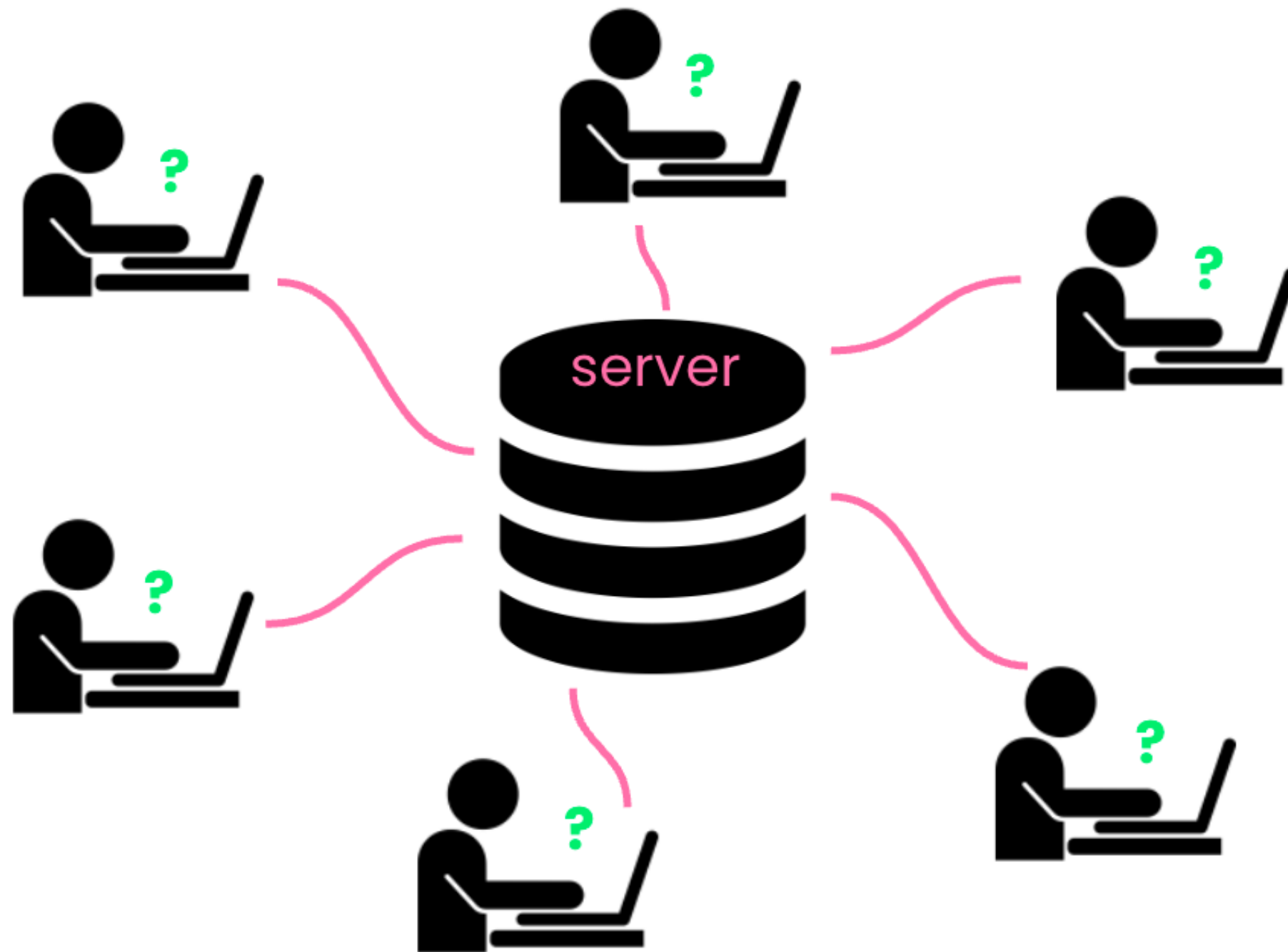
Floats

a float field

patrons

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45783	Jasmin	2022	2.05
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- Floats store numbers that include a fractional part

- `NUMERIC` is a flexible and popular float data type in SQL

Schemas

patrons

card_num	INT
name	VARCHAR
member_year	INT
total_fine	NUMERIC

checkouts

id	INT
start_date	DATE
due_date	DATE
card_num	INT
book_id	INT

books

id	INT
title	VARCHAR
author	VARCHAR
genre	VARCHAR
pub_year	INT

Database storage

Let's practice!

INTRODUCTION TO SQL