Databases

INTRODUCTION TO SQL

Jasmin Ludolf

Senior Data Science Content Developer, DataCamp

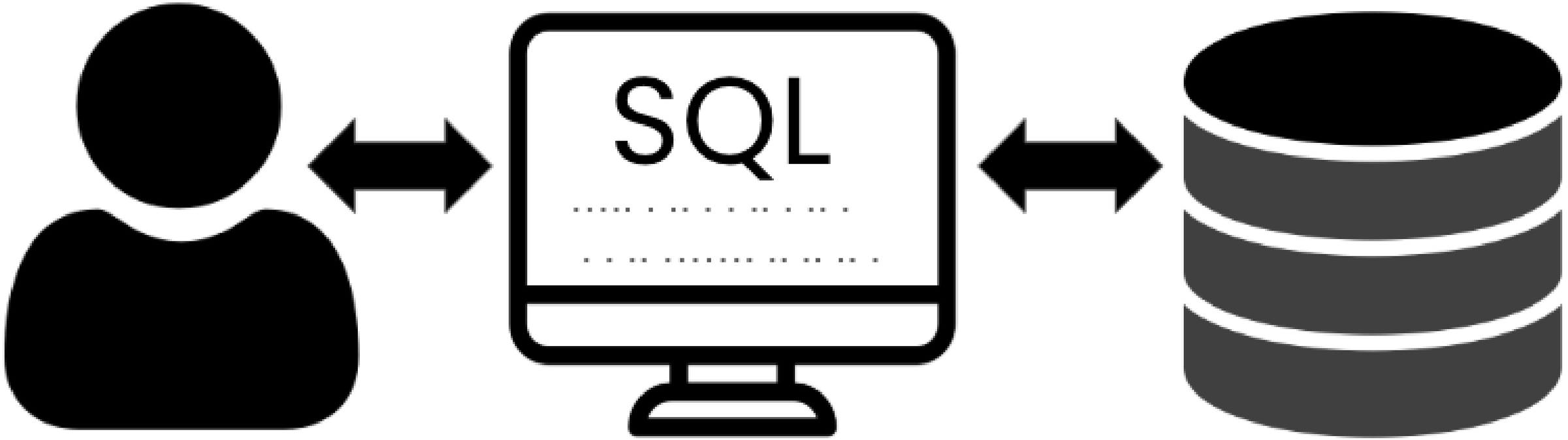
datacamp

Course goals

1. Understand databases and their structure → Chapter 1
2. Extract information from databases using SQL → Chapter 2

Structured Query Language (SQL)

- SQL communicates with databases



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

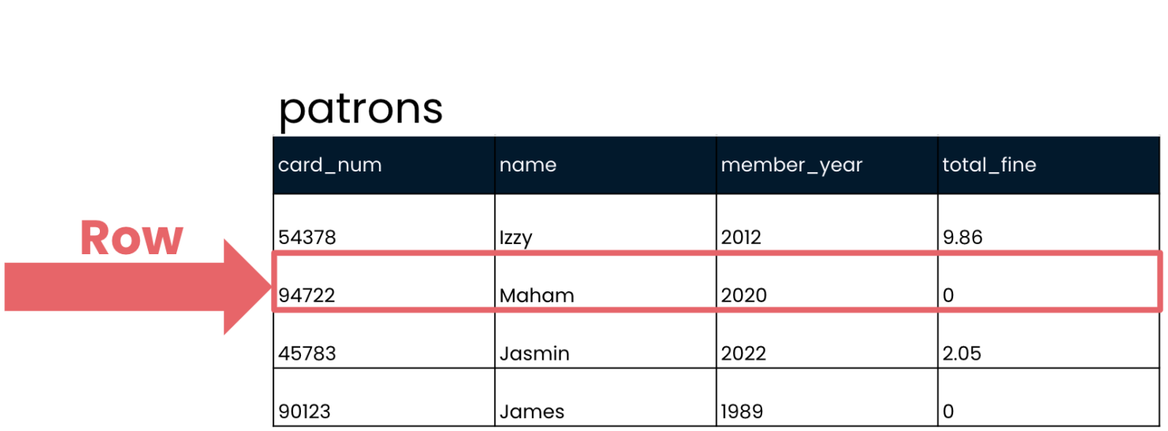
id	start_date	due_date	card_num	book_id
567	2022-05-13	2022-05-27	54378	638
568	2022-06-10	2022-06-24	54378	322
569	2022-06-27	2022-07-11	45783	156
570	2022-08-14	2022-08-28	90123	912

A closer look at tables

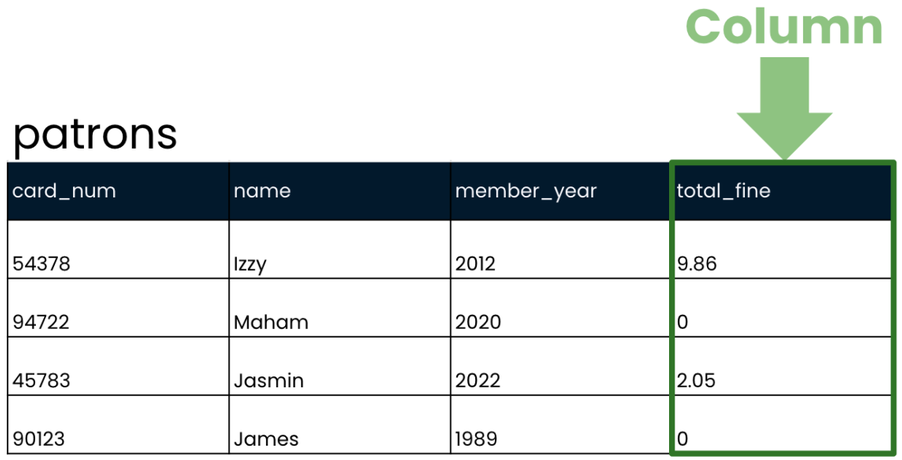
patrons

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

Rows and columns



- Individual data



- Specific part of data

Relational databases

- Define relationships between tables of data inside the database

checkouts

id	start_date	due_date	**card_num**	**book_id**
23359	2024-05-11	2024-05-25	**54378**	**547**
23360	2024-05-12	2024-05-26	**94722**	**156**
23361	2024-05-12	2024-05-26	**45783**	**912**
23362	2024-05-13	2024-05-27	**90123**	**838**

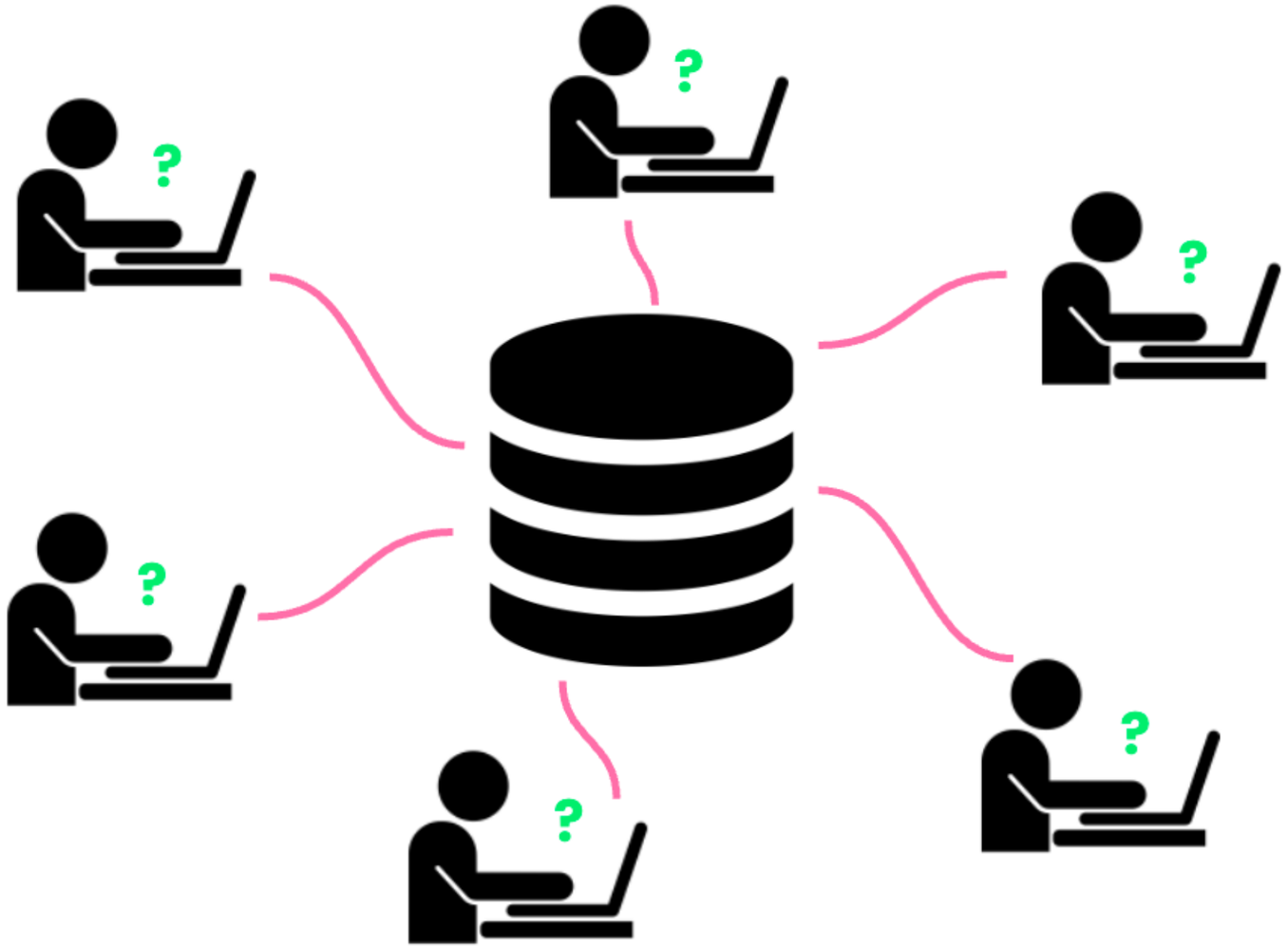
patrons

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
838	Being Mortal	Atul Gawande	Non-Fiction	2015
912	Educated	Tara Westover	Non-Fiction	2018
547	Segment of One	Michael Grigsby	Fiction	2022
156	Where the Wild Things Are	Maurice Sendak	Childrens	1963

Database advantages



Let's practice!

INTRODUCTION TO SQL

Tables

INTRODUCTION TO SQL

Jasmin Ludolf

Senior Data Science Content Developer, DataCamp

Table naming

Table names:

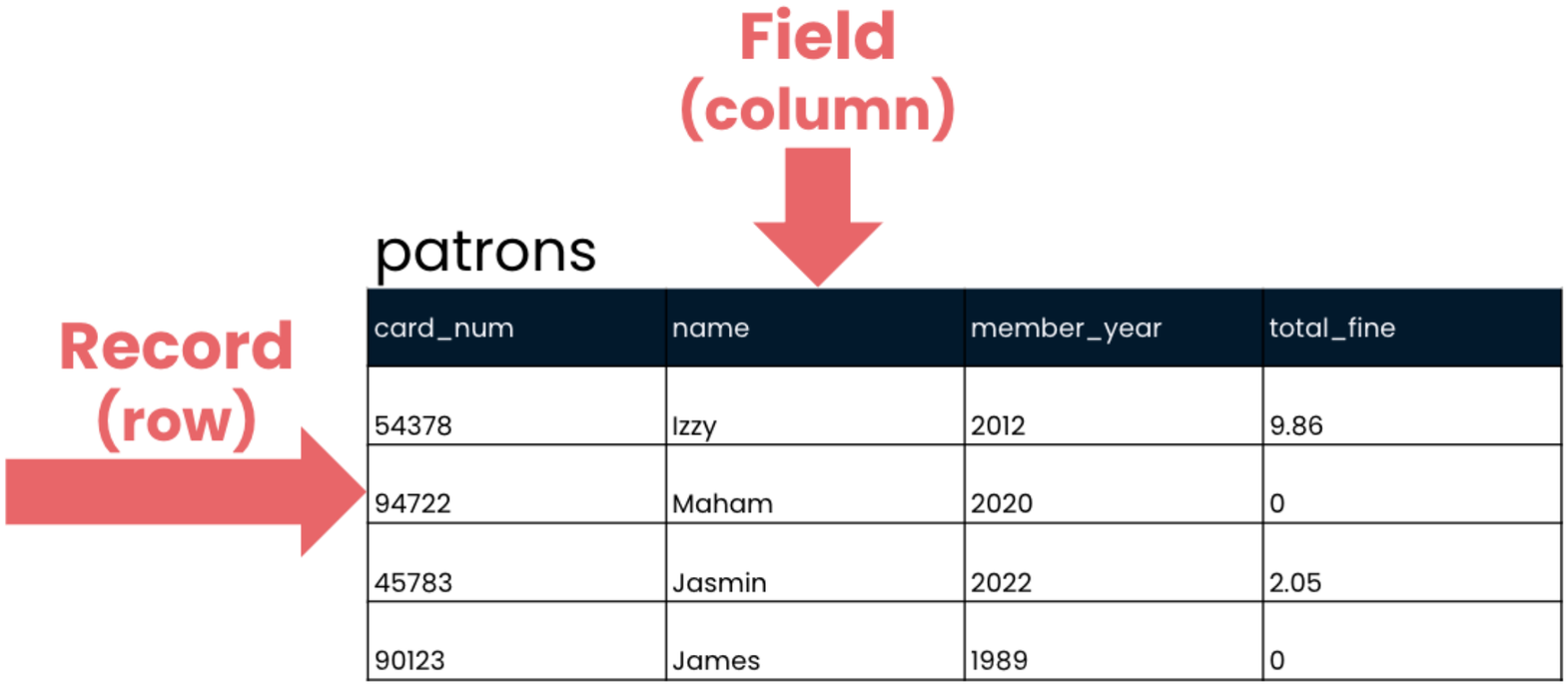
- Clear
- Refer the data it contains(plural)
- Lowercase
- Use underscores—no spaces

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

Records and fields

- Table rows are *records*
- Table columns are *fields*



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

Records

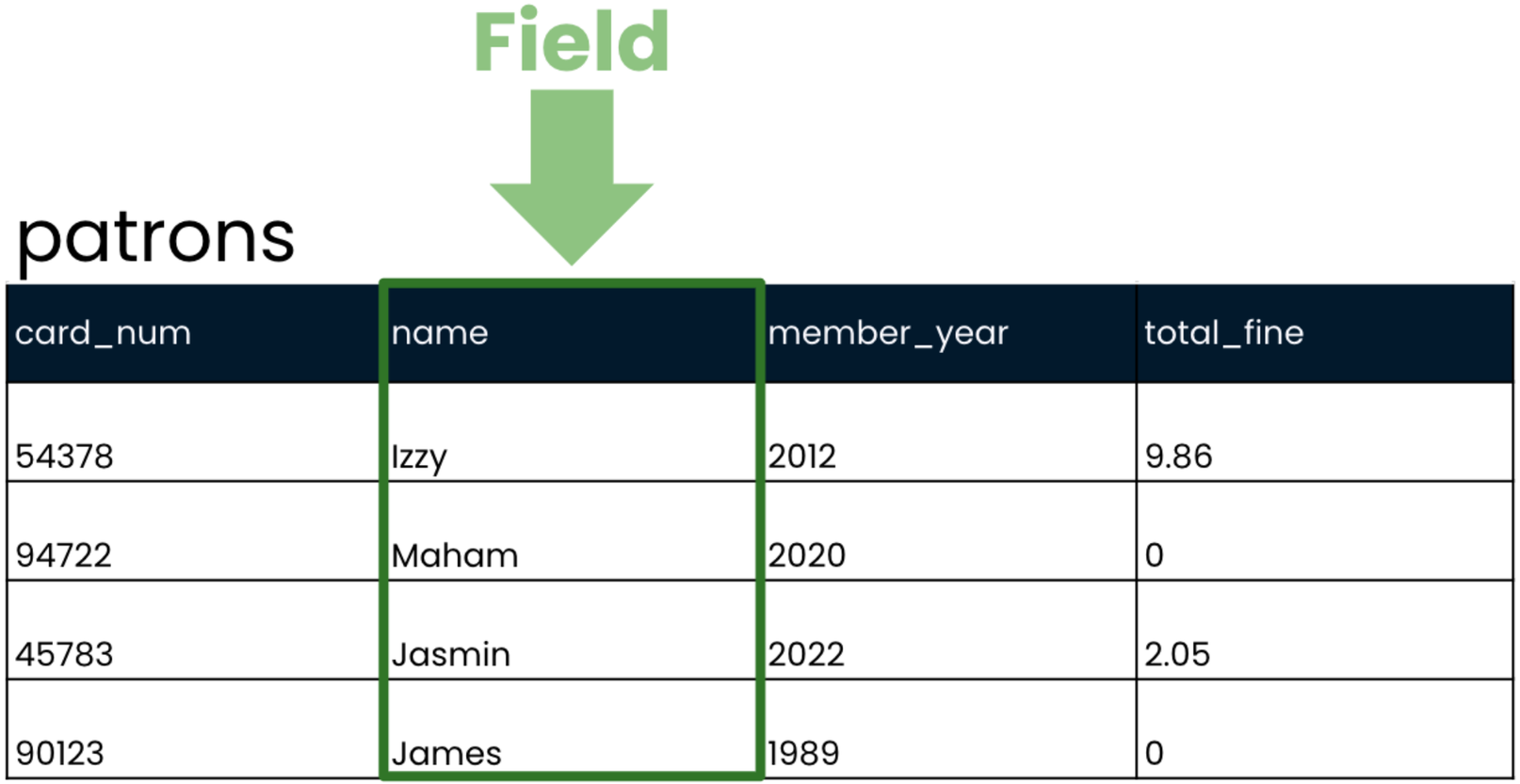
- A specific data observation

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

Fields

- One piece of a record



Field naming

Field names:

- Lowercase
- Use underscores—no spaces
- Singular
- Different from the table name

Unique identifiers

- *Keys* identify unique records

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

Multiple tables

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

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

card_num	name	member_year	total_fine	checkout_id	start_date	due_date	book_id
54378	Izzy	2012	9.86	23359	2024-05-11	2024-05-25	547
54378	Izzy	2012	9.86	23360	2024-05-11	2024-05-26	156
94722	Maham	2020	0				
45783	Jasmin	2022	2.05	23361	2024-05-12	2024-05-26	912
90123	James	1989	0	23362	2024-05-13	2024-05-27	838

Let's practice!

INTRODUCTION TO SQL

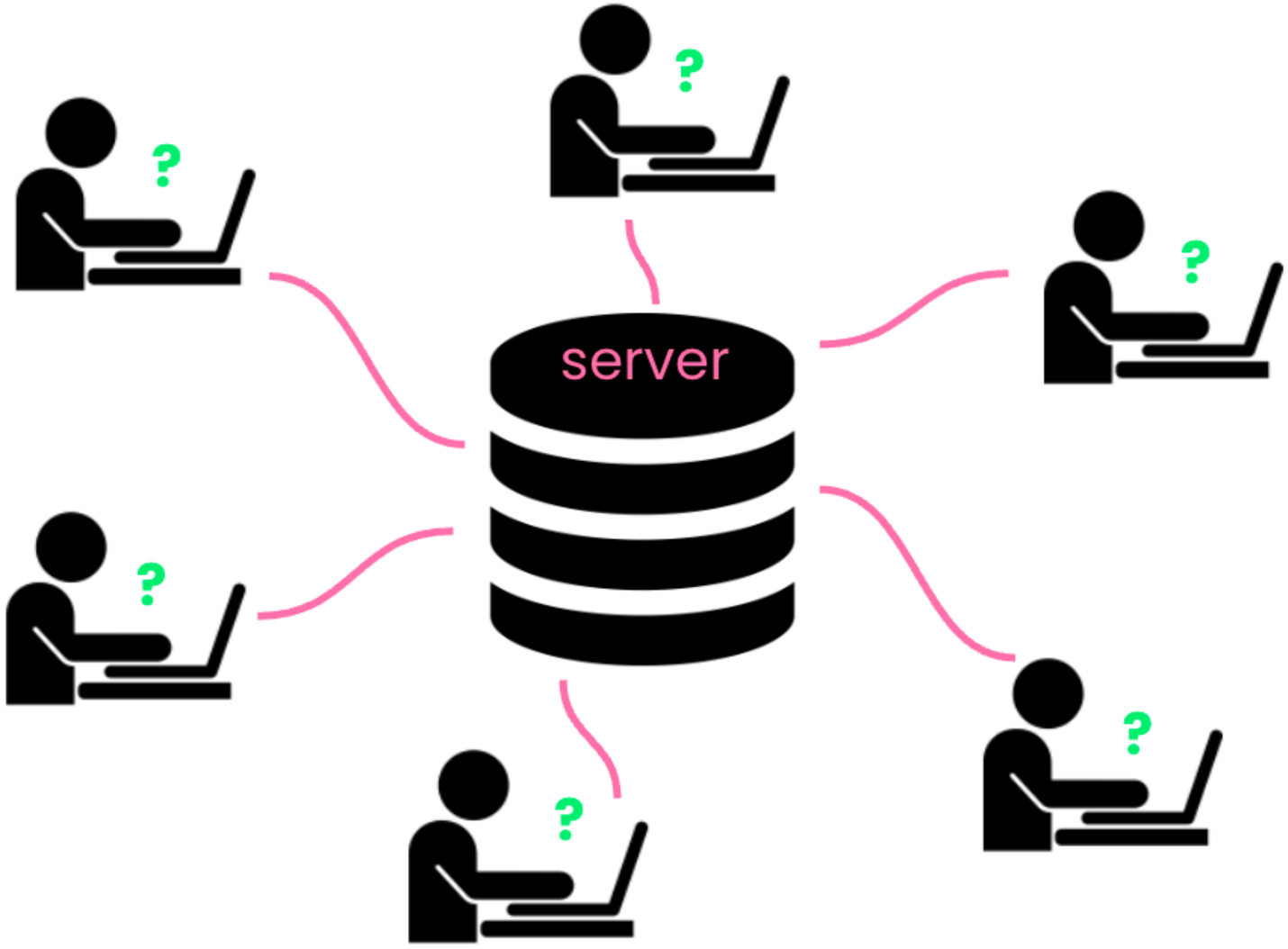
Data types

INTRODUCTION TO SQL

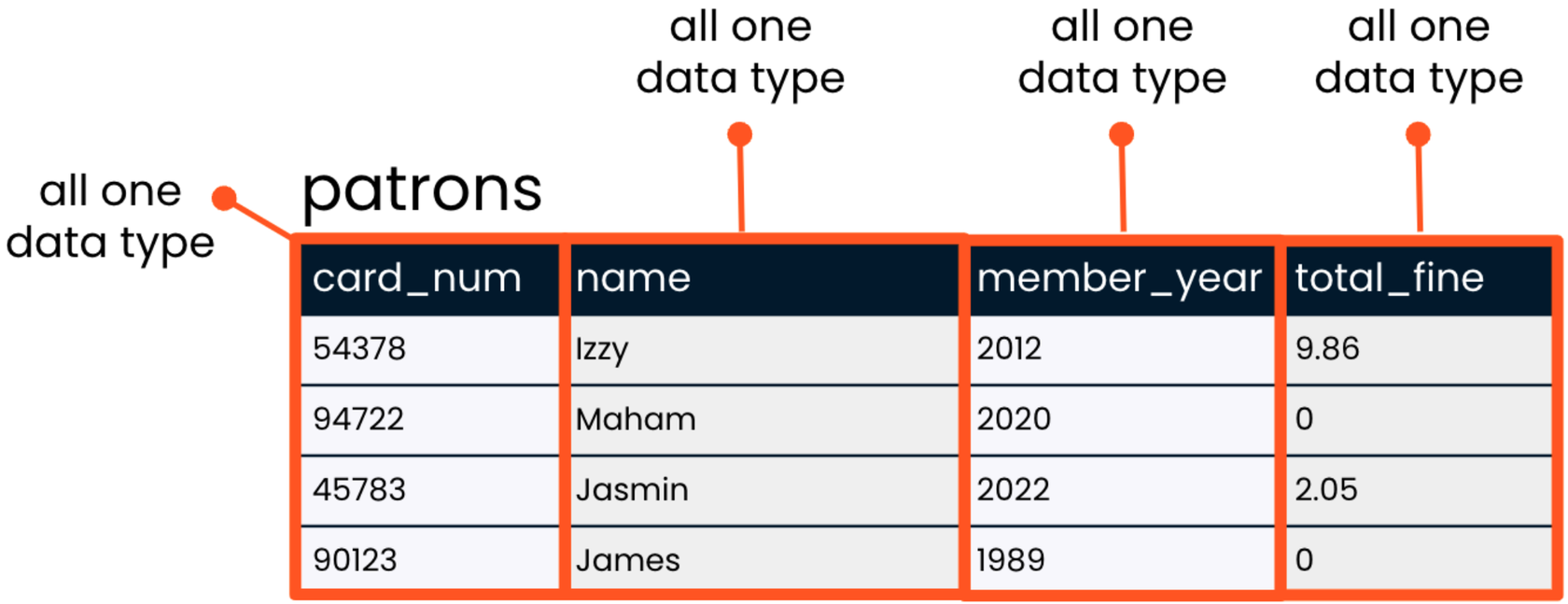
Jasmin Ludolf

Senior Data Science Content Developer, DataCamp

Database storage



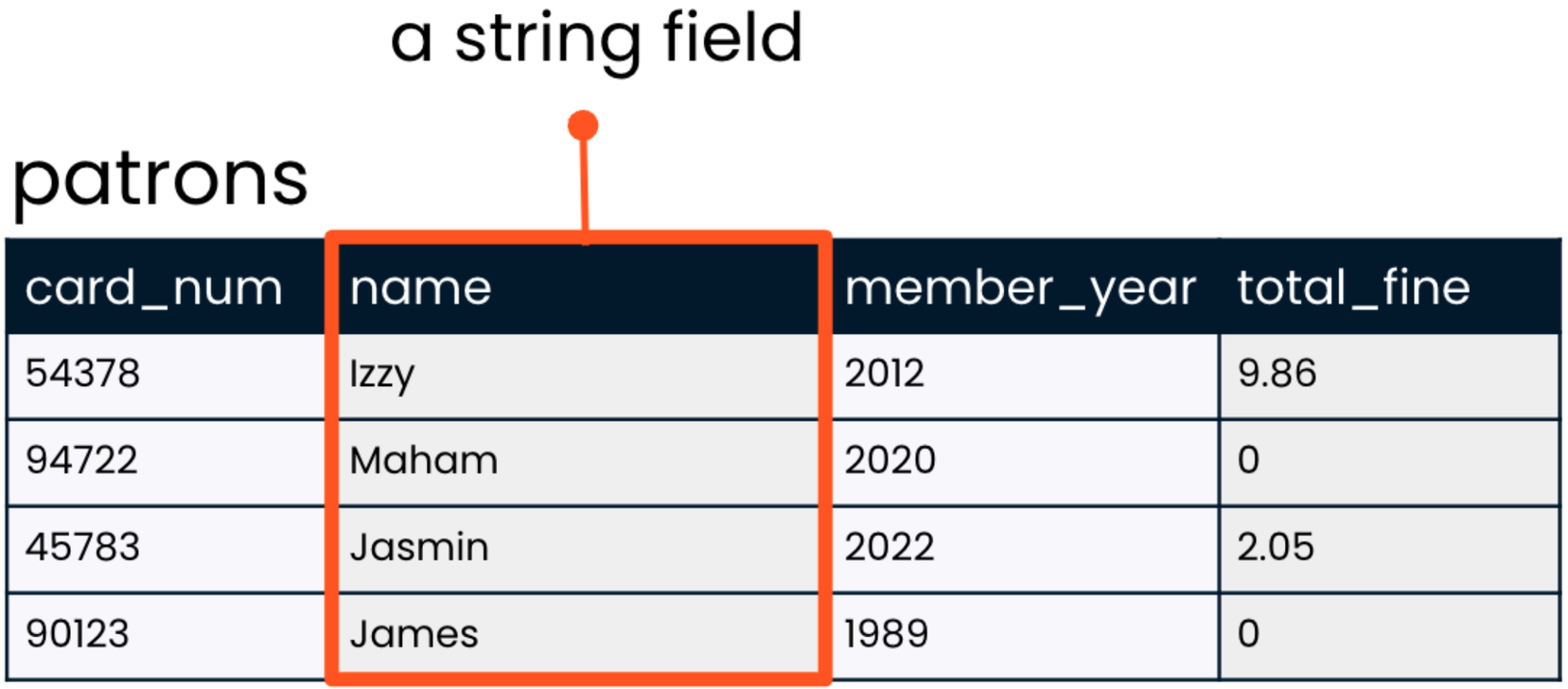
SQL data types



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

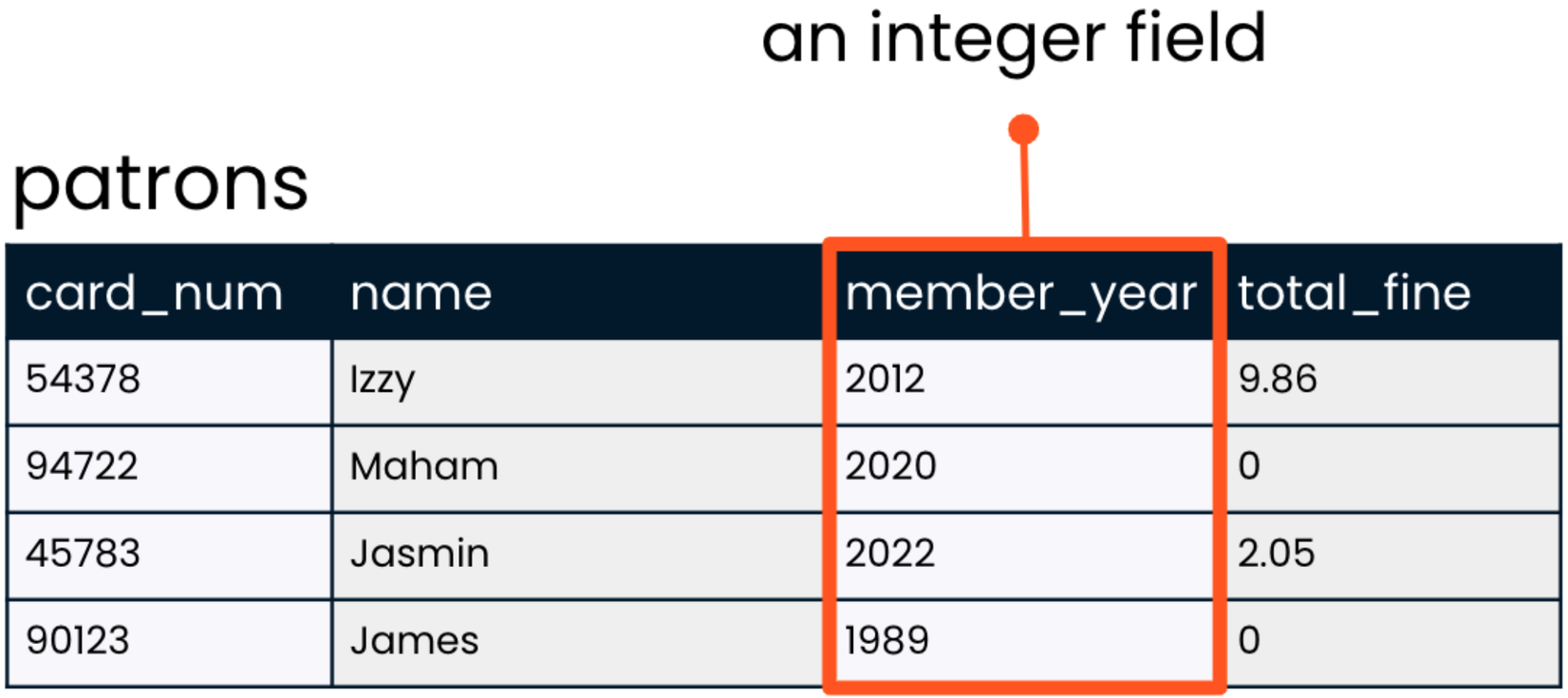
- Different types of data are stored differently and take up different space
- Some operations only apply to certain data types

Strings



- A string is a sequence of characters such as letters or punctuation
- `VARCHAR` is a flexible and popular string data type in SQL

Integers

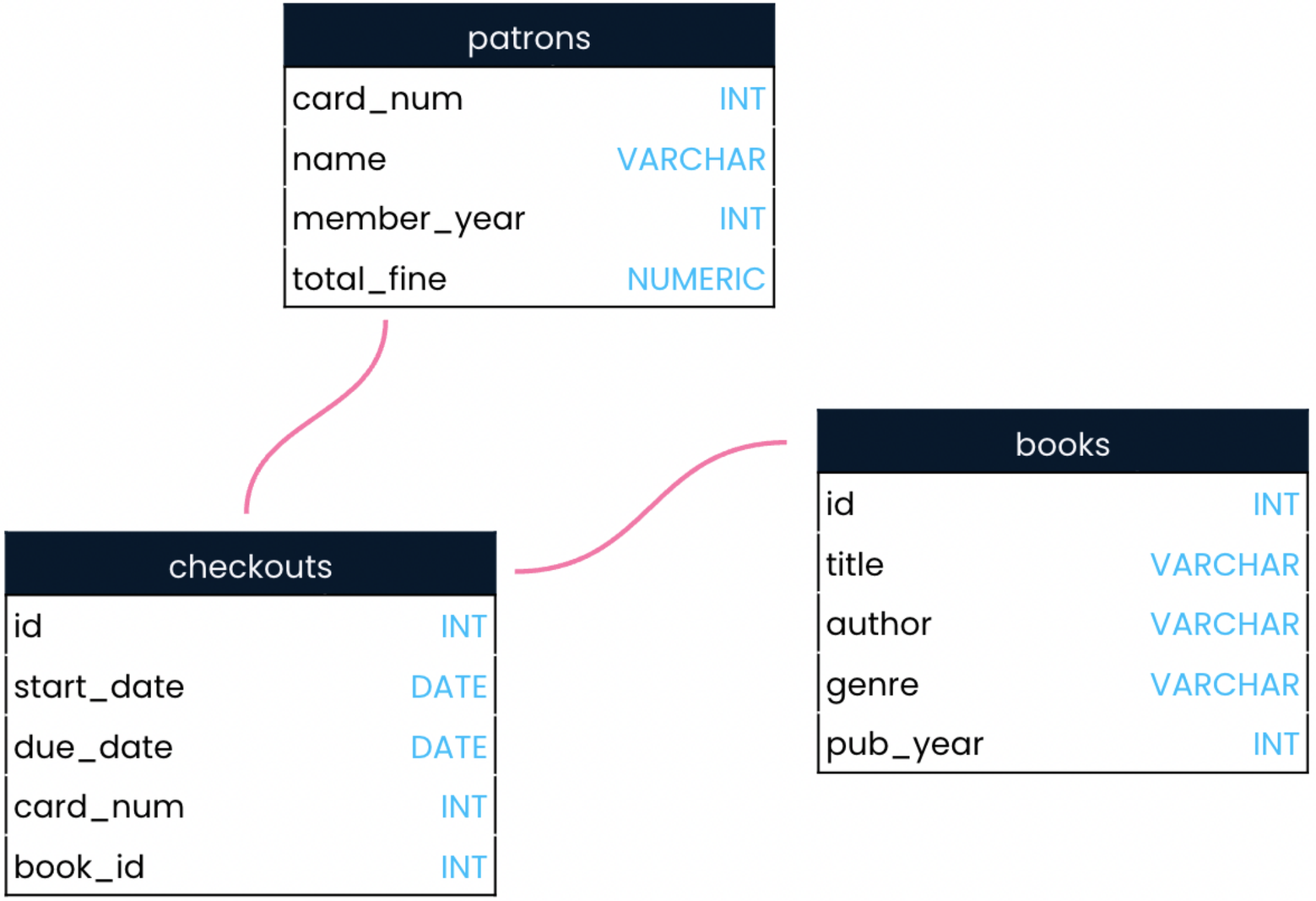


- Integers store whole numbers
- `INT` is a flexible and popular integer data type in SQL

Floats

- 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

Let's practice!

INTRODUCTION TO SQL