# Entity Relationship diagram

Welcome to this Lab activity

In this lab activity you will be exploring how objects and their properties are represented in a relational database. Furthermore you will be looking at depicting a relational database schema in an Entity Relationship (ER) diagram and how to identify and select appropriate field types for storing data in a MySQL database. For the purpose of this lab you will be working with the Terminal panel inside Visual Studio Code.

Start the Lab environment application

It is simple to launch a lab exercise. You only need to click on the button "Start" below the activity title to enter a lab environment.

Let's explore this lab activity. Go ahead and click on the "Start" button!

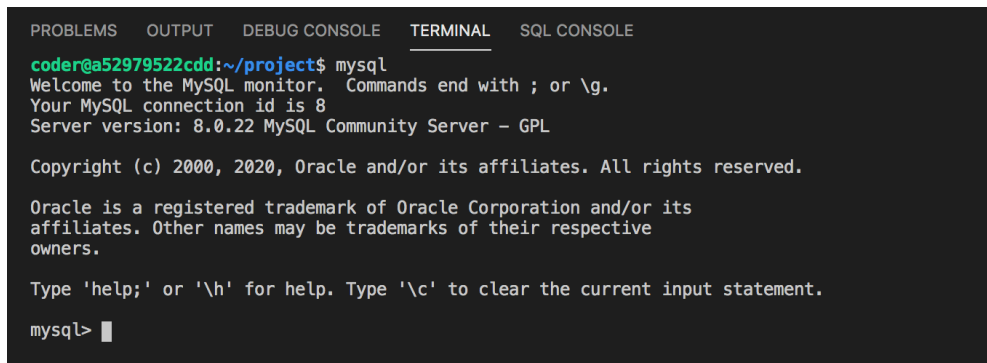## Entity Relationship

↑ **Start**
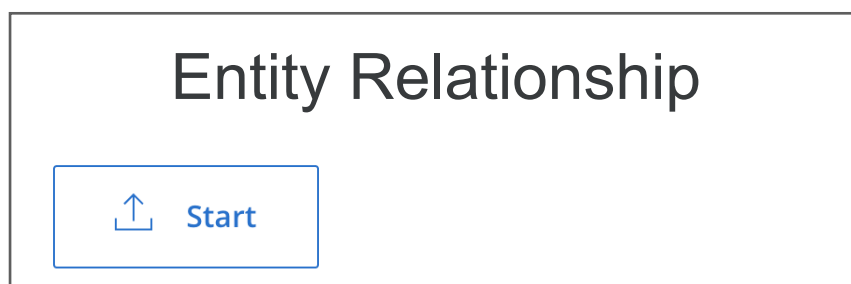
Task 1: Accessing the MySQL interactive shell

The folder structure has already been partially constructed for you and organised into different topics. For the purpose of this lab, you are not required to make any changes to the folder structure. You can see a folder called "topic8" inside this lab environment; it is only there as a reference for you and you are not required to add any content to it. Let's get started!

In order to access your mysql interactive shell use the Visual Studio Code Terminal and run the following command:

- **mysql**: type this command and press *Enter*. This command will log you into mysql shell as the root(default) user.

If you have successfully followed all the above steps you should now be logged in inside mysql and see the following result on the Terminal:

Context

In the first few topics you were working on a 'Book shop' dynamic web application. Let us suppose we wanted to develop the app functionality further and we have a very large book database...

- We want users of the app to be able to search for books, publishers, authors containing specific words.

- We want users of the app to be able to search for books based on publication date.

- We would like the most recent books to appear highest in the list by default, but for the user to be able to change the sort criteria.

- We would like at least two types of users for the app, customers to search for books reading data related to books from database and admin users to create, update and delete data as well as reading data from database.

- We would like a user to be able to click on a book and see all data relevant to that book as well as checking stock availability of a book.

- We would like admin users to be able to update stock availability when new books arrive at store or when books are sold to customers.

- How readily does the current data storage solution facilitate these basic functional requirements?

After completing Tasks 1-6 you need to upload pictures of any hand-drawn documents or notes on the next discussion activity.

Task 1: The application concept

List all the app functionalities that you have developed so far and functionalities listed above in addition to any new functionalities you would like to add to your app.

Task 2: Define 3 basic functions the app will perform

Make your basic functions very specific, i.e.:
Basic function 1: Display a list of available books in alphabetic order. The author's name will appear next to the name and price of the book and so on.

You may find sketching a simple wireframe useful for this part of the task.

Task 3: Object Identification

In a relational database schema, every type of object or entity is represented by its own distinct table. Every record (row) in the table will hold details about a specific instance of that type of thing.

What are the objects or entities that need to be represented in your database? For example, if the Twitter app were to use a relational database, a `Tweet' might be considered an entity (type of thing), and have its own table. Each row within the Tweet table would then represent a specific Tweet.

List the tables required for your application to meet the basic requirements identified in Task 2.

Task 4: Object Properties

Each column or field in the tables will represent a property of that class of object. For example, the properties of a Tweet might include 'user_account', 'timestamp' and 'tweet_text'.

What information about an object do you think would be needed for your application to meet its functional requirements?

List the fields you think should be associated with each entity in your schema.

Task 5: Field Types (15 mins)

When designing a relational database schema, we should also consider the type of data that each column or field in the database will contain.

Here are some of its commonly used field types:

- INT (whole numbers)

- DECIMAL (decimal numbers)

- VARCHAR(L) (variable length string, where L is the maximum length)

- CHAR(L) (fixed length string, where L is the length)

- TEXT (for long strings of text)

- BLOB (binary object, for binary encoded data such as images)

- TIMESTAMP (for date and time values stored in UTC)

You can refer to the MySQL Documentation for other field types.

Beside each field on your list, specify which field type you would choose to represent its data.

Task 6: Depict your schema in an ER diagram (15 mins)

A standard format for depicting relational database schemas is with an Entity Relationship (ER) diagram. Produce an ER diagram for your application's schema. Include table names and relationship cardinally between entities (tables).

Draw a separate diagram with all the tables including their names, field names, field types, primary and foreign keys (PKs and FKs).

When designing your database, remember different types of SQL queries you practiced in the previous lab; basic and advanced queries including aggregate functions, joins and nested SELECT. Thinking of potential future queries or functionalities could help you to identify entities, properties for each entity and PKs, FKs and association types.

Task 7: Exit mysql shell

Exiting the mysql shell is very straight forward. In your Terminal panel type the following command:

- **exit**: type this command and press *Enter*. This command will log you out from your mysql virtual server.

If you have successfully exited the database you will get the following confirmation:

```
mysql> exit
Bye
root@7fbe1633ac7c:/home/coder/project#
```

End of Section

Congratulations for completing this section. In the next lab activity you will be practicing more with database operations. Make sure you have a copy of your hand written documents and notes related to this activity to share in the next discussion.