

QUESTION:

Lab 3: Create a database called library_db and a table books with columns: book_id, title, author, publisher, year_of_publication, and price. Insert five records into the table.

CODE:

```
CREATE DATABASE library_db;
```

```
CREATE TABLE books (
    book_id INT PRIMARY KEY,
    title VARCHAR(100),
    author VARCHAR(100),
    publisher VARCHAR(100),
    year_of_publication INT,
    price DECIMAL(10,2)
);
```

```
INSERT INTO books (book_id, title, author, publisher, year_of_publication, price)
```

```
VALUES
```

```
(1, 'Introduction to SQL', 'James Smith', 'TechPress', 2018, 450.00),
(2, 'Database Management Systems', 'Navathe', 'Pearson', 2016, 650.00),
(3, 'Learning Python', 'Mark Lutz', 'OReilly', 2015, 799.00),
(4, 'Web Development Guide', 'John Doe', 'WebBooks', 2020, 550.00),
(5, 'Advanced Java Programming', 'Herbert Schildt', 'McGraw Hill', 2019, 700.00);
```

SCREENSHOT:

	book_id	title	author	publisher	year_of_publication	price
<input type="checkbox"/>	1	Introduction to SQL	James Smith	TechPress	2018	450.00
<input type="checkbox"/>	2	Database Management Systems	Navathe	Pearson	2016	650.00
<input type="checkbox"/>	3	Learning Python	Mark Lutz	OReilly	2015	799.00
<input type="checkbox"/>	4	Web Development Guide	John Doe	WebBooks	2020	550.00
<input type="checkbox"/>	5	Advanced Java Programming	Herbert Schildt	McGraw Hill	2019	700.00

QUESTION:

Lab 4: Create a table members in library_db with columns: member_id, member_name, date_of_membership, and email. Insert five records into this table.

CODE:

```
CREATE TABLE members (
    member_id INT PRIMARY KEY,
    member_name VARCHAR(100),
    date_of_membership DATE,
    email VARCHAR(100)
);
```

```
INSERT INTO members (member_id, member_name, date_of_membership, email)
VALUES
(1, 'Rahul Sharma', '2022-01-15', 'rahul.sharma@example.com'),
(2, 'Priya Patel', '2021-12-20', 'priya.patel@example.com'),
(3, 'Amit Kumar', '2023-03-05', 'amit.kumar@example.com'),
(4, 'Sneha Mehta', '2022-07-10', 'sneha.mehta@example.com'),
(5, 'Karan Joshi', '2023-01-25', 'karan.joshi@example.com');
```

SCREENSHOT:

	book_id	title	author	publisher	year_of_publication	price
<input type="checkbox"/>	1	Introduction to SQL	James Smith	TechPress	2018	450.00
<input type="checkbox"/>	2	Database Management Systems	Navathe	Pearson	2016	650.00
<input type="checkbox"/>	3	Learning Python	Mark Lutz	O'Reilly	2015	799.00
<input type="checkbox"/>	4	Web Development Guide	John Doe	WebBooks	2020	550.00
<input type="checkbox"/>	5	Advanced Java Programming	Herbert Schildt	McGraw Hill	2019	700.00

QUESTION:

Lab 3: Retrieve all members who joined the library before 2022. Use appropriate SQL syntax with WHERE and ORDER BY.

CODE:

```
SELECT *
FROM members
WHERE date_of_membership < '2022-01-01'
ORDER BY date_of_membership ASC;
```

SCREENSHOT:

A screenshot of a database table interface. The table has columns: book_id, title, author, publisher, year_of_publication, and price. There are 5 rows of data. Row 1: book_id 1, title 'Introduction to SQL', author 'James Smith', publisher 'TechPress', year_of_publication 2018, price 450.00. Row 2: book_id 2, title 'Database Management Systems', author 'Navathe', publisher 'Pearson', year_of_publication 2016, price 650.00. Row 3: book_id 3, title 'Learning Python', author 'Mark Lutz', publisher 'O'Reilly', year_of_publication 2015, price 799.00. Row 4: book_id 4, title 'Web Development Guide', author 'John Doe', publisher 'WebBooks', year_of_publication 2020, price 550.00. Row 5: book_id 5, title 'Advanced Java Programming', author 'Herbert Schildt', publisher 'McGraw Hill', year_of_publication 2019, price 700.00. At the bottom, there are buttons for Check all, With selected: (Edit, Copy, Delete), and Export.

	book_id	title	author	publisher	year_of_publication	price
<input type="checkbox"/>	1	Introduction to SQL	James Smith	TechPress	2018	450.00
<input type="checkbox"/>	2	Database Management Systems	Navathe	Pearson	2016	650.00
<input type="checkbox"/>	3	Learning Python	Mark Lutz	O'Reilly	2015	799.00
<input type="checkbox"/>	4	Web Development Guide	John Doe	WebBooks	2020	550.00
<input type="checkbox"/>	5	Advanced Java Programming	Herbert Schildt	McGraw Hill	2019	700.00

QUESTION:

Lab 4: Write SQL queries to display the titles of books published by a specific author. Sort the results by year_of_publication in descending order.

CODE:

```
SELECT title, author, year_of_publication
FROM books
WHERE author = 'Mark Lutz'
ORDER BY year_of_publication DESC;
```

SCREENSHOT:

A screenshot of a database table interface. The table has columns: title, author, and year_of_publication. A single row is selected, showing "Learning Python" in the title column, "Mark Lutz" in the author column, and "2015" in the year_of_publication column. Below the table are standard database management tools: Edit, Copy, Delete, Check all, With selected, Export, Show all, Number of rows (set to 25), Filter rows, and Search this table.

	title	author	year_of_publication
<input type="checkbox"/>	Learning Python	Mark Lutz	2015

With selected: Check all Export Edit Copy Delete Show all Number of rows: 25 Filter rows: Search this table

QUESTION:

Lab 3: Add a CHECK constraint to ensure that the price of books in the books table is greater than 0.

CODE:

```
ALTER TABLE books
```

```
ADD CONSTRAINT chk_price CHECK (price > 0);
```

SCREENSHOT:

A screenshot of a database table interface. The table has columns: book_id, title, author, publisher, year_of_publication, and price. Five rows are listed. The last row, which includes the book "Advanced Java Programming" by Herbert Schildt, has its price set to 700.00. Below the table are standard database management tools: Edit, Copy, Delete, Check all, With selected, Export, Show all, Number of rows (set to 25), Filter rows, and Sort by key (set to None).

	book_id	title	author	publisher	year_of_publication	price
<input type="checkbox"/>	1	Introduction to SQL	James Smith	TechPress	2018	450.00
<input type="checkbox"/>	2	Database Management Systems	Navathe	Pearson	2016	650.00
<input type="checkbox"/>	3	Learning Python	Mark Lutz	O'Reilly	2015	799.00
<input type="checkbox"/>	4	Web Development Guide	John Doe	WebBooks	2020	550.00
<input type="checkbox"/>	5	Advanced Java Programming	Herbert Schildt	McGraw Hill	2019	700.00

With selected: Check all Export Edit Copy Delete Show all Number of rows: 25 Filter rows: Search this table Sort by key: None

QUESTION:

Lab 4: Modify the members table to add a UNIQUE constraint on the email column, ensuring that each member has a unique email address.

CODE:

```
ALTER TABLE members
```

```
ADD CONSTRAINT unique_email UNIQUE (email);
```

SCREENSHOT:

		member_id	member_name	date_of_membership	email
<input type="checkbox"/>	Edit Copy Delete	1	Rahul Sharma	2022-01-15	rahul.sharma@example.com
<input type="checkbox"/>	Edit Copy Delete	2	Priya Patel	2021-12-20	priya.patel@example.com
<input type="checkbox"/>	Edit Copy Delete	3	Amit Kumar	2023-03-05	amit.kumar@example.com
<input type="checkbox"/>	Edit Copy Delete	4	Sneha Mehta	2022-07-10	sneha.mehta@example.com
<input type="checkbox"/>	Edit Copy Delete	5	Karan Joshi	2023-01-25	karan.joshi@example.com

Check all With selected: Edit Copy Delete Export

QUESTION:

Lab 3: Create a table authors with the following columns: author_id, first_name, last_name, and country. Set author_id as the primary key.

CODE:

```
CREATE TABLE authors (
    author_id INT PRIMARY KEY,
    first_name VARCHAR(100),
    last_name VARCHAR(100),
    country VARCHAR(100)
);
```

SCREENSHOT:

The screenshot shows a MySQL Workbench interface. At the top, a green status bar indicates: "MySQL returned an empty result set (i.e. zero rows). (Query took 0.0016 seconds.)". Below this is a toolbar with the SQL command: "SELECT * FROM `authors`". To the right of the toolbar is a button for "Profiling" and links for "Edit inline", "Edit", "Explain SQL", "Create PHP code", and "Refresh". The main area displays a table header with columns: "author_id", "first_name", "last_name", and "country". Below the header, there is a button labeled "Query results operations" and a "Create view" button.

QUESTION:

Lab 4: Create a table publishers with columns: publisher_id, publisher_name, contact_number, and address. Set publisher_id as the primary key and contact_number as unique.

CODE:

```
CREATE TABLE publishers (
    publisher_id INT PRIMARY KEY,
    publisher_name VARCHAR(150),
    contact_number VARCHAR(20) UNIQUE,
    address VARCHAR(200)
);
```

SCREENSHOT:

The screenshot shows a MySQL Workbench interface. At the top, a green status bar indicates: "MySQL returned an empty result set (i.e. zero rows). (Query took 0.0016 seconds.)". Below this is a toolbar with the SQL command: "SELECT * FROM `publishers`". To the right of the toolbar is a button for "Profiling" and links for "Edit inline", "Edit", "Explain SQL", "Create PHP code", and "Refresh". The main area displays a table header with columns: "publisher_id", "publisher_name", "contact_number", and "address".

QUESTION:

Lab 3: Add a new column genre to the books table. Update the genre for all existing records.

CODE:

ALTER TABLE books

ADD genre VARCHAR(50);

UPDATE books

SET genre = 'Education'

WHERE book_id = 1;

UPDATE books

SET genre = 'Technology'

WHERE book_id = 2;

UPDATE books

SET genre = 'Programming'

WHERE book_id = 3;

UPDATE books

SET genre = 'Web Development'

WHERE book_id = 4;

UPDATE books

SET genre = 'Java'

WHERE book_id = 5;

SCREENSHOT:

The screenshot shows a table named 'books' with the following data:

	book_id	title	author	publisher	year_of_publication	price	genre
<input type="checkbox"/>	1	Introduction to SQL	James Smith	TechPress	2018	450.00	Education
<input type="checkbox"/>	2	Database Management Systems	Navathe	Pearson	2016	650.00	Technology
<input type="checkbox"/>	3	Learning Python	Mark Lutz	O'Reilly	2015	799.00	Programming
<input type="checkbox"/>	4	Web Development Guide	John Doe	WebBooks	2020	550.00	Web Development
<input type="checkbox"/>	5	Advanced Java Programming	Herbert Schildt	McGraw Hill	2019	700.00	Java

Below the table are standard MySQL Workbench navigation and search controls.

QUESTION:

Lab 4: Modify the members table to increase the length of the email column to 100 characters.

CODE:

```
ALTER TABLE members
```

```
MODIFY email VARCHAR(100);
```

SCREENSHOT:

The screenshot shows a table named 'members' with the following data:

	member_id	member_name	date_of_membership	email
<input type="checkbox"/>	1	Rahul Sharma	2022-01-15	rahul.sharma@example.com
<input type="checkbox"/>	2	Priya Patel	2021-12-20	priya.patel@example.com
<input type="checkbox"/>	3	Amit Kumar	2023-03-05	amit.kumar@example.com
<input type="checkbox"/>	4	Sneha Mehta	2022-07-10	sneha.mehta@example.com
<input type="checkbox"/>	5	Karan Joshi	2023-01-25	karan.joshi@example.com

Below the table are standard MySQL Workbench navigation and search controls.

QUESTION:

Lab 3: Drop the publishers table from the database after verifying its structure.

CODE:

```
DROP TABLE publishers;
```

SCREENSHOT:



QUESTION:

Lab 4: Create a backup of the members table and then drop the original members table.

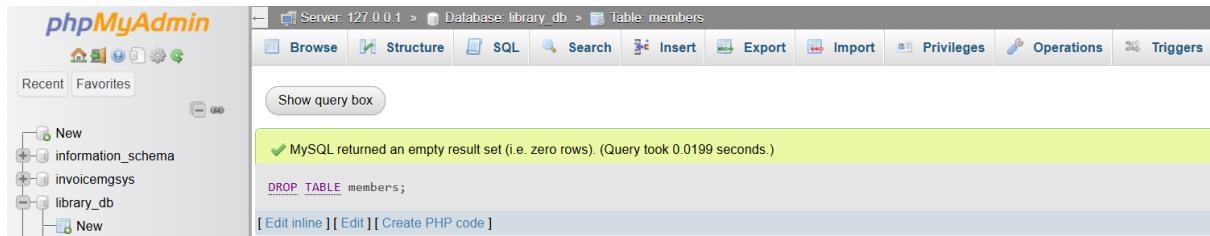
CODE:

```
CREATE TABLE members_backup AS
```

```
SELECT * FROM members;
```

```
DROP TABLE members;
```

SCREENSHOT:



QUESTION:

Lab 4: Insert three new authors into the authors table, then update the last name of one of the authors.

CODE:

```
INSERT INTO authors (author_id, first_name, last_name, country)
```

```
VALUES
```

```
(1, 'Robert', 'Martin', 'USA'),
```

```
(2, 'Ken', 'Thompson', 'USA'),
```

```
(3, 'Dennis', 'Ritchie', 'USA');
```

UPDATE authors

```
SET last_name = 'Richards'
```

```
WHERE author_id = 3;
```

SCREENSHOT:

	author_id	first_name	last_name	country
<input type="checkbox"/>	1	Robert	Martin	USA
<input type="checkbox"/>	2	Ken	Thompson	USA
<input type="checkbox"/>	3	Dennis	Richards	USA

Up Check all With selected: Edit Copy Delete Export

QUESTION:

Lab 5: Delete a book from the books table where the price is higher than \$100.

CODE:

```
DELETE FROM books
```

```
WHERE price > 100;
```

SCREENSHOT:

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0006 seconds.)

```
SELECT * FROM `books`
```

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

book_id	title	author	publisher	year_of_publication	price	genre
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Query results operations

Create view

QUESTION:

Lab 3: Update the year_of_publication of a book with a specific book_id.

CODE:

UPDATE books

SET year_of_publication = 2021

WHERE book_id = 3;

SCREENSHOT:

	book_id	title	author	publisher	year_of_publication	price	genre
<input type="checkbox"/>	6	Data Structures and Algorithms	Robert Lafore	TechPress	2022	750.00	Programming
<input type="checkbox"/>		Check all	With selected:	<input type="checkbox"/> Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	<input type="checkbox"/> Export

QUESTION:

Lab 4: Increase the price of all books published before 2015 by 10%.

CODE:

UPDATE books

SET price = price * 1.10

WHERE year_of_publication < 2015;

SCREENSHOT:

	book_id	title	author	publisher	year_of_publication	price	genre
<input type="checkbox"/>	6	Data Structures and Algorithms	Robert Lafore	TechPress	2014	825.00	Programming
<input type="checkbox"/>		Check all	With selected:	<input type="checkbox"/> Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	<input type="checkbox"/> Export
<input type="checkbox"/>	Show all	Number of rows:	25	Filter rows:	Search this table		

QUESTION:

Lab 3: Remove all members who joined before 2020 from the members table.

CODE:

```
DELETE FROM members_backup
```

```
WHERE date_of_membership < '2020-01-01';
```

SCREENSHOT:

member_id	member_name	date_of_membership	email
1	Rahul Sharma	2022-01-15	rahul.sharma@example.com
2	Priya Patel	2021-12-20	priya.patel@example.com
3	Amit Kumar	2023-03-05	amit.kumar@example.com
4	Sneha Mehta	2022-07-10	sneha.mehta@example.com
5	Karan Joshi	2023-01-25	karan.joshi@example.com

QUESTION:

Lab 4: Delete all books that have a NULL value in the author column.

CODE:

```
DELETE FROM books
```

```
WHERE author IS NULL;
```

SCREENSHOT:

book_id	title	author	publisher	year_of_publication	price	genre
6	Data Structures and Algorithms	Robert Lafore	TechPress	2014	825.00	Programming

QUESTION:

Lab 4: Write a query to retrieve all books with price between \$50 and \$100.

CODE:

```
SELECT *  
FROM books  
WHERE price BETWEEN 50 AND 100;
```

SCREENSHOT:

A screenshot of a database table interface. The table has columns: book_id, title, author, publisher, year_of_publication, price, and genre. One row is visible: book_id 6, title 'Data Structures and Algorithms', author 'Robert Lafore', publisher 'TechPress', year_of_publication 2014, price 825.00, and genre 'Programming'. Below the table are standard database actions: Edit, Copy, Delete, Check all, With selected:, and Export.

book_id	title	author	publisher	year_of_publication	price	genre
6	Data Structures and Algorithms	Robert Lafore	TechPress	2014	825.00	Programming

QUESTION:

Lab 5: Retrieve the list of books sorted by author in ascending order and limit the results to the top 3 entries.

CODE:

```
SELECT *  
FROM books  
ORDER BY author ASC  
LIMIT 3;
```

SCREENSHOT:

A screenshot of a database table interface showing the top 3 books sorted by author. The table has columns: book_id, title, author, publisher, year_of_publication, price, and genre. Five rows are visible, but only the first three are highlighted in grey. The first row: book_id 6, title 'Data Structures and Algorithms', author 'Robert Lafore', publisher 'TechPress', year_of_publication 2014, price 825.00, and genre 'Programming'. The second row: book_id 7, title 'Artificial Intelligence Basics', author 'Stuart Russell', publisher 'AI Press', year_of_publication 2021, price 850.00, and genre 'Technology'. The third row: book_id 8, title 'Machine Learning Guide', author 'Tom Mitchell', publisher 'ML Books', year_of_publication 2019, price 950.00, and genre 'Technology'. Below the table are standard database actions: Edit, Copy, Delete, Check all, With selected:, and Export.

book_id	title	author	publisher	year_of_publication	price	genre
6	Data Structures and Algorithms	Robert Lafore	TechPress	2014	825.00	Programming
7	Artificial Intelligence Basics	Stuart Russell	AI Press	2021	850.00	Technology
8	Machine Learning Guide	Tom Mitchell	ML Books	2019	950.00	Technology
9	Clean Code	Robert Martin	Prentice Hall	2008	700.00	Programming
10	Deep Learning	Ian Goodfellow	MIT Press	2016	1200.00	Technology

QUESTION:

Lab 3: Grant SELECT permission to a user named librarian on the books table.

CODE:

```
GRANT SELECT ON books TO 'librarian'@'localhost';
```

SCREENSHOT:

✓ MySQL returned an empty result set (i.e. zero rows). (Query took 0.0153 seconds.)

```
GRANT SELECT ON books TO 'librarian'@'localhost';
```

[Edit inline] [Edit] [Create PHP code]

QUESTION:

Lab 4: Grant INSERT and UPDATE permissions to the user admin on the members table.

CODE:

```
GRANT INSERT, UPDATE ON members TO 'admin'@'localhost';
```

SCREENSHOT:

✓ MySQL returned an empty result set (i.e. zero rows). (Query took 0.0112 seconds.)

```
GRANT INSERT, UPDATE ON members TO 'admin'@'localhost';
```

[Edit inline] [Edit] [Create PHP code]

QUESTION:

Lab 3: Revoke the INSERT privilege from the user librarian on the books table.

CODE:

```
REVOKE INSERT ON books FROM 'librarian'@'localhost';
```

SCREENSHOT:

	book_id	title	author	publisher	year_of_publication	price	genre
<input type="checkbox"/>	6	Data Structures and Algorithms	Robert Lafore	TechPress	2014	825.00	Programming
<input type="checkbox"/>	7	Artificial Intelligence Basics	Stuart Russell	AI Press	2021	850.00	Technology
<input type="checkbox"/>	8	Machine Learning Guide	Tom Mitchell	ML Books	2019	950.00	Technology
<input type="checkbox"/>	9	Clean Code	Robert Martin	Prentice Hall	2008	700.00	Programming
<input type="checkbox"/>	10	Deep Learning	Ian Goodfellow	MIT Press	2016	1200.00	Technology

QUESTION:

Lab 4: Revoke all permissions from user admin on the members table.

CODE:

```
REVOKE ALL PRIVILEGES ON members FROM 'admin'@'localhost';
```

SCREENSHOT:

Show query box

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0022 seconds.)

```
REVOKE ALL PRIVILEGES ON members FROM 'admin'@'localhost';
```

[Edit inline] [Edit] [Create PHP code]

QUESTION:

Lab 3: Use COMMIT after inserting multiple records into the books table, then make another insertion and perform a ROLLBACK.

CODE:

```
START TRANSACTION;
```

```
INSERT INTO books (book_id, title, author, publisher, year_of_publication, price, genre)
```

```
VALUES
```

```
(14, 'Cloud Computing Basics', 'Thomas Erl', 'TechWorld', 2020, 700.00, 'Technology');
```

```
ROLLBACK;
```

SCREENSHOT:

	book_id	title	author	publisher	year_of_publication	price	genre
<input type="checkbox"/>	6	Data Structures and Algorithms	Robert Lafore	TechPress	2014	825.00	Programming
<input type="checkbox"/>	7	Artificial Intelligence Basics	Stuart Russell	AI Press	2021	850.00	Technology
<input type="checkbox"/>	8	Machine Learning Guide	Tom Mitchell	ML Books	2019	950.00	Technology
<input type="checkbox"/>	9	Clean Code	Robert Martin	Prentice Hall	2008	700.00	Programming
<input type="checkbox"/>	10	Deep Learning	Ian Goodfellow	MIT Press	2016	1200.00	Technology
<input type="checkbox"/>	11	Networking Essentials	James Kurose	Pearson	2017	600.00	Technology
<input type="checkbox"/>	12	Operating Systems Concepts	Abraham Silberschatz	Wiley	2018	850.00	Technology
<input type="checkbox"/>	13	Computer Architecture	John Hennessy	Morgan Kaufmann	2015	900.00	Technology

QUESTION:

Lab 4: Set a SAVEPOINT before making updates to the members table, perform some updates, and then roll back to the SAVEPOINT.

CODE:

START TRANSACTION;

SAVEPOINT sp1;

UPDATE members

SET member_name = 'Rahul S.'

WHERE member_id = 1;

UPDATE members

SET email = 'updated.priya@example.com'

WHERE member_id = 2;

ROLLBACK TO SAVEPOINT sp1;

COMMIT;

SCREENSHOT:

	member_id	member_name	date_of_membership	email
<input type="checkbox"/>	1	Rahul S.	2022-01-15	rahul.sharma@example.com
<input type="checkbox"/>	2	Priya Patel	2021-12-20	new.priya@example.com
<input type="checkbox"/>	3	Amit Kumar	2023-03-05	amit.kumar@example.com
<input type="checkbox"/>	4	Sneha Mehta	2022-07-10	sneha.mehta@example.com
<input type="checkbox"/>	5	Karan Joshi	2023-01-25	karan.joshi@example.com

Check all With selected: Edit Copy Delete Export

QUESTION:

Lab 3: Perform an INNER JOIN between books and authors tables to display the title of books and their respective authors' names.

CODE:

```
SELECT  
    books.title,  
    authors.first_name,  
    authors.last_name  
FROM books  
INNER JOIN authors  
ON books.author = CONCAT(authors.first_name, ' ', authors.last_name);
```

SCREENSHOT:

		member_id	member_name	date_of_membership	email
<input type="checkbox"/>	Edit Copy Delete	1	Rahul S.	2022-01-15	rahul.sharma@example.com
<input type="checkbox"/>	Edit Copy Delete	2	Priya Patel	2021-12-20	new.priya@example.com
<input type="checkbox"/>	Edit Copy Delete	3	Amit Kumar	2023-03-05	amit.kumar@example.com
<input type="checkbox"/>	Edit Copy Delete	4	Sneha Mehta	2022-07-10	sneha.mehta@example.com
<input type="checkbox"/>	Edit Copy Delete	5	Karan Joshi	2023-01-25	karan.joshi@example.com

Check all With selected: Edit Copy Delete Export

QUESTION:

Lab 4: Use a FULL OUTER JOIN to retrieve all records from the books and authors tables, including those with no matching entries in the other table.

CODE:

```
SELECT  
    books.title,  
    authors.first_name,  
    authors.last_name  
FROM books
```

LEFT JOIN authors

ON books.author = CONCAT(authors.first_name, ' ', authors.last_name)

UNION

SELECT

books.title,
authors.first_name,
authors.last_name

FROM books

RIGHT JOIN authors

ON books.author = CONCAT(authors.first_name, ' ', authors.last_name);

SCREENSHOT:

title	first_name	last_name
Clean Code	Robert	Martin
Data Structures and Algorithms	NULL	NULL
Artificial Intelligence Basics	NULL	NULL
Machine Learning Guide	NULL	NULL
Deep Learning	NULL	NULL
Networking Essentials	NULL	NULL
Operating Systems Concepts	NULL	NULL
Computer Architecture	NULL	NULL
NULL	Ken	Thompson
NULL	Dennis	Richards

QUESTION:

Lab 3: Group books by genre and display the total number of books in each genre.

CODE:

```
SELECT genre,COUNT(*) AS total_books  
FROM books  
GROUP BY genre;
```

SCREENSHOT:

The screenshot shows a table of book genres and their counts. The table has two columns: 'genre' and 'total_books'. There are two rows: one for 'Programming' with a count of 2, and one for 'Technology' with a count of 6. The table is presented in a grid format with alternating row colors. Above the table, there is a header bar with options to 'Show all', set the 'Number of rows' (set to 25), and a 'Filter rows' search bar. Below the table, there is another header bar with similar options.

genre	total_books
Programming	2
Technology	6

QUESTION:

Lab 4: Group members by the year they joined and find the number of members who joined each year.

CODE:

```
SELECT YEAR(date_of_membership) AS join_year,COUNT(*) AS total_members  
FROM members  
GROUP BY YEAR(date_of_membership);
```

SCREENSHOT:

The screenshot shows a table of member join years and counts. The table has two columns: 'join_year' and 'total_members'. There are three rows: one for 2021 with a count of 1, one for 2022 with a count of 2, and one for 2023 with a count of 2. The table is presented in a grid format with alternating row colors. Above the table, there is a header bar with options to 'Show all', set the 'Number of rows' (set to 25), and a 'Filter rows' search bar. Below the table, there is another header bar with similar options.

join_year	total_members
2021	1
2022	2
2023	2

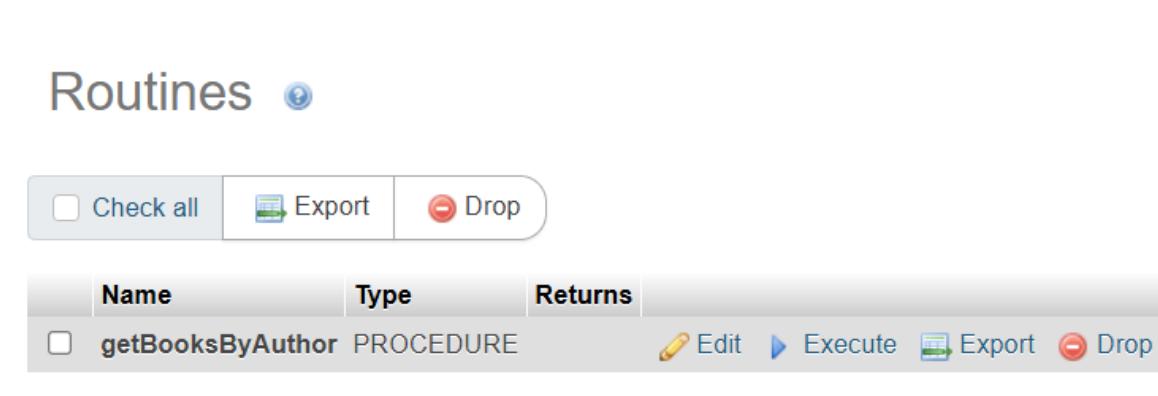
QUESTION:

Lab 3: Write a stored procedure to retrieve all books by a particular author.

CODE:

```
DELIMITER //  
  
CREATE PROCEDURE getBooksByAuthor(IN authorName VARCHAR(100))  
  
BEGIN  
  
SELECT * FROM books WHERE author=authorName;  
  
END //  
  
DELIMITER ;
```

SCREENSHOT:



The screenshot shows the 'Routines' section in MySQL Workbench. At the top, there are buttons for 'Check all', 'Export', and 'Drop'. Below is a table with columns 'Name', 'Type', and 'Returns'. A single row is selected, showing 'getBooksByAuthor' as a PROCEDURE. To the right of the table are buttons for 'Edit', 'Execute', 'Export', and 'Drop'.

Name	Type	Returns
getBooksByAuthor	PROCEDURE	

QUESTION:

Lab 4: Write a stored procedure that takes book_id as an argument and returns the price of the book.

CODE:

```
DELIMITER //  
  
CREATE PROCEDURE getBookPrice(IN bid INT)  
  
BEGIN  
  
SELECT price FROM books WHERE book_id=bid;  
  
END //  
  
DELIMITER ;
```

SCREENSHOT:

Routines

<input type="checkbox"/> Name	Type	Returns		Edit		Execute		Export		Drop
<input type="checkbox"/> getBookPrice	PROCEDURE			Edit		Execute		Export		Drop
<input type="checkbox"/> getBooksByAuthor	PROCEDURE			Edit		Execute		Export		Drop

QUESTION:

Lab 3: Create a view to show only the title, author, and price of books from the books table.

CODE:

```
CREATE VIEW books_view AS
```

```
SELECT title,author,price
```

```
FROM books;
```

SCREENSHOT:

<input type="checkbox"/> Show all	Number of rows:	25	Filter rows:	Search this table
Extra options				
			author	price
<input type="checkbox"/>				Data Structures and Algorithms Robert Lafore 825.00
<input type="checkbox"/>				Artificial Intelligence Basics Stuart Russell 850.00
<input type="checkbox"/>				Machine Learning Guide Tom Mitchell 950.00
<input type="checkbox"/>				Clean Code Robert Martin 700.00
<input type="checkbox"/>				Deep Learning Ian Goodfellow 1200.00
<input type="checkbox"/>				Networking Essentials James Kurose 600.00
<input type="checkbox"/>				Operating Systems Concepts Abraham Silberschatz 850.00
<input type="checkbox"/>				Computer Architecture John Hennessy 900.00

QUESTION:

Lab 4: Create a view to display members who joined before 2020.

CODE:

```
CREATE VIEW members_before_2020 AS  
SELECT *  
FROM members  
WHERE date_of_membership<'2020-01-01';
```

SCREENSHOT:

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0010 seconds.)

```
SELECT * FROM `members_before_2020`
```

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

member_id	member_name	date_of_membership	email
-----------	-------------	--------------------	-------

Query results operations

Create view

QUESTION:

Lab 3: Create a trigger to automatically update the last_modified timestamp of the books table whenever a record is updated.

CODE:

```
DELIMITER //  
CREATE TRIGGER update_last_modified  
BEFORE UPDATE ON books  
FOR EACH ROW  
BEGIN  
SET NEW.last_modified=CURRENT_TIMESTAMP;  
END //DELIMITER ;
```

SCREENSHOT:

The screenshot shows the MySQL Workbench interface with the 'Triggers' tab selected. At the top, there are buttons for 'Check all', 'Export', and 'Drop'. Below is a table with columns: Name, Table, Time, and Event. One row is present in the table, representing a trigger named 'update_last_modified' for the 'books' table, triggered 'BEFORE UPDATE'. To the right of the table are 'Edit', 'Export', and 'Drop' buttons.

Name	Table	Time	Event
<input type="checkbox"/> update_last_modified	books	BEFORE	UPDATE

QUESTION:

Lab 4: Create a trigger that inserts a log entry into a log_changes table whenever a DELETE operation is performed on the books table.

CODE:

```
DELIMITER //  
CREATE TRIGGER log_book_deletion  
AFTER DELETE ON books  
FOR EACH ROW  
BEGIN  
    INSERT INTO log_changes(book_id,title,deleted_at)  
VALUES(OLD.book_id,OLD.title,CURRENT_TIMESTAMP);  
END //  
DELIMITER ;
```

SCREENSHOT:

The screenshot shows the MySQL Workbench interface with the 'Triggers' tab selected. It displays two triggers in the list: 'log_book_deletion' (AFTER DELETE) and 'update_last_modified' (BEFORE UPDATE). Both triggers are associated with the 'books' table. To the right of each trigger are 'Edit', 'Export', and 'Drop' buttons.

Name	Table	Time	Event
<input type="checkbox"/> log_book_deletion	books	AFTER	DELETE
<input type="checkbox"/> update_last_modified	books	BEFORE	UPDATE

QUESTION:

Lab 3: Write a PL/SQL block to insert a new book into the books table and display a confirmation message.

CODE:

```
DELIMITER //
```

```
CREATE PROCEDURE insertBook()
BEGIN
    INSERT INTO books (book_id, title, author, publisher, year_of_publication, price, genre)
    VALUES (15,'Python Programming','Mark Lutz','OReilly',2023,800.00,'Programming');
    SELECT 'Book inserted successfully.' AS message;
END //
```

```
DELIMITER ;
```

SCREENSHOT:

The screenshot shows the MySQL Workbench interface with the SQL tab selected. The query window contains the following code:

```
CALL insertBook();
```

The results pane shows a green status bar indicating:

Showing rows 0 - 0 (1 total, Query took 0.0032 seconds.)

Below the status bar, the message "Book inserted successfully." is displayed. At the bottom of the results pane, there are two sets of pagination and filtering controls.

QUESTION:

Lab 4: Write a PL/SQL block to display the total number of books in the books table.

CODE:

```
DELIMITER //
```

```
CREATE PROCEDURE getTotalBooks()
BEGIN
    SELECT COUNT(*) AS total_books FROM books;
END //
```

```
DELIMITER ;
```

SCREENSHOT:

The screenshot shows a MySQL query results interface. At the top, there is a button labeled "Extra options". Below it, a table header "total_books" is shown with a single data cell containing the value "9". Above the table, there are filtering options: "Show all" (unchecked), "Number of rows: 25" (selected), "Filter rows:", and a search bar "Search this table". At the bottom, there is a "Query results operations" section with three buttons: "Print", "Copy to clipboard", and "Create view".

QUESTION:

Lab 3: Write a PL/SQL block to declare variables for book_id and price, assign values, and display the results.

CODE:

```
DELIMITER //
```

```
CREATE PROCEDURE showBookInfo()
```

```
BEGIN
```

```
    DECLARE v_book_id INT;
```

```
    DECLARE v_price DECIMAL(10,2);
```

```
    SET v_book_id = 101;
```

```
    SET v_price = 499.99;
```

```
    SELECT v_book_id AS book_id, v_price AS price;
```

```
END //
```

```
DELIMITER ;
```

SCREENSHOT:

		<input type="checkbox"/> Show all	Number of rows:	25	Filter rows:	Search this table
<hr/>						
<input type="button" value="Extra options"/>						
<hr/>						
book_id	price					
101	499.99					
		<input type="checkbox"/> Show all	Number of rows:	25	Filter rows:	Search this table
<hr/>						
<hr/>						
Query results operations		<input type="button" value="Print"/>	<input type="button" value="Copy to clipboard"/>	<input type="button" value="Create view"/>		

QUESTION:

Lab 4: Write a PL/SQL block using constants and perform arithmetic operations on book prices.

CODE:

```
DELIMITER //
```

```
CREATE PROCEDURE priceOperations()
BEGIN
    DECLARE CONST_DISCOUNT DECIMAL(5,2) DEFAULT 50.00;
    DECLARE total_price DECIMAL(10,2);
    SELECT SUM(price) INTO total_price FROM books;
    SELECT total_price AS original_total,
           CONST_DISCOUNT AS discount,
           (total_price - CONST_DISCOUNT) AS discounted_total;
END //
DELIMITER ;
```

SCREENSHOT:

<input type="checkbox"/> Show all	Number of rows:	25	Filter rows:	Search this table
<hr/>				
<input type="checkbox"/> Extra options				
<hr/>				
original_total	discount	discounted_total		
7675.00	50.00	7625.00		
<hr/>				
Query results operations				
<input type="button"/> Print	<input type="button"/> Copy to clipboard	<input type="button"/> Create view		

QUESTION:

Lab 3: Write a PL/SQL block using IF-THEN-ELSE to check if a book's price is above \$100 and print a message accordingly.

CODE:

DELIMITER //

```
CREATE PROCEDURE checkBookPrice(IN bid INT)
BEGIN
    DECLARE book_price DECIMAL(10,2);
    SELECT price INTO book_price FROM books WHERE book_id = bid;
    IF book_price > 100 THEN
        SELECT CONCAT('Book ID ', bid, ' has a price above $100') AS message;
    ELSE
        SELECT CONCAT('Book ID ', bid, ' has a price $100 or below') AS message;
    END IF;
END //
```

DELIMITER ;

SCREENSHOT:

The screenshot shows a database query results page. At the top, there is a header bar with options: 'Show all' (unchecked), 'Number of rows: 25' (selected), 'Filter rows: Search this table' (empty), and an 'Extra options' button. Below the header, the results are displayed in a table-like format. The first column is labeled 'message' and contains the text 'Book ID 3 has a price \$100 or below'. At the bottom of the page, there is a 'Query results operations' section with three buttons: 'Print', 'Copy to clipboard', and 'Create view'.

message
Book ID 3 has a price \$100 or below

Query results operations

Print Copy to clipboard Create view

QUESTION:

Lab 4: Use a FOR LOOP in PL/SQL to display the details of all books one by one.

CODE:

```
DELIMITER //  
  
CREATE PROCEDURE displayBooksForLoop()  
  
BEGIN  
  
DECLARE done INT DEFAULT 0;  
  
DECLARE v_book_id INT;  
  
DECLARE v_title VARCHAR(255);  
  
DECLARE v_author VARCHAR(100);  
  
DECLARE v_publisher VARCHAR(100);  
  
DECLARE v_year INT;  
  
DECLARE v_price DECIMAL(10,2);  
  
DECLARE v_genre VARCHAR(50);  
  
DECLARE cur_books CURSOR FOR  
  
    SELECT book_id, title, author, publisher, year_of_publication, price, genre FROM books;  
  
    DECLARE CONTINUE HANDLER FOR NOT FOUND SET done = 1;  
  
    OPEN cur_books;  
  
    read_loop: LOOP  
  
        FETCH cur_books INTO v_book_id, v_title, v_author, v_publisher, v_year, v_price,  
        v_genre;  
  
        IF done THEN  
  
            LEAVE read_loop;  
  
        END IF;  
  
        SELECT v_book_id AS book_id, v_title AS title, v_author AS author, v_publisher AS  
        publisher, v_year AS year_of_publication, v_price AS price, v_genre AS genre;  
  
    END LOOP;  
  
    CLOSE cur_books;  
  
END //DELIMITER ;
```

SCREENSHOT:

```
CALL `displayBooksForLoop`();
```

Execution results of routine `displayBooksForLoop`

book_id	title	author	publisher	year_of_publication	price	genre
1	Mathematics Basics	John Doe	EduPub	2015	150.00	Education
2	Physics Fundamentals	Jane Smith	SciencePub	2018	200.00	Science
3	Chemistry 101	Alice Brown	ChemBooks	2017	120.00	Science
4	Programming in C	Robert Martin	TechPress	2020	300.00	Programming
5	English Grammar	Emily White	LangPub	2016	100.00	Language

QUESTION:

Lab 3: Write a PL/SQL block using an explicit cursor to fetch and display all records from the members table.

CODE:

```
DELIMITER //  
  
CREATE PROCEDURE displayMembers()  
  
BEGIN  
  
DECLARE done INT DEFAULT 0;  
  
DECLARE v_member_id INT;  
  
DECLARE v_member_name VARCHAR(100);  
  
DECLARE v_date_of_membership DATE;  
  
DECLARE v_email VARCHAR(100);  
  
DECLARE cur_members CURSOR FOR  
  
SELECT member_id, member_name, date_of_membership, email FROM members;  
  
DECLARE CONTINUE HANDLER FOR NOT FOUND SET done = 1;
```

```

OPEN cur_members;

read_loop: LOOP
    FETCH cur_members INTO v_member_id, v_member_name, v_date_of_membership,
v_email;
    IF done THEN
        LEAVE read_loop;
    END IF;
    SELECT v_member_id AS member_id, v_member_name AS member_name,
v_date_of_membership AS date_of_membership, v_email AS email;
    END LOOP;
CLOSE cur_members;
END //;
DELIMITER ;

```

SCREENSHOT:

Execution results of routine `displayMembers`			
member_id	member_name	date_of_membership	email
1	Rahul S.	2022-01-15	rahul.sharma@example.com
2	Priya Patel	2021-12-20	new.priya@example.com
3	Amit Kumar	2023-03-05	amit.kumar@example.com
4	Sneha Mehta	2022-07-10	sneha.mehta@example.com
5	Karan Joshi	2023-01-25	karan.joshi@example.com

QUESTION:

Lab 4: Create a cursor to retrieve books by a particular author and display their titles.

CODE:

```
DELIMITER //

CREATE PROCEDURE getBooksByAuthorCursor(IN authorName VARCHAR(100))

BEGIN

DECLARE done INT DEFAULT 0;

DECLARE v_title VARCHAR(255);

DECLARE cur_books CURSOR FOR

SELECT title FROM books WHERE author = authorName;

DECLARE CONTINUE HANDLER FOR NOT FOUND SET done = 1;

OPEN cur_books;

read_loop: LOOP

    FETCH cur_books INTO v_title;

    IF done THEN

        LEAVE read_loop;

    END IF;

    SELECT v_title AS title;

END LOOP;

CLOSE cur_books;

END //


DELIMITER ;
```

SCREENSHOT:

title
Mathematics Basics

QUESTION:

Lab 3: Perform a transaction that includes inserting a new member, setting a SAVEPOINT, and rolling back to the savepoint after making updates.

CODE:

```
START TRANSACTION;

INSERT INTO members (member_id, member_name, date_of_membership, email)
VALUES (6, 'Amit Sharma', '2023-05-10', 'amit.sharma@example.com');

SAVEPOINT sp_before_update;

UPDATE members

SET member_name = 'Amit S.'

WHERE member_id = 6;

UPDATE members

SET email = 'amit.new@example.com'

WHERE member_id = 6;

ROLLBACK TO SAVEPOINT sp_before_update;

COMMIT;
```

SCREENSHOT:

	member_id	member_name	date_of_membership	email
<input type="checkbox"/>   	1	Rahul S.	2022-01-15	rahul.sharma@example.com
<input type="checkbox"/>   	2	Priya Patel	2021-12-20	new.priya@example.com
<input type="checkbox"/>   	3	Amit Kumar	2023-03-05	amit.kumar@example.com
<input type="checkbox"/>   	4	Sneha Mehta	2022-07-10	sneha.mehta@example.com
<input type="checkbox"/>   	5	Karan Joshi	2023-01-25	karan.joshi@example.com
<input type="checkbox"/>   	6	Amit Sharma	2023-05-10	amit.sharma@example.com

QUESTION:

Lab 4: Use COMMIT after successfully inserting multiple books into the books table, then use ROLLBACK to undo a set of changes made after a savepoint.

CODE:

```
START TRANSACTION;  
  
INSERT INTO books (book_id,title,author,publisher,year_of_publication,price,genre)  
VALUES  
(20,'Machine Learning','John Smith','TechPress',2022,400.00,'Programming'),  
(21,'Artificial Intelligence','Jane Doe','AI Pub',2021,350.00,'Programming'),  
(22,'Big Data Analytics','Alice Brown','DataPub',2020,300.00,'Data Science');  
  
COMMIT;  
  
START TRANSACTION;  
  
SAVEPOINT sp_before_update;  
  
UPDATE books  
  
SET price = price + 50  
  
WHERE book_id IN (20,21);  
  
ROLLBACK TO SAVEPOINT sp_before_update;  
  
COMMIT;
```

SCREENSHOT:

<input type="checkbox"/>	 Edit	 Copy	 Delete	1 Mathematics Basics	John Doe	EduPub	2015	150.00	Education
<input type="checkbox"/>	 Edit	 Copy	 Delete	2 Physics Fundamentals	Jane Smith	SciencePub	2018	200.00	Science
<input type="checkbox"/>	 Edit	 Copy	 Delete	3 Chemistry 101	Alice Brown	ChemBooks	2017	120.00	Science
<input type="checkbox"/>	 Edit	 Copy	 Delete	4 Programming in C	Robert Martin	TechPress	2020	300.00	Programming
<input type="checkbox"/>	 Edit	 Copy	 Delete	5 English Grammar	Emily White	LangPub	2016	100.00	Language
<input type="checkbox"/>	 Edit	 Copy	 Delete	11 Data Structures	Alice Brown	TechPub	2021	250.00	Programming
<input type="checkbox"/>	 Edit	 Copy	 Delete	12 Algorithms	Bob Smith	TechPub	2020	300.00	Programming
<input type="checkbox"/>	 Edit	 Copy	 Delete	13 Database Systems	Carol White	EduPub	2019	200.00	Education
<input type="checkbox"/>	 Edit	 Copy	 Delete	14 Data Structures	Alice Brown	TechPub	2021	250.00	Programming
<input type="checkbox"/>	 Edit	 Copy	 Delete	15 Algorithms	Bob Smith	TechPub	2020	300.00	Programming
<input type="checkbox"/>	 Edit	 Copy	 Delete	16 Database Systems	Carol White	EduPub	2019	200.00	Education
<input type="checkbox"/>	 Edit	 Copy	 Delete	17 Data Structures	Alice Brown	TechPub	2021	250.00	Programming
<input type="checkbox"/>	 Edit	 Copy	 Delete	18 Algorithms	Bob Smith	TechPub	2020	300.00	Programming
<input type="checkbox"/>	 Edit	 Copy	 Delete	19 Database Systems	Carol White	EduPub	2019	200.00	Education
<input type="checkbox"/>	 Edit	 Copy	 Delete	20 Machine Learning	John Smith	TechPress	2022	400.00	Programming
<input type="checkbox"/>	 Edit	 Copy	 Delete	21 Artificial Intelligence	Jane Doe	AI Pub	2021	350.00	Programming
<input type="checkbox"/>	 Edit	 Copy	 Delete	22 Big Data Analytics	Alice Brown	DataPub	2020	300.00	Data Science