



REPUBLIC OF PHILIPPINES

BICOL UNIVERSITY

POLANGUI

Polangui, Albay



National Bookstore Inventory Management System

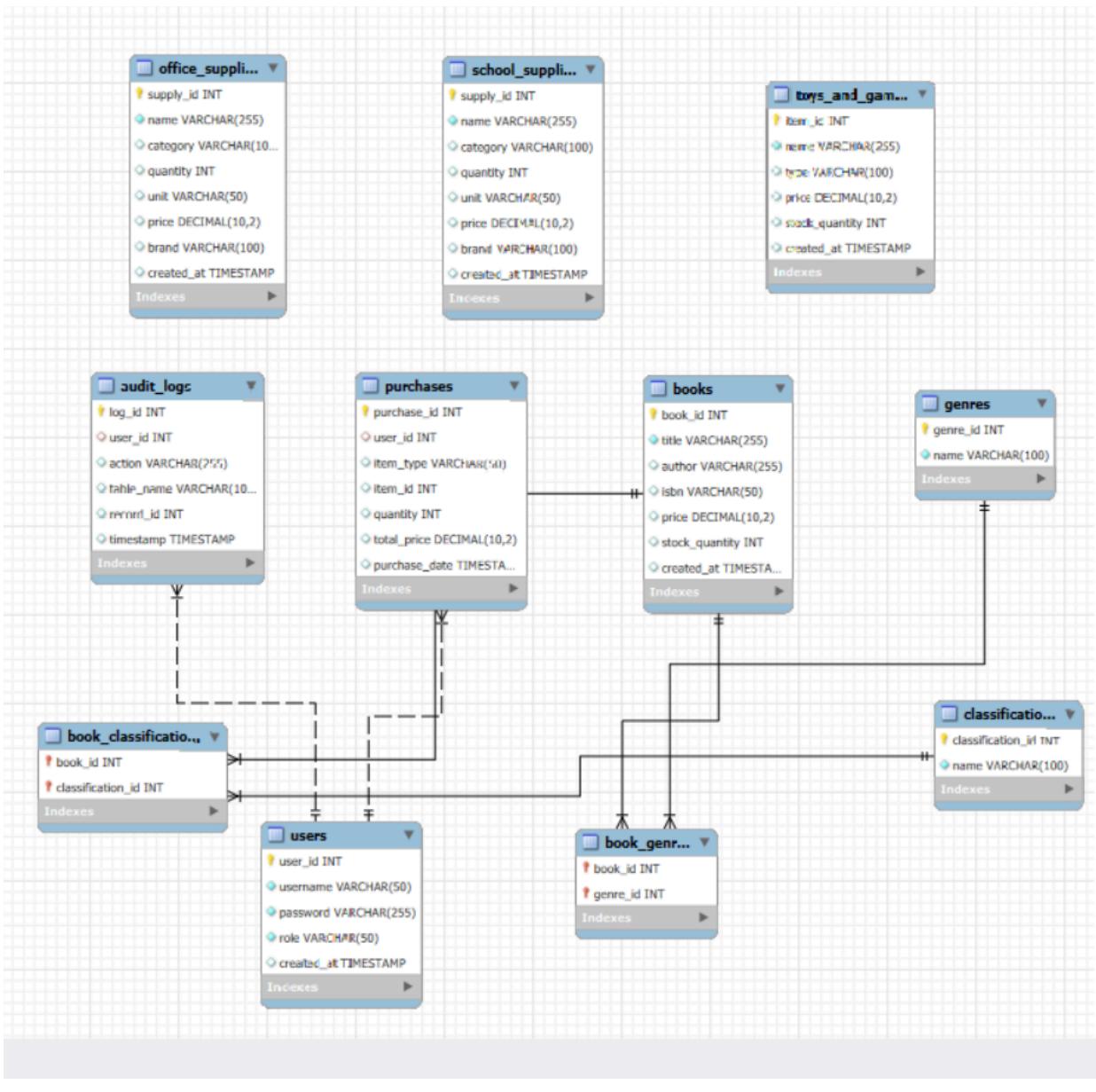
Information Management

GROUP 3

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The National Bookstore Inventory Management System is a comprehensive database designed to efficiently manage the inventory of various product categories, including books, school supplies, office supplies, toys, and educational games. The system ensures real-time monitoring of stock levels and generates reliable reports to support informed decision-making. It keeps detailed records of all products and tracks inventory movement across different categories.

FINAL ER DIAGRAM



Database schema and table descriptions

TABLE: USER

Column	Data Type	Description
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user_id	INT	Primary key, auto-incremented
username	VARCHAR(50)	Unique username
password	VARCHAR(255)	Encrypted password
role	VARCHAR(50)	Role of the user (e.g., admin, staff)
created_at	TIMESTAMP	Timestamp of account creation

TABLE: BOOKS

Column	Data Type	Description
book_id	INT	Primary key, auto-incremented
title	VARCHAR(255)	Title of the book
author	VARCHAR(255)	Author name
isbn	VARCHAR(50)	ISBN identifier
price	DECIMAL(10,2)	Price of the book
stock_quantity	INT	Number of books in stock
created_at	TIMESTAMP	Date/time the book was added

TABLE: GENRE

Column	Data Type	Description
genre_id	INT	Primary key, auto-incremented
name	VARCHAR(100)	Genre name (unique)

TABLE: CLASSIFICATION

Stores broader book classifications (e.g., educational, fiction).

Column	Data Type	Description
classification_id	INT	Primary key, auto-incremented
name	VARCHAR(100)	Classification name (unique)

TABLE: BOOK_GENRE

Column	Data Type	Description
book_id	INT	Foreign key to <code>books</code>
genre_id	INT	Foreign key to <code>genres</code>

Composite primary key: (book_id, genre_id)

TABLE : BOOKS CLASSIFICATION

Column	Data Type	Description
book_id	INT	Foreign key to <code>books</code>
classification_id	INT	Foreign key to <code>classifications</code>

TABLE : SCHOOL SUPPLIES

Column	Data Type	Description
supply_id	INT	Primary key, auto-incremented
name	VARCHAR(255)	Name of the item
category	VARCHAR(100)	Category of the item
quantity	INT	Units available
unit	VARCHAR(50)	Unit of measure (e.g., pcs)
price	DECIMAL(10,2)	Price per unit
brand	VARCHAR(100)	Brand name
created_at	TIMESTAMP	Date/time added to inventory

TABLE: OFFICE SUPPLY

Column	Data Type	Description
supply_id	INT	Primary key, auto-incremented
name	VARCHAR(255)	Name of the item
category	VARCHAR(100)	Category of the item
quantity	INT	Units available
unit	VARCHAR(50)	Unit of measure
price	DECIMAL(10,2)	Price per unit
brand	VARCHAR(100)	Brand name
created_at	TIMESTAMP	Date/time added to inventory

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TABLE: TOY AND GAMES

Column	Data Type	Description
item_id	INT	Primary key, auto-incremented
name	VARCHAR(255)	Name of the toy/game
type	VARCHAR(100)	Type/category (e.g., puzzle)
price	DECIMAL(10,2)	Price of the item
stock_quantity	INT	Units available in inventory
created_at	TIMESTAMP	Date/time added to inventory

TABLE: PURCHASES

Column	Data Type	Description
purchase_id	INT	Primary key, auto-incremented
user_id	INT	Foreign key to <code>users</code>
item_type	VARCHAR(50)	Indicates source table (e.g., 'books')
item_id	INT	ID of the item (linked by item_type)
quantity	INT	Quantity purchased
total_price	DECIMAL(10,2)	Total price for the purchase
purchase_dat	TIMESTAMP	Date/time of purchase

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TABLE: AUDIT_LOGS

Column	Data Type	Description
log_id	INT	Primary key, auto-incremented
user_id	INT	Foreign key to <code>users</code>
action	VARCHAR(255)	Action performed (e.g., INSERT)
table_name	VARCHAR(100)	Name of the affected table
record_id	INT	ID of the record involved
timestamp	TIMESTAMP	When the action occurred

```
CREATE DATABASE IF NOT EXISTS national_bookstore_inventory_management_system;
USE national_bookstore_inventory_management_system;
```

```
CREATE TABLE users (
    user_id INT AUTO_INCREMENT PRIMARY KEY,
    username VARCHAR(50) NOT NULL UNIQUE,
    password VARCHAR(255) NOT NULL,
    role VARCHAR(50) NOT NULL,
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

```
CREATE TABLE books (
    book_id INT AUTO_INCREMENT PRIMARY KEY,
    title VARCHAR(255) NOT NULL,
    author VARCHAR(255),
    isbn VARCHAR(50),
```

```
    price DECIMAL(10,2),
    stock_quantity INT,
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

```
CREATE TABLE genres (
    genre_id INT AUTO_INCREMENT PRIMARY KEY,
    name VARCHAR(100) NOT NULL UNIQUE
);
```

-- Classifications

```
CREATE TABLE classifications (
    classification_id INT AUTO_INCREMENT PRIMARY KEY,
    name VARCHAR(100) NOT NULL UNIQUE
);
```

```
CREATE TABLE book_genres (
    book_id INT,
    genre_id INT,
    PRIMARY KEY (book_id, genre_id),
    FOREIGN KEY (book_id) REFERENCES books(book_id) ON DELETE CASCADE,
    FOREIGN KEY (genre_id) REFERENCES genres(genre_id) ON DELETE CASCADE
);
```

```
CREATE TABLE book_classifications (
    book_id INT,
    classification_id INT,
    PRIMARY KEY (book_id, classification_id),
    FOREIGN KEY (book_id) REFERENCES books(book_id) ON DELETE CASCADE,
    FOREIGN KEY (classification_id) REFERENCES classifications(classification_id) ON
DELETE CASCADE
);
```

```
CREATE TABLE school_supplies (
    supply_id INT AUTO_INCREMENT PRIMARY KEY,
    name VARCHAR(255) NOT NULL,
    category VARCHAR(100),
    quantity INT,
    unit VARCHAR(50),
    price DECIMAL(10,2),
    brand VARCHAR(100),
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

```
CREATE TABLE office_supplies (
    supply_id INT AUTO_INCREMENT PRIMARY KEY,
    name VARCHAR(255) NOT NULL,
    category VARCHAR(100),
    quantity INT,
    unit VARCHAR(50),
    price DECIMAL(10,2),
    brand VARCHAR(100),
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

```
CREATE TABLE toys_and_games (
    item_id INT AUTO_INCREMENT PRIMARY KEY,
    name VARCHAR(255) NOT NULL,
    type VARCHAR(100),
    price DECIMAL(10,2),
    stock_quantity INT,
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

```
CREATE TABLE purchases (
    purchase_id INT AUTO_INCREMENT PRIMARY KEY,
    user_id INT,
```

```
    item_type VARCHAR(50),
    item_id INT,
    quantity INT,
    total_price DECIMAL(10,2),
    purchase_date TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    FOREIGN KEY (user_id) REFERENCES users(user_id)
);
```

```
CREATE TABLE audit_logs (
    log_id INT AUTO_INCREMENT PRIMARY KEY,
    user_id INT,
    action VARCHAR(255),
    table_name VARCHAR(100),
    record_id INT,
    timestamp TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    FOREIGN KEY (user_id) REFERENCES users(user_id)
);
```

```
SELECT COUNT(*) FROM books;
SELECT COUNT(*) FROM office_supplies;
SELECT COUNT(*) FROM school_supplies;
SELECT COUNT(*) FROM toys_and_games;
SELECT COUNT(*) FROM genres;
SELECT COUNT(*) FROM classifications;
SELECT COUNT(*) FROM book_genres;
SELECT COUNT(*) FROM book_classifications;
SELECT COUNT(*) FROM audit_logs;
SELECT COUNT(*) FROM users;
SELECT COUNT(*) FROM purchases;
```

```
-- genres, classification insertion
```

```
INSERT INTO genres (name) VALUES
```

```
('Fiction'),  
('Non-fiction'),  
('Mystery'),  
('Science Fiction'),  
('Biography');
```

```
INSERT INTO classifications (name) VALUES
```

```
('Educational'),  
('Entertainment'),  
('Reference'),  
('Literature'),  
('Textbook');
```

```
INSERT INTO book_genres (book_id, genre_id)
```

```
SELECT book_id, (SELECT genre_id FROM genres WHERE name = 'Fiction')  
FROM books  
ORDER BY book_id  
LIMIT 20000;
```

```
INSERT INTO book_genres (book_id, genre_id)
```

```
SELECT book_id, (SELECT genre_id FROM genres WHERE name = 'Non-fiction')  
FROM books  
ORDER BY book_id  
LIMIT 20000 OFFSET 20000;
```

```
INSERT INTO book_genres (book_id, genre_id)
```

```
SELECT book_id, (SELECT genre_id FROM genres WHERE name = 'Mystery')  
FROM books  
ORDER BY book_id  
LIMIT 20000 OFFSET 40000;
```

```
INSERT INTO book_genres (book_id, genre_id)
```

```
SELECT book_id, (SELECT genre_id FROM genres WHERE name = 'Science Fiction')
```

```
FROM books
ORDER BY book_id
LIMIT 20000 OFFSET 60000;

INSERT INTO book_genres (book_id, genre_id)
SELECT book_id, (SELECT genre_id FROM genres WHERE name = 'Biography')
FROM books
ORDER BY book_id
LIMIT 20000 OFFSET 80000;

INSERT INTO book_classifications (book_id, classification_id)
SELECT book_id, (SELECT classification_id FROM classifications WHERE name =
'Educational')
FROM books
ORDER BY book_id
LIMIT 20000;

INSERT INTO book_classifications (book_id, classification_id)
SELECT book_id, (SELECT classification_id FROM classifications WHERE name =
'Entertainment')
FROM books
ORDER BY book_id
LIMIT 20000 OFFSET 20000;

INSERT INTO book_classifications (book_id, classification_id)
SELECT book_id, (SELECT classification_id FROM classifications WHERE name =
'Reference')
FROM books
ORDER BY book_id
LIMIT 20000 OFFSET 40000;

INSERT INTO book_classifications (book_id, classification_id)
SELECT book_id, (SELECT classification_id FROM classifications WHERE name = 'Literature')
FROM books
```

```
ORDER BY book_id  
LIMIT 20000 OFFSET 60000;
```

```
INSERT INTO book_classifications (book_id, classification_id)  
SELECT book_id, (SELECT classification_id FROM classifications WHERE name = 'Textbook')  
FROM books  
ORDER BY book_id  
LIMIT 20000 OFFSET 80000;
```

```
SELECT  
    b.book_id,  
    b.title,  
    b.author,  
    b.isbn,  
    b.price,  
    b.stock_quantity,  
    g.name AS genre  
FROM books b  
JOIN book_genres bg ON b.book_id = bg.book_id  
JOIN genres g ON bg.genre_id = g.genre_id  
ORDER BY b.book_id;
```

```
SELECT  
    b.book_id,  
    b.title,  
    b.author,  
    b.isbn,  
    b.price,  
    b.stock_quantity,  
    c.name AS classification  
FROM books b  
JOIN book_classifications bc ON b.book_id = bc.book_id  
JOIN classifications c ON bc.classification_id = c.classification_id
```

```
ORDER BY b.book_id;

SELECT
    b.book_id,
    b.title,
    b.author,
    b.isbn,
    b.price,
    b.stock_quantity,
    g.name AS genre,
    c.name AS classification
FROM books b
JOIN book_genres bg ON b.book_id = bg.book_id
JOIN genres g ON bg.genre_id = g.genre_id
JOIN book_classifications bc ON b.book_id = bc.book_id
JOIN classifications c ON bc.classification_id = c.classification_id
ORDER BY b.book_id;
```

ROW COUNTS:

ROW COUNTS PER TABLE

MySQL Workbench - Default Connection - Warning... x

File Edit View Query Database Server Tools Scripting Help

Navigator

Schemas national_bookstore_inventory

Tables book_genres classifications genres audit_logs book_classifications book_genres books books classifications users purchases

SQL Editor

```

record_id INT,
  timestamp DEFAULT CURRENT_TIMESTAMP,
  FOREIGN KEY (user_id) REFERENCES users(user_id)
);

100 • SELECT COUNT(*) FROM books;
101 • SELECT COUNT(*) FROM office_supplies;
102 • SELECT COUNT(*) FROM school_supplies;
103 • SELECT COUNT(*) FROM toys_and_games;
104 • SELECT COUNT(*) FROM genres;
105 • SELECT COUNT(*) FROM classifications;
106 • SELECT COUNT(*) FROM book_genres;
107 • SELECT COUNT(*) FROM book_classifications;
108 • SELECT COUNT(*) FROM audit_logs;
109 • SELECT COUNT(*) FROM users;
110 • SELECT COUNT(*) FROM purchases;
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MySQL Workbench

Default Connection - Warning... X

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

national_bookstore_inventory

Tables

- audit_logs
- book_classifications
- book_genres
- books
- classifications
- dim_category
- dim_date
- dim_item
- dim_users
- fact_purchases
- genres
- office_supplies
- purchases

Administration Schemas Information

Schema: national_bookstore_inventory.

FullSchemaScript

```

95 record_id INT,
96 timestamp TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
97 FOREIGN KEY (user_id) REFERENCES users(user_id)
98 );
99
100 • SELECT COUNT(*) FROM books;
101 • SELECT COUNT(*) FROM office_supplies;
102 • SELECT COUNT(*) FROM school_supplies;
103 • SELECT COUNT(*) FROM toys_and_games;
104 • SELECT COUNT(*) FROM genres;
105 • SELECT COUNT(*) FROM classifications;
106 • SELECT COUNT(*) FROM book_genres;
107 • SELECT COUNT(*) FROM book_classifications;
108 • SELECT COUNT(*) FROM audit_logs;
109 • SELECT COUNT(*) FROM users;
110 • SELECT COUNT(*) FROM purchases;
111
112 */

```

Result Grid | Filter Rows: Export: Wrap Cell Content: COUNT(*)

100000

Result 4 x

Action Output

#	Time	Action	Message	Duration / Fetch
17	11:24:54	SELECT COUNT(*) FROM school_supplies	1 row(s) returned	0.078 sec / 0.000 sec
18	11:25:02	SELECT COUNT(*) FROM toys_and_games	1 row(s) returned	0.047 sec / 0.000 sec

Object Info Session

Query Completed

MySQL Workbench

Default Connection - Warning... X

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

national_bookstore_inventory

Tables

- audit_logs
- book_classifications
- book_genres
- books
- classifications
- dim_category
- dim_date
- dim_item
- dim_users
- fact_purchases
- genres
- office_supplies
- purchases

Administration Schemas Information

Schema: national_bookstore_inventory.

FullSchemaScript

```

95 record_id INT,
96 timestamp TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
97 FOREIGN KEY (user_id) REFERENCES users(user_id)
98 );
99
100 • SELECT COUNT(*) FROM books;
101 • SELECT COUNT(*) FROM office_supplies;
102 • SELECT COUNT(*) FROM school_supplies;
103 • SELECT COUNT(*) FROM toys_and_games;
104 • SELECT COUNT(*) FROM genres;
105 • SELECT COUNT(*) FROM classifications;
106 • SELECT COUNT(*) FROM book_genres;
107 • SELECT COUNT(*) FROM book_classifications;
108 • SELECT COUNT(*) FROM audit_logs;
109 • SELECT COUNT(*) FROM users;
110 • SELECT COUNT(*) FROM purchases;
111
112 */

```

Result Grid | Filter Rows: Export: Wrap Cell Content: COUNT(*)

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Result 5 x

Action Output

#	Time	Action	Message	Duration / Fetch
18	11:25:03	SELECT COUNT(*) FROM toys_and_games	1 row(s) returned	0.047 sec / 0.000 sec
19	11:25:15	SELECT COUNT(*) FROM genres	1 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

Query Completed

MySQL Workbench

Default Connection - Warning... X

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

national_bookstore_inventory

Tables

- audit_logs
- book_classification
- book_genres
- books
- classifications
- dim_category
- dim_date
- dim_item
- dim_users
- fact_purchases
- genres
- office_supplies
- purchases

Administration Schemas Information

Schema: national_bookstore_inventory.

FullSchemaScript

```

95 record_id INT,
96 timestamp TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
97 FOREIGN KEY (user_id) REFERENCES users(user_id)
98 );
99
100 • SELECT COUNT(*) FROM books;
101 • SELECT COUNT(*) FROM office_supplies;
102 • SELECT COUNT(*) FROM school_supplies;
103 • SELECT COUNT(*) FROM toys_and_games;
104 • SELECT COUNT(*) FROM genres;
105 • SELECT COUNT(*) FROM classifications;
106 • SELECT COUNT(*) FROM book_genres;
107 • SELECT COUNT(*) FROM book_classifications;
108 • SELECT COUNT(*) FROM audit_logs;
109 • SELECT COUNT(*) FROM users;
110 • SELECT COUNT(*) FROM purchases;
111
112 */

```

Result Grid | Filter Rows: Export: Wrap Cell Content: COUNT(*)

5

Result 6 x

Action Output

#	Time	Action	Message	Duration / Fetch
19	11:25:15	SELECT COUNT(*) FROM genres	1 row(s) returned	0.000 sec / 0.000 sec
20	11:25:25	SELECT COUNT(*) FROM classifications	1 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

Query Completed

MySQL Workbench

Default Connection - Warning... ×

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

- national_bookstore_inventory
- Other objects
- Tables
- audit_logs
- book_classifications
- book_genres
- books
- classifications
- dim_category
- dim_date
- dim_items
- dim_users
- fact_purchases
- genres
- office_supplies
- purchases

Administration Schemas Information

Schema: national_bookstore_inventory

Object Info Session

Query Completed

Favourites

book_genres classifications genres audit_logs book_classifications book_genres books books classifications users purchases

SQLAdditions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

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record_id INT,
timestamp DEFAULT CURRENT_TIMESTAMP,
FOREIGN KEY (user_id) REFERENCES users(user_id)
);

100 • SELECT COUNT(*) FROM books;
101 • SELECT COUNT(*) FROM office_supplies;
102 • SELECT COUNT(*) FROM school_supplies;
103 • SELECT COUNT(*) FROM toys_and_games;
104 • SELECT COUNT(*) FROM genres;
105 • SELECT COUNT(*) FROM classifications;
106 • SELECT COUNT(*) FROM book_genres;
107 • SELECT COUNT(*) FROM book_classifications;
108 • SELECT COUNT(*) FROM audit_logs;
109 • SELECT COUNT(*) FROM users;
110 • SELECT COUNT(*) FROM purchases;
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MySQL Workbench

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

- national_bookstore_inventory

Tables

- audit_logs
- book_classifications
- book_genres
- book_supplies
- classifications
- dim_category
- dim_date
- dim_items
- dim_users
- fact_purchases
- genres
- logistics
- office_supplies
- purchases

Administration Schemas Information

Schemas: national_bookstore_inventory

```

1 SELECT COUNT(*) FROM books;
2 SELECT COUNT(*) FROM office_supplies;
3 SELECT COUNT(*) FROM school_supplies;
4 SELECT COUNT(*) FROM toy_and_games;
5 SELECT COUNT(*) FROM genres;
6 SELECT COUNT(*) FROM classifications;
7 SELECT COUNT(*) FROM book_genres;
8 SELECT COUNT(*) FROM book_classifications;
9 SELECT COUNT(*) FROM audit_logs;
10 SELECT COUNT(*) FROM users;
11 SELECT COUNT(*) FROM purchases;
12
13 -- KPI QUERIES
14
15 CREATE TABLE dim_users (
    user_id INT PRIMARY KEY,
    ...
);

```

Result Grid | Filter Rows | Export | Wrap Cell Content | COUNT(*)

2014

Result 11 x

Action Output

Time Action Message Duration / Fetch

24 11:26:01 SELECT COUNT(*) FROM users 1 row(s) returned 0.000 sec / 0.000 sec

25 11:26:20 SELECT COUNT(*) FROM purchases 1 row(s) returned 0.000 sec / 0.000 sec

Object Info Session Query Completed

MySQL Workbench

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

- national_bookstore_inventory

Tables

- audit_logs
- book_classifications
- book_genres
- book_supplies
- classifications
- dim_category
- dim_date
- dim_items
- dim_users

Administration Schemas Information

Schemas: national_bookstore_inventory

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BASIC STAR SCHEMA & SCHEMA SCRIPT



Table dim_users

```
{ user_id INT [pk]
username VARCHAR(50)
role VARCHAR(50)
}
```

Table dim_items {

```
item_id INT item_type VARCHAR(50)
name VARCHAR(255)
category VARCHAR(100)
price DECIMAL(10,2)
```

```
Primary Key (item_id, item_type)
)
```

Table dim_date { date_id INT [pk]

```
full_date DATE day INT
month INT
```

```
year INT  
quarter INT  
}  
  
Table dim_category {  
    category_id INT [pk]  
    category_name VARCHAR(100) }  
Table fact_purchases {  
    purchase_id INT [pk, increment]  
    user_id INT item_id INT  
    item_type VARCHAR(50)  
    date_id INT  
    category_id INT  
    quantity INT  
    total_price DECIMAL(10,2)  
}
```

Indexing and performance improvements

```
USE national_bookstore_inventory_management_system;  
SELECT  
    b.book_id,  
    b.title,  
    b.author,  
    b.isbn,  
    b.price,  
    b.stock_quantity,  
    c.name AS classification  
FROM books b  
JOIN book_classifications bc ON b.book_id = bc.book_id  
JOIN classifications c ON bc.classification_id = c.classification_id  
ORDER BY b.book_id;
```

```
SELECT
    b.book_id,
    b.title,
    b.author,
    b.isbn,
    b.price,
    b.stock_quantity,
    g.name AS genre,
    c.name AS classification
FROM books b
JOIN book_genres bg ON b.book_id = bg.book_id
JOIN genres g ON bg.genre_id = g.genre_id
JOIN book_classifications bc ON b.book_id = bc.book_id
JOIN classifications c ON bc.classification_id = c.classification_id
ORDER BY b.book_id;
```

```
SELECT
    item_type,
    YEAR(purchase_date) AS year,
    MONTH(purchase_date) AS month,
    SUM(total_price) AS monthly_revenue
FROM purchases
GROUP BY item_type, YEAR(purchase_date), MONTH(purchase_date)
ORDER BY year, month, item_type;
```

```
SELECT
    item_type,
    item_id,
    SUM(quantity) AS total_quantity_sold
FROM purchases
GROUP BY item_type, item_id
ORDER BY total_quantity_sold DESC
LIMIT 5;
```

```
SELECT
    u.username,
    COUNT(p.purchase_id) AS total_transactions,
    SUM(p.total_price) AS total_sales
FROM purchases p
JOIN users u ON p.user_id = u.user_id
GROUP BY u.user_id
ORDER BY total_sales DESC;

-- Indexes for JOINs and WHERE
CREATE INDEX idx_books_book_id ON books(book_id);
CREATE INDEX idx_book_genres_book_id ON book_genres(book_id);
CREATE INDEX idx_book_genres_genre_id ON book_genres(genre_id);
CREATE INDEX idx_book_classifications_book_id ON book_classifications(book_id);
CREATE INDEX idx_book_classifications_classification_id ON
book_classifications(classification_id);
CREATE INDEX idx_purchases_user_id ON purchases(user_id);
CREATE INDEX idx_purchases_purchase_date ON purchases(purchase_date);
CREATE INDEX idx_books_stock_quantity ON books(stock_quantity);
CREATE INDEX idx_purchases_item_type_item_id ON purchases(item_type, item_id);

SELECT
    item_type,
    YEAR(purchase_date) AS year,
    MONTH(purchase_date) AS month,
    SUM(total_price) AS monthly_revenue
FROM purchases
GROUP BY item_type, YEAR(purchase_date), MONTH(purchase_date)
ORDER BY year, month, item_type;

SELECT
    item_type,
```

```
item_id,  
SUM(quantity) AS total_quantity_sold  
FROM purchases  
GROUP BY item_type, item_id  
ORDER BY total_quantity_sold DESC  
LIMIT 5;
```

```
SELECT  
u.username,  
COUNT(p.purchase_id) AS total_transactions,  
SUM(p.total_price) AS total_sales  
FROM purchases p  
JOIN users u ON p.user_id = u.user_id  
GROUP BY u.user_id  
ORDER BY total_sales DESC;
```

```
SELECT  
title,  
stock_quantity  
FROM books  
WHERE stock_quantity < 10  
ORDER BY stock_quantity ASC;
```

ROLE AND CONTRIBUTIONS

Kyla Shaina Layosa – Project Leader (Phase 1)

Kyla led the team and designed the Entity-Relationship (ER) diagram and database schemas. This means she planned how the data is organized and how different parts of the database relate to each other.

Kristina Paula Alamil – Database Architect (Phase 5)

Kristina focused on improving the speed of the database. She identified slow SQL queries, analyzed them using tools like EXPLAIN to understand their execution plans , and optimized them by adding indexes and rewriting the queries for better performance.

Nicole Anne Bellen – SQL Developer(PHASE 2)

Nicole was responsible for inserting a large amount of data over 100,000 rows into each table of the database. This provided a substantial dataset for testing and optimizing the system's performance.

Shane Yvette Penaflor – Back-End Developer (Phase 3)

Shane integrated the database with the application, ensuring that data flows smoothly between the user interface and the database. She also worked on business intelligence components like Advanced Queries, KPI, and Basic Star Schema, which help in analyzing and visualizing data.

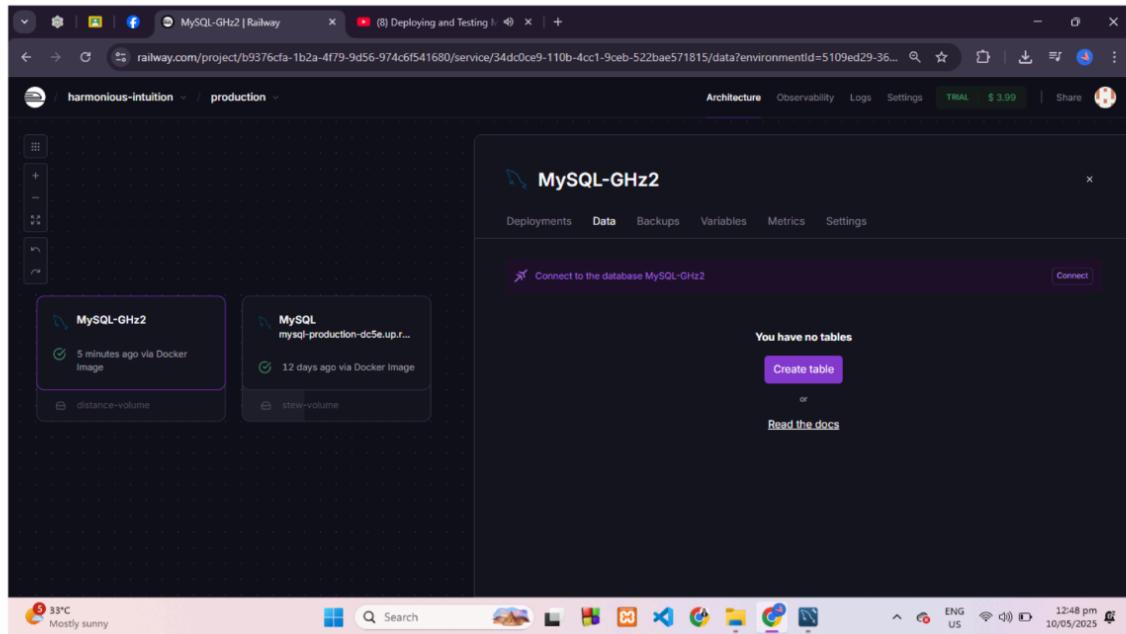
Lovely Irish Benoyo – QA Tester(Phase 4)

Irish tested the system to ensure everything works correctly and documented the processes, including creating backups of the database. This ensures that the system is reliable and that data can be recovered if needed .

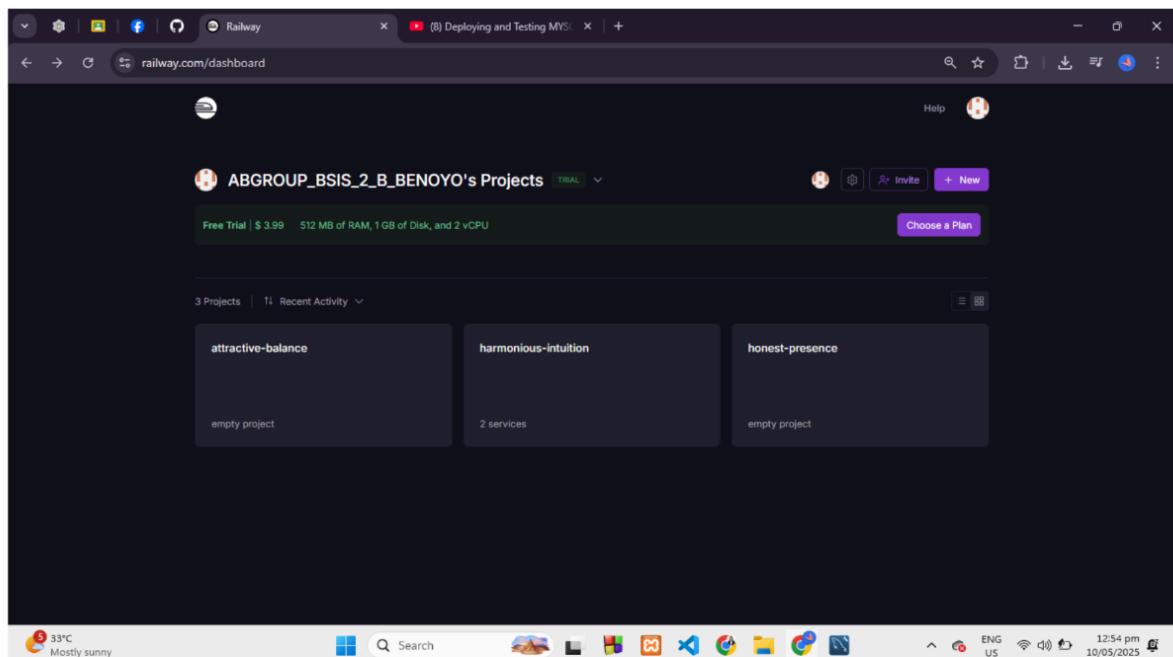
Screenshots of outputs and dashboards

DOCUMENTATION OF RAILWAY DEPLOYMENT

By: Lovely Irish R. Benoyo



The photo above shows the Railway dashboard showing the project name “MySQL-GHz2” this project is my first attempt on exploring how to deploy railway to MySQL Workbench.



These are my previous attempt in Railway.com

AFTER INDEXING:

MySQL Workbench

File Edit View Query Database Server Tools Scripting Help

Navigator: Schemas Administration - Data Import/Res... books school_supplies toys_and_games office_supplies

Query 1: EXPLAIN SELECT item_type, item_id, SUM(quantity) AS total_quantity_sold FROM purchases GROUP BY item_type, item_id ORDER BY total_quantity_sold DESC LIMIT 5;

EXPLAIN SELECT u.username, COUNT(p.purchase_id) AS total_transactions,

Result Grid: (1 row)

ID	Select Type	Table	Partitions	Type	Possible Keys	Key	Key Len	Ref	Rows	Filtered	Extra
1	SIMPLE	purchases	HULL	ALL	HULLS	HULL	HULL	HULL	2014	100.00	Using temporary; Using filesort

Action Output: (3 rows)

#	Time	Action	Message	Duration / Fetch
69	12-27-18	SHOW PROFILES	4 row(s) returned	0.015 sec / 0.000 sec
70	12-29-24	EXPLAIN SELECT item_type, YEAR(purchase_date) AS year, MONTH(purc... 1 row(s) returned		0.000 sec / 0.000 sec
71	12-29-55	EXPLAIN SELECT item_type, item_id, SUM(quantity) AS total_quantity_sold ... 1 row(s) returned		0.016 sec / 0.000 sec

Object Info Session Query Completed

12:30 pm 10/05/2025

MySQL Workbench

File Edit View Query Database Server Tools Scripting Help

Navigator: Schemas Administration - Data Import/Res... books school_supplies toys_and_games office_supplies

Query 1: EXPLAIN SELECT item_type, item_id, SUM(quantity) AS total_quantity_sold FROM purchases GROUP BY item_type, item_id ORDER BY total_quantity_sold DESC LIMIT 5;

SELECT u.username, COUNT(p.purchase_id) AS total_transactions, SUM(p.total_price) AS total_sales FROM purchases p JOIN users u ON p.user_id = u.user_id

Result Grid: (6 rows)

item_type	item_id	total_quantity_sold
school_supplies	1	840
book	33	34
Fiction Books	100	33
The Iliad	59	32
book	1	31

Action Output: (3 rows)

#	Time	Action	Message	Duration / Fetch
65	12-26-16	SET profiling = 1	0 row(s) affected. 1 warning(s): 1287 '@@profiling' is deprecated and will be removed...	0.000 sec
66	12-26-33	SELECT item_type, YEAR(purchase_date) AS year, MONTH(purchase_date)... 7 row(s) returned		0.016 sec / 0.000 sec
67	12-26-46	SELECT item_type, item_id, SUM(quantity) AS total_quantity_sold FROM pur... 5 row(s) returned		0.047 sec / 0.000 sec

Object Info Session Query Completed

12:26 pm 10/05/2025

MySQL Workbench

National Book Store - Warning...

File Edit View Query Database Server Tools Scripting Help

Navigator: books audit_logs

SCHEMAS: national_bookstore_inve...

Tables: audit_logs book_classifications book_genres books classifications dim_category dim_date dim_items dim_users

Administration Schemas Information

Table: purchases

Columns:

purchase_id	int AI PK
user_id	int
item_type	varchar(50)
item_id	int
quantity	int
total_price	decimal(10)
purchase_date	timestamp

Result Grid | Filter Rows: Export: Wrap Cell Content: Fetch rows: | Result Grid | Form Editor | Read Only | Context Help | Snippets

Output: Action Output

#	Time	Action	Message	Duration / Fetch
5623	20:46:24	SELECT item_type, item_id, SUM(quantity) AS total_quantity_sold FROM purchases ...	5 row(s) returned	0.062 sec / 0.000 sec
5624	20:46:24	SELECT username, COUNT(purchase_id) AS total_transactions, SUM(p.total_p... 1000 row(s) returned		0.078 sec / 0.000 sec
5625	20:46:30	SELECT title, stock_quantity FROM books WHERE stock_quantity < 10 ORDER BY s...	1836 row(s) returned	0.125 sec / 0.015 sec

books 41 x

Object Info Session

REFLECTION AND LIMITATION

This project was especially difficult, and it took a long time to get done, but I can say it was definitely worth it. It was an amazing experience because, as students, we understood how to design and implement a real-life database system integrated with Business Intelligence tools. We synthesized our classroom knowledge with experience while constructing the initial ER diagram and executing intricate SQL queries alongside dashboard generation. A major takeaway from this experience is the necessity of data modeling. In the particular details from the first chapters, we faced challenges determining the relationships between tables for items such as books, school supplies, toys, and office supplies. However, at the end of the day from multiple rounds of attempts and feedback, we arrived at an adroitly normalized, scalable, and easily queryable structure. We also learned how crucial optimization is after working with large amounts of data, such as the 100k records we utilized. At first, some queries were performing slowly, but after optimization with execution plan analysis, performance vastly improved. It was very enlightening to witness how databases work in the background, especially the improvement of query execution due to the use of indexes. Constructing the BI dashboards turned out to be some of the most enjoyable yet challenging moments in my case. Most of us weren't familiar with tools like Power BI, so figuring out how to interlink, filter, and display the information graphically was a learning process. Aside from the technical learnings, we also developed soft skills like communication and time management. Coordinating tasks, syncing our work in GitHub, and making sure everyone contributed was a key part of our success. We learned to divide responsibilities, conduct peer code reviews, and support each other when someone struggled. Despite our best efforts, the system has its limitations. For instance, the dashboards are not yet connected to live data; manual refresh is still required. We also focused mainly on purchase transactions and inventory, so customer feedback, returns, or real-time stock movement were not included in this phase. Additionally, while we outlined our backup and recovery strategy, we didn't have time to simulate a real recovery scenario. This is something we would definitely include in future versions.

Lastly, like any group project, collaboration was both a strength and a struggle. Coordinating tasks, resolving merge conflicts in GitHub, and managing version control

taught us a lot about teamwork and communication. Mas naging aware kami na documentation and clear commit messages are just as important as the code itself.