

CRYPTOCURRENCY EXCHANGE

This **Cryptocurrency Exchange Platform** database manages core operations like user accounts, wallets, transactions, and market data. It allows for the calculation of trading volumes, generating user reports, and analyzing market trends.

Database Design Overview

- **Users:** Stores user information like name, email, and account status.
- **Wallets:** Tracks user wallets and cryptocurrency balances.
- **Transactions:** Records buy, sell, and transfer activities for cryptocurrencies.
- **Market Data:** Stores live price data and historical information for analysis.

Tables and Relationships

➤ Users:

- user_id (Primary Key)
- username, email, password_hash
- created_at, account_status

➤ Wallets:

- wallet_id (Primary Key)
- user_id (Foreign Key to Users)
- currency (e.g., BTC, ETH)
- balance

➤ Transactions:

- transaction_id (Primary Key)
- wallet_id (Foreign Key to Wallets)
- type (buy/sell/transfer)
- amount, price_at_transaction, transaction_fee

➤ Market Data:

- market_id (Primary Key)
- currency_pair (e.g., BTC/USDT)
- price, volume
- timestamp

Sample SQL Queries:

1. Create Users Table

The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'airline_reservation' schema. The main editor window contains the following SQL query:

```
1 CREATE TABLE Users (  
2     user_id INT PRIMARY KEY AUTO_INCREMENT,  
3     username VARCHAR(50) UNIQUE NOT NULL,  
4     email VARCHAR(100) UNIQUE NOT NULL,  
5     password_hash VARCHAR(255) NOT NULL,  
6     created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,  
7     account_status ENUM('active', 'suspended', 'closed') DEFAULT 'active'  
8 );  
9  
10  
11  
12  
13
```

The right sidebar shows a message: "Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help." Below this, there are tabs for "Context Help" and "Snippets".

The bottom output window shows the execution results:

#	Time	Action	Message	Duration / Fetch
1	19:37:05	CREATE DATABASE cryptocurrency_exchange	1 row(s) affected	0.032 sec
2	19:37:43	USE cryptocurrency_exchange	0 row(s) affected	0.000 sec
3	19:40:13	CREATE TABLE Users (user_id INT PRIMARY KEY AUTO_INCREMENT, user...	0 row(s) affected	0.078 sec

2. Create Wallets Table

The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'airline_reservation' schema. The main editor window contains the following SQL query:

```
1 CREATE TABLE Wallets (  
2     wallet_id INT PRIMARY KEY AUTO_INCREMENT,  
3     user_id INT NOT NULL,  
4     currency VARCHAR(10) NOT NULL,  
5     balance DECIMAL(18, 8) DEFAULT 0.0,  
6     FOREIGN KEY (user_id) REFERENCES Users(user_id) ON DELETE CASCADE  
7 );  
8  
9  
10  
11  
12
```

The right sidebar shows a message: "Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help." Below this, there are tabs for "Context Help" and "Snippets".

The bottom output window shows the execution results:

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2	19:37:43	USE cryptocurrency_exchange	0 row(s) affected	0.000 sec
3	19:40:13	CREATE TABLE Users (user_id INT PRIMARY KEY AUTO_INCREMENT, user...	0 row(s) affected	0.078 sec
4	19:42:32	CREATE TABLE Wallets (wallet_id INT PRIMARY KEY AUTO_INCREMENT, u...	0 row(s) affected	0.062 sec

3. Create Transactions Table

The screenshot shows the MySQL Workbench interface with the 'airline_reservation' schema selected. The SQL editor contains the following code to create the 'Transactions' table:

```
1 CREATE TABLE Transactions (  
2     transaction_id INT PRIMARY KEY AUTO_INCREMENT,  
3     wallet_id INT NOT NULL,  
4     type ENUM('buy', 'sell', 'transfer') NOT NULL,  
5     amount DECIMAL(18, 8) NOT NULL,  
6     price_at_transaction DECIMAL(18, 8) NOT NULL,  
7     transaction_fee DECIMAL(18, 8) DEFAULT 0.0,  
8     timestamp TIMESTAMP DEFAULT CURRENT_TIMESTAMP,  
9     FOREIGN KEY (wallet_id) REFERENCES Wallets(wallet_id) ON DELETE CASCADE  
10 );  
11  
12  
13  
14
```

The Output window shows the execution results:

#	Time	Action	Message	Duration / Fetch
1	19:37:05	CREATE DATABASE cryptocurrency_exchange	1 row(s) affected	0.032 sec
2	19:37:43	USE cryptocurrency_exchange	0 row(s) affected	0.000 sec
3	19:40:13	CREATE TABLE Users (user_id INT PRIMARY KEY AUTO_INCREMENT, user...	0 row(s) affected	0.078 sec
4	19:42:32	CREATE TABLE Wallets (wallet_id INT PRIMARY KEY AUTO_INCREMENT, u...	0 row(s) affected	0.062 sec
5	19:44:03	CREATE TABLE Transactions (transaction_id INT PRIMARY KEY AUTO_INCRE...	0 row(s) affected	0.047 sec

4. Create Market Data Table

The screenshot shows the MySQL Workbench interface with the 'airline_reservation' schema selected. The SQL editor contains the following code to create the 'MarketData' table:

```
1 CREATE TABLE MarketData (  
2     market_id INT PRIMARY KEY AUTO_INCREMENT,  
3     currency_pair VARCHAR(20) NOT NULL,  
4     price DECIMAL(18, 8) NOT NULL,  
5     volume DECIMAL(18, 8) NOT NULL,  
6     timestamp TIMESTAMP DEFAULT CURRENT_TIMESTAMP  
7 );  
8
```

The Output window shows the execution results:

#	Time	Action	Message	Duration / Fetch
1	20:43:28	CREATE TABLE MarketData (market_id INT PRIMARY KEY AUTO_INCREMENT...	0 row(s) affected	0.062 sec

Insert Sample Data into Tables:

Insert Users

The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'airline_reservation' schema. The main editor window contains the following SQL query:

```
1 INSERT INTO Users (username, email, password_hash, account_status)
2 VALUES
3 ('Thireesha', 'trisha@example.com', 'hashed_password_123', 'active'),
4 ('Aysha fathima', 'jane@example.com', 'hashed_password_456', 'active'),
5 ('Anupriyaa', 'alice@example.com', 'hashed_password_789', 'suspended');
6
```

The right sidebar shows a message: "Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help."

The bottom Output panel shows the execution results:

#	Time	Action	Message	Duration / Fetch
1	19:37:05	CREATE DATABASE cryptocurrency_exchange	1 row(s) affected	0.032 sec
2	19:37:43	USE cryptocurrency_exchange	0 row(s) affected	0.000 sec
3	19:40:13	CREATE TABLE Users (user_id INT PRIMARY KEY AUTO_INCREMENT, user...	0 row(s) affected	0.078 sec
4	19:42:32	CREATE TABLE Wallets (wallet_id INT PRIMARY KEY AUTO_INCREMENT, u...	0 row(s) affected	0.062 sec
5	19:44:03	CREATE TABLE Transactions (transaction_id INT PRIMARY KEY AUTO_INCRE...	0 row(s) affected	0.047 sec
6	19:48:56	INSERT INTO Users (username, email, password_hash, account_status) VALUES (...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.015 sec

Insert Wallets

The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'airline_reservation' schema. The main editor window contains the following SQL query:

```
1 INSERT INTO Wallets (user_id, currency, balance)
2 VALUES
3 (1, 'BTC', 0.5),
4 (1, 'ETH', 10.0),
5 (2, 'BTC', 1.0),
6 (2, 'USD', 1000.0),
7 (3, 'ETH', 5.0);
8
```

The right sidebar shows a message: "Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help."

The bottom Output panel shows the execution results:

#	Time	Action	Message	Duration / Fetch
2	19:37:43	USE cryptocurrency_exchange	0 row(s) affected	0.000 sec
3	19:40:13	CREATE TABLE Users (user_id INT PRIMARY KEY AUTO_INCREMENT, use...	0 row(s) affected	0.078 sec
4	19:42:32	CREATE TABLE Wallets (wallet_id INT PRIMARY KEY AUTO_INCREMENT, ...	0 row(s) affected	0.062 sec
5	19:44:03	CREATE TABLE Transactions (transaction_id INT PRIMARY KEY AUTO_INCRE...	0 row(s) affected	0.047 sec
6	19:48:56	INSERT INTO Users (username, email, password_hash, account_status) VALUES ...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.015 sec
7	19:50:23	INSERT INTO Wallets (user_id, currency, balance) VALUES (1, 'BTC', 0.5), (1, 'ET...	5 row(s) affected Records: 5 Duplicates: 0 Warnings: 0	0.016 sec

Insert Transactions

MySQL Workbench

Local instance MySQL90 - W...

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Information

Schema: airline_reservation

Query 1 SQL File 3*

```
1 INSERT INTO Transactions (wallet_id, type, amount, price_at_transaction, transaction_fee)
2 VALUES
3 (1, 'buy', 0.2, 30000.00, 10.0),
4 (2, 'sell', 5.0, 2000.00, 15.0),
5 (3, 'buy', 100.0, 1.00, 1.0),
6 (4, 'transfer', 500.0, 1.00, 0.5);
7
```

SQLAdditions

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

Context Help Snippets

Output

Action Output

#	Time	Action	Message	Duration / Fetch
3	19:40:13	CREATE TABLE Users (user_id INT PRIMARY KEY AUTO_INCREMENT, use...	0 row(s) affected	0.078 sec
4	19:42:32	CREATE TABLE Wallets (wallet_id INT PRIMARY KEY AUTO_INCREMENT, ...	0 row(s) affected	0.062 sec
5	19:44:03	CREATE TABLE Transactions (transaction_id INT PRIMARY KEY AUTO_INCRE...	0 row(s) affected	0.047 sec
6	19:48:56	INSERT INTO Users (username, email, password_hash, account_status) VALUES ...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.015 sec
7	19:50:23	INSERT INTO Wallets (user_id, currency, balance) VALUES (1, 'BTC', 0.5), (1, 'ET...	5 row(s) affected Records: 5 Duplicates: 0 Warnings: 0	0.016 sec
8	19:52:24	INSERT INTO Transactions (wallet_id, type, amount, price_at_transaction, transacti...	4 row(s) affected Records: 4 Duplicates: 0 Warnings: 0	0.015 sec

Object Info Session

Insert Market Data

MySQL Workbench

Local instance MySQL90 - W...

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Administration Schemas

Information

Schema: airline_reservation

Query 1 SQL File 3*

```
1 INSERT INTO MarketData (currency_pair, price, volume)
2 VALUES
3 ('BTC/USDT', 30000.00, 100.00000000),
4 ('ETH/USDT', 2000.00, 500.00000000),
5 ('BTC/ETH', 15.00, 50.00000000);
6
```

SQLAdditions

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

Context Help Snippets

Output

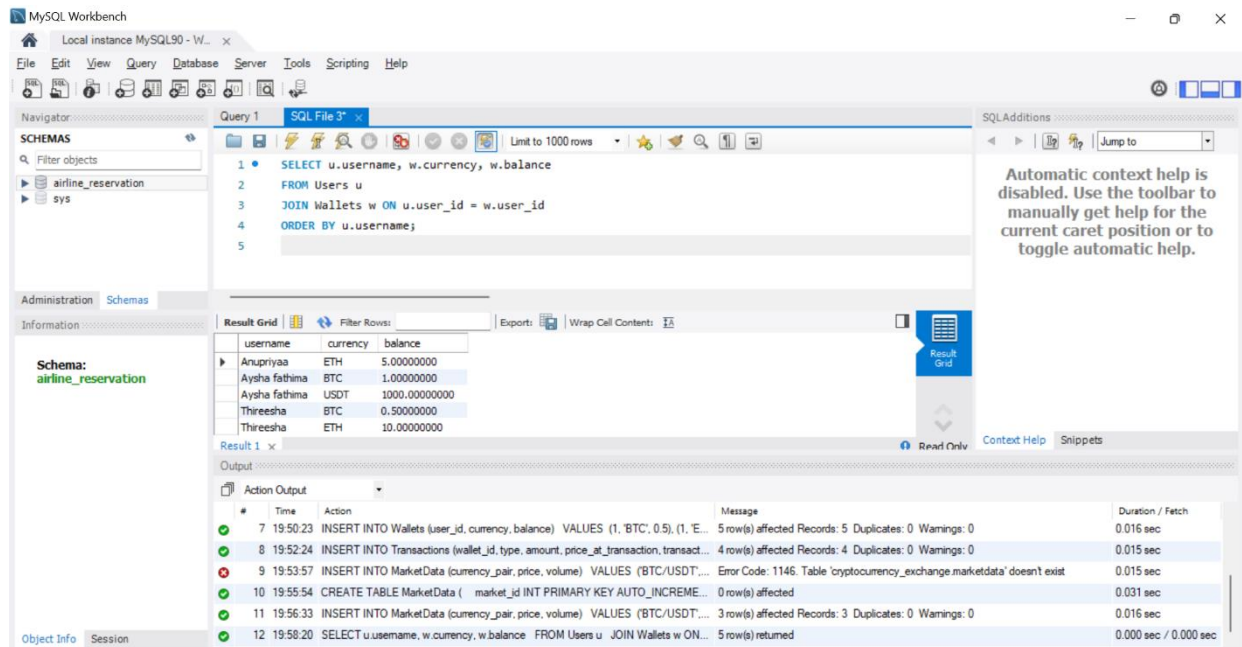
Action Output

#	Time	Action	Message	Duration / Fetch
6	19:48:56	INSERT INTO Users (username, email, password_hash, account_status) VALUES ...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.015 sec
7	19:50:23	INSERT INTO Wallets (user_id, currency, balance) VALUES (1, 'BTC', 0.5), (1, 'ET...	5 row(s) affected Records: 5 Duplicates: 0 Warnings: 0	0.016 sec
8	19:52:24	INSERT INTO Transactions (wallet_id, type, amount, price_at_transaction, transacti...	4 row(s) affected Records: 4 Duplicates: 0 Warnings: 0	0.015 sec
9	19:53:57	INSERT INTO MarketData (currency_pair, price, volume) VALUES ('BTC/USDT', ...	Error Code: 1146. Table 'cryptocurrency_exchange.marketdata' doesn't exist	0.015 sec
10	19:55:54	CREATE TABLE MarketData (market_id INT PRIMARY KEY AUTO_INCREMENT...	0 row(s) affected	0.031 sec
11	19:56:33	INSERT INTO MarketData (currency_pair, price, volume) VALUES ('BTC/USDT', ...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.016 sec

Object Info Session

Retrieve Data from Tables

Query 1: Retrieve All Users and Their Wallet Balances



MySQL Workbench

Local instance MySQL90 - W...

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Administration Schemas

Information

Schema: airline_reservation

Query 1 SQL File 3*

```
1 SELECT u.username, w.currency, w.balance
2 FROM Users u
3 JOIN Wallets w ON u.user_id = w.user_id
4 ORDER BY u.username;
5
```

Result Grid

username	currency	balance
Anupriyaa	ETH	5.00000000
Aysha fathima	BTC	1.00000000
Aysha fathima	USD	1000.00000000
Threesha	BTC	0.50000000
Threesha	ETH	10.00000000

Result 1 x

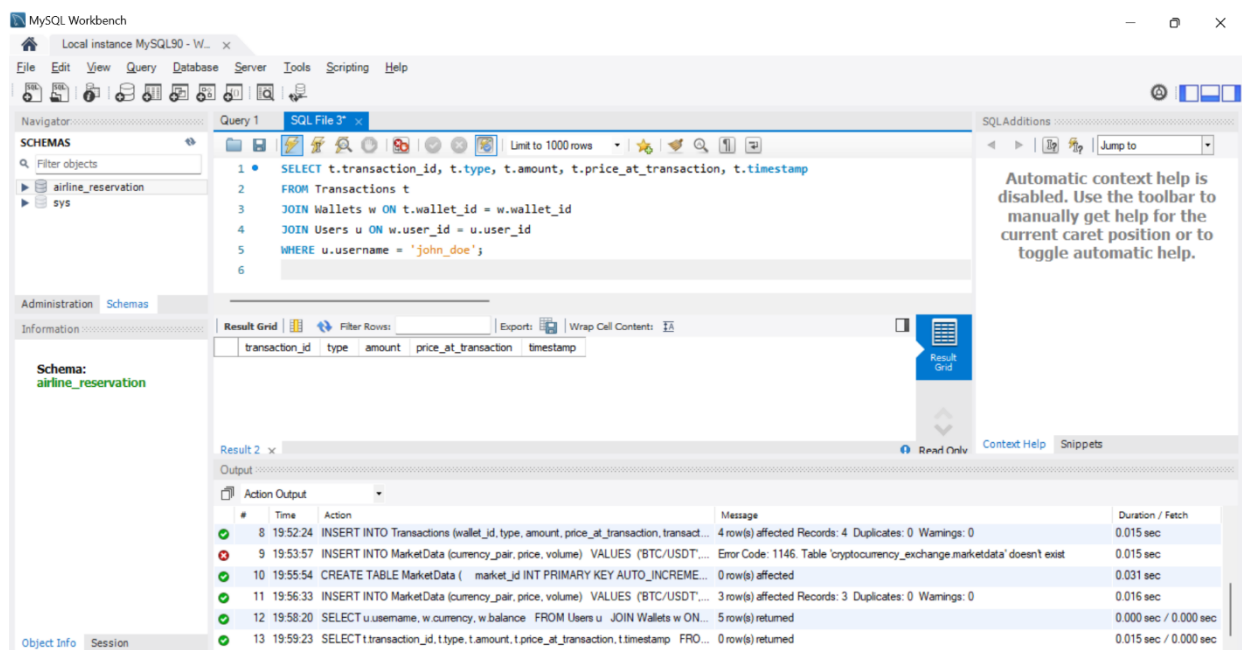
Output

Action Output

#	Time	Action	Message	Duration / Fetch
7	19:50:23	INSERT INTO Wallets (user_id, currency, balance) VALUES (1, 'BTC', 0.5), (1, 'E...	5 row(s) affected Records: 5 Duplicates: 0 Warnings: 0	0.016 sec
8	19:52:24	INSERT INTO Transactions (wallet_id, type, amount, price_at_transaction, transact...	4 row(s) affected Records: 4 Duplicates: 0 Warnings: 0	0.015 sec
9	19:53:57	INSERT INTO MarketData (currency_pair, price, volume) VALUES ('BTC/USD', ...	Error Code: 1146. Table 'cryptocurrency_exchange.marketdata' doesn't exist	0.015 sec
10	19:55:54	CREATE TABLE MarketData (market_id INT PRIMARY KEY AUTO_INCREMENT...	0 row(s) affected	0.031 sec
11	19:56:33	INSERT INTO MarketData (currency_pair, price, volume) VALUES ('BTC/USD', ...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.016 sec
12	19:58:20	SELECT u.username, w.currency, w.balance FROM Users u JOIN Wallets w ON...	5 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

Query 2: Retrieve All Transactions for a Specific User



MySQL Workbench

Local instance MySQL90 - W...

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Administration Schemas

Information

Schema: airline_reservation

Query 1 SQL File 3*

```
1 SELECT t.transaction_id, t.type, t.amount, t.price_at_transaction, t.timestamp
2 FROM Transactions t
3 JOIN Wallets w ON t.wallet_id = w.wallet_id
4 JOIN Users u ON w.user_id = u.user_id
5 WHERE u.username = 'john_doe';
6
```

Result Grid

transaction_id	type	amount	price_at_transaction	timestamp
----------------	------	--------	----------------------	-----------

Result 2 x

Output

Action Output

#	Time	Action	Message	Duration / Fetch
8	19:52:24	INSERT INTO Transactions (wallet_id, type, amount, price_at_transaction, transact...	4 row(s) affected Records: 4 Duplicates: 0 Warnings: 0	0.015 sec
9	19:53:57	INSERT INTO MarketData (currency_pair, price, volume) VALUES ('BTC/USD', ...	Error Code: 1146. Table 'cryptocurrency_exchange.marketdata' doesn't exist	0.015 sec
10	19:55:54	CREATE TABLE MarketData (market_id INT PRIMARY KEY AUTO_INCREMENT...	0 row(s) affected	0.031 sec
11	19:56:33	INSERT INTO MarketData (currency_pair, price, volume) VALUES ('BTC/USD', ...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.016 sec
12	19:58:20	SELECT u.username, w.currency, w.balance FROM Users u JOIN Wallets w ON...	5 row(s) returned	0.000 sec / 0.000 sec
13	19:59:23	SELECT t.transaction_id, t.type, t.amount, t.price_at_transaction, t.timestamp FRO...	0 row(s) returned	0.015 sec / 0.000 sec

Object Info Session

Query 3: Calculate Total Trading Volume for BTC/USDT

MySQL Workbench

Local instance MySQL90 - W...

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Administration Schemas

Information

Schema: airline_reservation

Query 1

SQL File 3*

Limit to 1000 rows

1 SELECT currency_pair, SUM(volume) AS total_volume

2 FROM MarketData

3 WHERE currency_pair = 'BTC/USDT';

4

Result Grid

currency_pair total_volume

BTC/USDT 100.00000000

Result 3 x

Read Only Context Help Snippets

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

Output

Action Output

#	Time	Action	Message	Duration / Fetch
9	19:53:57	INSERT INTO MarketData (currency_pair, price, volume) VALUES ('BTC/USDT', ...	Error Code: 1146. Table 'cryptocurrency_exchange.marketdata' doesn't exist	0.015 sec
10	19:55:54	CREATE TABLE MarketData (market_id INT PRIMARY KEY AUTO_INCREMENT, ...	0 row(s) affected	0.031 sec
11	19:56:33	INSERT INTO MarketData (currency_pair, price, volume) VALUES ('BTC/USDT', ...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.016 sec
12	19:58:20	SELECT u.username, w.currency, w.balance FROM Users u JOIN Wallets w ON...	5 row(s) returned	0.000 sec / 0.000 sec
13	19:59:23	SELECT t.transaction_id, t.type, t.amount, t.price_at_transaction, t.timestamp FRO...	0 row(s) returned	0.015 sec / 0.000 sec
14	20:00:46	SELECT currency_pair, SUM(volume) AS total_volume FROM MarketData WHE...	1 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

Query 4: List Suspended Users

MySQL Workbench

Local instance MySQL90 - W...

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Navigator

SCHEMAS

Filter objects

airline_reservation

sys

Administration Schemas

Information

Schema: airline_reservation

Query 1

SQL File 3*

Limit to 1000 rows

1 SELECT username, email

2 FROM Users

3 WHERE account_status = 'suspended';

4

Result Grid

username email

Anupriya alice@example.com

Users 4 x

Read Only Context Help Snippets

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

Output

Action Output

#	Time	Action	Message	Duration / Fetch
10	19:55:54	CREATE TABLE MarketData (market_id INT PRIMARY KEY AUTO_INCREMENT, ...	0 row(s) affected	0.031 sec
11	19:56:33	INSERT INTO MarketData (currency_pair, price, volume) VALUES ('BTC/USDT', ...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.016 sec
12	19:58:20	SELECT u.username, w.currency, w.balance FROM Users u JOIN Wallets w ON...	5 row(s) returned	0.000 sec / 0.000 sec
13	19:59:23	SELECT t.transaction_id, t.type, t.amount, t.price_at_transaction, t.timestamp FRO...	0 row(s) returned	0.015 sec / 0.000 sec
14	20:00:46	SELECT currency_pair, SUM(volume) AS total_volume FROM MarketData WHE...	1 row(s) returned	0.000 sec / 0.000 sec
15	20:02:30	SELECT username, email FROM Users WHERE account_status = 'suspended' L...	1 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

1. Calculate Trading Volume for a Currency Pair

Retrieve the total volume traded for a specific currency pair in a given time period.

The screenshot shows the MySQL Workbench interface. The 'Query' tab is active, displaying the following SQL query:

```
1 SELECT currency_pair, SUM(volume) AS total_volume
2 FROM MarketData
3 WHERE currency_pair = 'BTC/USD' AND timestamp >= '2024-10-01'
4 GROUP BY currency_pair;
```

The 'Result Grid' is empty, showing columns 'currency_pair' and 'total_volume'. The 'Output' pane shows the execution log:

#	Time	Action	Message	Duration / Fetch
1	20:43:28	CREATE TABLE MarketData (market_id INT PRIMARY KEY AUTO_INCREMENT...	0 row(s) affected	0.062 sec
2	20:57:07	SELECT currency_pair, SUM(volume) AS total_volume FROM MarketData WHERE...	0 row(s) returned	0.032 sec / 0.000 sec

2. Generate User Report with Wallet Balances

Generate a report of users along with their wallet balances for all cryptocurrencies.

The screenshot shows the MySQL Workbench interface. The 'Query' tab is active, displaying the following SQL query:

```
1 SELECT u.username, w.currency, w.balance
2 FROM Users u
3 JOIN Wallets w ON u.user_id = w.user_id
4 ORDER BY u.username;
```

The 'Result Grid' shows the following data:

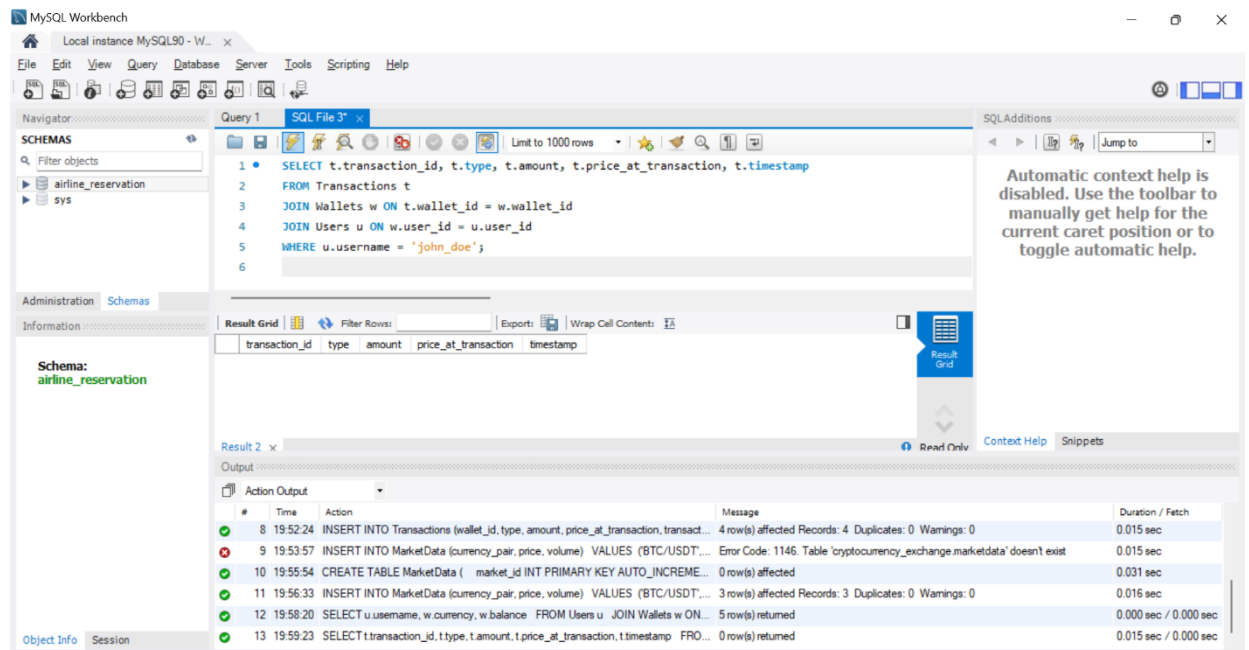
username	currency	balance
Anupriyaa	ETH	5.00000000
Aysha fathima	BTC	1.00000000
Aysha fathima	USDT	1000.00000000
Threasha	BTC	0.50000000
Threasha	ETH	10.00000000

The 'Output' pane shows the execution log:

#	Time	Action	Message	Duration / Fetch
7	19:50:23	INSERT INTO Wallets (user_id, currency, balance) VALUES (1, 'BTC', 0.5), (1, 'E...	5 row(s) affected Records: 5 Duplicates: 0 Warnings: 0	0.016 sec
8	19:52:24	INSERT INTO Transactions (wallet_id, type, amount, price_at_transaction, transact...	4 row(s) affected Records: 4 Duplicates: 0 Warnings: 0	0.015 sec
9	19:53:57	INSERT INTO MarketData (currency_pair, price, volume) VALUES ('BTC/USD', ...	Error Code: 1146. Table 'cryptocurrency_exchange.marketdata' doesn't exist	0.015 sec
10	19:55:54	CREATE TABLE MarketData (market_id INT PRIMARY KEY AUTO_INCREMENT...	0 row(s) affected	0.031 sec
11	19:56:33	INSERT INTO MarketData (currency_pair, price, volume) VALUES ('BTC/USD', ...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.016 sec
12	19:58:20	SELECT u.username, w.currency, w.balance FROM Users u JOIN Wallets w ON...	5 row(s) returned	0.000 sec / 0.000 sec

3.Track a User's Transaction History

Retrieve all transactions performed by a specific user, including the type and timestamp.



Conclusion :

The Cryptocurrency Exchange System is a vital platform for facilitating the secure buying, selling, and trading of digital assets. This system ensures efficient management of users, wallets, transactions, and market data, providing users with real-time access to trading opportunities. With robust database design, the platform enhances transparency, security, and scalability, enabling seamless handling of transactions while minimizing risks. By offering analytical tools for market trends and trading volumes, it empowers users to make informed decisions. As cryptocurrencies continue to grow in popularity, such a system plays an essential role in driving adoption and ensuring a smooth, reliable, and secure exchange experience for all participants.