UE22CS351A
Database Management System

Investor Portfolio Management System
(Set-8 Version-1)

Prepared by:

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Semester-5
Section-J

1. Draw an E-R Diagram for EcoVenture Investments that allows them to effectively manage their growing needs. Illustrate the various components in the system and their underlying relationships.

PES UNIVERSITY

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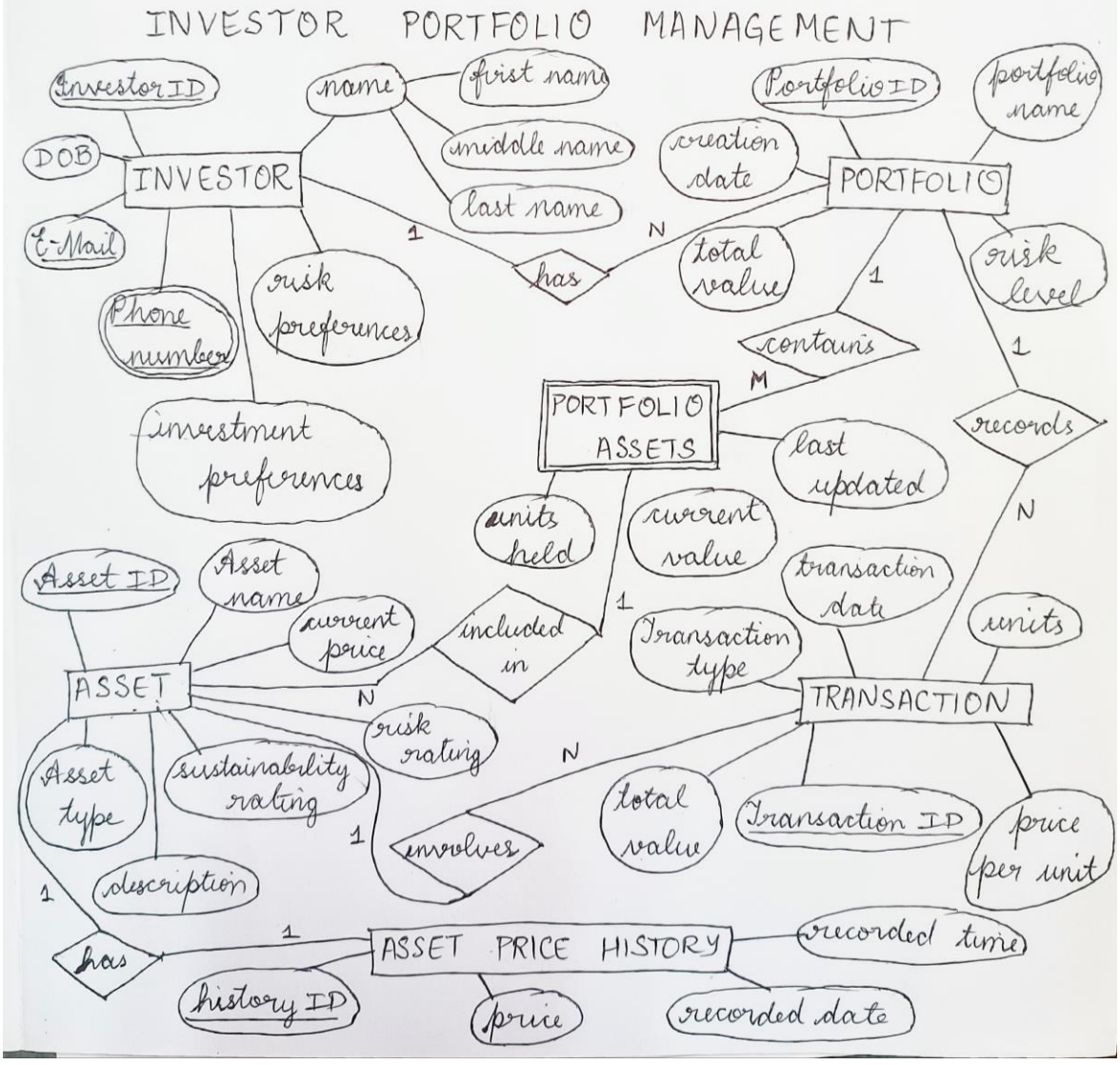
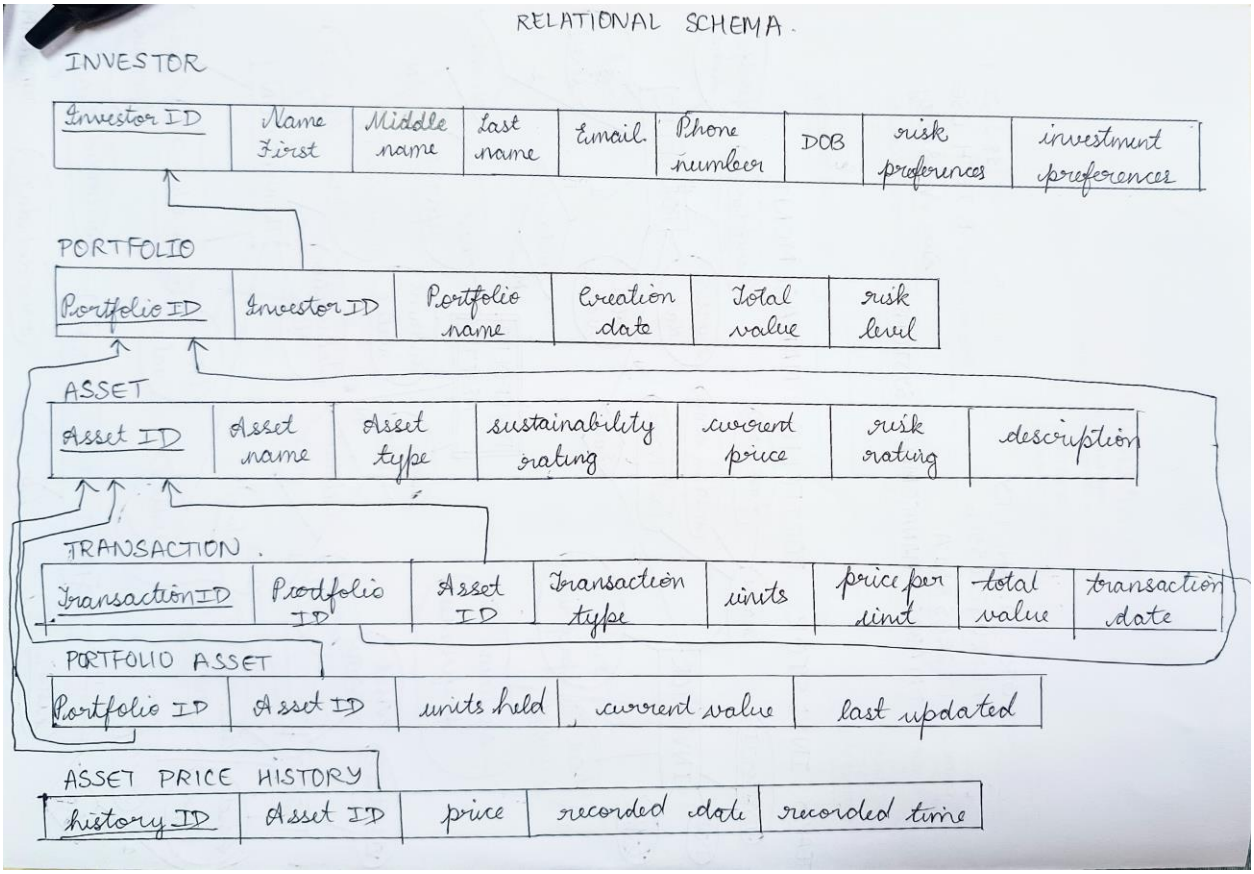
DBMS HACKATHON
(AUGUST-DECEMBER 2024)

Name	SIRI. N. SHETTY	Sem	5	Date	18-11-2024
SRN	PES2UG22CS556	Program of Study		B.TECH CSE	
Course Code	UE22CS351A	Siri N Shetty			
Course Title	DATABASE MANAGEMENT SYSTEMS	Signature of the Candidate			
Max Marks					
Obtained Marks		Signature of the Faculty			



2. Convert the E-R Diagram to a relational schema depicting the constraints, providing a clear view of the system.




```
mysql> prompt 556_568_575_600>
PROMPT set to '556_568_575_600>'
```

3. Develop the database with all relevant tables based on the schema, ensuring proper relationships and constraints. Populate each table with at least 5 records. Attach screenshots showing the SQL queries for table creation and queries displaying the populated data.

```
556_568_575_600>CREATE DATABASE hackathon;
Query OK, 1 row affected (0.14 sec)

556_568_575_600>use hackathon;
Database changed
556_568_575_600>CREATE TABLE Investor (    investor_id INT AUTO_INCREMENT PRIMARY KEY,    full_name VARCHAR(100) NOT NUL
L,    email VARCHAR(150) UNIQUE NOT NULL,    phone_number VARCHAR(20) UNIQUE NOT NULL,    address TEXT,    risk_toleranc
e ENUM('Low', 'Medium', 'High') DEFAULT 'Medium',    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP);
Query OK, 0 rows affected (0.07 sec)

556_568_575_600>CREATE TABLE Portfolio (    portfolio_id INT AUTO_INCREMENT PRIMARY KEY,    investor_id INT NOT NULL,
 portfolio_name VARCHAR(100) NOT NULL,    initial_investment DECIMAL(15, 2) NOT NULL,    created_at TIMESTAMP DEFAULT CU
RRENT_TIMESTAMP,    status ENUM('Active', 'Inactive') DEFAULT 'Active',    FOREIGN KEY (investor_id) REFERENCES Investor
(investor_id) ON DELETE CASCADE);
Query OK, 0 rows affected (0.12 sec)

556_568_575_600>CREATE TABLE Asset (    asset_id INT AUTO_INCREMENT PRIMARY KEY,    asset_name VARCHAR(100) NOT NULL,
 asset_type ENUM('Stock', 'Bond', 'ETF', 'Real Estate', 'Cryptocurrency') NOT NULL,    market_value DECIMAL(15, 2) NOT N
ULL,    risk_level ENUM('Low', 'Medium', 'High') NOT NULL,    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP);
Query OK, 0 rows affected (0.21 sec)

556_568_575_600>CREATE TABLE Transaction (    transaction_id INT AUTO_INCREMENT PRIMARY KEY,    portfolio_id INT NOT NUL
L,    asset_id INT NOT NULL,    transaction_type ENUM('Buy', 'Sell') NOT NULL,    transaction_date DATE NOT NULL,    uni
ts DECIMAL(12, 4) NOT NULL,    price_per_unit DECIMAL(15, 2) NOT NULL,    total_value DECIMAL(15, 2) NOT NULL,    FOREIG
N KEY (portfolio_id) REFERENCES Portfolio(portfolio_id) ON DELETE CASCADE,    FOREIGN KEY (asset_id) REFERENCES Asset(as
set_id) ON DELETE CASCADE);
Query OK, 0 rows affected (0.20 sec)
```

```
556_568_575_600>CREATE TABLE Market_History (    history_id INT AUTO_INCREMENT PRIMARY KEY,    asset_id INT NOT NULL,
 date DATE NOT NULL,    market_value DECIMAL(15, 2) NOT NULL,    FOREIGN KEY (asset_id) REFERENCES Asset(asset_id) ON DE
LETE CASCADE);
Query OK, 0 rows affected (0.24 sec)
```

```
556_568_575_600>CREATE TABLE Portfolio_Asset (    portfolio_id INT NOT NULL,    asset_id INT NOT NULL,    units_owned DE
CIMAL(12, 4) NOT NULL,    purchase_price DECIMAL(15, 2) NOT NULL,    current_value DECIMAL(15, 2) NOT NULL,    last_upda
ted TIMESTAMP DEFAULT CURRENT_TIMESTAMP,    PRIMARY KEY (portfolio_id, asset_id),    FOREIGN KEY (portfolio_id) REFERENC
ES Portfolio(portfolio_id) ON DELETE CASCADE,    FOREIGN KEY (asset_id) REFERENCES Asset(asset_id) ON DELETE CASCADE);
Query OK, 0 rows affected (0.24 sec)

556_568_575_600>show tables;
+--------------------+
| Tables_in_hackathon |
+--------------------+
| asset              |
| investor           |
| market_history     |
| portfolio          |
| portfolio_asset    |
| transaction        |
+--------------------+
6 rows in set (0.00 sec)
```

```
556_568_575_600>-- Insert records into Investor table
556_568_575_600>INSERT INTO Investor (full_name, email, phone_number, address, risk_tolerance) VALUES
    -> ('Alice Johnson', 'alice.johnson@example.com', '1234567890', '123 Elm Street, NY', 'Low'),
    -> ('Bob Smith', 'bob.smith@example.com', '0987654321', '456 Oak Avenue, CA', 'Medium'),
    -> ('Charlie Brown', 'charlie.brown@example.com', '1122334455', '789 Pine Lane, TX', 'High'),
    -> ('Diana Prince', 'diana.prince@example.com', '2233445566', '101 Maple Drive, FL', 'Medium'),
    -> ('Edward Stark', 'edward.stark@example.com', '3344556677', '202 Birch Boulevard, WA', 'High');
Query OK, 5 rows affected (0.10 sec)
Records: 5  Duplicates: 0  Warnings: 0

556_568_575_600>
556_568_575_600>-- Insert records into Portfolio table
556_568_575_600>INSERT INTO Portfolio (investor_id, portfolio_name, initial_investment) VALUES
    -> (1, 'Retirement Fund', 50000.00),
    -> (2, 'Growth Portfolio', 75000.00),
    -> (3, 'High-Risk Portfolio', 100000.00),
    -> (4, 'Diversified Portfolio', 60000.00),
    -> (5, 'Crypto Focus', 45000.00);
Query OK, 5 rows affected (0.09 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

```
556_568_575_600>INSERT INTO Asset (asset_name, asset_type, market_value, risk_level) VALUES
    -> ('Apple Inc.', 'Stock', 150.50, 'Low'),
    -> ('US Treasury Bond', 'Bond', 102.75, 'Low'),
    -> ('S&P 500 ETF', 'ETF', 420.30, 'Medium'),
    -> ('Downtown Office', 'Real Estate', 500000.00, 'High'),
    -> ('Bitcoin', 'Cryptocurrency', 27000.00, 'High');
Query OK, 5 rows affected (0.09 sec)
Records: 5  Duplicates: 0  Warnings: 0

556_568_575_600>
556_568_575_600>-- Insert records into Portfolio_Asset table
556_568_575_600>INSERT INTO Portfolio_Asset (portfolio_id, asset_id, units_owned, purchase_price, current_value) VALUES
    -> (1, 1, 100.00, 145.00, 150.50),
    -> (1, 2, 50.00, 100.00, 102.75),
    -> (2, 3, 75.00, 400.00, 420.30),
    -> (3, 5, 1.50, 20000.00, 27000.00),
    -> (4, 4, 0.10, 450000.00, 500000.00);
Query OK, 5 rows affected (0.02 sec)
Records: 5  Duplicates: 0  Warnings: 0

556_568_575_600>
556_568_575_600>-- Insert records into Transaction table
556_568_575_600>INSERT INTO Transaction (portfolio_id, asset_id, transaction_type, transaction_date, units, price_per_un
it, total_value) VALUES
    -> (1, 1, 'Buy', '2024-11-01', 100.00, 145.00, 14500.00),
    -> (1, 2, 'Buy', '2024-11-02', 50.00, 100.00, 5000.00),
    -> (2, 3, 'Buy', '2024-11-03', 75.00, 400.00, 30000.00),
    -> (3, 5, 'Buy', '2024-11-04', 1.50, 20000.00, 30000.00),
    -> (4, 4, 'Buy', '2024-11-05', 0.10, 450000.00, 45000.00);
Query OK, 5 rows affected (0.09 sec)
```

```
556_568_575_600>-- Insert records into Market_History table
556_568_575_600>INSERT INTO Market_History (asset_id, date, market_value) VALUES
    -> (1, '2024-11-01', 145.00),
    -> (1, '2024-11-15', 150.50),
    -> (5, '2024-11-01', 20000.00),
    -> (5, '2024-11-15', 27000.00),
    -> (4, '2024-11-01', 450000.00);
Query OK, 5 rows affected (0.01 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

```
556_568_575_600>select * from Investor;
+-------------+--------------+--------------------------+--------------+-----------------------+----------------+---------------------+
| investor_id | full_name    | email                    | phone_number | address               | risk_tolerance | created_at          |
+-------------+--------------+--------------------------+--------------+-----------------------+----------------+---------------------+
|           1 | Alice Johnson | alice.johnson@example.com | 1234567890   | 123 Elm Street, NY    | Low            | 2024-11-18 10:11:46 |
|           2 | Bob Smith    | bob.smith@example.com    | 0987654321   | 456 Oak Avenue, CA    | Medium         | 2024-11-18 10:11:46 |
|           3 | Charlie Brown | charlie.brown@example.com | 1122334455   | 789 Pine Lane, TX     | High           | 2024-11-18 10:11:46 |
|           4 | Diana Prince | diana.prince@example.com | 2233445566   | 101 Maple Drive, FL   | Medium         | 2024-11-18 10:11:46 |
|           5 | Edward Stark | edward.stark@example.com | 3344556677   | 202 Birch Boulevard, WA | High           | 2024-11-18 10:11:46 |
+-------------+--------------+--------------------------+--------------+-----------------------+----------------+---------------------+
5 rows in set (0.00 sec)

556_568_575_600>select * from Portfolio;
+--------------+-------------+----------------------+--------------------+---------------------+--------+
| portfolio_id | investor_id | portfolio_name       | initial_investment | created_at          | status |
+--------------+-------------+----------------------+--------------------+---------------------+--------+
|            1 |           1 | Retirement Fund      |           50000.00 | 2024-11-18 10:11:46 | Active |
|            2 |           2 | Growth Portfolio     |           75000.00 | 2024-11-18 10:11:46 | Active |
|            3 |           3 | High-Risk Portfolio  |          100000.00 | 2024-11-18 10:11:46 | Active |
|            4 |           4 | Diversified Portfolio |           60000.00 | 2024-11-18 10:11:46 | Active |
|            5 |           5 | Crypto Focus         |           45000.00 | 2024-11-18 10:11:46 | Active |
+--------------+-------------+----------------------+--------------------+---------------------+--------+
5 rows in set (0.00 sec)

556_568_575_600>select * from Transaction;
+----------------+--------------+----------+------------------+------------------+----------+----------------+-------------+
| transaction_id | portfolio_id | asset_id | transaction_type | transaction_date | units    | price_per_unit | total_value |
+----------------+--------------+----------+------------------+------------------+----------+----------------+-------------+
|              1 |            1 |        1 | Buy              | 2024-11-01       | 100.0000 |         145.00 |    14500.00 |
|              2 |            1 |        2 | Buy              | 2024-11-02       |  50.0000 |         100.00 |     5000.00 |
|              3 |            2 |        3 | Buy              | 2024-11-03       |  75.0000 |         400.00 |    30000.00 |
|              4 |            3 |        5 | Buy              | 2024-11-04       |   1.5000 |       20000.00 |    30000.00 |
|              5 |            4 |        4 | Buy              | 2024-11-05       |   0.1000 |      450000.00 |    45000.00 |
+----------------+--------------+----------+------------------+------------------+----------+----------------+-------------+
5 rows in set (0.00 sec)
```

```
556_568_575_600>select * from Asset;
+----------+------------------+---------------+--------------+------------+---------------------+
| asset_id | asset_name       | asset_type    | market_value | risk_level | created_at          |
+----------+------------------+---------------+--------------+------------+---------------------+
|        1 | Apple Inc.       | Stock         |       150.50 | Low        | 2024-11-18 10:11:47 |
|        2 | US Treasury Bond | Bond          |       102.75 | Low        | 2024-11-18 10:11:47 |
|        3 | S&P 500 ETF      | ETF           |       420.30 | Medium     | 2024-11-18 10:11:47 |
|        4 | Downtown Office  | Real Estate   |    500000.00 | High       | 2024-11-18 10:11:47 |
|        5 | Bitcoin          | Cryptocurrency |     27000.00 | High       | 2024-11-18 10:11:47 |
+----------+------------------+---------------+--------------+------------+---------------------+
5 rows in set (0.00 sec)
```

```
556_568_575_600>select * from Portfolio_Asset;
+--------------+----------+-------------+----------------+---------------+---------------------+
| portfolio_id | asset_id | units_owned | purchase_price | current_value | last_updated        |
+--------------+----------+-------------+----------------+---------------+---------------------+
|            1 |        1 |    100.0000 |         145.00 |        150.50 | 2024-11-18 10:11:47 |
|            1 |        2 |     50.0000 |         100.00 |        102.75 | 2024-11-18 10:11:47 |
|            2 |        3 |     75.0000 |         400.00 |        420.30 | 2024-11-18 10:11:47 |
|            3 |        5 |      1.5000 |       20000.00 |      27000.00 | 2024-11-18 10:11:47 |
|            4 |        4 |      0.1000 |      450000.00 |     500000.00 | 2024-11-18 10:11:47 |
+--------------+----------+-------------+----------------+---------------+---------------------+
5 rows in set (0.00 sec)

556_568_575_600>select * from Market_History;
+------------+----------+------------+--------------+
| history_id | asset_id | date       | market_value |
+------------+----------+------------+--------------+
|          1 |        1 | 2024-11-01 |       145.00 |
|          2 |        1 | 2024-11-15 |       150.50 |
|          3 |        5 | 2024-11-01 |     20000.00 |
|          4 |        5 | 2024-11-15 |     27000.00 |
|          5 |        4 | 2024-11-01 |    450000.00 |
+------------+----------+------------+--------------+
5 rows in set (0.00 sec)
```

4. Demonstrate the use of Federated Storage Engine in MySQL on the “asset” table created in your database, establishing a connection between the server and the client. You need to clean up the asset database by removing all the assets with risk level = “Low” to focus on Medium and High risk investments.

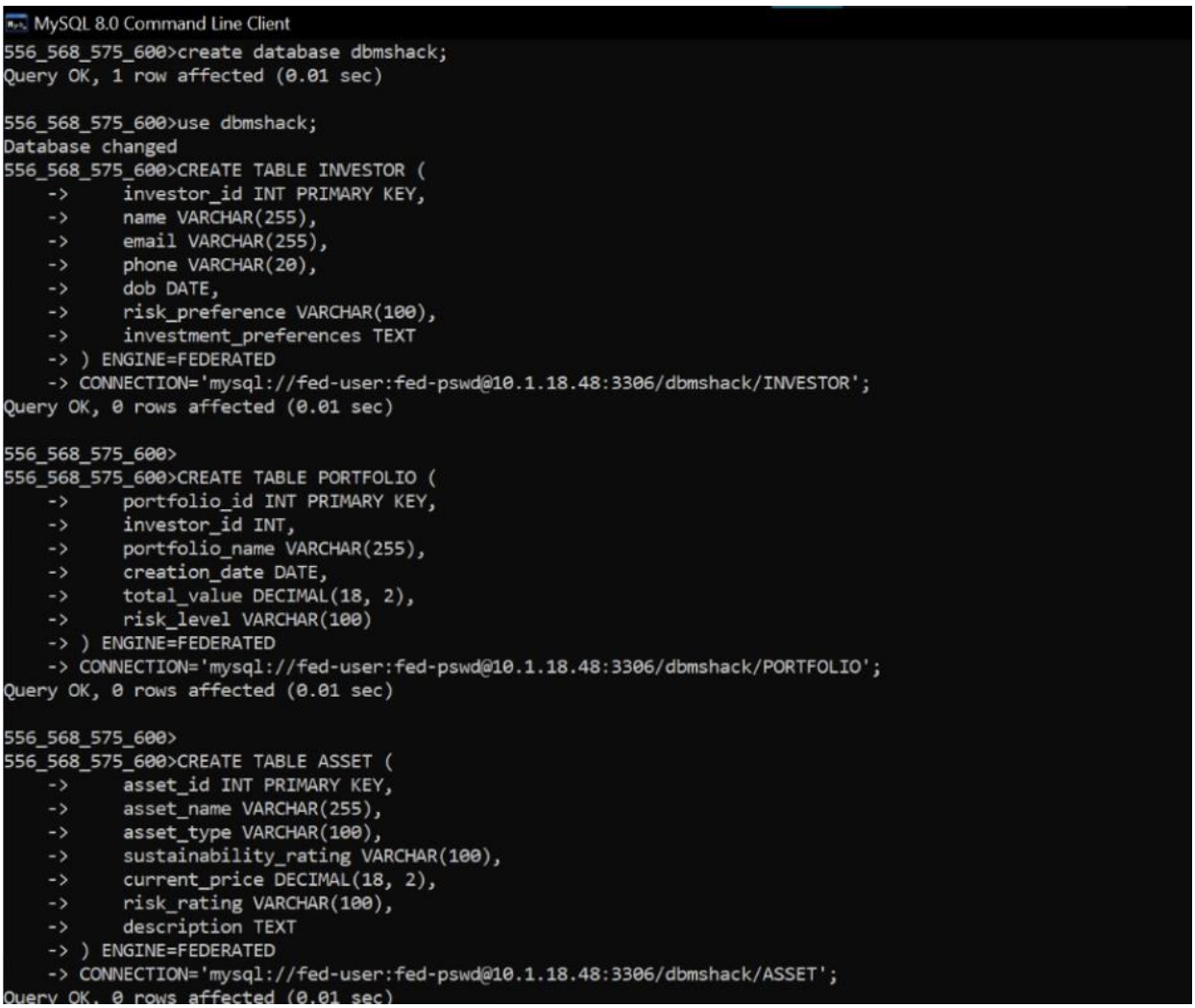
   Write an SQL query to perform the above operation and attach relevant screenshots demonstrating the federated storage engine.

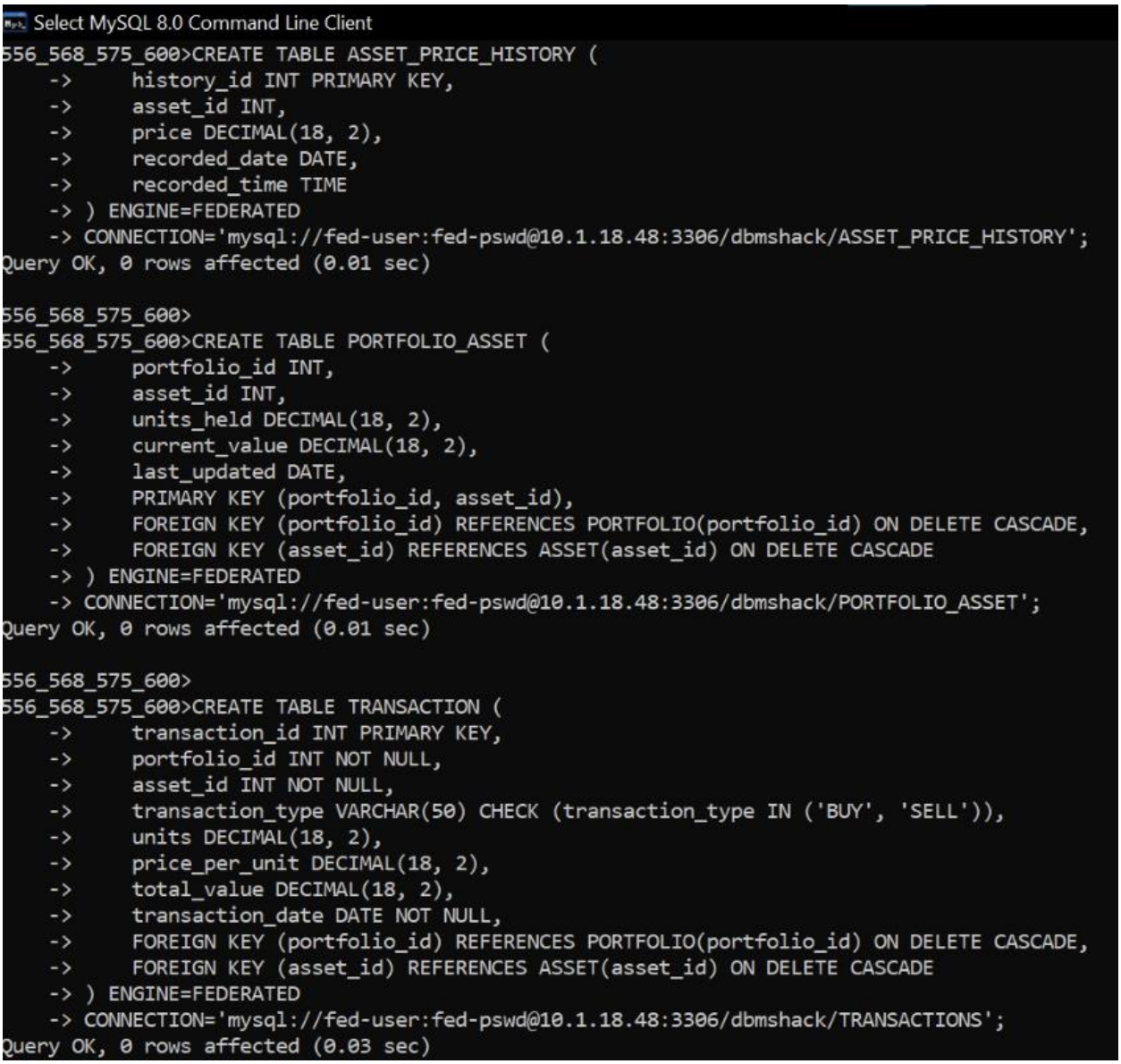
   Remote

```
556_568_575_600->select*from asset;
+----------+-----------------+----------------+----------------------+---------------+-------------+------------------
--------------------------+
| asset_id | asset_name      | asset_type     | sustainability_rating | current_price | risk_rating | description
                          |
+----------+-----------------+----------------+----------------------+---------------+-------------+------------------
--------------------------+
|        1 | Tesla Stock     | Stock          | A                    |        250.00 | High        | Electric vehicle
manufacturer stock        |
|        2 | Bitcoin         | Cryptocurrency | C                    |      45000.00 | High        | Decentralized dig
ital currency             |
|        3 | Green Bond      | Bond           | A+                   |       1000.00 | Low         | Eco-friendly bond
 supporting green projects |
|        4 | Amazon Stock    | Stock          | B                    |       3300.00 | Medium      | E-commerce and cl
oud computing stock       |
|        5 | Solar Energy ETF | ETF            | A+                   |        150.00 | Low         | ETF focused on so
lar energy companies      |
+----------+-----------------+----------------+----------------------+---------------+-------------+------------------
--------------------------+
5 rows in set (0.00 sec)

556_568_575_600->DELETE FROM ASSET WHERE risk_rating = 'Low';
Query OK, 2 rows affected (0.01 sec)
```

```
556_568_575_600->DELETE FROM ASSET WHERE risk_rating = 'Low';
Query OK, 2 rows affected (0.01 sec)

556_568_575_600->select*from asset;
+----------+--------------+----------------+----------------------+---------------+-------------+-----------------------
----------------+
| asset_id | asset_name   | asset_type     | sustainability_rating | current_price | risk_rating | description
               |
+----------+--------------+----------------+----------------------+---------------+-------------+-----------------------
----------------+
|        1 | Tesla Stock  | Stock          | A                    |        250.00 | High        | Electric vehicle manu
facturer stock  |
|        2 | Bitcoin      | Cryptocurrency | C                    |      45000.00 | High        | Decentralized digital
 currency       |
|        4 | Amazon Stock | Stock          | B                    |       3300.00 | Medium      | E-commerce and cloud
computing stock |
+----------+--------------+----------------+----------------------+---------------+-------------+-----------------------
----------------+
3 rows in set (0.00 sec)
```

Client:


MySQL 8.0 Command Line Client
556_568_575_600>create database dbmshack;
Query OK, 1 row affected (0.01 sec)
556_568_575_600>use dbmshack;
Database changed
556_568_575_600>CREATE TABLE INVESTOR (
-> investor_id INT PRIMARY KEY,
-> name VARCHAR(255),
-> email VARCHAR(255),
-> phone VARCHAR(20),
-> dob DATE,
-> risk_preference VARCHAR(100),
-> investment_preferences TEXT
->) ENGINE=FEDERATED
-> CONNECTION='mysql://fed-user:fed-pswd@10.1.18.48:3306/dbmshack/INVESTOR';
Query OK, 0 rows affected (0.01 sec)
556_568_575_600>
556_568_575_600>CREATE TABLE PORTFOLIO (
-> portfolio_id INT PRIMARY KEY,
-> investor_id INT,
-> portfolio_name VARCHAR(255),
-> creation_date DATE,
-> total_value DECIMAL(18, 2),
-> risk_level VARCHAR(100)
->) ENGINE=FEDERATED
-> CONNECTION='mysql://fed-user:fed-pswd@10.1.18.48:3306/dbmshack/PORTFOLIO';
Query OK, 0 rows affected (0.01 sec)
556_568_575_600>
556_568_575_600>CREATE TABLE ASSET (
-> asset_id INT PRIMARY KEY,
-> asset_name VARCHAR(255),
-> asset_type VARCHAR(100),
-> sustainability_rating VARCHAR(100),
-> current_price DECIMAL(18, 2),
-> risk_rating VARCHAR(100),
-> description TEXT
->) ENGINE=FEDERATED
-> CONNECTION='mysql://fed-user:fed-pswd@10.1.18.48:3306/dbmshack/ASSET';
Query OK, 0 rows affected (0.01 sec)


Select MySQL 8.0 Command Line Client
556_568_575_600>CREATE TABLE ASSET_PRICE_HISTORY (
-> history_id INT PRIMARY KEY,
-> asset_id INT,
-> price DECIMAL(18, 2),
-> recorded_date DATE,
-> recorded_time TIME
->) ENGINE=FEDERATED
-> CONNECTION='mysql://fed-user:fed-pswd@10.1.18.48:3306/dbmshack/ASSET_PRICE_HISTORY';
Query OK, 0 rows affected (0.01 sec)
556_568_575_600>
556_568_575_600>CREATE TABLE PORTFOLIO_ASSET (
-> portfolio_id INT,
-> asset_id INT,
-> units_held DECIMAL(18, 2),
-> current_value DECIMAL(18, 2),
-> last_updated DATE,
-> PRIMARY KEY (portfolio_id, asset_id),
-> FOREIGN KEY (portfolio_id) REFERENCES PORTFOLIO(portfolio_id) ON DELETE CASCADE,
-> FOREIGN KEY (asset_id) REFERENCES ASSET(asset_id) ON DELETE CASCADE
->) ENGINE=FEDERATED
-> CONNECTION='mysql://fed-user:fed-pswd@10.1.18.48:3306/dbmshack/PORTFOLIO_ASSET';
Query OK, 0 rows affected (0.01 sec)
556_568_575_600>
556_568_575_600>CREATE TABLE TRANSACTION (
-> transaction_id INT PRIMARY KEY,
-> portfolio_id INT NOT NULL,
-> asset_id INT NOT NULL,
-> transaction_type VARCHAR(50) CHECK (transaction_type IN ('BUY', 'SELL')),
-> units DECIMAL(18, 2),
-> price_per_unit DECIMAL(18, 2),
-> total_value DECIMAL(18, 2),
-> transaction_date DATE NOT NULL,
-> FOREIGN KEY (portfolio_id) REFERENCES PORTFOLIO(portfolio_id) ON DELETE CASCADE,
-> FOREIGN KEY (asset_id) REFERENCES ASSET(asset_id) ON DELETE CASCADE
->) ENGINE=FEDERATED
-> CONNECTION='mysql://fed-user:fed-pswd@10.1.18.48:3306/dbmshack/TRANSACTIONS';
Query OK, 0 rows affected (0.03 sec)

```
Select MySQL 8.0 Command Line Client

556_568_575_600>show tables;
+--------------------+
| Tables_in_dbmshack |
+--------------------+
| asset              |
| asset_price_history |
| investor           |
| portfolio          |
| portfolio_asset    |
| transaction        |
+--------------------+
6 rows in set (0.01 sec)

556_568_575_600>select * from asset;
+----------+-----------------+---------------+----------------------+---------------+-------------+-----------------------------------------+
| asset_id | asset_name      | asset_type    | sustainability_rating | current_price | risk_rating | description                             |
+----------+-----------------+---------------+----------------------+---------------+-------------+-----------------------------------------+
|        1 | Tesla Stock     | Stock         | A                    |        250.00 | High        | Electric vehicle manufacturer stock     |
|        2 | Bitcoin         | Cryptocurrency | C                    |      45000.00 | High        | Decentralized digital currency          |
|        3 | Green Bond      | Bond          | A+                   |       1000.00 | Low         | Eco-friendly bond supporting green projects |
|        4 | Amazon Stock    | Stock         | B                    |       3300.00 | Medium      | E-commerce and cloud computing stock    |
|        5 | Solar Energy ETF | ETF           | A+                   |        150.00 | Low         | ETF focused on solar energy companies   |
+----------+-----------------+---------------+----------------------+---------------+-------------+-----------------------------------------+
5 rows in set (0.99 sec)

556_568_575_600>select * from asset;
+----------+-------------+---------------+----------------------+---------------+-------------+-----------------------------------+
| asset_id | asset_name  | asset_type    | sustainability_rating | current_price | risk_rating | description                       |
+----------+-------------+---------------+----------------------+---------------+-------------+-----------------------------------+
|        1 | Tesla Stock | Stock         | A                    |        250.00 | High        | Electric vehicle manufacturer stock |
|        2 | Bitcoin     | Cryptocurrency | C                    |      45000.00 | High        | Decentralized digital currency    |
|        4 | Amazon Stock | Stock         | B                    |       3300.00 | Medium      | E-commerce and cloud computing stock |
+----------+-------------+---------------+----------------------+---------------+-------------+-----------------------------------+
3 rows in set (0.09 sec)

556_568_575_600>
```

5. Assuming that you have created (investor, portfolio, asset, portfolio_asset, transactions) as part of the database.

   You have been tasked with analysing the growth of various assets owned by investors over a period of 20 years. Each asset has a fixed current value and grows at a specified annual compound interest rate.

   Using the given asset values and a 5% annual growth rate, calculate the projected values of all assets after 20 years. The output should include the following details (columns) for each asset:

   Investor's full name
   Portfolio name
   Asset name
   Projected asset value after 20 years

```
+----------------+--------------------------+---------------------+--------------------+
| full_name      | portfolio_name           | asset_name          | projected_value    |
+----------------+--------------------------+---------------------+--------------------+
```

```
556_568_575_600>SELECT
    ->     inv.full_name AS "Investor's Full Name",
    ->     port.portfolio_name AS "Portfolio Name",
    ->     a.asset_name AS "Asset Name",
    ->     ROUND(pa.current_value * POWER(1 + 0.05, 20), 2) AS "Projected Asset Value After 20 Years"
    -> FROM
    ->     Portfolio_Asset pa
    -> JOIN
    ->     Portfolio port ON pa.portfolio_id = port.portfolio_id
    -> JOIN
    ->     Investor inv ON port.investor_id = inv.investor_id
    -> JOIN
    ->     Asset a ON pa.asset_id = a.asset_id;
+---------------------+----------------------+-----------------+-----------------------------------+
| Investor's Full Name | Portfolio Name       | Asset Name      | Projected Asset Value After 20 Years |
+---------------------+----------------------+-----------------+-----------------------------------+
| Alice Johnson       | Retirement Fund      | Apple Inc.      |                            399.32 |
| Alice Johnson       | Retirement Fund      | US Treasury Bond |                            272.63 |
| Bob Smith           | Growth Portfolio     | S&P 500 ETF     |                           1115.18 |
| Charlie Brown       | High-Risk Portfolio  | Bitcoin         |                          71639.04 |
| Diana Prince        | Diversified Portfolio | Downtown Office |                        1326648.85 |
+---------------------+----------------------+-----------------+-----------------------------------+
5 rows in set (0.04 sec)
```

6. Assuming that you have created (investor, portfolio, asset, portfolio_asset, transactions) tables as part of the database.

   Create a stored procedure that handles the process of transferring an asset from one portfolio to another. The procedure should:

   - Deduct the asset units from the source portfolio.
   - Add the asset units to the destination portfolio.
   - Update the current values in both portfolios accordingly.
   - Ensure that both portfolios belong to the same investor.

```
556_568_575_600->
556_568_575_600->CREATE PROCEDURE TransferAsset2(
    ->     IN source_portfolio_id INT, -- Source Portfolio ID
    ->     IN destination_portfolio_id INT, -- Destination Portfolio ID
    ->     IN asset_id INT, -- Asset ID to be transferred
    ->     IN transfer_units DECIMAL(18, 2) -- Number of units to transfer
    -> )
    -> BEGIN
    ->     DECLARE source_investor_id INT;
    ->     DECLARE destination_investor_id INT;
    ->     DECLARE current_price DECIMAL(18, 2);
    ->     DECLARE transfer_value DECIMAL(18, 2);
    ->     DECLARE source_units DECIMAL(18, 2);
    ->
    ->     -- 1. Verify that both portfolios belong to the same investor
    ->     SELECT investor_id INTO source_investor_id
    ->     FROM PORTFOLIO_3
    ->     WHERE portfolio_id = source_portfolio_id
    ->     LIMIT 1;
    ->
    ->     SELECT investor_id INTO destination_investor_id
    ->     FROM PORTFOLIO_3
    ->     WHERE portfolio_id = destination_portfolio_id
    ->     LIMIT 1;
    ->
    ->     IF source_investor_id != destination_investor_id THEN
    ->         SIGNAL SQLSTATE '45000'
    ->         SET MESSAGE_TEXT = 'Both portfolios must belong to the same investor.';
    ->     END IF;
    ->
    ->     -- 2. Check if the source portfolio has the asset and enough units of the asset
    ->     SELECT units_held INTO source_units
    ->     FROM PORTFOLIO_ASSET
    ->     WHERE portfolio_id = source_portfolio_id AND asset_id = asset_id
    ->     LIMIT 1;
    ->
    ->     IF source_units IS NULL THEN
    ->         SIGNAL SQLSTATE '45000'
    ->         SET MESSAGE_TEXT = 'The asset does not exist in the source portfolio.';
    ->     END IF;
    ->
    ->     IF source_units < transfer_units THEN
    ->         SIGNAL SQLSTATE '45000'
    ->         SET MESSAGE_TEXT = 'Insufficient units in the source portfolio.';
    ->     END IF;
    ->
    ->     -- 3. Get the current price of the asset
    ->     SELECT current_price INTO current_price
    ->     FROM ASSET
    ->     WHERE asset_id = asset_id
    ->     LIMIT 1;
    ->
    ->     -- 4. Calculate the transfer value
    ->     SET transfer_value = current_price * transfer_units;
    ->
    ->     -- 5. Deduct units from the source portfolio (only if the asset exists in this portfolio)
    ->     UPDATE PORTFOLIO_ASSET
    ->     SET units_held = units_held - transfer_units,
    ->         current_value = current_value - transfer_value
    ->     WHERE portfolio_id = source_portfolio_id AND asset_id = asset_id;
    ->
    ->     -- 6. Add units to the destination portfolio
    ->     INSERT INTO PORTFOLIO_ASSET (portfolio_id, asset_id, units_held, current_value, last_updated)
    ->     VALUES (destination_portfolio_id, asset_id, transfer_units, transfer_value, CURDATE())
    ->     ON DUPLICATE KEY UPDATE
    ->         units_held = units_held + transfer_units,
    ->         current_value = current_value + transfer_value,
    ->         last_updated = CURDATE();
    ->
    ->     -- 7. Update total values in both portfolios
    ->     UPDATE PORTFOLIO_3
    ->     SET total_value = total_value - transfer_value
    ->     WHERE portfolio_id = source_portfolio_id;
    ->
    ->     UPDATE PORTFOLIO_3
    ->     SET total_value = total_value + transfer_value
    ->     WHERE portfolio_id = destination_portfolio_id;
    ->
    -> END$$
Query OK, 0 rows affected (0.01 sec)
```

```
556_568_575_600->select *from portfolio_asset;
+--------------+----------+------------+---------------+--------------+
| portfolio_id | asset_id | units_held | current_value | last_updated |
+--------------+----------+------------+---------------+--------------+
|            1 |        1 |       0.00 |          NULL | 2023-12-01   |
|            2 |        1 |      10.00 |          NULL | 2024-11-18   |
|            2 |        2 |       0.50 |      22500.00 | 2023-12-01   |
|            4 |        4 |       5.00 |       5000.00 | 2023-12-01   |
+--------------+----------+------------+---------------+--------------+
4 rows in set (0.00 sec)

556_568_575_600->CALL TransferAsset(2, 1, 1, 10);
Query OK, 0 rows affected (0.01 sec)

556_568_575_600->select *from portfolio_asset;
+--------------+----------+------------+---------------+--------------+
| portfolio_id | asset_id | units_held | current_value | last_updated |
+--------------+----------+------------+---------------+--------------+
|            1 |        1 |      10.00 |          NULL | 2024-11-18   |
|            2 |        1 |       0.00 |          NULL | 2024-11-18   |
```

7. Assuming that you have created (investor, portfolio, asset, portfolio_asset, transactions) as part of the database.

   Write a SQL trigger that will automatically update the current value of assets in the portfolio_asset table following any buy or sell transactions recorded in the transaction table.

   Ensure that the trigger:
   - Increases the current value of an asset when a 'Buy' transaction is recorded.
   - Decreases the current value of an asset when a 'Sell' transaction is recorded.
   - Updates the last_updated timestamp for the affected asset record in the portfolio_asset table immediately after the transaction is processed.

   Create a front-end using streamlit demonstrating the above triggers execution and attach the relevant screenshots.

```
556_568_575_600>DELIMITER $$
556_568_575_600>
556_568_575_600>CREATE TRIGGER update_portfolio_asset
    -> AFTER INSERT ON Transaction
    -> FOR EACH ROW
    -> BEGIN
    ->     DECLARE updated_value DECIMAL(15, 2);
    ->
    ->     -- Fetch the current value of the asset
    ->     SELECT current_value INTO updated_value
    ->     FROM Portfolio_Asset
    ->     WHERE portfolio_id = NEW.portfolio_id AND asset_id = NEW.asset_id;
    ->
    ->     -- Update the current value based on transaction type
    ->     IF NEW.transaction_type = 'Buy' THEN
    ->         UPDATE Portfolio_Asset
    ->         SET current_value = current_value + (NEW.units * NEW.price_per_unit),
    ->             last_updated = CURRENT_TIMESTAMP
    ->         WHERE portfolio_id = NEW.portfolio_id AND asset_id = NEW.asset_id;
    ->     ELSEIF NEW.transaction_type = 'Sell' THEN
    ->         UPDATE Portfolio_Asset
    ->         SET current_value = current_value - (NEW.units * NEW.price_per_unit),
    ->             last_updated = CURRENT_TIMESTAMP
    ->         WHERE portfolio_id = NEW.portfolio_id AND asset_id = NEW.asset_id;
    ->     END IF;
    -> END$$
Query OK, 0 rows affected (0.02 sec)
```

Code to execute frontend in Streamlit:

```python
import streamlit as st
import mysql.connector
import pandas as pd

from dotenv import load_dotenv
import os

# Load environment variables from .env file
load_dotenv()

# Database connection
def get_db_connection():
    return mysql.connector.connect(
        host="localhost",
        user="root",  # Replace with your username
        password=os.getenv("DB_PASSWORD"),  # Replace with your
password
        database="hackathon"  # Replace with your database name
    )
```

```
# Function to display Portfolio_Asset table
def display_portfolio_assets():
    conn = get_db_connection()
    query = "SELECT * FROM Portfolio_Asset"
    df = pd.read_sql(query, conn)
    conn.close()
    return df

# Function to add a transaction
def add_transaction(portfolio_id, asset_id, transaction_type,
units, price_per_unit):
    conn = get_db_connection()
    cursor = conn.cursor()
    query = """
    INSERT INTO Transaction (portfolio_id, asset_id,
transaction_type, transaction_date, units, price_per_unit,
total_value)
    VALUES (%s, %s, %s, NOW(), %s, %s, %s)
    """
    total_value = units * price_per_unit
    cursor.execute(query, (portfolio_id, asset_id,
transaction_type, units, price_per_unit, total_value))
    conn.commit()
    conn.close()

# Streamlit UI
st.title("Portfolio Asset Management")
st.write("Demonstrating SQL Trigger Execution")

# Display Portfolio_Asset table
st.header("Portfolio Assets")
st.write("Current state of Portfolio_Asset table:")
df = display_portfolio_assets()
st.dataframe(df)

# Add a transaction
st.header("Add a Transaction")
portfolio_id = st.number_input("Portfolio ID", min_value=1,
step=1)
asset_id = st.number_input("Asset ID", min_value=1, step=1)
transaction_type = st.selectbox("Transaction Type", ["Buy",
"Sell"])
units = st.number_input("Units", min_value=0.01, step=0.01,
format="%.2f")
```

```
price_per_unit = st.number_input("Price Per Unit",
min_value=0.01, step=0.01, format="%.2f")

if st.button("Add Transaction"):
    add_transaction(portfolio_id, asset_id, transaction_type,
units, price_per_unit)
    st.success("Transaction added successfully!")
    st.write("Updated Portfolio_Asset table:")
    df = display_portfolio_assets()
    st.dataframe(df)
```

Output:

	portfolio_id	asset_id	units_owned	purchase_price	current_value	last_updated
0	1	1	100	145	150.5	2024-11-18 10:11:47
1	1	2	50	100	102.75	2024-11-18 10:11:47
2	2	3	75	400	420.3	2024-11-18 10:11:47
3	3	5	1.5	20,000	27,000	2024-11-18 10:11:47
4	4	4	0.1	450,000	500,000	2024-11-18 10:11:47
5	6	1	50	140	150.5	2024-11-18 11:14:58

Add a Transaction

Portfolio ID

1

Asset ID

1

Transaction Type

Buy

Units

10.00

Price Per Unit

100.00

Add Transaction

Add Transaction

Transaction added successfully!

Updated Portfolio_Asset table:

	portfolio_id	asset_id	units_owned	purchase_price	current_value	last_updated
0	1	1	100	145	1,150.5	2024-11-18 11:33:05
1	1	2	50	100	102.75	2024-11-18 10:11:47
2	2	3	75	400	420.3	2024-11-18 10:11:47
3	3	5	1.5	20,000	27,000	2024-11-18 10:11:47
4	4	4	0.1	450,000	500,000	2024-11-18 10:11:47
5	6	1	50	140	150.5	2024-11-18 11:14:58

8. Assuming that you have created (investor, portfolio, asset, portfolio_asset, transactions) as part of the database.

   EcoVenture Investments wants to project the future value of assets within investor portfolios, accounting for a constant annual growth rate. You are required to implement a function that takes the asset's current value, interest rate, and number of years as input and returns the projected future value.

   - Create a **user-defined SQL function** calculate_future_value that takes:
     1. current_value (DECIMAL) – the current market value of the asset from the portfolio_asset table.
     2. interest_rate (DECIMAL) – a constant annual growth rate.
     3. years (INT) – the number of years over which the asset value is projected.
   - The function should return the **projected future value** using the formula: Future Value = Current Value * (1 + interest_rate) ^ years
   - Use the function to display for each asset:
     - Investor's full name (from the investor table)
     - Portfolio name (from the portfolio table)
     - Asset name (from the asset table)
     - Current asset value (from the portfolio_asset table)
     - Projected asset value after 10 years (using the created function)

```
556_568_575_600>
556_568_575_600>DELIMITER ;
556_568_575_600>DELIMITER $$
556_568_575_600>
556_568_575_600>CREATE FUNCTION calculate_future_value(current_value DECIMAL, interest_rate DECIMAL, years INT)
    -> RETURNS DECIMAL
    -> DETERMINISTIC
    -> BEGIN
    ->     DECLARE future_value DECIMAL;
    ->     SET future_value = current_value * POWER(1 + interest_rate, years);
    ->     RETURN future_value;
    -> END$$
Query OK, 0 rows affected (0.05 sec)

556_568_575_600>
556_568_575_600>DELIMITER ;
556_568_575_600>SELECT
    ->     i.full_name AS investor_name,
    ->     p.portfolio_name,
    ->     a.asset_name,
    ->     pa.current_value AS current_asset_value,
    ->     calculate_future_value(pa.current_value, 0.05, 10) AS projected_asset_value_10_years
    -> FROM
    ->     Portfolio_Asset pa
    -> JOIN
    ->     Portfolio p ON pa.portfolio_id = p.portfolio_id
    -> JOIN
    ->     Investor i ON p.investor_id = i.investor_id
    -> JOIN
    ->     Asset a ON pa.asset_id = a.asset_id;
+---------------+----------------------+-----------------+---------------------+-------------------------------+
| investor_name | portfolio_name       | asset_name      | current_asset_value | projected_asset_value_10_years |
+---------------+----------------------+-----------------+---------------------+-------------------------------+
| Alice Johnson | Retirement Fund      | Apple Inc.      |             1150.50 |                          1151 |
| Alice Johnson | Tech Growth          | Apple Inc.      |              150.50 |                           151 |
| Alice Johnson | Retirement Fund      | US Treasury Bond |              102.75 |                           103 |
| Bob Smith     | Growth Portfolio     | S&P 500 ETF     |              420.30 |                           420 |
| Diana Prince  | Diversified Portfolio | Downtown Office |           500000.00 |                        500000 |
| Charlie Brown | High-Risk Portfolio  | Bitcoin         |            27000.00 |                         27000 |
+---------------+----------------------+-----------------+---------------------+-------------------------------+
6 rows in set, 10 warnings (0.26 sec)
```

9. Demonstrate Transaction Isolation and identify its type by implementing the following Create a new portfolio for an investor with an initial investment of ₹5000 under the name 'Retirement Fund'. Start a transaction and update the portfolio by adding ₹1000 to the initial investment. In a separate session, attempt to update the same portfolio by adding ₹500. Please submit screenshots of the portfolio insertion, the transaction and the update of ₹1000, as well as the error received when trying to update from the separate session.

```
556_568_575_600>select * from Portfolio;
+--------------+-------------+-----------------------+--------------------+---------------------+--------+
| portfolio_id | investor_id | portfolio_name        | initial_investment | created_at          | status |
+--------------+-------------+-----------------------+--------------------+---------------------+--------+
|            1 |           1 | Retirement Fund       |           51500.00 | 2024-11-18 10:11:46 | Active |
|            2 |           2 | Growth Portfolio      |           75000.00 | 2024-11-18 10:11:46 | Active |
|            3 |           3 | High-Risk Portfolio   |          100000.00 | 2024-11-18 10:11:46 | Active |
|            4 |           4 | Diversified Portfolio |           60000.00 | 2024-11-18 10:11:46 | Active |
|            5 |           5 | Crypto Focus          |           45000.00 | 2024-11-18 10:11:46 | Active |
|            6 |           1 | Tech Growth           |           30000.00 | 2024-11-18 11:14:51 | Active |
|            7 |           1 | Tech Growth           |           30000.00 | 2024-11-18 11:16:56 | Active |
+--------------+-------------+-----------------------+--------------------+---------------------+--------+
7 rows in set (0.00 sec)

556_568_575_600>INSERT INTO Portfolio (investor_id, portfolio_name, initial_investment)VALUES (1, 'Retirement Fund', 5000);
Query OK, 1 row affected (0.04 sec)

556_568_575_600>select * from Portfolio;
+--------------+-------------+-----------------------+--------------------+---------------------+--------+
| portfolio_id | investor_id | portfolio_name        | initial_investment | created_at          | status |
+--------------+-------------+-----------------------+--------------------+---------------------+--------+
|            1 |           1 | Retirement Fund       |           51500.00 | 2024-11-18 10:11:46 | Active |
|            2 |           2 | Growth Portfolio      |           75000.00 | 2024-11-18 10:11:46 | Active |
|            3 |           3 | High-Risk Portfolio   |          100000.00 | 2024-11-18 10:11:46 | Active |
|            4 |           4 | Diversified Portfolio |           60000.00 | 2024-11-18 10:11:46 | Active |
|            5 |           5 | Crypto Focus          |           45000.00 | 2024-11-18 10:11:46 | Active |
|            6 |           1 | Tech Growth           |           30000.00 | 2024-11-18 11:14:51 | Active |
|            7 |           1 | Tech Growth           |           30000.00 | 2024-11-18 11:16:56 | Active |
|            9 |           1 | Retirement Fund       |            5000.00 | 2024-11-18 11:44:24 | Active |
+--------------+-------------+-----------------------+--------------------+---------------------+--------+
8 rows in set (0.00 sec)
```

```
556_568_575_600>select * from Portfolio;
+--------------+-------------+----------------------+--------------------+---------------------+--------+
| portfolio_id | investor_id | portfolio_name       | initial_investment | created_at          | status |
+--------------+-------------+----------------------+--------------------+---------------------+--------+
|            1 |           1 | Retirement Fund      |           51500.00 | 2024-11-18 10:11:46 | Active |
|            2 |           2 | Growth Portfolio     |           75000.00 | 2024-11-18 10:11:46 | Active |
|            3 |           3 | High-Risk Portfolio  |          100000.00 | 2024-11-18 10:11:46 | Active |
|            4 |           4 | Diversified Portfolio|           60000.00 | 2024-11-18 10:11:46 | Active |
|            5 |           5 | Crypto Focus         |           45000.00 | 2024-11-18 10:11:46 | Active |
|            6 |           1 | Tech Growth          |           30000.00 | 2024-11-18 11:14:51 | Active |
|            7 |           1 | Tech Growth          |           30000.00 | 2024-11-18 11:16:56 | Active |
|            9 |           1 | Retirement Fund      |            5000.00 | 2024-11-18 11:44:24 | Active |
+--------------+-------------+----------------------+--------------------+---------------------+--------+
8 rows in set (0.00 sec)

556_568_575_600>START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

556_568_575_600>UPDATE Portfolio
    -> SET initial_investment = initial_investment + 1000
    -> WHERE portfolio_name = 'Retirement Fund';
Query OK, 2 rows affected (0.00 sec)
Rows matched: 2  Changed: 2  Warnings: 0

556_568_575_600>select * from Portfolio;
+--------------+-------------+----------------------+--------------------+---------------------+--------+
| portfolio_id | investor_id | portfolio_name       | initial_investment | created_at          | status |
+--------------+-------------+----------------------+--------------------+---------------------+--------+
|            1 |           1 | Retirement Fund      |           52500.00 | 2024-11-18 10:11:46 | Active |
|            2 |           2 | Growth Portfolio     |           75000.00 | 2024-11-18 10:11:46 | Active |
|            3 |           3 | High-Risk Portfolio  |          100000.00 | 2024-11-18 10:11:46 | Active |
|            4 |           4 | Diversified Portfolio|           60000.00 | 2024-11-18 10:11:46 | Active |
|            5 |           5 | Crypto Focus         |           45000.00 | 2024-11-18 10:11:46 | Active |
|            6 |           1 | Tech Growth          |           30000.00 | 2024-11-18 11:14:51 | Active |
|            7 |           1 | Tech Growth          |           30000.00 | 2024-11-18 11:16:56 | Active |
|            9 |           1 | Retirement Fund      |            6000.00 | 2024-11-18 11:44:24 | Active |
+--------------+-------------+----------------------+--------------------+---------------------+--------+
```

```
556_568_575_600>UPDATE Portfolio
    -> SET initial_investment = initial_investment + 500
    -> WHERE portfolio_name = 'Retirement Fund';
Query OK, 2 rows affected (0.00 sec)
Rows matched: 2  Changed: 2  Warnings: 0

556_568_575_600>select * from Portfolio;
+--------------+-------------+----------------------+--------------------+---------------------+--------+
| portfolio_id | investor_id | portfolio_name       | initial_investment | created_at          | status |
+--------------+-------------+----------------------+--------------------+---------------------+--------+
|            1 |           1 | Retirement Fund      |           53000.00 | 2024-11-18 10:11:46 | Active |
|            2 |           2 | Growth Portfolio     |           75000.00 | 2024-11-18 10:11:46 | Active |
|            3 |           3 | High-Risk Portfolio  |          100000.00 | 2024-11-18 10:11:46 | Active |
|            4 |           4 | Diversified Portfolio|           60000.00 | 2024-11-18 10:11:46 | Active |
|            5 |           5 | Crypto Focus         |           45000.00 | 2024-11-18 10:11:46 | Active |
|            6 |           1 | Tech Growth          |           30000.00 | 2024-11-18 11:14:51 | Active |
|            7 |           1 | Tech Growth          |           30000.00 | 2024-11-18 11:16:56 | Active |
|            9 |           1 | Retirement Fund      |            6500.00 | 2024-11-18 11:44:24 | Active |
+--------------+-------------+----------------------+--------------------+---------------------+--------+
8 rows in set (0.00 sec)
```