Big Data for Managers & Analytics

Submitted To:

Prof. Amarnath Mitra

Report on Project on Database Management using MySQL

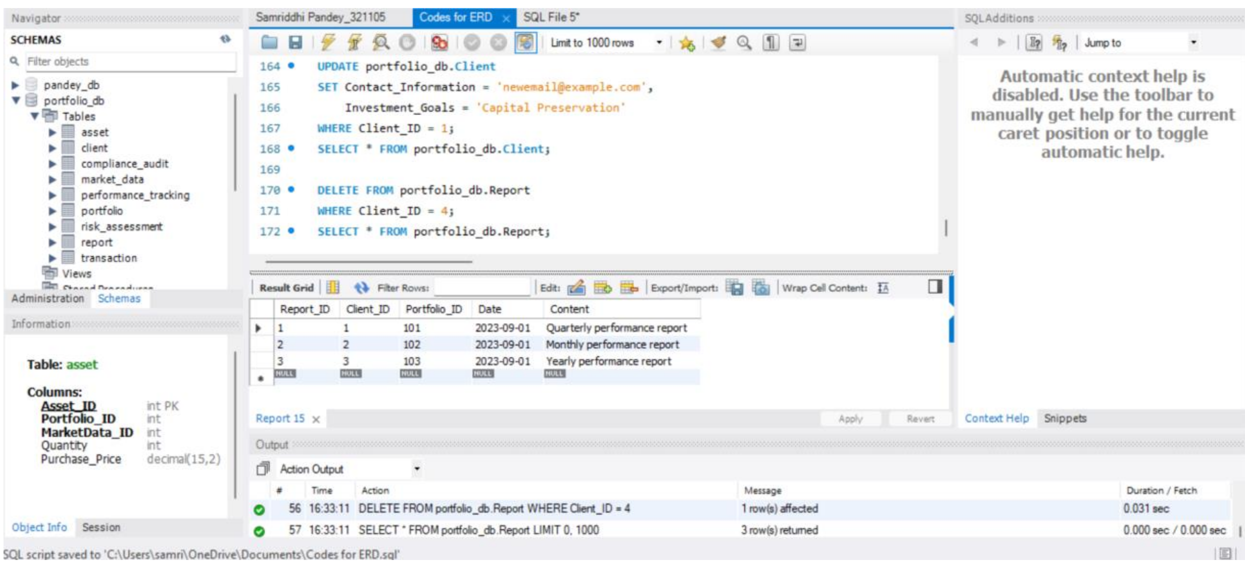
Topic: Portfolio Management Systems

Submitted by:

Samriddhi Pandey (321105)

Portfolio Schema Description

The **Portfolio database** is designed to maintain a comprehensive and organized repository of portfolio management data for clients, including their investment portfolios, assets, transactions, market data, risk assessments, performance tracking, and compliance audits. This database enables efficient portfolio management, performance analysis, risk assessment, and regulatory compliance reporting, helping financial institutions manage client investments more effectively.



Description of Each Table in Portfolio

1. **Client**:

- **Description**: Stores personal and contact information for each client, along with their investment goals. It acts as the central entity linking all other portfolio management activities.
- **Fields**: Client_ID, Name, Contact_Information, Investment_Goals

	Client_ID	Name	Contact_Information	Investment_Goals
▶	1	Alice Smith	alice@example.com	Retirement Savings
	2	Bob Johnson	bob@example.com	Wealth Growth
	3	Charlie Brown	charlie@example.com	Risk Minimization
	4	Diana Prince	diana@example.com	Diversification

2. **Portfolio**:

- **Description**: Holds detailed information about each client's investment portfolio, including the portfolio's risk level, total value, and the associated client ID. Each portfolio is unique to a client and tracks their overall investments.
- **Fields**: Portfolio_ID, Client_ID, Risk_Level, Total_Value

	Portfolio_ID	Client_ID	Risk_Level	Total_Value
▶	101	1	Moderate	500000.00
	102	2	High	1000000.00
	103	3	Low	300000.00
	104	4	Balanced	750000.00

3. **Market_Data**:

- **Description**: Records market data for various assets, such as stocks, bonds, ETFs, and commodities. It tracks the price of assets and their types on a specific date, serving as a reference for asset performance within portfolios.
- **Fields**: MarketData_ID, Asset_Type, Price, Date

	MarketData_ID	Asset_Type	Price	Date
▶	1	Stock	150.75	2023-09-01
	2	Bond	102.50	2023-09-01
	3	ETF	250.00	2023-09-01
	4	Commodity	75.30	2023-09-01

4. **Asset**:

- **Description**: Stores information about the specific assets held within each client's portfolio. This includes the portfolio to which the asset belongs, the market data associated with the asset, and details such as the quantity of the asset and the purchase price.
- **Fields**: Asset_ID, Portfolio_ID, MarketData_ID, Quantity, Purchase_Price

Asset_ID	Portfolio_ID	MarketData_ID	Quantity	Purchase_Price
1	101	1	100	145.50
2	102	2	200	100.00
3	103	3	50	240.00
4	104	4	150	70.00

5. **Transaction**:

- **Description**: Captures details of all transactions related to assets within a portfolio. This includes both purchases and sales of assets, along with the transaction date and the number of assets transacted.
- **Fields**: Transaction_ID, Asset_ID, Date, Type, Quantity

Transaction_ID	Asset_ID	Date	Type	Quantity
1	1	2023-08-15	Buy	100
2	2	2023-08-20	Buy	200
3	3	2023-08-25	Buy	50
4	4	2023-08-30	Buy	150

6. **Report**:

- **Description**: Holds the performance and financial reports generated for each client's portfolio over a specific period. Reports contain performance summaries, risk assessments, and recommendations.
- **Fields**: Report_ID, Client_ID, Portfolio_ID, Date, Content

	Report_ID	Client_ID	Portfolio_ID	Date	Content
▶	1	1	101	2023-09-01	Quarterly performance report
	2	2	102	2023-09-01	Monthly performance report
	3	3	103	2023-09-01	Yearly performance report
	4	4	104	2023-09-01	Half-yearly performance report

7. **Risk_Assessment**:

- **Description**: Records risk assessments for each portfolio, including the type of risk (e.g., market, credit, liquidity) and the assessed risk level. This helps in evaluating the potential risks involved in a client's investment portfolio.
- **Fields**: Assessment_ID, Portfolio_ID, Risk_Type, Risk_Level

	Assessment_ID	Portfolio_ID	Risk_Type	Risk_Level
▶	1	101	Market Risk	3.50
	2	102	Credit Risk	4.75
	3	103	Liquidity Risk	2.00
	4	104	Inflation Risk	3.00

8. **Performance_Tracking**:

- **Description**: Tracks the performance of portfolios over time, including metrics such as the return rate and other performance indicators. This helps in monitoring how well a portfolio is performing and whether it is meeting the client's investment goals.
- **Fields**: Tracking_ID, Portfolio_ID, Return_Rate, Performance_Metrics

	Tracking_ID	Portfolio_ID	Return_Rate	Performance_Metrics
▶	1	101	7.25	Q3 2023 - 7.25% return
	2	102	12.50	Q3 2023 - 12.50% return
	3	103	4.00	Q3 2023 - 4.00% return
	4	104	8.00	Q3 2023 - 8.00% return

9. **Compliance_Audit**:

- **Description**: Stores compliance audit records for each portfolio, ensuring that portfolios are adhering to regulatory standards and policies. It includes the audit date and compliance status for reporting purposes.
- **Fields**: Audit_ID, Portfolio_ID, Audit_Date, Compliance_Status

Audit_ID	Portfolio_ID	Audit_Date	Compliance_Status
1	101	2023-08-31	Compliant
2	102	2023-08-31	Compliant
3	103	2023-08-31	Compliant
4	104	2023-08-31	Non-Compliant

Stress Testing

Stress testing of database using the **CRUD** operations:

- **Create:** Used to insert new records.
- **Read:** Used to retrieve and view data.
- **Update:** Used to modify existing data.
- **Delete:** Used to remove data.

<u>Create Operation:</u>

Inserting into Performance Tracking Table:

INSERT INTO portfolio_db.Performance_Tracking (Tracking_ID, Portfolio_ID, Return_Rate, Performance_Metrics)

VALUES

(1, 101, 7.25, 'Q3 2023 - 7.25% return'),

(2, 102, 12.50, 'Q3 2023 - 12.50% return'),

(3, 103, 4.00, 'Q3 2023 - 4.00% return'),

(4, 104, 8.00, 'Q3 2023 - 8.00% return');

	Tracking_ID	Portfolio_ID	Return_Rate	Performance_Metrics
▶	1	101	7.25	Q3 2023 - 7.25% return
	2	102	12.50	Q3 2023 - 12.50% return
	3	103	4.00	Q3 2023 - 4.00% return
	4	104	8.00	Q3 2023 - 8.00% return

<u>Read (Select) Operation: -</u>

Retrieving from portfolio Table where risk level is Moderate

SELECT * FROM portfolio_db.Portfolio WHERE Risk_Level = 'Moderate';

	Portfolio_ID	Client_ID	Risk_Level	Total_Value
▶	101	1	Moderate	500000.00

Update Operation:

Updating From Client Table:

	Client_ID	Name	Contact_Information	Investment_Goals
▶	1	Alice Smith	newemail@example.com	Capital Preservation
	2	Bob Johnson	bob@example.com	Wealth Growth
	3	Charlie Brown	charlie@example.com	Risk Minimization
	4	Diana Prince	diana@example.com	Diversification

Delete Operation:

Deleting from Report Table:

	Report_ID	Client_ID	Portfolio_ID	Date	Content
▶	1	1	101	2023-09-01	Quarterly performance report
	2	2	102	2023-09-01	Monthly performance report
	3	3	103	2023-09-01	Yearly performance report