

# PORTFOLIO MANAGEMENT

## *Query Squad*

<i>Daksh</i>	<i>Chaitrika</i>	<i>Srisai</i>	<i>Sreeja</i>	<i>Rohan</i>
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## 1 Introduction

The Query Squad is proud to present an innovative "Portfolio Management System" designed to cater to the diverse needs of traders, individual investors, research analysts, government agencies, and corporate executives in the dynamic & ever-changing world of stock market investments.

In this digital age, our comprehensive database empowers users to efficiently manage, analyze, and retrieve essential & meaningful data that is instrumental in shaping their investment strategies and decision-making processes within the mini-world of the stock market.

## 2 Purpose

Our purpose is to build a system which is a one-stop solution for all kinds of users, addressing their unique needs in the stock market domain. It equips users with the tools to access, dissect, and leverage data for informed decision-making, thereby optimizing their investment strategies and elevating their portfolio.

It serves as a subset or microcosm of the larger financial market landscape, highlighting the unique challenges and opportunities that traders, investors, analysts, government agencies, and corporate executives encounter in their stock market-related activities.

Our system has been such designed that it's completely scalable to larger extents of the original market size datasets without losing its usecase and consistency.

## 3 Users

- **Traders :** *use stock market databases to monitor market movements, identify trading opportunities, and execute trades*
- **Individual investors :** *use stock market databases to research potential investments, track their portfolios, and make informed trading decisions on personal level*
- **Research analysts :** *use stock market databases to conduct fundamental and technical analysis of companies & industries and general market trends*
- **Govt. agencies :** *agencies such as the Securities and Exchange Commission(SEC), use stock market databases to monitor and prevent the market for frauds & insider trading*
- **Corporate executives :** *use stock market databases to track the performance of their company & its competitors and to identify potential investment and partnership opportunities*

## 4 Applications

The designed DB helps the above mentioned users to understand, manage, store data(not necessarily everyone) and retrieve data according to the details of their case study. Also, they can establish some more meaningful connections between other various data

For instance, users can perform following to fetch meaningful data:

- An investor could use the database to calculate their capital gains tax liabilities and progress towards investment goals
- A researcher could use the database to study the relationship between different market factors, or to test a new investment model
- An investor could use the database to assess the risk of their investment portfolio and identify potential areas of concern
- A trader could use the database to develop and implement a trading plan
- An investor could use the database to develop tax planning strategies, such as tax-loss harvesting and asset location
- A user can use to develop and implement fraud detection systems

## 5 DB Requirements

### 5.1 Strong Entities

Entity type	Attribute	Attribute type	Data type	Constraints
STOCKS	StockID	key attribute	varchar	not null
	Stock	simple	varchar	not null
	Price	simple	float	not null
	Gain or Loss	simple	float	not null
	Total shares	simple	int	not null
	Market Cap	derived	float	not null
	Book Value	simple	float	not null
	Price/Earning	simple	float	not null
MUTUAL FUNDS	MFID	key attribute	varchar	not null
	Fund	simple	varchar	not null
	Price	simple	float	not null
	Gain or Loss	simple	float	not null
	Total shares	simple	int	not null
	Fund size	derived	float	not null
TRANSACTIONS	TransID	key attribute	varchar	not null
	FolioID	foreign key	varchar	not null
	HoldingID	foreign key	float	not null
	Type	simple	varchar	not null
	Date	simple	date	not null
	Qty change	simple	int	not null
USERS	PAN	key attribute	varchar	not null
	Name	composite	varchar	not null
	Email ID	multi-valued	float	-
	Contact	multi-valued	varchar	not null
	DOB	simple	date	not null
PORTFOLIOS	FolioID	key attribute	varchar	not null
	PAN	foreign key	varchar	not null
	Stock investments	simple	float	not null
	MF investments	simple	float	not null
	Net invested	derived	float	not null
	Net Gain/Loss	derived	float	not null

## 5.2 Weak Entities

Entity type	Attribute	Attribute type	Data type	Constraints
HOLDINGS	HoldingID	partial key	varchar	not null
	FolioID	partial key	varchar	not null
	Type	simple	varchar	not null
	Qty	simple	int	not null
	Invested total	derived	float	not null
	Net Gain/Loss	derived	float	not null
TAXES	Type	simple	varchar	not null
	Percentage	simple	float	not null
	Amount	simple	float	not null
	TransID	partial key	varchar	not null

## 5.3 Relationship Types

Relationship type	Degree	Entities	Cardinality	Constraints
belongs to	2	Holding <i>belongs to</i> Folio	N:M	Hold(0,N), Folio(0,N)
holding of	2	Holding <i>holding of</i> Equity	N:M	Hold(0,N), Equity(0,N)
owned by	2	Folio <i>owned by</i> User	N:1	Folio(1,1), User(1,N)
applied on	2	Tax <i>applied on</i> Transaction	1:1	Tax(1,1), Trans(0,1)
of...belonging to	3	Transaction <i>of</i> Holding <i>belonging to</i> Folio	N:1:M	Trans(1,1), Hold(1,N), Folio(0,N)

# 6 Functionalities

All types of end-users as mentioned above can access the data using the given functionalities except for those mentioned with type [ADMIN] (accessible only by Administrators).

## 6.1 RETRIEVALS

- **Selections**

- All stocks with P/E ratio less than a threshold
- All Tax records of a given type say "Capital Gains tax"
- All holdings of MFs as the holding type
- All Portfolios with net gain/loss above a certain value

- **Projection**

- Names of all stocks with prices less than a value
- Last names of all user with no email IDs
- All the MFs owned by a particular PAN

- **Aggregate**

- Sum of market Caps of all the stocks in the market
- MF with minimum fund size amongst all
- Average of all Portfolios' net gain/loss owned by a particular PAN
- Most traded MF for the day using most transactions for a particular MF in day

- **Search**

- *Using wildcards for matching stock / MF names while searching*
- *Searching for all transactions on dates starting with a particular digit or number*
- *All holdings with HoldingID starting with "St" to represent Stocks (and not MF)*

## 6.2 ANALYSIS

- **Avg. Portfolio Gain/Loss**

- *Average gain/loss per portfolio could be found across all the portfolios owned by a particular PAN (individual)*
- *This could be done by joining 2 entities, namely portfolios and users*

- **Portfolio Diversity**

- *Provide percentage of gain & loss incurred by stocks and by MFs for a user across all Portfolios*
- *This could be done by joining 2 entities, namely portfolios and users*

- **Avg. Gain/Loss for P/E Stocks**

- *Average gain/loss incurred by a user across all the stocks owned by him having P/E greater than a value*
- *This is achieved by joining 4 entities, namely stocks, holdings, portfolios and users*

## 6.3 MODIFICATIONS

- **Insert [ADMIN]**

- *Allows admins to add new users and their required details to the DB*
- *Used to add new transactions to DB and make all its required relations*

- **Update [ADMIN]**

- *Allows admins to update the live stock prices as well as their day gains or losses*
- *Used to update the new details in the holdings as well as in portfolios with change in stock / MF details*

- **Delete [ADMIN]**

- *Allows admins to delete users or some of their portfolios or even a particular holding in different scenarios*
- *Used to delete all the redundant data that might form in transactions due to errors*
- *Helps in deleting false transactions or stock / MF details of a freshly close company*

## 7 Summary

Our Portfolio Management System is a powerful tool that can help individuals and organizations track and manage their investments because of the functionalities that are provided in it.

It can store a wide range of data, including account information, investment holdings, transaction history, and performance metrics. This data can then be used to generate reports, track individual investments, and make informed investment decisions for future.

The database can be used by a variety of users, including individual investors, financial advisors, investment managers, and researchers. It can provide a number of benefits, including convenience, accuracy, and flexibility. The provided functionalities especially can be used efficiently in order to generate valuable meaning out of the data set.