

PORTFOLIO MANAGEMENT

Query Squad

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Phase 3

1 Introduction

In this phase of the project, we make an operational, logical and efficient relational model for the same ER diagrams that we developed in the previous phase.

We are going to follow the process of normalization and try to minimize redundancy to Nil or as minimal as possible.

2 Initial DB Schema

We have provided the initial state of the SB schema which can also be considered as the relational model before performing any kind of normalization.

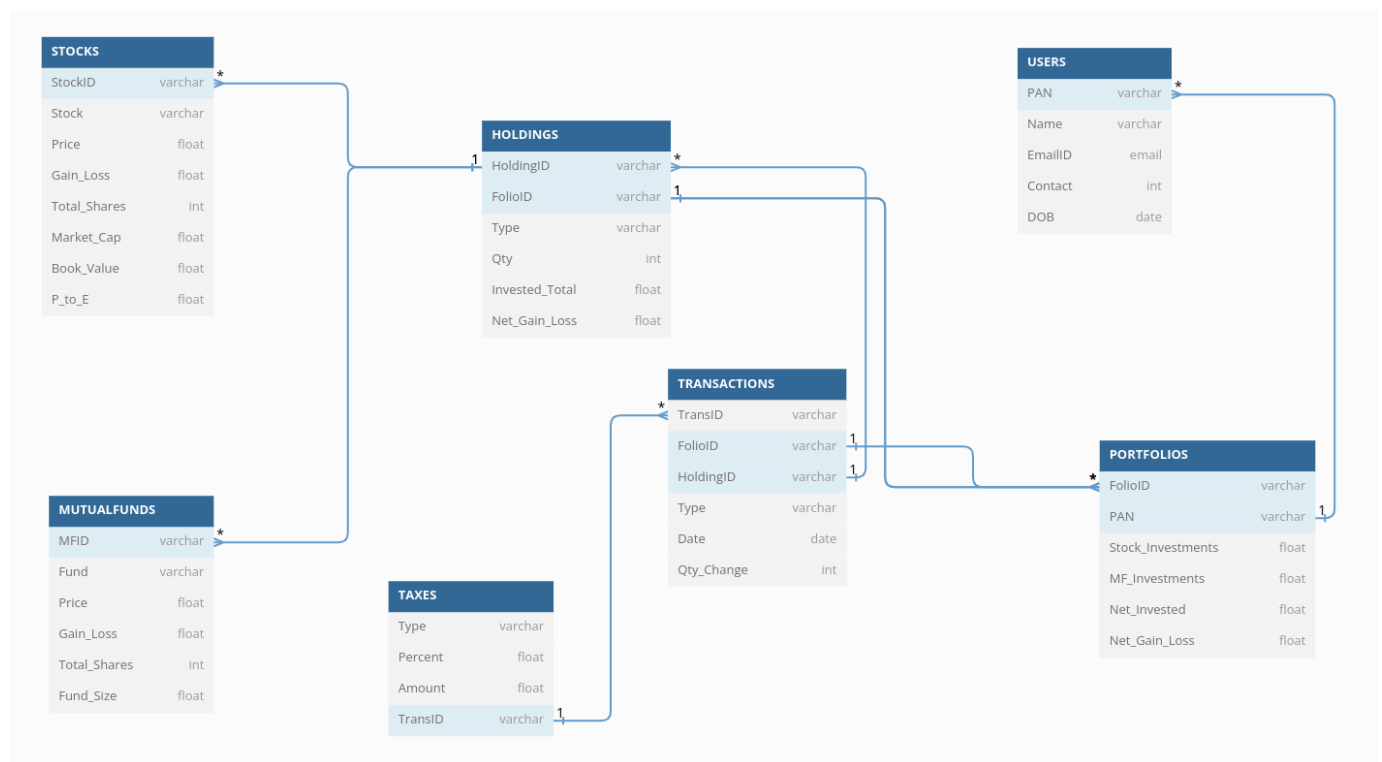


Figure 1: Initial DB Schema

3 General Modification

3.1 Changes

- In the process of converting to a relational model from an ER model, we have made a change in the schema by adding the following
- HoldingID in HOLDINGS entity is a case where single attribute relates as foreign key to 2 different tables simultaneously leading to difficulties in actual mapping
- Thus, to simplify the mapping, we added another table in between to check that it is mapping to which one of the 2 tables (Stocks or Mutual Funds)
- So, if the Equity is a Stock then the MFID in Equity table will be NULL and not map any value in MF table. Similarly, vice-versa for Equity being MF, StockID will be NULL

3.2 Model

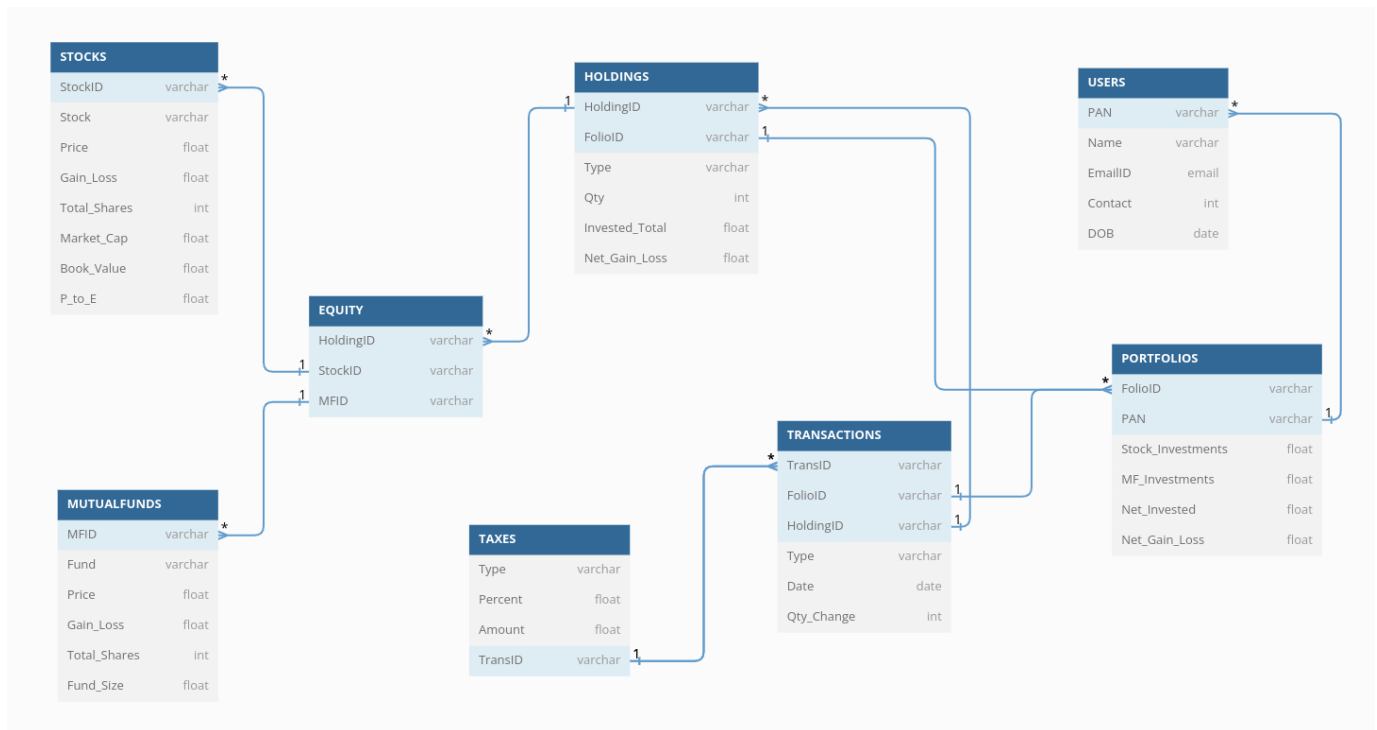


Figure 2: Updated Schema (added table)

4 1st Normal form

4.1 Requirement

Any column in all the relation should hold only atomic values (no further sub parts)

We need to remove any kind of multi-valued attributes and somehow convert them to possible solutions

4.2 Changes

- We have 2 multi-valued attributes, namely EmailID and Contact in Users relation
- Thus, we changed it to single values normal attribute and rather will have multiple rows to represent the multiple values
- Currently, since the data sets are not filled yet, so we assume that the appropriate changes will be made once the data sets are filled

4.3 Model

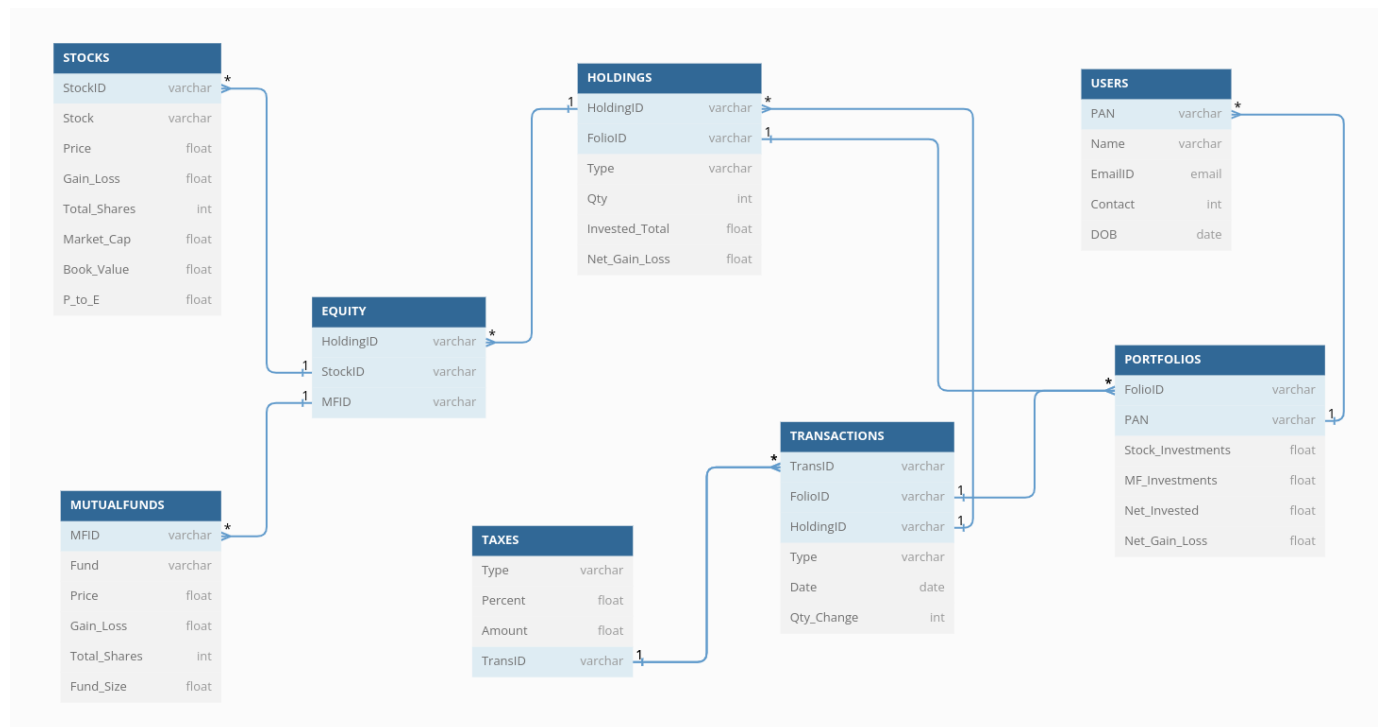


Figure 3: 1st Normal form

5 2nd Normal form

5.1 Requirement

The requirement is that it should be in its 1st normal form and there should not exist any partial dependency where an attribute depends on another attribute which is NOT part of any candidate key.

5.2 Changes

Since there are no partial dependencies amongst the attributes in any table at the current state so no changes are being made.

6 3rd Normal form

6.1 Requirement

For this stage, we need the model to be in 2nd normal form already. Plus, it should not contain any kind of transitive dependency of non-prime attributes

6.2 Changes

Since the current relational model by itself does not have any kind of non-prime transitive dependency so we have not made any changes in this step leading to the same model figure as above.

7 Final Relational Model

7.1 STOCKS

StockID represents the primary key for this relation.

7.2 MUTUAL FUNDS

MFID is the primary key for this relation.

7.3 EQUITY

HoldingID is the primary key. StockID is a foreign key referencing STOCKS.StockID. MFID is a foreign key referencing MUTUALFUNDS.MFID.

7.4 HOLDINGS

HoldingID is a foreign key referencing EQUITY.HoldingID. FolioID is a foreign key referencing PORTFOLIOS.FolioID. Overall, HoldingID & FolioID make the primary key for this relation.

7.5 TRANSACTIONS

TransID is the primary key. FolioID is a foreign key referencing PORTFOLIOS.FolioID. HoldingID is a foreign key referencing HOLDINGS.HoldingID.

7.6 TAXES

TransID is a foreign key here referencing to TRANSACTIONS.TransID. Further, it is also the primary key of this relation.

7.7 PORTFOLIOS

FolioID is the primary key. PAN is the foreign key referencing to USERS.PAN.

7.8 USERS

PAN is the primary key making it unique for all entries in the relation.

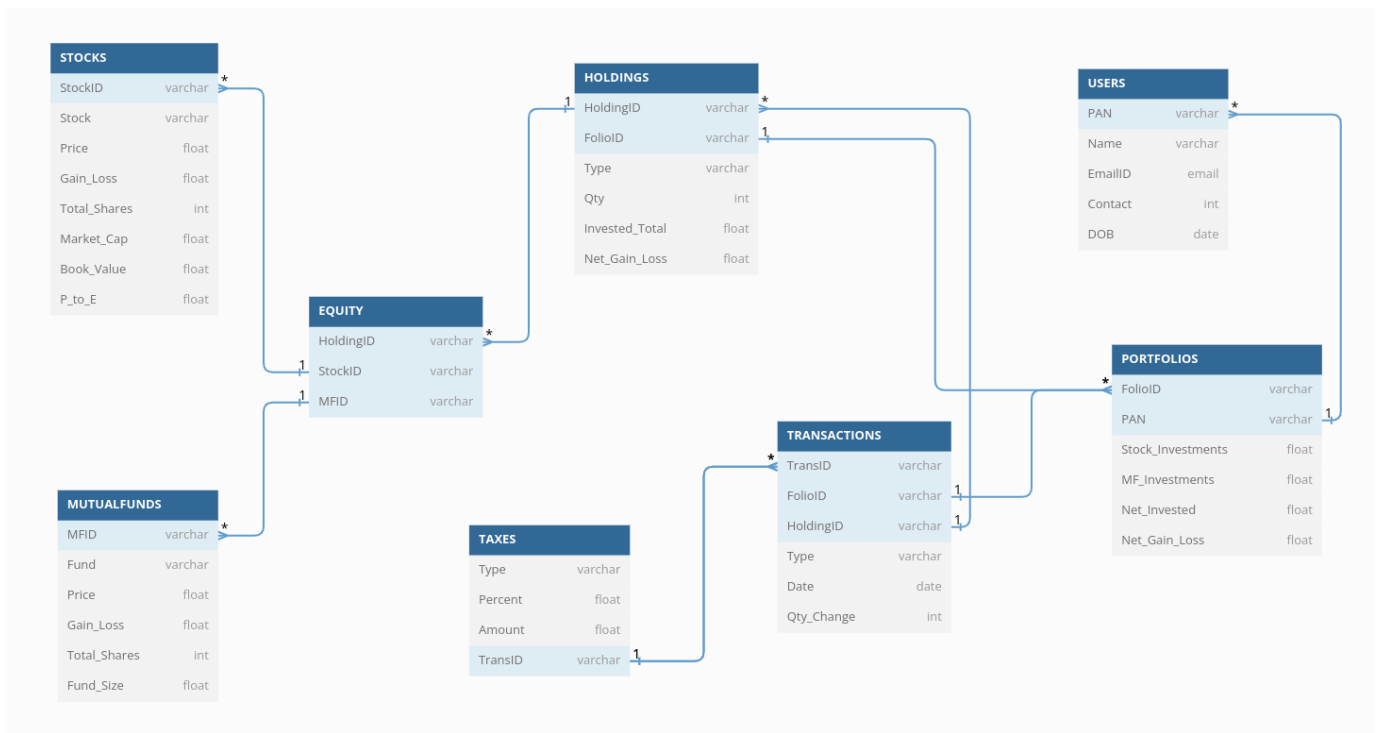


Figure 4: FINAL NORMALIZED MODEL