**Database Design of Integrated Investment Management System**

**Business Problem**

There are many different stock trading platforms with different policies. For example, they may have different policies about service fee, minimum deposit, trading types. Different platforms are suitable for different investors and investment types. However, as each platform is independent, investors often can't find the best fit for them. Our database management system integrates information from various platforms. Our target is to help investors to well plan their investment portfolios and find the most suitable platforms. By using our system, investors can compare policies of different platforms and directly invest in different platforms without switching between sites.

**Mission Statement/Objectives**

* Compare the policies of different platforms.
* Let users store and manage their basic information.
* Users can perform investment portfolio management.
* Store the records of stock transactions.
* Users can hire fund managers to help them manage fund.

**ENTITIES DESCRIPTION & KEY DESIGN DECISIONS**

**Watchlist** - Related to Investors and Stocks/Funds, allowing investors to track selected investments.

* The use of a Watchlist entity allows investors to easily monitor the performance of desired stocks or funds.
* **Cardinality**/**Relationship**:
  1. One-to-Many: Each Watchlist is owned by only one Investor.
  2. Many-to-Many: Each Watchlist can contains multiple Stock Information.
  3. Many-to-Many: Each Watchlist can contains multiple Fund Information.

**Platform Comparison** - Contains data for comparing different Platforms, requested by Investors.

* The Platform Comparison entity was designed to enable feature-to-feature comparison between different investment platforms.
* **Cardinality**/**Relationship**:
  1. One-to-Many: A Platform Comparison contains at least two Platforms.
  2. One-to-Many: Each Platform Comparison is requested by only one Investor.

**Investor** - Central to the system, creates Orders, has Accounts, and can request Platform Comparisons.

* The Account and Investor entities are kept separate to maintain a clear distinction between user information and financial information. One Investor can have many Accounts among different Platforms.
* **Cardinality**/**Relationship**:
  1. One-to-Many: One Investor can place multiple Orders.
  2. One-to-Many: One Investor can create multiple Accounts.
  3. One-to-Many: One Investor can add multiple Payments Methods.
  4. One-to-Many: One Investor can create multiple Notifications.
  5. One-to-Many: One Investor can have multiple Watchlists.

**Order** - Placed by Investors, contains details about transactions for Stocks/Funds.

* The Order entity represents investors’ transactions of Funds/Stocks.
* **Cardinality**/**Relationship**:
  1. One-to-Many: Each Order contains at most one Stock Information.
  2. One-to-Many: Each Order can be placed using one Account.
  3. One-to-Many: Each Order contains at most one fund Information.

**Account** - Owned by Investors, used to place Orders and perform Transactions.

* The Account and Investor entities are kept separate to maintain a clear distinction between user information and financial information. One Investor can have many Accounts among different Platforms.
* **Cardinality**/**Relationship**:
  1. One-to-Many: One Account can place multiple orders.
  2. One-to-Many: One Account must be owned by one Investor.
  3. One-to-Many: One Account must relate to one Platform.
  4. One-to-Many: One Account can relate to multiple Automatic Investment.
  5. One-to-One: One Account must have one portfolio.
  6. Many-to-Many: One Account may has multiple Transaction History.

**Transaction History** - Logs the financial activities associated with an Account.

* The Transaction History entity ensures that all financial activities are logged for transparency and auditing purposes.
* **Cardinality**/**Relationship**:
  1. One-to-Many: Each Transaction History must be linked to two Accounts.

**Portfolio** - A collection of Stocks/Funds owned by an Investor.

* The Portfolio entity help investors see their current fund distribution and properly plan their investment.
* **Cardinality**/**Relationship**:
  1. One-to-Many: One Portfolio can contain multiple Stock Information.
  2. One-to-One: A Portfolio is attached to one Account.

**Automatic Investment** - Set up by Investors and managed by Fund Managers, linked to specific Accounts.

* The Automatic Investment entity linked to Fund Managers allows for the automation of investment strategies, which is a valuable feature for users.
* **Cardinality**/**Relationship**:
  1. One-to-Many: Each Automatic Investment must be handled by one Fund Manager.
  2. One-to-Many: An Automatic Investment relates to one Account.

**Fund Manager** - Manages Automatic Investments, related to specific Policies.

* The Fund Manager entity allows investors to find professional managers help them perform investment through Automatic Investment entity.
* **Cardinality**/**Relationship**:
  1. One-to-Many: A Fund Manager can handle multiple Automatic Investments.
  2. One-to-Many: A Fund Manager must work for only one Platform.

**Policy** - Governs the operation of Platforms, issued by Platforms and associated with Fund Managers.

* The Policy entity associated with the Platform and Fund Manager ensures that each platform operates within its regulatory framework and Investor can choose suitable Platform by comparing Platforms’ Policies.
* **Cardinality**/**Relationship**:
  1. One-to-Many: One Policy must be issued by one Platform.

**Platform** - The investment platforms that hold Accounts and are compared in Platform Comparisons.

* The Platform entity represents different trading platforms integrated in the project.
* **Cardinality**/**Relationship**:
  1. One-to-Many: A Platform can have multiple Accounts.
  2. One-to-Many: A Platform can be involved in multiple Platform Comparisons.
  3. One-to-Many: A Platform can have multiple Fund Managers.
  4. One-to-Many: A Platform can issue multiple Policies.

**Payment Method** - Linked to Investors for managing billing and transactions.

* The Payment Method entity linked to Investor allows investors to pay by different cards.
* **Cardinality**/**Relationship**:
  1. One-to-Many: One account must be added by one Investor.

**Notification** - Sent to Investors regarding account activity or other alerts.

* The Notification entity ensures that investors are kept informed and engaged with stocks/funds they are interested in.
* **Cardinality**/**Relationship**:
  1. One-to-Many: A Notification must be created by one Investor.

**Fund Information** - Details about investment funds, used for Portfolio construction.

* The separation of Stock Information and Fund Information into two entities allows for specialized reporting and analysis for each type of investment.
* **Cardinality**/**Relationship**:
  1. One-to-Many: One Fund Information can be used in multiple Orders.
  2. Many-to-Many: One Stock Information can be used in multiple Watchlists.

**Stock Information** - Details about stocks, used for Portfolio construction and Watchlist tracking.

* The separation of Stock Information and Fund Information into two entities allows for specialized reporting and analysis for each type of investment.
* **Cardinality**/**Relationship**:
  1. One-to-Many: One Stock Information can be used in multiple Orders.
  2. Many-to-Many: One Stock Information can be used in multiple Portfolios.
  3. Many-to-Many: One Stock Information can be used in multiple Watchlists.

**ERD:**

图示, 示意图

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