

Hedge Fund Management System

Lab6: Functional Dependencies and Normal Forms

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Functional Dependencies

User Table (UserID, UserName, Email, Password)

- $\text{UserID} \rightarrow \text{UserName}$
- $\text{UserID} \rightarrow \text{Email}$
- $\text{UserID} \rightarrow \text{Password}$

Conclusion: UserID is the Primary Key or Super Key, and the table satisfies BCNF.

Portfolio Table (PortfolioID, UserID, Portfolio_name, CreationDate)

- $\text{PortfolioID} \rightarrow \text{UserID}$ (BCNF)
- $\text{PortfolioID} \rightarrow \text{Portfolio_name}$ (BCNF)
- $\text{PortfolioID} \rightarrow \text{CreationDate}$ (BCNF)
- $\text{UserID} \rightarrow \text{PortfolioID}$ (3NF)

Conclusion: PortfolioID is the Primary Key, and UserID is a Foreign Key. Updates or deletions can cause anomalies.

Position Table (UserID, Role, Access)

- $\text{UserID} \rightarrow \text{Role}$
- $\text{UserID} \rightarrow \text{Access}$
- $\text{Role} \rightarrow \text{Access}$ (2NF)

Conclusion: UserID is the Primary Key, and the table meets BCNF.

Asset Table (Asset_id, Asset_name, NAV)

- $\text{Asset_id} \rightarrow \text{Asset_name}$ (BCNF)
- $\text{Asset_id} \rightarrow \text{NAV}$
- $\text{Asset_name} \rightarrow \text{Asset_id}$ (3NF)

Conclusion: Asset_id is the Primary Key. The table is in BCNF.

AssetData Table (Asset_id, Date, NAV)

- $(\text{Asset_id}, \text{Date}) \rightarrow \text{NAV}$

Conclusion: Asset_id, Date is the composite Key.

Support Ticket Table (Ticket_id, UserID, Issue, Creation Date, Status, End Time)

- $\text{Ticket_id} \rightarrow \text{UserID}$
- $\text{Ticket_id} \rightarrow \text{Creation Date}$
- $\text{Ticket_id} \rightarrow \text{Status}$
- $\text{Ticket_id} \rightarrow \text{Issue}$
- $\text{Ticket_id} \rightarrow \text{End Time}$

Conclusion: Ticket_id is the Primary Key, and the table is in BCNF.

Transaction Table (Transaction_ID, Amount, PortfolioID, Asset_id, Transaction Type, Time, Unit)

- $\text{Transaction_ID} \rightarrow \text{Amount}$ (BCNF)
- $\text{Transaction_ID} \rightarrow \text{PortfolioID}$
- $\text{Transaction_ID} \rightarrow \text{Asset_id}$
- $\text{Transaction_ID} \rightarrow \text{Transaction Type}$

- $\text{Transaction_ID} \rightarrow \text{Time}$
- $\text{Transaction_ID} \rightarrow \text{Unit}$
- $\{\text{Asset_id}, \text{Transaction Type}, \text{Time}\} \rightarrow \text{Transaction_ID}$ (3NF)

Conclusion: Transaction_ID is the Primary Key, with BCNF.

Admin Log Table (UserID, Action-Date, Action-Type)

- $\text{UserID} \rightarrow \text{Action-Type}$ (BCNF)
- $\text{UserID} \rightarrow \text{Action-Date}$

Conclusion: UserID is the Primary Key. The table meets BCNF.