Data Fundamentals:

Database Evaluation Essay

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## Part 1 – Retrieving Data from a Database

Diagram

Description automatically generated

### SQL Statements

* Select all borrowers:

SELECT \*

FROM Borrower;

* Select all books borrowed by borrowers, order by borrow date:

SELECT \*

FROM Book

WHERE Borrower.BookID = Book.BookIDBook

ORDER BY Borrower.BorrowDate ASC;

* Select all books and include the author first and last name:

SELECT \*

(

INSERT INTO Book (AuthorFirstName, AuthorLastName)

SELECT AuthorFirstName, AuthorLastName

FROM Author

)

FROM Book;

* Insert a new client with an occupation of pilot:

INSERT INTO Client (Occupation)

VALUES (‘pilot’);

## Part 2 – Database Normalization

### Existing Dependencies in the current database

Graphical user interface, application, table

Description automatically generated with medium confidence

Based on the above Entity Relationship Diagram made from Microsoft Excel with given miniature database tables, it is notable that ITEMIDs are highlighted in yellow and SUPPLIERIDs are highlighted in green.

Both have Primary and Foreign Keys labeled next to the COLUMN\_NAME based on few assumptions. When the purchases are made from suppliers, ITEMID are recorded with new purchases. The new and existing inventories are recorded in the SUPPLIERID. Therefore, two tables are linked through the Produce, Animal Products, and Grain Tables with their respective Primary Keys (ITEMID & SUPPLIERID). As new items are delivered, each field is updated accordingly (Study.com, 2022). ITEMID has 1:Many relationship with items that populate the Produce, Animal Products, and Grain Tables. Therefore, ITEMID serves as a Foreign Key for all three tables. SUPPLIERID has 1:Many relationship with items that populate the Produce, Animal Products, and Grain Tables. Therefore, SUPPLIERID serves as a Foreign Key for all three tables (Study.com, 2022).

Based on the above Entity Relationship Diagram (ERD), there are two primary keys and several foreign keys in the database. The ITEMID serves as a Foreign Key in the Produce, Animal Products, and Grain Tables (Study.com, 2022) since each of these IDs is referencing to Primary Key record in the Purchases table. Which is unique record of the table. SUPPLIERID serves as a Foreign Key in the Produce, Animal Products, and Grain Tables (Study.com, 2022) since each other these IDs is referencing to Primary key record in the Suppliers table. Both Suppliers and Purchases tables can be join using the common keys in Produce, Animal Products, and Grain Tables since both have SUPPLIERID and ITEMID for line items or rows (Study.com, 2022). The database can change its structure by adding a purchase ID as primary and making the ITEMID as foreign and adding purchase ID as foreign keys to three other tables (Produce, Animal Products, and Grain).

### Normalization - Steps to 3NF

First Normal Form (1NF) calls for each column being a single value, not multiple values. Each column or field should have a unique name. Next, all values in a column or field should have the same data type. Lastly, no two records or rows are identical (Study.com, 2022). Two Primary Key holder tables (Suppliers and Purchases) meet these requirements. Other three tables meet these requirements implicitly by implying that the last requirement, unique records, is met given the assumption of ITEMID and SUPPLIERID are unique across the tables. Therefore, all five tables meet the 1NF requirements.

Second Normal Form (2NF) calls for no partial dependencies of any columns on the Primary Key for the subject table along with 1NF conditions are met (Study.com, 2022). Product, Animal Products, Grains have partial dependencies on the PLUCODE, PRODUCENAME, ANPRDNAME, and GRAINNAME to ITEMID. SPECIALTY column in the Suppliers table is depended on the SUPPLIERID. Only Purchases table meet 2NF. All the other tables can meet the requirements by moving the dependent attributes to a new table using ITEMID as a Foreign Key.

Third Normal Form (3NF) requires no transitive dependency in the tables (Study.com, 2022). Purchases table has transitive dependency because TOTALREV are derived from TOTALBOUGHT minus TOTALSOLD. Also, MARGIN has transitive dependency with TOTALREV divided by ITEMID counts. Purchases tables can be divided into three parts to achieve the 3NF.

## Part 3 – Developing ERD

### Entity Relationship Diagram

A picture containing calendar

Description automatically generated

## Reference:

*Study.com | Take Online Courses. Earn College Credit. Research Schools, Degrees & Careers*. (2022). Study.Com. https://study.com/academy/lesson/database-fundamentals-designing-a-simple-database.html