

MGMT 582 Group 3

Dae Sung Kim, Vedanti gulalkari, soham patil, tvisha goswami, rishab malhotra

**Background**

The University Book Store has been supplying Purdue with goods since 1939. The bookstore sells various kinds of items textbooks, hooded sweatshirt, jewelry, magnet, sweatpants, t-shirts, kids wear, post stamps, and many more. However, even with these diverse products, the bookstore manages inventory through manual excel manipulation. These manual inputs caused multiple human errors. Due to this poor data management, the bookstore has difficulty understanding status of their own inventory and failed to restock some of the items in proper time, losing profit opportunities.

The University Book Store has provided a dataset in order for us to create database that will help the store manage its bookstore efficiently and gain insight about their business status. The dataset includes two separate excel files.

The first file contains information regarding the inventory of each item that the store sells. The excel file has columns of UPC code, Display Name, QTD sold, Current Quantity on hand, Current quantity on order, Author, Last Transaction Date, Rental Availability, Sales Price, and Vendor. UPC code is a unique code for each item. Display Name column describes the item. The QTD sold column shows information about quantity sold in a month. Current quantity on hand column stores information about the quantity the store physical has. The Current Quantity on order gives information about quantity store bought from vendor but not physically arrived at the store yet. Based on this information, the University Book Store manages its inventory and decides when to restock certain items.

The second file contains information regarding customer and invoice information. This excel files shows information regarding customer and their purchase habit.

Based on this information, we have created database that will complement the bookstore’s inventory management and sales report.

**Introduction**

Our **project objective** is to design an optimized database for the store, helping them store the data in an organized way, so that database can assist the store to manage their inventory. The database also consists of the vendor information. In addition to the inventory management issue, the store also needs to manage the vendor orders, that need to be placed just in time to avoid stockout or overstocking. Well implemented database will also help the University Book Store to visualize best-selling items and patterns in the stock usage.

**Conceptual Data Modeling**

**[Diagram

Description automatically generated](https://lucid.app/lucidchart/361b3208-db7a-4679-80f2-7d98b868b20d/edit?invitationId=inv_57e409b7-f9bc-4c3f-9f46-8eeae6ed1076&page=0_0)**

**Relational Data Modeling**

**Graphical user interface, text, application, email

Description automatically generated**

**Normalization Analysis:**

**1st Normal Form (1NF):**

A table is referred to as being in its First Normal Form if atomicity of the table is 1. Our tables do not contain a single cell holding multiple values. All attributes are either single-valued attributes or composite attributes. The First normal form disallows the multi-valued attribute, composite attribute, and their combinations.

The Book-Store table contains composite key - Address. It can be broken down into Street, State and Pin-Code. To implement 1NF, we will include Street, State and Pin-Code columns independently instead of one Address column.

**Second Normal Form (2NF):**

The tables are now in 1NF and they do not possess any partial functional dependency. Hence, table is in 2NF.

**Third Normal Form (3NF):**

There is no transitive functional dependency in the dataset and hence the tables are in 3NF.

**Commentary**

For a structured design and scalability of bookstore business the data was organized in the following way:

1. The primary objective of the bookstore would be to engage more customers and sell as many items as possible to enhance profits. Customers entity has been created which stores all the information about the customer such as Customer Name, contact details. So that the bookstore can use this information to do target marketing, if necessary.
2. A separate Item\_Inventory entity has been created which enlists all the information about the products sold at the bookstore. Items at the bookstore can be classified mainly into three categories: - Books, Clothes & miscellaneous. It was divided based on number of varieties within the categories. In addition, an inventory management is key for smooth functioning of the business. Hence, it also lists attributes such as Quantity\_OnHand, Quant\_OnOrder, ItemName, Price etc. So that, the bookstore manager can easily find which quantity needs to be restocked or over bought.
3. To have an optimized demand and supply of the items, it is important to have full information about the vendors. A separate vendor entity is created which enlists which item is purchased from which vendor. It enlists attributes VendorID and Vendor Name
4. Finally, an employee entity is created which contains all the details of employees working at the bookstore. It enlists employee Name, Salary, Contact etc.

Lastly, the database has been designed for one branch of the University Book Store. However, with the certain additional attributes and modification in the relationships between certain entities, the database can be scaled for further expansion of the store.