

# AP CS Database Project

## Problem Statement

**ShoeFly Inc** is a growing shoe retail business with shoe stores around the bay selling a variety of shoe styles under a number of different names. They just acquired a new chain, Shoeper Duper Shoes, and they are concerned that their already inefficient supply chain is about to get much worse. You have been hired to develop a centralized database to manage inventory and orders for the entire company. To help you plan, you have been given the following information:

**Shoeper Duper Shoes:** Sells high end footwear for men and women at three outlets at the Fremont Hub, at Stoneridge Mall in Pleasanton, and at Santana Row in Santa Clara. These shoes are sold in European sizes men's 35 to 48 and women's 35 to 44. Men's brands include Siprikis Oxford in burgundy, tan, and black \$199.95, Siprikis alligator in silver and black \$249.95, ntparker Oxford in brown and tan \$259.95, and SexeMara loafers mixed color \$329.35. Women's brands include FABRIZIO VITI suede flat in powder blue, gold, and green \$855, CHRISTIAN LOUBOUTIN knee high boots in beige and blue \$2995, and GIVENCHY pumps in black and royal blue patent leather \$1075.

**Shoeter Hunting Apparel:** Sells mid priced shoes for hunting, fishing, and hiking at locations at Railroad Blvd in Livermore, Newpark Mall Newark, and Sunvalley Shopping in Concord. Shoes are sold in American sizes men's 6.5 to 13 and women's 5.5 to 12. Brands include Dr. Martens, Zamberlan, Asolo, and Keen. Dr. Martens Ridge in black and tan \$150, Zamberlan Vioz Lux in black and suede \$330, Asolo Thyrus in blue, black, and brown \$235. All styles available in both men's and women's sizes.

**Cheap Shoet Discount:** Women's and children's discount shoes in American sizes. Locations at Southland Mall Hayward, Great Mall Fremont, and Hilltop Mall in Richmond. For women, Sketchers sneaker in grey, blue and brown \$54.99, Fergalicios sandal in black and white \$39.99, and Madden Girl wedge sandal in black and grey \$39.99. For kids, Nickelodian Paw Patrol boy's (blue) and girl's (pink) \$24.49, Starwars Sketcher Adepts grey \$32.29, Arizona girl's sandals in pink, brown, and purple \$13.99

## Deliverables

- You will need to create a database that includes Stores, their Locations, Phone Numbers, Fax Numbers, and Store Managers; Current Inventory by shoe brand, size, and color for each store; Orders for shoe brand, size, color, store, and date placed. All creation must be done using scripts.
- Draw (or use excel to create) a schema for your database (see example on slide 17 of database ppt). Your schema must include all primary and foreign keys and field descriptions including datatypes. Write a query that requires joining at least three different tables.
- Save and print copies of all of your scripts. Save and print screenshots of all of your completed tables and query results.

## Guidelines

This database must follow the first, second, and third normal forms (1NF, 2NF, 3NF).

### First Normal

To be in first normal form (1NF), a table must have the following qualities:

- The table is two-dimensional with rows and columns.
- Each row contains data that pertains to some thing or portion of a thing.
- Each column contains data for a single attribute of the thing it's describing.
- Each cell (intersection of a row and a column) of the table must have only a single value.
- Entries in any column must all be of the same kind. If, for example, the entry in one row of a column contains an employee name, all the other rows must contain employee names in that column, too.
- Each column must have a unique name.
- No two rows may be identical (that is, each row must be unique).
- The order of the columns and the order of the rows are not significant.

### Second Normal

To appreciate second normal form (2NF), you must understand the idea of functional dependency. A functional dependency is a relationship between or among attributes. One attribute is functionally dependent on another if the value of the second attribute determines the value of the first attribute. If you know the value of the second attribute, you can determine the value of the first attribute. Every table in first normal form must have a unique primary key. That key may consist of one or more than one column. A key consisting of more than one column is called a composite key. To be in second normal form (2NF), all non-key attributes must depend on the entire key. Thus, every relation that is in 1NF with a single attribute key is automatically in second normal form. Our tables will not use composite keys so we only need to be sure that each table contains a single attribute to be 2NF.

### Third Normal

For the third normal form (3NF), we need to avoid *transitive dependencies*. A transitive dependency occurs when one attribute depends on a second attribute, which depends on a third attribute. Deletions in a table with such a dependency can cause unwanted information loss. A relation in third normal form is a relation in second normal form with no transitive dependencies. As an example, consider what would happen if orders were tied to the store manager who placed them. That store manager later retires and is removed from the database. What happens to all of the orders that she placed? While the order may seem to be dependent on the person placing the order, this relationship is transitive. The order actually belongs to the store regardless of who placed it. So to avoid "modification anomalies", make sure that no one table if removed or corrupted can prevent other tables from being accessed.