Sean Park

Database Design in 3NF

Item (id, name, inventory_level, reorder_level, weight, category, subcategory, color, description, active)

ItemPrice (id, *item_id*, start_date, end_date, price, type)

ManufacturerPurchase (id, *item_id*, date, quantity)

ItemOrder (id, *item_id*, *order_id*, shipped_date, quantity)

Order (id, *user_id*, *school_id*, order_date, payment_receipt)

User (id, username, password, access_type, first_name, last_name, email, phone, active)

School (id, name, address1, address2, zipcode, city, state, min_grade, max_grade, active)

Key:
Solid underlined fields are primary keys;
Italicized fields are foreign keys;

Database Design Notes

1. Customers may be indirectly associated with a school through orders, but since customers do change school affiliations from time to time and we want them to still be customers when they change schools, we will not directly link customers to particular schools.

2. The shipped_date is placed in the ItemOrder table instead of the Order table because shipments of parts of orders are allowed when some items are out of stock.

3. The address2 field in School can be NULL.

4. When an item is selected for order, a new row is inserted into the ItemOrder table with a NULL shipped_date and associated with a row in Order, which has a NULL order_date and a NULL school_id. The NULL values in Order are populated when an order is placed and the shipped_date in ItemOrder is populated when the shipment is sent out.

5. When a shipper completes a shipment, a callback would populate the shipped_date fields of all the ItemOrder fields that correspond to the items being shipped. The callback would also decrement the item's inventory_level by the ItemOrder's quantity.

6. The current price of an item is found by querying the ItemPrice row with the corresponding item_id and a end_date value of NULL. When a new price for an

item is added, a callback will set the end_date field in the item's current price to the date of entry and add a new row to the ItemPrice table with the new price, the date of entry as the start_date and an end_date value of NULL.

7. When an item is purchased from a manufacturer, a callback will increase the inventory_level of the item purchased and check if the price inputted is different from the current price. If the prices are different, the interaction described in note #9 will take place.

8. The category field in Item refers to one of the major four categories sold in the store: chess_piece, board, clock and supplies. Each category is further broken up into subcategories, denoting a different type of item in that category (e.g. clocks would be broken up into analog and electronic). All other details of the item (e.g. material, size, etc.) are noted in the description field.

9. 3NF is violated in the Item table because of transitive dependency of description and weight on category, subcategory and name. This could be resolved by creating a ItemType table which holds those fields. However, given the small scale of the store and its system, this option was overlooked to minimize the number of joins.

10. 3NF is violated in the School table because of transitive dependency of city and state on zipcode. This could be resolved by creating a Zipcodes table which holds those fields. However, given the small scale of the store and its system, this option was overlooked to minimize the number of joins.