Normalization Analysis

Our schema:

1.cart (ID, CID, NAME, USERNAME, PRICE, QUANTITY, PURCHASED)

function dependency: {ID}->{NAME}, {CID}->{USERNAME}, {ID}->{PRICE},

{ID,CID}->{QTY}, {ID,CID}->{PURCHASED}

2.product(ID, NAME, IMAGE, PRICE, QUANTITY)

function dependency: {ID}->{NAME}, {ID}->{IMAGE}, {ID}->{PRICE},

{ID}->{QUANTITY}

3.OrderList (orderNum, accName, prodName, ordertype, price, qty, purchaseDate, pickupDate)

function dependency: {orderNum,accName,prodName}->{ordertype}, {prodName}->{price}, {orderNum,accName,prodName}->{qty},

{orderNum,accName,prodName}->{purchaseDate}, {orderNum,accName,prodName}->{pickupDate}

4.account (id, accname, password, usertype, firstName, lastName, address, phone)

function dependency: {id}->{accname}, {id}->{password}, {id}->{usertype}

Analysis:

1. For cart table, {ID}, {CID}, {ID, CID} all contains attributes that are CK, so they are all superkeys. All the FD in this table have superkeys on the left hand side, so this table satisfied 3NF.
2. For product table, ID is a CK, so {ID} is a superkey. All the FD in this table have superkeys on the left hand side, so this table satisfied 3NF.
3. For orderList table, {prodName} and {orderNum,accName,prodName}, all contains attributes that are CK, so they are all superkeys. All the FD in this table have superkeys on the left hand side, so this table satisfied 3NF.
4. For account table, id is a CK, so {id} is a superkey. All the FD in this table have superkeys on the left hand side, so this table satisfied 3NF.

Five queries:

1. INSERT INTO mingjunz.account VALUES ((select max(ID)+1 from mingjunz.account), '" + username + "', '" + password + "', '" + user\_type + "', '" + first\_name + "', '" + last\_name + "', '" + address + "', '" + phone + "');

This query is used to insert user with information (ID, username, password, user\_type, first\_name, last\_name, address, phone).

1. select \* from mingjunz.account where accname ='" + accname + "' and password='" + password + "';

This query is used to check if the account with corresponding information exits in database.

1. "UPDATE yilingding.cart SET quantity=quantity+"+number1+"where username='"+username+"' AND id="+id1;

This query is used to update the quantity that in user’s cart with corresponding username and id of the product.

1. "DELETE FROM yilingding.cart WHERE username='"+name+"'";

This query is used to delete products from cart.

1. select ordernum from mingjunz.orderlist order by ordernum desc;

This query is used to find the largest order number so that we will use this number+1 when generating a new order.

ER-Diagram:

