**CSC540 Database Management Systems**

**Project Report 1**

**WolfWR, WolfCity wholesale store chain**

**Assumptions:**

1. A staff works for at most one store at a given point of time.
2. There is a single warehouse handling the inventory within multiple stores.
3. A person can sign up for as a club member only at a store.
4. A club member can return only a damaged/defective product. Thus, we do not add the returned product back to the inventory.
5. Only two membership levels exist, gold and platinum.
6. Both gold and platinum memberships last for a year after which the membership has to be renewed.
7. One checkout by the customer at a store is considered as one transaction.
8. Each transaction will have exactly one staff (cashier) associated with it.
9. The cashback amount for platinum memberships will be rewarded in the first transaction of the next year.

**Problem Statement**

We have designed a WolfWR wholesale-store Database System for WolfCity.

The staff at WolfWR will be using this database system to maintain staff information, club-member information, supplier information, store information and merchandise information.

The four major tasks that will be performed include: information processing, maintaining inventory records, maintaining billing and transaction records, and generating reports regarding total sales, customer growth, and merchandise stock. Staff at the registration office will sign up new customers and cancel memberships. All the transactions made by club members will be recorded and maintained. Staff at the warehouse office will record and maintain information pertaining to new shipments received, product transfers between stores, handling returns from stores to warehouse and returns of damaged/defective products from customers.

In order to record and maintain all the various data transactions taking place in the huge wholesale store chain, a database is required to avoid conflicts. There may prevail situations where multiple transactions take place at the same time. For instance, when multiple customer registrations are happening concurrently or when stores are transferring products to one another. In order to perform these tasks efficiently, a database is needed. Without a database, there could be data redundancy and data inconsistency.

**Intended Users:**

1. Administrative Staff: The Admin has the whole and sole control of the WolfWR wholesale-supply chain, they have access to all the information associated with the wholesale store chain. They will have to access to everything that happens and can add/update/ delete anything with respect to the store, staff, club members, product transfers, suppliers etc.
2. Registration Office Staff: The Registration Office Staff handles registering new customers and cancelling membership subscriptions of existing customers. They can view the information for which he/ she is responsible. They can add/delete information related to the customers holding an active membership.
3. Warehouse Office Staff: The Warehouse Office Staff handles new shipments received by stores and suppliers, monitors the transfer of products between stores, and handles product returns. They can view the information for which he/she is responsible.
4. Billing Staff: The Billing Staff generates the bills that need to be paid to suppliers, and handle cashback reward checks for platinum members

**Main Entities:**

1. Staff Information: staff ID, store ID, name, age, home address, job title, phone number, email address and time of employment.
2. Club member information: customer id, first name, last name, membership level, email address, phone, home address, active status
3. Supplier Information: supplier id, supplier name, phone, email address, location
4. Merchandise Information: product ID, product name, quantity in stock, buy price, market price, production data, expiration date, supplier ID
5. Store Information: store ID, manager ID, store address, phone number

**Application Program Interfaces:**

**Information Processing:**

addStaffInfo(Staff ID, Store ID, Name, Age, PhoneNumber, Title, TimeOfEmp, Email, Address)

return confirmation

updateStaffInfo(Staff ID, Store ID, Name, Age, PhoneNumber, Title, TimeOfEmp, Email, Address)

Return confirmation

If NULL for any fields, then those fields wont be updated

deleteStaffInfo(Staff ID)

Return confirmation

addStoreInfo(Staff ID, Store ID, Name, Age, PhoneNumber, Title, TimeOfEmp, Email, Address)

return confirmation

updateStoreInfo(Staff ID, Store ID, Name, Age, PhoneNumber, Title, TimeOfEmp, Email, Address)

Return confirmation

If NULL for any fields, then those fields wont be updated

deleteStoreInfo(Staff ID)

Return confirmation

addCustomerInfo(Cust ID, Staff ID, Store ID, Sign up date)

Return confirmation

updateCustomerInfo(Cust ID, Staff ID, Store ID, Sign up date)

Return confirmation

If NULL for any fields, then those fields wont be updated

deleteCustomerInfo(Cust ID)

Return confirmation

addSupplierInfo(supplier id, supplier name, phone, email address, location)

Return confirmation

updateSupplierInfo(supplier id, supplier name, phone, email address, location)

Return confirmation

If NULL for any fields, then those fields wont be updated

deleteSupplierInfo(supplier id, supplier name, phone, email address, location)

Return confirmation

giveMemberships(Cust ID, Store ID, Sign up date, Staff ID)

Return Confirmation

cancelMemberships(Cust ID, Store ID, Staff ID, Sign up date)

Return Confirmation

setMembershipStatus(Cust ID, Store ID, Staff ID, Sign up date)

Return confirmation

getMembershipStatus(Cust ID, Store ID, Staff ID, Sign up date)

Return confirmation

**Maintaining Inventory office:**

createInventory(Product ID, Product Name, Supplier ID, Quantity in stock, buy price, market price, production data, expiration date)

Return confirmation

updateInventory(Product ID, Product Name, Supplier ID, Quantity in stock, buy price, market price, production data, expiration date)

Return confirmation

getProductInfo(Product ID, Product Name, Supplier ID, Quantity in stock, buy price, market price, production data, expiration date)

Return list of products

manageTransfer()

**Maintaining Billing office:**

generateBills(supplier id, supplier name, phone, email address, location)

Return generated bill

generateReports(supplier id, supplier name, phone, email address, location)

Return generated report details

checkMembershipStatus(Cust ID, Store ID, Staff ID, Sign up date)

Return membership status

addReward(discount info, valid dates for sale, Cust ID)

apply discount

checkSale(transaction ID, store id, customer id, cashier id, purchase date, product list, total price)

return confirmation

**Reports:**

getCustomerInfoReport(Cust ID, Staff ID, Store ID, Sign up date)

return report of customer records

getStaffInfoReport(Staff ID, Store ID, Name, Age, PhoneNumber, Title, TimeOfEmp, Email, Address)

return report of staff records

**Tasks and Operations – Realistic Situations:**

**Situation 1:** The admin wants to know the merchandise stock report generated for the current month in store A. She/He then realizes that there is an excess of Product B. A product transfer/return is requested from store A to the warehouse.

**Situation 2:** An existing club member named Henry, enters one of the wholesale stores. He realizes that his new phone number has not been updated in the system. The registration office staff updates his new phone number in the system.

**Situation 3:** A platinum member named Emma is billing her products in the billing counter. Once the bill is generated, she realizes that the discount was not applied for certain products and that she did not receive a 2% cashback reward for the previous year. The billing staff updates the sale information of each product in the store and sends a reward check based on her membership level.

**Description of Views:**

* Billing staff: Billing staff can generate bills that need to be paid to suppliers. They can also handle yearly rewards for platinum members and send out reward checks. All transaction and billing related reports can be generated by the billing staff. Need not be aware of warehouse
* Registration staff: Operators in the registration office can sign up new customers and cancel memberships. Need not to be aware of supplier and warehouse information
* Warehouse staff: Operators in the warehouse office can add in new shipments received, transfer products between stores, and handle returns. This staff need not be aware of customers info and store level information.
* Customer: club member info, transaction info and also return transaction info. Store info. Need not be aware of supplier nor warehouse information.
* Supplier: Supplied product info and billing info. Need not to be aware of anything other info.

**Description of Local E/R diagrams:**

* The staff working at the wholesale store can be managers, billing staff, registration staff, warehouse staff, cashier etc…
* Merchandise uses ProdID as a key, since no two distinct products can have the same product number.
* Staff uses Staff ID as a key because there are many staff working in various departments. A unique id is used to distinguish between them.
* Store uses StoreID as a key, to differentiate between different stores located around the region/country.
* Club members are given a unique ID because two customers cannot have the same number.
* The ‘Levels’ entity use LevelID as a key, to distinguish between the different types of levels, such as gold or platinum.
* Suppliers are given a unique ID in order to differentiate between each supplier.
* Transactions have a unique id called Transaction\_id. This is given so that the staff can handle the transactions taking place in different stores, and can be used to handle returns.
* Signup is a weak entity connected between Stores and Staff. It does not exist without a Store or Staff. One staff can only sign up one customer at a time.
* Each product is supplied by exactly one supplier, and each supplier can supply many products.
* Each staff works for at most one store and each store is managed by exactly one staff. See assumption #1
* Each transaction is completed by exactly one club member and club members can have exactly one level.
* Each staff can sign up exactly one customer at exactly one store. Check assumption #3.
* Many new shipments of products can be handled by exactly one staff and many bills can be generated for suppliers by exactly one staff.
* Multiple transactions can be made at one store and scanned by one staff.
* The membership of many club members can be cancelled by exactly one staff member. This is done so that there would not be any conflict when cancelling the memberships.
* Many rewards checks are given out by exactly one billing staff member based on their membership level.