Georgia PPE Management

CS 4400: Introduction to Database Systems

Summer 2020: Semester Project

Project Purpose

In this project you will analyze, specify, design, implement, document, and demonstrate an online system. You are required to use the classical methodology for relational database development. The system will be implemented using a relational DBMS that supports standard SQL queries. You will use your localhost MySQL Server (Version 5.1 or above) to implement your database and the application. You also cannot use any other software like Access or SQLite. Ask the professors or TAs if you have questions.

Project Phases

Inputs (we give you)

• Text description	• Revised text description • Advanced ERD • Raw initial data	• Database schema • Initialized database • Procedure shell
Phase I	**Phase II**	**Phase III**
• Entity Relationship Diagram • Logical constraints	• Relational schema • Database schema • Initialized database	• Implemented procedures

Outputs (you turn in)

Directions for Phase II

In Phase II, your tasks are to:

a) Translate the given ERD for our PPE Management System into a **relational schema diagram**
b) Translate the relational schema diagram written in (a) into **create table statements**
c) **Insert** the provided initial data into your database constructed by (b)

Relational Schema [50%]

Convert the Enhanced Entity-Relationship Diagram (EERD) that we've provided into a set of relational schema. Identify primary and foreign keys, and show referential integrity using either (1) arrows or (2) the text-based foreign key notation introduced in class and the conversion slides.

DO NOT USE YOUR EERD FROM PHASE I. *We require you to use the* ***provided*** *EERD for this assignment, where the focus is on making sure that you understand and can apply the conversation process correctly. This will also give us time to evaluate the EERD that your team has submitted for Phase I.*

Create Table Statements [30%]

Provide the MySQL CREATE TABLE statements, including domain constraints, integrity constraints, primary keys and uniqueness constraints, and foreign key constraints. You do not need to specify ON UPDATE and ON DELETE clauses and can leave them to their default behaviors. You should submit the **original MySQL statements (that you hand-type), NOT the SQL dump** (20% deduction).

Insert Statements [20%]

You should insert all information from the provided initial data file into the tables you constructed in the previous section. You will turn in the insert statements that accomplish this. Note that these insert statements **do not have to be hand-typed**, and we encourage some sort of automation to generate these. You may have to fiddle with the excel file to get it in a format you like before you can convert it into database-ready insertions. In other works, the initial data isn't necessarily formatted in a way that matches your relational schema.

The initial data spreadsheet has been provided in the in the Canvas Assignment.

Submission Checklist

Each team needs **one of its members** to upload the deliverables to Canvas. The other team members should log in and check to ensure that all files have been uploaded correctly. Please include your team numbers in the file names.

Your submission should include the following, compiled into **2 documents (do not zip)**:

1. Relational schema (schema_team#.pdf)
2. Create table & insert statements (mysql_team#.sql)
    a. A template has been provided in the Canvas Assignment
    b. The .sql file must run in MySQL Workbench without error for you to receive credit for these statements

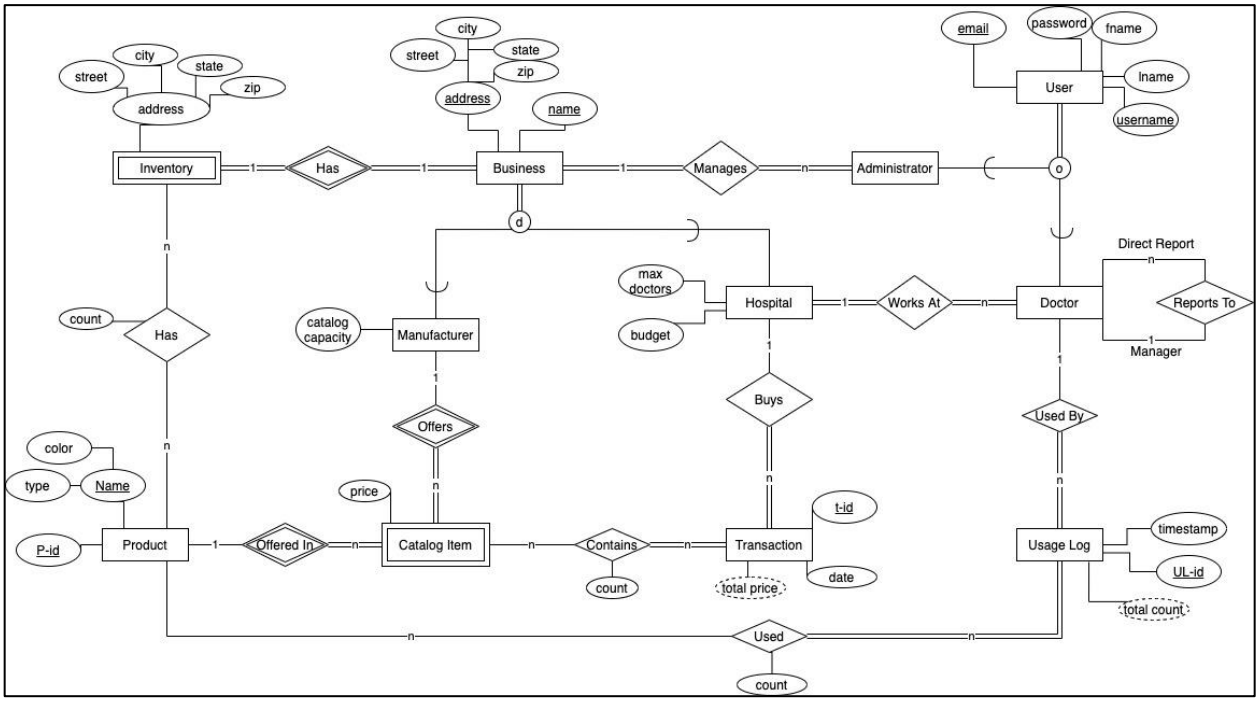
Version History

Version	Date	Notes
0	6/23/20	Initial Release

Entity Relationship Diagram

Note: This is **not** the diagram we are expecting for Phase I. The Phase I solution will be posted on Canvas after the grace period of Phase I closes.

This diagram has many additions and differences over the Phase I solution. It follows a slightly modified story line, found on the next page.



A copy of the ERD is in the Canvas Assignment.

Revised Description

The Georgia PPE Management (GPM) application will track transactions and inventory for Georgia's hospitals and manufacturers to give all relevant parties the most up-to-date information on the availability of PPE. As a reminder, PPE stands for personal protective equipment, and it is vital in protecting healthcare workers while they are taking care of infected patients. In this application, Georgia's manufacturers can produce and sell a variety of PPE products. Hospitals can purchase this PPE from the manufacturers to add to their own stockpiles. Below, you will find a more in-depth explanation of the various components of this system:

Product

A product is a type of PPE (i.e., mask, gown, gloves, etc.). Each product offering can be produced by multiple manufacturers, and hospitals can purchase these products from any manufacturer that produces them. A product can be identified in 2 ways, both of which should be stored in the system:

1. Canonically, with a unique name that consists of a color and a type. For example, "blue mask" and "green gown" are all valid products in the system but merely "gown" without a color is not.
2. A unique 5-character product identifier.

Business

A business is a company that can hold inventory of PPE, either to sell or to use. Its inventory is stored offsite at a separate address.

A business must be either a manufacturer or a hospital and has a unique address and unique name. All businesses must have **at least one** administrator that is able to perform tasks such as view logs, make purchases, generate reports, etc.

Manufacturer

The manufacturers are the producers of PPE products in this system. They give Georgia's hospitals a source to acquire and purchase PPE. A manufacturer has a Catalog Limit that limits how many items can be in its catalog.

Each manufacturer maintains a single product catalog of its different PPE offerings. A catalog item represents a specific product by a specific manufacturer to be sold. The catalog item also stores a price, which represents how much the manufacturer is pricing the product in its catalog. A product can only appear in one catalog item per manufacturer. However, multiple manufacturers can sell a given product in their own catalogs.

Examples of 2 manufacturers' catalogs can be found below. Note that each product has its own universal product ID, but BLMSK in one manufacturer's catalog is a different catalog item from the one in the other manufacturer's catalog. Note that this enables each manufacturer to price products independent of other manufacturers.

Marietta Mask Production Company		
Product ID	**Product Name**	**Price**
GNMSK	Green Mask	$1.25
BLMSK	Blue Mask	$1.10
RDMSK	Red Mask	$1.05

Georgia Tech Production Lab		
Product ID	**Product Name**	**Price**
GNMSK	Green Mask	$1.00
BLMSK	Blue Mask	$2.00
GNGWN	Green Gown	$5.00

Hospital

Conceptually, a hospital is a consumer of the PPE that is made by manufacturers. Each hospital has a budget (money the hospital can use to purchase PPE) and a maximum number of doctors that can work there. A hospital needs to have at least one doctor hired to take care of patients.

A hospital can purchase PPE products from a manufacturer's catalog through the means of a transaction. This transaction is uniquely identified by a 4-digit numeric ID. In any given transaction, a hospital may purchase a variety of PPE products out of a single manufacturer's catalog, but only if it has enough remaining budget and the manufacturer has enough inventory for the entire order. The transaction should keep track of the purchaser, seller, transaction date, products exchanged, and the counts of each product sold. It would also be nice to know the order total. For example, a transaction may look like this:

Transaction			ID: 0001
			Date: 05/01/2020
Hospital:	Grady		
Manufacturer:	Georgia Tech Production Lab		
Product	**Count**	**Unit Price**	**Line Total**
Green Mask	100	$1.00	$100.00
Green Gown	200	$5.00	$1000.00
		Order Total:	$1100.00

After a transaction occurs, the hospital's budget and inventory and the manufacturer's inventory should be reflected accordingly.

Inventory

Businesses have exactly one inventory offsite at a separate address that they use to store their stock of PPE. For hospitals, this can be thought of as a stockpile; for manufacturers, this can be thought of as a warehouse.

Remember, before a transaction occurs, the manufacturer must have enough inventory to fulfill the entire transaction. Before a doctor issues a usage log, the hospital must have enough inventory to fulfill all the items being requested by the doctor.

Examples of inventories can be found below:

Business:	Grady Hospital
Address:	123 Atlantic Dr, Atlanta, GA 30318

Warehouse Inventory

Product	**Count**
Green Mask	1000
Green Gown	200
Blue Gown	100

Business:	North Georgia PPE Co
Address:	123 Marietta Pkwy, Marietta, GA 30068

Warehouse Inventory

Product	**Count**
Green Mask	1000
White Gown	500
Blue Mask	100
Red Gloves	100

User

A user is someone who has an account in the system. We store their first name, last name, unique email, unique username, and password. A user must be either a doctor, an administrator, or both.

Administrator

Administrators aren't really interesting as far as the database is concerned (except the fact that they are administrators). You'll be performing Phase III from the perspective of administrator, though. This will entail adding users and businesses, pulling reports on transactions and usages, facilitating transactions, etc.

Doctor

A doctor works at a hospital and must be assigned to a hospital upon addition to the system. A doctor can also report to up to 1 managing doctor.

Doctors in the hospital have access to the hospital's PPE. This equipment is essential to their day-to-day jobs. The hospital keeps track of doctors' usage of PPE through Usage Logs. A usage log tracks when a doctor uses inventory: what products, how many, and when the usage occurred. Obviously, the hospital's inventory must have enough products in stock as a prerequisite to the doctor logging a usage (you can't use PPE you don't have). After the usage is

logged, the hospital's inventory should be deducted appropriately. A usage log has a unique 5-digit ID as well as a timestamp indicating the date and time a doctor withdrew the inventory.

An example of a usage log can be found below:

Usage Log

ID:	55111
Hospital:	Grady
Doctor:	gpburdell
Timestamp:	2020-05-01 5:00 PM

Product	**Count**
Gray Scrub	2
Blue Mask	1
White Goggles	1
Total Count	4