Georgia PPE Management

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 I

In Phase I, your task is to read the entire description of the system and then translate this textual description into an Entity-Relationship Diagram (ERD) for a potential database system. For any system requirements that cannot be expressed using ERD notation, you must list as logical constraints (we expect at least 3).

1. ERD
    a. **Will use** strong entities, binary relationships, and attributes of all types (simple, composite, derived, etc.).
    b. **Will not use** weak entities, identifying relationships, recursive relationships, or n-ary relationships.
    c. Most entities are pretty explicit in the description (i.e. the headings), but a few are more implicit and require more thought to recognize

      d. <mark>All relationships should specify mandatory or partial participation as well as cardinalities in ERD notation.</mark>

      e. You should represent all attributes mentioned in the description. Additionally, <u>you are expected to come up with at least 1 derived attribute per entity</u>.

2. This ERD must capture the functionalities of the application system whenever possible using the components listed in #1.

3. <u>Logical constraints must be ones that cannot be specified using ERD notation, nor can they be related directly to data types or values (i.e. "the product's ID must be a number" is not a logical constraint; it's a domain constraint).</u>

4. The design of your system (ERD + logical constraints) must encompass all functionalities as indicated by the description in this document. For any ambiguity, you are allowed to add additional assumptions that note what was ambiguous, what your decision was, and how the decision impacted your design. If you make an assumption without listing it, your diagram may lose points because the grading TA might not be able to tell what you were thinking. Assumptions should not contradict this document's description but rather should be used to clarify ambiguity.

Submission Checklist

<mark>Your submission should include the following, compiled into **one pdf**</mark>:
1. Cover Page (found on Canvas) with all fields filled in
2. Entity-Relationship Diagram
3. List of 3 or more logical constraints
4. List of any assumptions you think the grading TA should know about

Version History

Version	Date	Notes
0	6/8/20	Initial Release
1	6/10/20	Clarifications for ambiguity

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 a manufacturer, 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.

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 unique business name that allows us to identify it, but it also has an address and 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. This catalog is composed of different catalog items that are uniquely identified by the manufacturer with a 5-character alphanumeric reference number. 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 that product using a separate reference number in their catalog.

Examples of 2 manufacturer's catalogs can be found below. Note that each product has its own universal product ID, but it can have a different reference number and price for each manufacturer that produces it.

Marietta Mask Production Company

Product ID	Reference Number	Product Name	Price
GNMSK	MMPC0	Green Mask	$1.25
BLMSK	MMPC1	Blue Mask	$1.10
RDMSK	MMPC2	Red Mask	$1.05

Georgia Tech Production Lab

Product ID	Reference Number	Product Name	Price
GNMSK	GTPL0	Green Mask	$1.00
BLMSK	GTPL1	Blue Mask	$2.00
GNGWN	GTPL2	Green Gown	$5.00

Hospital

Conceptually, a hospital is a consumer of the PPE that is made by manufacturers. Each hospital has a unique name, an address, a budget (money the hospital has to purchase PPE), and the 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 a 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 capacity in its warehouse 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 partner warehouse's inventory should be reflected accordingly.

Warehouse

Hospitals need to partner with exactly one warehouse to store all the inventory they buy. A Warehouse is uniquely identified by its name or its unique address. Warehouses may be assigned to only one hospital at a time.

As an example, Emory Hospital may partner with Decatur Warehouse while Grady Hospital may partner with Midtown Warehouse Co. A warehouse may exist in the system without being used by a hospital; however, a hospital may not exist without partnering with a warehouse.

The warehouse has an overall capacity that limits the total number of products it can hold.

Examples of warehouses can be found below:

Name:	Midtown Warehouse
Partner Hospital:	Grady
Address:	123 Atlantic Dr, Atlanta, GA 30318
Capacity:	1400

Warehouse Inventory

Product	Count
Green Mask	1000
Green Gown	200
Blue Gown	100

Name:	North Georgia Warehouse
Partner Hospital:	Kennestone
Address:	123 Marietta Pkwy, Marietta, GA 30068
Capacity:	2000

Warehouse Inventory

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

Name:	Dunwoody Warehouse
Partner Hospital:	
Address:	123 Abernathy Rd., Dunwoody, GA 30301
Capacity:	1000

Warehouse Inventory

Product	Count
Green Mask	1000
Blue Gown	4s00
Blue Gloves	300

Doctor

A doctor works at a hospital and is a user of the system. A doctor creates an account in the system with a unique email, unique username, first name, last name, and a password. A doctor must be assigned to a hospital upon addition to the system.

Doctors in the hospital have access to the hospital's PPE that is stored in its partner warehouse. 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 partner warehouse 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 partner warehouse'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