



## **InfinityArtwerks Database Management System**

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for the CS214 Fundamentals of Database Management System

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## 1.1 Background of the Study

**InfinityArtwerks**, a thriving local printing shop in Velez, Cagayan de Oro, Philippines, has carved its niche in the industry over the past eight years. The company's business model distinguishes itself in its adaptability, specializing in the production of diverse items such as T-shirts, tarpaulins, glass plaques, medals, and wood prints. Unlike conventional shops that maintain extensive inventories, InfinityArtwerks adopts a demand-and-supply approach. It procures supplies only in response to customer orders, ensuring a nimble and efficient operation.

At the core of InfinityArtwerks is a compact yet dedicated team totaling five individuals. The hands-on involvement of the two owners, complemented by the support of two shop clerks and a clerk overseeing tools, machines, and maintenance, reflects the streamlined structure of the organization. This compact team ensures efficient coordination, enabling the company to maintain a personalized touch in customer interactions. The small scale of operations aligns with the company's commitment to flexibility and responsiveness in meeting client requirements.

## 1.2 Statement of the Problem

InfinityArtwerks faces several operational challenges that necessitate the implementation of a database application. These challenges can be categorized as follows:

- **Manual Order Processing:** The current approach to customer order management at InfinityArtwerks is predominantly manual, relying on traditional invoice systems. This has led to instances where orders are overlooked or forgotten until the customer arrives for collection. How can the company streamline and automate its order processing to the company's operability?
- **Ad-hoc Supplier Management:** With no dedicated storage or system for supplier information, InfinityArtwerks relies on personal contacts stored in phones to procure necessary supplies. How can the company establish an efficient and organized system for managing supplier relationships and ensuring a timely and cost-effective supply chain?
- **Lack of Inventory and Order Management:** The absence of an inventory management system poses challenges in tracking and retrieving customer orders, especially in cases of reprints. How can InfinityArtwerks transition from manual, folder-based storage to an organized digital inventory system to improve retrieval, reduce redundancies, and facilitate reprints?

- **Operational Inefficiency:** The absence of a comprehensive database system contributes to operational inefficiencies, affecting day-to-day activities. How can integrating a database application enhance operational efficiency, streamline communication, and support the small but dynamic team at InfinityArtwerks?

### 1.3 Objective of the Project

The primary objective of this project is to design, develop, and implement a comprehensive database application tailored to address the operational challenges faced by InfinityArtwerks, a local printing shop in Cagayan de Oro, Philippines. The key goals of this project include:

- **Systemized Order Processing:** Introduce a systematic order processing system that ensures accuracy and minimizes the risk of oversight.
- **Supplier Relationship Management:** Establish an organized supplier management system within the database application to streamline communication, track orders from suppliers efficiently, and optimize the supply chain.
- **Digital Inventory Management:** Transition from manual, folder-based storage to a digital inventory management system. This system should facilitate easy tracking and retrieval of customer orders and support seamless reprints.
- **Operational Efficiency Improvement:** Utilize the database application to enhance overall operating efficiency. This includes improving the overall workflow of day-to-day activities.

## 1.4 Scope and Limitations

### **SCOPE:**

#### **Order Processing:**

Functionality: The database application will enable the shop to create and track orders efficiently. It includes features such as order creation, itemized tracking, and transaction management.

Transactions to Monitor: The application will monitor order items, ensuring accurate tracking of each transaction from creation to completion.

#### **Supplier Management:**

Functionality: The application will allow the shop to check and manage supplies effectively. This includes tracking the remaining supplies in stock and managing new supply orders from suppliers.

Supplier Transactions: The system will maintain records of supply transactions, ensuring visibility into supplier interactions and order timelines.

#### **Customer Transaction History:**

Functionality: The database application will store and provide access to customer transaction history. This feature is crucial for facilitating reprints and maintaining a comprehensive record of customer interactions.

**LIMITATIONS:****Financial Accounts:**

Scope Restriction: The database application will not handle taxation or financial aspects of the business. It is focused solely on the operational needs of order processing, supply management, and customer transaction history.

**Application Platform:**

Platform Specification: The application will be developed as a Windows desktop application. This platform restriction is essential for ensuring compatibility with the existing infrastructure and technology preferences of InfinityArtwerks.



## 2.1 Database System Architecture

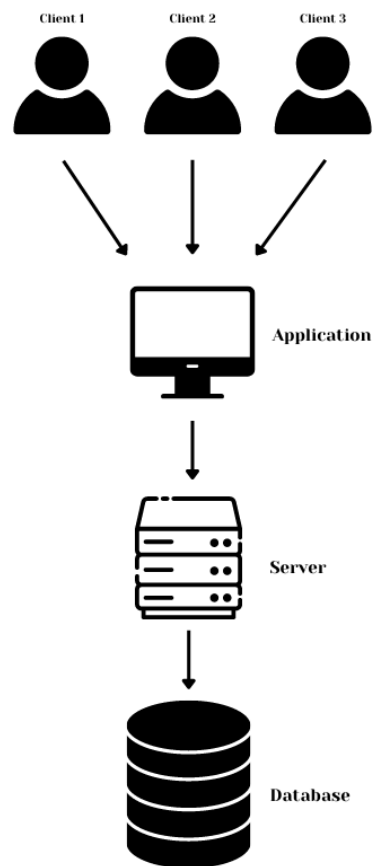


Figure 1. Database System Architecture Design

The diagram illustrates how a client's request for specific data follows a path through the network until it reaches the server. Upon receipt, the server swiftly searches the database and retrieves the requested information. The server then packages the data into a response and readies it to the requesting client. The response is sent back across the network and received by the client who initially made the request. Finally, the desired information is displayed on the client's interface, fulfilling their data needs.

## **2.2 Database Modeling**

### **Business Rules**

#### **A. User Authorization**

- Every user must have an authorization level assigned to them.

#### **B. Transactions**

- A customer can make multiple transactions.
- An Order Item can only contain one Product.
- An Order Transaction can include multiple Order Items.
- A Customer ID is required for a transaction to be processed.
- Payment methods are limited to In-store, G-cash, and Bank.
- Each transaction has a unique Order ID.

#### **C. Suppliers and Categories**

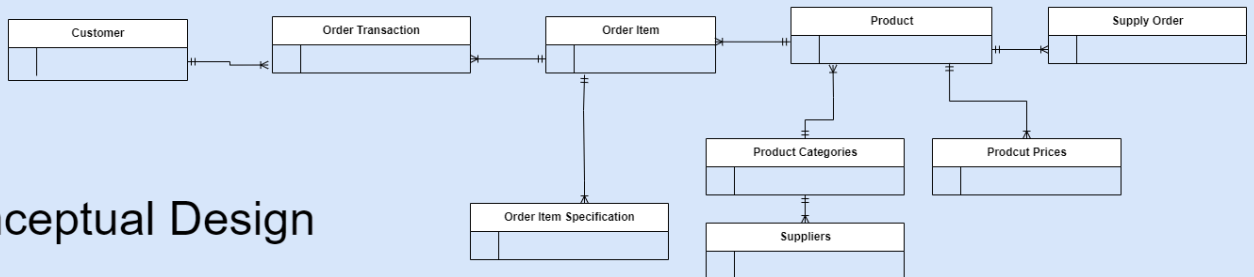
- There can be multiple Supplier IDs associated with a single category.
- A Category ID is mandatory for every Product.

#### **D. Products**

- A Product can have numerous Supply Orders.
- Order Items can have different Specifications.

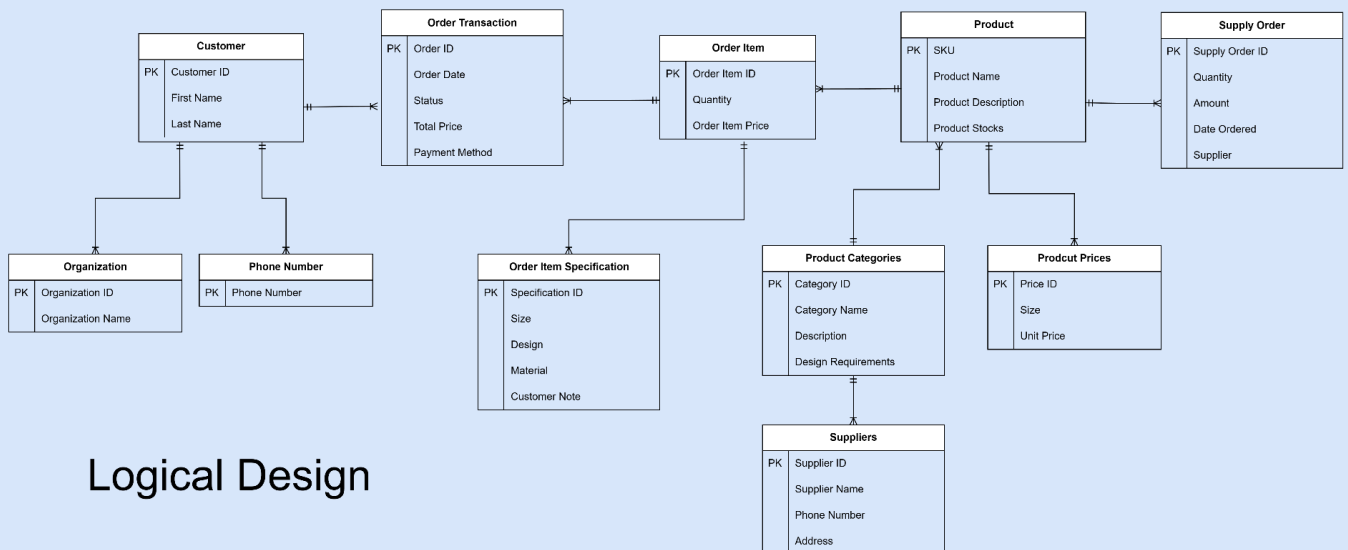
## Conceptual Design

### Conceptual Design

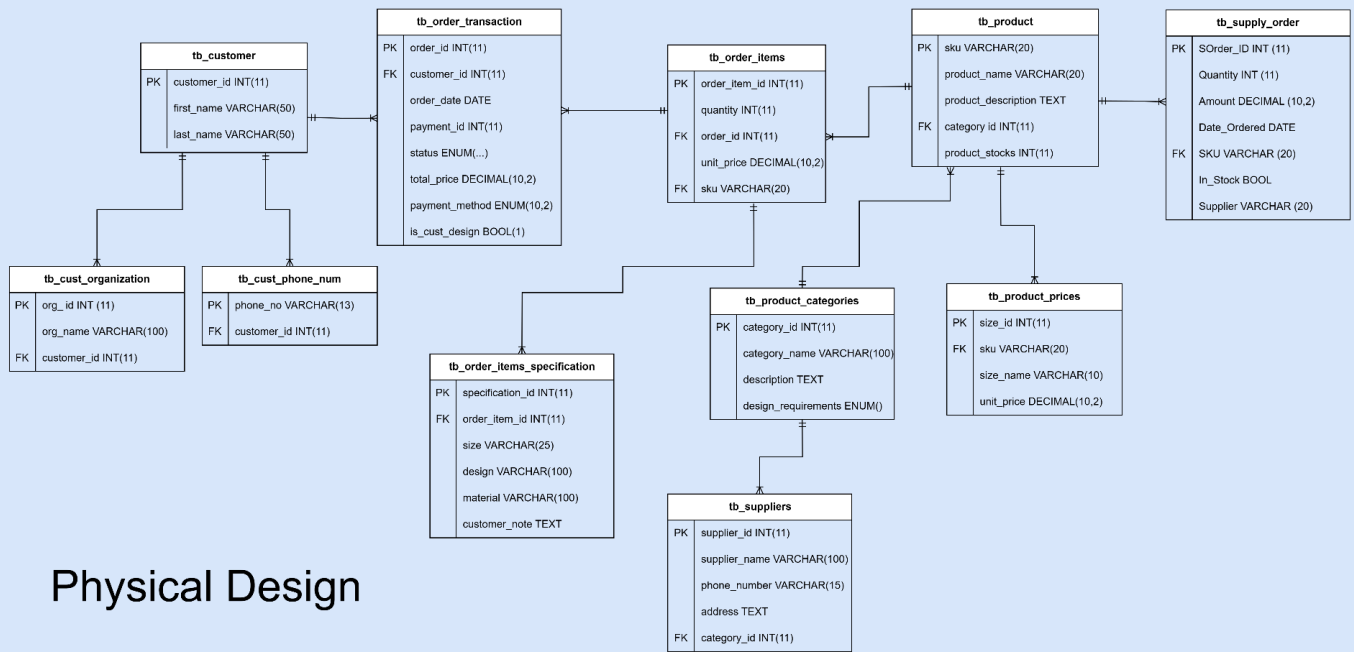


## Logical Design

### Logical Design



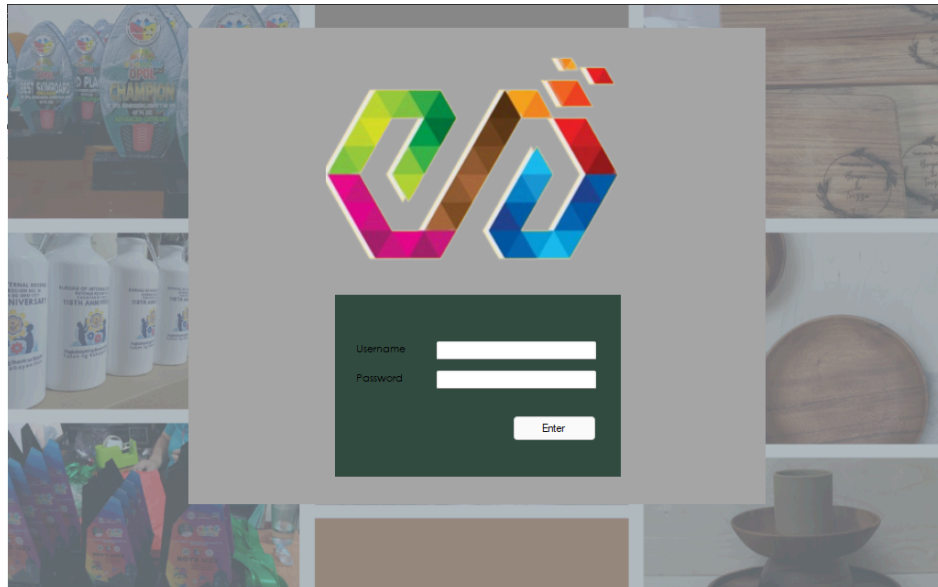
## Physical Design



Physical Design

### 3.1 UI Design and Feature

#### 3.1.1 Login Form



#### 3.1.2. Dashboard form



### 3.1.3 Create new order, customer information form

The screenshot shows a web application interface for creating a new order. At the top, there is a dark green header with a colorful logo on the left and a 'Log Out' link on the right. Below the header is a sidebar with a light green background containing four menu items: 'New Order' (highlighted with an orange bar), 'Orders', 'Order History', and 'Supplies'. The main content area has a light green background and features a dark green modal form titled 'Customer Information'. This form contains four input fields: 'First name', 'Last name', 'Contact Number', and 'Organization'. Below these fields is a light gray button labeled 'Proceed'.

#### 3.1.3.1 Create new order, order items form

The screenshot displays the 'Create new order, order items form' interface. It features a dark green header with a logo and a 'Log Out' link. Below the header is a sidebar with a light green background and four menu items: 'New Order' (highlighted), 'Orders', 'Order History', and 'Supplies'. The main content area has a light green background and includes a horizontal navigation bar with four tabs: 'Fabrics', 'Banners', 'Glass', and 'Wood'. Below this bar is a large, empty light green area for adding order items. On the right side of the main content area, there is a dark green sidebar containing the following information: 'Recipient: Febron Sedorios', 'Total Items' (with a text input field), 'Total Price: 0 PHP', 'Payment Method' (with a dropdown menu), and a checkbox labeled 'Customer's Design'. At the bottom of this sidebar is a dark gray button labeled 'Check Out'.

### 3.1.3. 2. Order Item user control example

**New Order**

**Orders**

**Order History**

**Supplies**

**Fabrics**

**Banners**

**Glass**

**Wood**

**FABRIC Type**

Laces

**Quantity**

**Design**

**Customer Note**

**Price**

..

**Recipient**

Febron Sedorios

**Total Items**

.....

**Total Price**

0 PHP

**Payment Method**

Customer's Design

**Proceed**

**Check Out**

### 3.1.4. Check Order Form

**New Order**

**Orders**

**Order History**

**Supplies**


**Check orders**

**Delete** **Check Item** **Status** **Recipient** **PhoneN0** **OrderID** **Date** **TotalPrice** **Org**

Delete	Check Item	pending	Febron Sedorios	09476457919	186	January 2024	0	Babic
Delete	Check Item	pending	Febron Sedorios	0972557340	182	January 2024	220.00	
Delete	Check Item	pending	Febron Sedorios	0972557340	183	January 2024	230.00	
Delete	Check Item	pending	Babic Bayta	98929292	184	January 2024	175.00	
Delete	Check Item	pending	Babic Bayta	98929292	185	January 2024	175.00	

**Check order items**

### 3.1.4.1. Check order form, check items


Log Out

New Order

Orders

Order History

Supplies


### Check orders

		Status	Recipient	PhoneN0	OrderID	Date	TotalPrice	Org
Delete	Check Item	pending	Febron Sedor...	09476457919	186	January 2024	0	Babic
Delete	Check Item	pending	Febron Sedor...	0972557340	182	January 2024	220.00	
Delete	Check Item	pending	Febron Sedor...	0972557340	183	January 2024	230.00	
Delete	Check Item	pending	pending jyta	98929292	184	January 2024	175.00	
Delete	Check Item	pending	Babic Bayta	98929292	185	January 2024	175.00	

### Check order items

ItemID	Name	Tools	Category	Quantity	Design	Size	Material	Note
182	Plaoue	photoshop	Glass	1	awewa	108		werew

### 3.1.5. Order history form


Log Out

New Order

Orders

Order History

Supplies

### Completed orders

	Recipient	PhoneN0	OrderID	Date	TotalPrice	Org
Check Item	Febron Sedorios	09476457919	186	January 2024	0	Babic
Check Item	Febron Sedoriosa	09476457919	182	January 2024	220.00	
Check Item	Febron Sedoriosa	0972557340	182	January 2024	220.00	
Check Item	Febron Sedoriosa	0972557340	182	January 2024	220.00	

### Order items



### 3.1.5.1 Order history form, check items

**Completed orders**

	Recipient	PhoneN0	OrderID	Date	TotalPrice	Org
Check Item	Febron Sedorios	09476457919	186	January 2024	0	Babic
Check Item	Febron Sedoriosa	09476457919	182	January 2024	220.00	
Check Item	Febron Sedoriosa	09722557340	182	January 2024	220.00	
Check Item	Febron Sedoriosa	0972557340	182	January 2024	220.00	

**Order items**

ItemID	Name	Tools	Category	Quantity	Design	Size	Material	Note
182	Plaque	photoshop	Glass	1	qwewq	108		werew

### 3.1.6. Check stock and order supplies form

**Product Stocks**

Product	SKU	Category	Stock	Needed
Laces	Inf12	Fabrics	1200	0
Medal	Inf15	Glass	12313	0
Plaque	Inf14	Glass	15	0
T-shirt	Inf11	Fabrics	421	0

**Supply Ordered**

Comp	SupplyID	Quantity	Amount	Date	Product
<input type="checkbox"/>	Delete	17	10	123123...	Januar...
<input type="checkbox"/>					Laces

Product: Laces  
Supplier: Fabric...plier 1  
Quantity: 10  
Amount: 123123  
Check Out

### 3.2 Authorization Rules

Authorization rules are to control access and actions within the developed application for taking orders and payments at InfinityArtwerks.

#### User Levels and Access Controls:

- **Admin:** The admin can access all data and functionality to prevent leaks. The admin can create/edit user accounts, set permissions, manage inventory, modify data, view customer profiles, and view order history.
- **Staff:** The staff is strictly for taking orders, determining order history, and processing payments. The staff can view customer profiles and order history. The staff cannot modify data.
- **Manager:** The manager has access to all staff functionalities, with the unique capability to delete orders, thereby granting them additional control over data management within the system.

#### Data access rules:

- **Customer Data:** Only accessible by admin and staff with appropriate permissions.
  - Order Transactions Templates: Only accessible by admin and staff with appropriate permissions
- **Inventory data:** Accessible by admin and staff with inventory management permissions.
- **Suppliers data:** Accessible by admin and staff with inventory management permissions.

**Action Rules:**

- a) **Creating/editing user accounts:** Admin only.
- b) **Setting permissions:** Admin only.
- c) **Managing inventory:** Admin and staff with inventory management permissions.
- d) **Modifying data:** Admin and staff with appropriate permissions.
- e) **Processing payments:** Staff with payment processing permissions.
- f) **Viewing customer profiles:** Admin and staff with appropriate permissions.
- g) **Viewing order history:** Admin and staff with appropriate permissions.
- h) **Placing orders:** Admin and staff.
- i) **Tracking order status:** Admin and staff.

### 3.3 Database Maintenance Schedule

Maintenance of the database system for InfinityArtwerks occurs every 15 days to ensure its continued functionality, security, and performance.

**Quarterly maintenance sessions cover the following:**

- a) **Check database integrity:** Run integrity checks to identify and address data inconsistencies or corruption.
- b) **Optimize database performance:** Analyze queries, indexes, and table structures to optimize performance and prevent slowdowns.
- c) **Update database software:** Apply security patches and updates promptly to address vulnerabilities and bugs.
- d) **Manage storage space:** Monitor disk usage and free up space to ensure optimal performance.

### 3.4 Database Recovery Policy

#### Scope and Purpose

In the event of data loss, corruption, or system failure, the InfinityArtwerks database recovery policy offers precise instructions for prompt and effective recovery, safeguarding all application components and data. This policy assigns roles and responsibilities for communication, backup, and recovery in addition to outlining safe backup practices and acceptable time frames for data loss and restoration. Continuous testing and policy modifications ensure the printing shop's information security and seamless event scheduling continuity.

#### Backup and Recovery Goals:

1. **Recovery Time Objective (RTO):** The maximum acceptable time to restore the database to its operational state is 5 hours.
2. **Recovery Point Objective (RPO):** The maximum permissible amount of data loss is 1 hour's worth.

#### Backup Strategy and Recovery Procedures:

##### Backup Strategy:

- Differential backups will be performed daily at 10 pm after office hours.
- Full backups will be performed accordingly during quarterly maintenance schedules.
- Backups will be stored onsite to ensure security for backups.

**Recovery Procedures:****The first thing to do is initial assessment:**

1. Determine the cause of the database malfunction.
2. Evaluate the extent of data loss and urgency of recovery based on affected critical functions.
3. Collect details about the last successful backup, any recent changes to the database, and error messages encountered.

**Two options for recovery in case of a disaster that results in a data loss:**

**A.) Full Backup Restore:** In case of hardware failure, major corruption, or major software upgrade gone wrong.

1. Stop all database processes.
2. Prepare the target environment.
3. Restore the latest full backup.
4. Validate data integrity.
5. Start the database server and test functionality.

**B.) Differential and Incremental Backup Restore:** In case of minor data loss, recent corruption, or accidental deletions.

1. Stop all database processes.
2. Identify the point of data loss.
3. Restore the latest differential or incremental backup.
4. Validate data integrity.
5. Start the database server and test functionality.

### **3.5 Other Supporting Materials**

Source Code:

<https://github.com/beachater/FDS-DB-APP>