**AcuCRM: Database Management Project**

**CS5200: Database Management System**

**Fall 2024 Section2**

Final Project Report

**Group BokkaHPutrevuA**

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# INTRODUCTION

SCENE:

**OWALA** is a trendy, innovative water bottle and hydration solutions company that has experienced explosive growth in FY24, driven by the viral popularity of their new Free Sip design on social media among young adults and teenagers. Currently lacking a foundational database system to support this rapidly expanding user base, OWALA has decided to enhance its marketing efforts and capitalize on its newfound popularity by consolidating all customer data in one place. They have reached out to us for consultation on developing a relational database to store and manage their customer data effectively.

This database management project aims to address challenges faced by the customer relations team at **OWALA**. The primary objective is to develop a relational database that effectively manages all customer and sales-related information and provides insights to support the sales and marketing team in planning an upcoming holiday season marketing campaign. By implementing complex queries to visualize the data, this project will enable the team to develop targeted, customer-centric marketing strategies for the holiday season.

Current Challenges:

* *Customer Information:* Currently stored in Excel, making trend analysis and customer segmentation difficult.
* *Order History:* Managed with a basic Square POS system, limiting visibility into customer purchasing patterns.
* *Support Tickets:* Managed through separate helpdesk software, isolating customer interactions from other data.
* *Marketing Leads:* Dispersed across individual team members’ email inboxes, complicating coordinated follow-ups.
* *Social Media Engagement:* Monitored via platform-specific dashboards, impeding a comprehensive view of brand perception.

This streamlined database will centralize these distinct data sources, offering a holistic view that enhances decision-making and supports a more cohesive holiday campaign.

# EXECUTIVE SUMMARY

In response to OWALA’s rapid growth and increasing demand for customer-centric strategies, this project focuses on developing a comprehensive database management system tailored to the needs of their customer relations team. As a company that has recently gained immense popularity with the viral success of its Free Sip design, OWALA currently lacks a foundational database system to centralize and manage customer data effectively. This project aims to create a robust relational database to organize and streamline customer, sales, and support information, empowering OWALA’s team to drive strategic, data-driven marketing efforts with precision and efficiency.

This system will address several key challenges faced by OWALA’s customer relations team: consolidating customer information currently scattered across Excel files, integrating order history data managed with Square POS, unifying support ticket interactions, organizing marketing leads, and consolidating social media engagement data. By centralizing these sources, OWALA will gain a holistic view of customer interactions, enhancing decision-making and enabling a coordinated holiday season campaign.

Key capabilities of this database include:

* **Data Visualization and Reporting**: Equips the marketing and sales teams with tools to create new gift sets for promotional holiday seasons, track lead generation and conversion metrics, and gain insights into customer behavior.
* **Data Normalization (3NF)**: Ensures data integrity, minimizes redundancy, and optimizes the database for efficiency and scalability.

This solution will provide OWALA with insights essential for targeted, customer-centric marketing strategies, especially as they prepare for the holiday season’s high-impact campaigns. By focusing on efficient data access, clean data management, and comprehensive reporting, this project is set to improve decision-making, enhance resource allocation, and elevate customer experience, aligning closely with OWALA’s strategic goals for growth and profitability.

# RATIONALE

This project sparks our team’s interest by providing an opportunity to apply comprehensive concepts in database management systems to solve a frequent, real-world challenge faced by major product-based manufacturing companies. By setting up a robust relational database, we directly support the organization’s ability to plan effectively and execute data-driven marketing campaigns, ultimately improving customer satisfaction and increasing product profitability.

Furthermore, this project allows us to explore advanced data visualization skills to address a real challenge. Implementing role-based access control and data normalization up to the third normal form (3NF) will help us create a highly efficient and streamlined database—skills essential for any database professional. The chance to make a tangible impact on the organization’s strategic goals, especially as they prepare for a high-stakes holiday season, makes this project particularly engaging and rewarding.

**Holiday Season Opportunity**

With the holiday season approaching, OWALA sees an opportunity to leverage its growing popularity and customer base. The company aims to:

* Create targeted marketing campaigns based on customer preferences and past purchases.
* Improve customer service by having a complete view of each customer's history.
* Identify potential brand ambassadors among their most engaged social media followers.
* Optimize inventory management based on historical sales data and current trends.

# DESCRIPTION OF DATA STORED IN THE DATABASE

**AcuCRM** has a comprehensive system to manage customer relationships, sales, marketing campaigns, product information, and support interactions. And they need a robust functioning database to manage their workload. To assist them in their functioning we have come up with a SQL database to help AcuCRM keep track of all important data fields effectively.

**IndustryType**  
This table categorizes business customers by their industry. Each industry type is identified by a unique *industryID* and has a descriptive *industryName*. For example, industries can include manufacturing, retail, and IT services. This helps classify and segment customers based on their business sector.

**SupportTicket**  
Support tickets record customer-reported issues. Each ticket has a unique ticketID and tracks details like the problem description *issueDesc*, status (e.g., Open, In Progress), *priority* (e.g., High or Urgent), *creationDt* (date the issue was reported), and *resolveDt* (date it was resolved). This allows monitoring of issue resolution and support team efficiency.

**Customer**  
The customer table tracks all customers, whether individuals or businesses. Each customer has a unique *customerID*, a *customerType* (Individual or Business), and contact details like email and phone. Customers are linked to their support tickets *ticketID* for managing ongoing issues.

**IndividualCustomer**   
This table is a specialization of the **Customer Table** for individual customers. Attributes like *customerName, age*, and *address details (streetName, city, state, zipCode)* help create detailed profiles of individual clients.

**BusinessCustomer**  
This table extends the **Customer Table** for business clients. It tracks information like *companyName*, the industry they belong to, *annualRevenue*, and *corpOfficeAddress.*

**SalesSource**  
This table identifies where leads originate, such as "Google Ads," "Referral," or "Social Media." Each source is uniquely identified by *sourceID* and described by attributes like *sourceOrigin* and *sourceName.*

**ContactMethod**  
This table captures how customers were contacted, such as via phone, email, or online chat. Attributes like *contactPhnNo* and *contactEmail* record contact details, while sourceID links the method to its corresponding sales source.

**MarketingCampaign**  
This table is used to track all historical and ongoing marketing campaigns the company has ever had. This table will attribute like *campaignName, startDt, endDt, campaignType,* and *estimatedRevenuePotential*. For Eg: a campaign named "Holiday Sale" might run from December 1 to December 31 and aim to generate $50K in sales.

**Sales**  
This table tracks sales leads and transactions, linking them to the customer, the source of the leads, and any related marketing campaigns. Attributes like *revenuePotential* and *conversionRate* measure the success of sales activities.

**ProductCategory**   
Products are categorized into groups such as "Electronics" or "Furniture." Each category is identified by a unique categoryID and described with a categoryName.

**Product**  
Products have attributes like productName, SKU, and basePrice. Additional attributes like isSeasonal (e.g., holiday-themed products) and giftingOption (e.g., gift-wrapping availability) help tailor marketing and inventory management.

**GiftSet**   
Special product bundles, or gift sets, are tracked here. Each gift set has a *giftSetName, price,* and should link all the products which will be included in the gift set

**SupportTeam**  
This table stores details about the customer support staff, like employeeID, firstName, and email. It ensures accountability and helps assign tickets to the correct team member.

**Interaction**  
Interactions record touchpoints between customers and the support team, such as calls, meetings, or emails. Attributes include *lastdateOfInteraction, interaction type, notes*, and feedback such as *customerRating* and *customerFeedback.*

**Orders**  
The orders table tracks customer purchases. Attributes like *orderDate, status*, and *totalAmount* ensure that orders are processed and tracked efficiently. Delivery information such as *shippingAddress* and *shippingZipCode* facilitates order fulfillment.

**Items**  
This table will keep track of the products included in cart and link them to orders. This is used to calculate coupon or promotional discounts on the cart items. Attributes like *orderID,* *productID,* and quantity enable detailed inventory tracking and order analysis.

**Promotion**  
Promotions, such as discounts or special offers, are managed here. Each promotion has a *promoName* and a *discountRate*, which can be applied to specific products.

**ProductPromotion**  
This table links products to their associated promotions, specifying the promotion's *startDt,* *endDt,* and the applied *discountRate.*

# UML DIAGRAM



# LOGICAL DESIGN

A computer screen shot of a computer

Description automatically generated

# USER INTERACTION

1. The user logs into their SQL database using their credentials. After logging in, they are presented with a menu to view, create, or delete gift sets using a pre-built procedure in SQL.

A flowchart of a product

Description automatically generated

1. The user logs into their SQL database using their credentials. After logging in, they are presented with a menu to view, update, or delete shipping dates for orders using a pre-built procedure in SQL.

A diagram of a product catalog

Description automatically generated

# TECHNICAL SPECIFICATION

Programming Language: Python

Database: MySQL (AcuCRM)

# READ ME

This section provides complete specifications for building and running the project on your system. Follow the instructions carefully to ensure successful setup.

**Overview:** Customer Relationship Management!

Our Python application connects to a MySQL server on your local system and allows users to perform CRUD (Create, Read, Update, Delete) operations on the AcuCRM database. The program enables the user to:

* Create a new gift set.
* Read and view data from the database.
* Delete an existing gift set from the database.
* Update the shipping dates of orders already listed.

**Technologies Used:**

Programming Language: Python

Database: MySQL (AcuCRM)

**Features**

**User Login:**

Prompts the user to enter their MySQL username and password to establish a secure connection to the database.

Users can enter exit to close the program without logging in.

**Gift Set Management:**

Users can create a new gift set by selecting products, assign a new name to it, and set a discounted value.

**Stored Procedure Execution:**

The program executes a stored procedure ‘*CreateGiftSet*’ to fetch and generate a new gift set from the available products.

**Graceful Exit:**

Ensures a safe disconnection from the database.

**Prerequisites**

* Python: Version 3.x
* MySQL Server: Ensure MySQL is installed and running.
* MySQL Database:
* A pre-configured MySQL database named AcuCRM with the required tables and stored procedures.
* A data dump file (*AcuCRM\_datadump.sql*) is provided to set up the database.
* MySQL User Privileges: The MySQL user must have privileges to execute stored procedures on the database.

**Installation**

1. Python Setup

Install the necessary Python packages using pip. Run the following command in your terminal:

bash

Copy code

*pip install pymysql prettytable*

pymysql: A MySQL client library used to connect Python to a MySQL database.

prettytable: A library for displaying data in a formatted, tabular structure.

**Troubleshooting Python Package Installation**

Command Not Found: If pip or pip3 is not found, ensure Python is installed and added to your system's PATH. Alternatively, use:

bash

Copy code

python -m pip install <package\_name>

Permission Issues: Use the --user flag to resolve permission issues:

bash

Copy code

pip install --user <package\_name>

**2. Database Setup**

Ensure the AcuCRM database is created, and the tables and procedures are defined correctly.

Import the SQL dump file provided (AcuCRM\_datadump.sql) using MySQL:

bash

Prerequisites for this step:

MySQL Installed: Confirm MySQL is installed and running on your system.

SQL File Provided: Ensure AcuCRM\_datadump.sql is included in the project zip file.

User Privileges: Ensure you have privileges to create databases, tables, and stored procedures.

**3. Database Credentials**

The script uses the following parameters to connect to the database:

host: Defaults to localhost, assuming MySQL is running locally. If using a remote server, replace it with the server's IP or domain name.

user: Enter your MySQL username when prompted in the script.

password: Enter your MySQL password when prompted.

database: Defaults to AcuCRM, which is the name of the database used by the script.

**Error Handling**

The application includes robust error handling to manage common issues:

Invalid MySQL Credentials:

Prompts the user to re-enter credentials if incorrect.

Exit Options:

Allows the user to safely exit the application if they wish to.

Connection Issues:

Handles errors related to connecting to the MySQL server.

Invalid Menu Input:

Notifies the user of invalid inputs for menu options and prompts for valid input.

Stored Procedure Errors:

Displays detailed error messages if issues arise while executing stored procedures.

# LESSONS LEARNED

**1. Technical Expertise Gained**

Developed proficiency in designing databases from scratch and normalizing them to eliminate redundancy. Gained experience in generating UML diagrams, creating textual descriptions for databases, and producing logical database designs to ensure clarity and alignment with system requirements. Enhanced skills in optimizing queries for performance and using SQL to interact with data effectively, including complex joins, aggregations, subqueries, functions, procedures, and triggers. Improved the ability to extract meaningful insights, such as trends over time and categorical comparisons, using host language libraries. Acquired knowledge of effectively using host language subroutines (e.g., Python functions, JavaScript) in conjunction with database programming objects like stored procedures and triggers to streamline database operations and enhance functionality.

**2. Insights Gained**

Recognized the importance of breaking down projects into smaller tasks and milestones. Allocating dedicated time for debugging and testing proved essential to ensure smooth progress and successful project completion. Gained a deeper understanding of the CRM domain, specifically how data is collected, stored, and leveraged for decision-making. Realized the critical role of clean, structured data in driving meaningful insights. Additionally, if applicable, learned the value of collaboration and communication within a team to achieve project goals more efficiently.

# CHALLENGES AND CONTINUED EFFORTS

**Website Development:**

We attempted to build a website as part of this project to enhance accessibility and user interaction. However, we faced challenges with the frontend development, which prevented us from delivering a functional interface. Despite these setbacks, we are committed to continuing work on this aspect. Future efforts will focus on resolving the issues and creating a fully functional and user-friendly website.

# FUTURE WORK

**Planned Uses of the Database**

**Operational Decision Support:** The database will be utilized to support real-time decision-making by providing insights into key metrics. For instance, it will aid in enhancing the efficiency of a customer relationship management team by analyzing customer demand trends or monitoring inventory levels.

**Integration with Predictive Analytics:** The database will be extended to serve as the backend for predictive models, enabling forecasting of sales, demand, or operational costs using historical data stored in the database.

**Potential Areas for Added Functionality**

**Data Automation:** Implement ETL (Extract, Transform, Load) pipelines to automate data ingestion, cleaning, and updates. This will reduce manual intervention and ensure the database contains accurate, up-to-date information.

**Data Governance:** Incorporate role-based access controls, data encryption, and audit logs to improve security and compliance with enterprise-level governance standards.

**Interactive Dashboards:** Develop user-friendly dashboards using tools like Power BI, Tableau, or Flask. These will enable stakeholders to visualize key metrics and trends in real-time.

**APIs for Data Access:** Build APIs to enable seamless integration of the database with other applications or systems. This will facilitate scalable and flexible data access for various teams or departments.

**Advanced Querying Features:** Introduce stored procedures and triggers to support sophisticated business logic. This will automate repetitive tasks, such as recalculations or alert notifications.

**Machine Learning Integration:** Integrate machine learning models directly into the database workflows to enable real-time analytics and adaptive decision-making capabilities.

**Mobile Application Support:** Design mobile-friendly access points or applications to allow stakeholders to access and interact with data on the go.

**Collaboration Features:** Add features for team collaboration, such as shared notes, annotation capabilities, or role-specific views to facilitate teamwork and productivity.

# CONCLUSION

AcuCRM revolutionizes customer relationship management by offering a streamlined platform that centralizes client interactions, tracks sales activities, and automates routine tasks. By providing intuitive tools for managing leads, tracking performance metrics, and enhancing communication, AcuCRM empowers businesses to build stronger relationships with their customers and drive growth. The platform's focus on user-friendly features and data-driven insights ensures a seamless experience for teams, promoting productivity and collaboration. As AcuCRM continues to grow, it has the potential to become a vital tool for businesses seeking to enhance customer engagement and achieve long-term success.