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Figure Database Development

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Database Development 281 Project

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# Introduction

Designing, building a database or data model, and examining specifications and their intentions as raw data are all parts of database development. The goal of database creation is to build a framework that will make it possible to store and retrieve data quickly. Table layout design, index construction, procedure development, and trigger development are all included in database development. It keeps all the information in an accessible manner. This is crucial for any kind of company. A database system saves crucial information about a company; when the information is analysed, it becomes useful knowledge about the business and aids in decision-making. Similarly, a database aids in creating a record about the firm, enabling it to make decisions with greater strength and awareness of its future. A business can gain insight into information to help it grow and make more money by storing data about an encounter.

The local business that was chosen is Roomys Sprokie. Mr Tian Bornman was the founder and owner who sadly passed away. This business has 2 branches which are located at Annlin and Nina Park in Pretoria North. The local Ice-cream store sells Frozen Yoghurt, Ice-cream as well as Ice-cream cakes for both people and dogs. What sets Roomys Sprokie apart from the rest of the Ice-cream stores is that they consider customers who have dietary requirements and cater for them by selling and serving Diary free and Gluten Free Products. A problem that Roomys Sprokie is facing is that they only have 2 branches which are in close proximity to each other as they are in the same city which causes limited amount of customers. Roomys Sprokie’s clientele is only walk-ins as they don’t not have a website for online deliveries and don’t deliver through third parties. This problem can be solved by adding an Online Shopping platform which will increase their profits and will has their clientele. This can be accomplished by using a new database that is being designed, as it will convey business-related information regarding sales deals, product stockpiles, client profiles, and Orders. Without a concentrated location to keep track of all this data, Roomys Sprokie won't know what's going on with their company.

# Entity Relationship Diagram

**Zero Normal Form**

Graphical user interface, application

Description automatically generated with medium confidence

**First Normal Form**

Diagram, table

Description automatically generated

**Second Normal Form**

Diagram

Description automatically generated

**Third Normal Form**

Diagram, engineering drawing

Description automatically generated

# Normalization Process

Data in a database is organised through a process called normalisation that lessens dependencies and redundancies across tables. By removing data duplication and inconsistencies, it helps to improve data integrity and consistency. By ensuring that each piece of data is recorded only once and that all related data items are stored in different tables, normalisation assures data integrity. To reduce duplication and enhance data integrity, normalisation involves moving data from 0NF to higher degrees of normalisation. This is accomplished by organising the data into manageable, smaller tables and creating connections between them based on shared characteristics.

**Zero Normal Form**

It is more of a disorganized, completely unnormalized condition of data than a formal degree of normalisation. In other words. The table includes data that is duplicated and not organised into rows and columns.

Product(Title, Description, UnitPrice, FirstName, LastName,IDNumber,PhoneNumber, FirstName,LastName,DateOfBirth,HireDate,PhoneNumber,PaymentMethod,Amount,StoreName,CompanyName,ContactName,PhoneNumber,Description,Price,OrderDate,Quantity,Date,IngredientsName,CityName,DiscountName,Discount,ExpiryDate)

**First Normal Form**

Each column in a table must have atomic values in order to achieve this degree of normalization, which means that the column cannot be fragmented into smaller chunks of data. Additionally, it demands that each row in a table be distinct and that the order of the rows be irrelevant.

Product (**ProductID**,Title, Description, UnitPrice, FirstName, LastName,IDNumber,PhoneNumber, FirstName,LastName,DateOfBirth,HireDate,PhoneNumber,PaymentMethod,Amount,StoreName,CompanyName,ContactName,PhoneNumber,Description,Price,OrderDate,Quantity,Date, CityName,DiscountName,Discount,ExpiryDate)

Product\_Ingredients(**IngredientsID**, ProductID, IngredientsName)

**Second Normal Form**

In order to achieve this level of normalization, a table must be in First Normal Form and all non-key columns must be reliant on the main key. In other words, no two non-key columns should be associated to each other but rather to the primary key.

Product (**ProductID**,Title, Description, UnitPrice, FirstName, LastName,IDNumber,PhoneNumber, FirstName,LastName,DateOfBirth,HireDate,PhoneNumber,PaymentMethod,Amount,StoreName,CompanyName,ContactName,PhoneNumber,Description,Price,OrderDate,Quantity,Date, CityName,DiscountName,Discount,ExpiryDate)

Product\_Ingredients(IngredientsID, ProductID)

Ingredients(**IngredientsID,** ProductID, IngredientsName)

**Third Normal Form**

A table must be in Second Normal Form and all non-key columns must be independent of one another in order to achieve this level of normalisation. In other words, no non-key columns should be connected to any other non-key columns other than the main key.

Product (**ProductID**,Title, Description, UnitPrice)

Product\_Ingredients(**IngredientsID**, ProductID)

Ingredients(**IngredientsID,** ProductID, IngredientsName)

Employee(**EmployeeID**,FirstName,LastName,DateOfBirth,HireDate,PhoneNumber)

OrderDetails(**O\_DetailsID**,ProductID,EmployeeID,Quantity)

Promotions(**PromotionsID**,ProductID,DiscountName,Discount,ExpiryDate)

City(**CityID**, CityName)

Customer (**CustomerID**, FirstName, LastName,IDNumber,PhoneNumber,CityID)

Payment(**PaymentID**,CustomerID,PaymentMethod,Amount)

Store(**StoreID**,StoreName,CityID)

Supplier(**SupplierID**,CompanyName,ContactName,PhoneNumber,CityID)

Stock(**StockID**,Description,Price,SupplierID)

Order(**OrderID**,SupplierID,StoreID,OrderDate)

Deliveries(**DeliveriesID**, OrderID, ProductID, CustomerID,Date)

# Entity Identification and Explanation

*Product*

- this table is meant to house the products the business is going to sell, it will include title, description and the unit price of the product

*Supplier*

-this table is meant for the suppliers who supply the business; it includes the company name, contact name, phone number, address as well as the supplier id since there are many of them

*Customer*

- this table is meant to keep track of customer details such as first and last name, id and phone number as well as their address

*Stock*

- used to keep track of all the inventory the business has including their respective suppliers, description and supplier id

*Employees*

- keeps tracks of all employee details and information, including first and last name, date of birth, hire date as well as their phone number

*Order*

- keeps track of all orders placed by customers, includes order id, customer id, store id and order date

*Payment*

- keeps tracks of all customer payment system as well as payment method, amount and customer id

*Deliveries*

- keeps track of all deliveries made and to be made by the business to the customers, delivery id, order id, customer id, product id, date

Store

- keeps track of various branches, includes store id, store name and address

*Order details*

- acts as bridge entity between orders and products

- keeps track on the number of orders placed along with the details e.g. date, product id, and quantity

# List of Questions and Queries

*Basic Queries:*

1. Show employee name, last name and age of all employees over the age of 20

2. Show all customer details of customers who have placed orders

3. Show the number of orders placed by customers group by number of orders and arrange in descending order

4. Show title of all products whose average price is greater than 100

5. Show all deliveries that were done before 1 April 2023

*Advanced Queries:*

1.Find all stores whose orders are above 5

2. Using a CTE display, the average unit price for each product along with average quantity for each order

3. Create a view for those customers whose payment method is cash and has placed an order, display their first name, last name and phone number

4. Create a view for stock supplied by Gatti Ice-Cream and whose price is below R100, display description, price and supplier id

5. Wrap any Transact-SQL statement of your choosing within a transaction. Make sure to rollback the transaction if there are any errors after the Transact-SQL statement.