Project 2 MTH785P
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Introduction

In modern technology, databases are essential for managing, organizing, and protecting data. They offer an organized framework for storing vast volumes of data, guaranteeing that it can be readily retrieved using well-crafted queries. Databases preserve data accuracy and integrity by imposing rules and constraints, which lowers errors and inconsistencies. Databases are also made to scale well, meeting the demands of expanding user populations and data. Databases are essential for managing complex datasets in enterprises, organizations, and individuals due to their structure, dependability, and scalability.

Database

The purpose of establishing a database is to keep everything organized and interconnected within the business. By doing so, the software will be optimized, and record-keeping will become much more comprehensible and accessible. This creates ease of access for the business/company.

The dataset chosen was taken from a small pizza restaurant via Kaggle (Zhuang, 2015). The data was then organized and divided into three primary fields, namely, the Orders Table, Products Table and Orders Details Table. There were relations created among similar fields for data integrity with the use of SQL queries via Microsoft Access. The orders table consists of the ID of the order, the date at which the order was placed (Order_Date), and the time when the product was ordered (Order_Time). The products table consists of the ID of the pizza, the name of the pizza, the size of the pizza, the category in which the pizza lies, and the ingredients that are used to make the pizza as pizza_ID, pizza_name, pizza_size, pizza_category and pizza_ingredients, respectively. “The Orders Details Table” consists of the order details_ID, the order_ID itself, pizza_ID, quantity, and the total_price of the order.

The vba queries are added to combine access database with excel to help company manage, retrieve and handle orders smoothly. The submitorder query adds a new order to the Orders Table and links it to Order Details Table with particular Pizza information. The addproduct query adds new pizza details such as name, size and price. The fetchorder query shows the data on excel worksheet for review after obtaining order details.When combined these queries enhance data handling and administration.

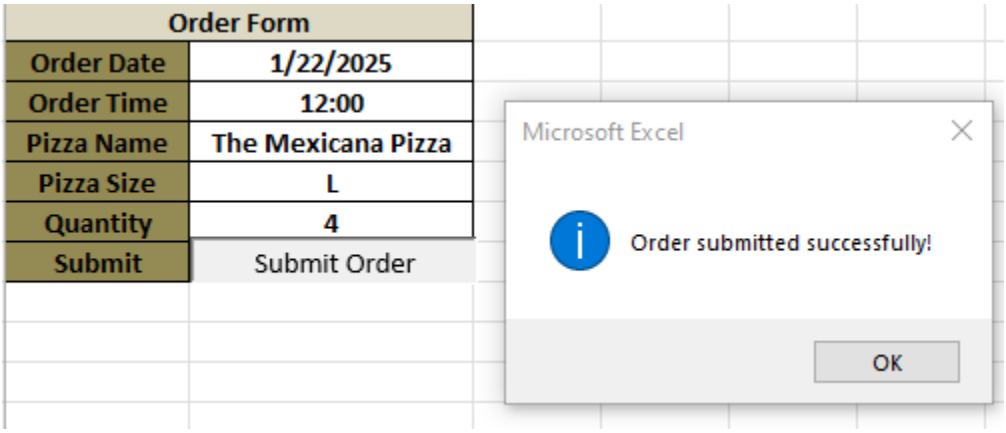
Front-end

The front end is for the data visualization of the user interface and user experience (UI/UX) in order to generate reports and further analyze employee performances with the help of KPIs for business optimization. The Microsoft Excel file showcases the dashboard for the order and product details with the help of conditional formatting, which was imported from Microsoft Access. There are 10 columns ranging from order ID to total revenue in the first sheet. In the second sheet, the pivot table is displayed, which summarises the data and gives the total revenue of the company in the year 2015, which comes out to be $817,860.05. There are pizza names on the left and pizza sizes on the top, with the most sales of size L (large), which was $375,318 whereas the last sold size was XXL (extra extra large), at $1006. The pivot table helps us by letting us analyze vast amounts of data on one sheet fairly quickly.

order_date	All					
Sum of TotalRevenue	**pizza_size**					
pizza_name	**L**	**M**	**S**	**XL**	**XXL**	**Grand Total**
The Barbecue Chicken Pizza	$20,584.00	$16,013.00	$6,171.00			$42,768.00
The Big Meat Pizza			$22,968.00			$22,968.00
The Brie Carre Pizza			$11,588.50			$11,588.50
The Calabrese Pizza	$5,589.00	$9,132.50	$1,212.75			$15,934.25
The California Chicken Pizza	$19,235.25	$15,812.00	$6,362.25			$41,409.50
The Chicken Alfredo Pizza	$3,901.00	$11,775.25	$1,224.00			$16,900.25
The Chicken Pesto Pizza	$8,279.25	$4,623.00	$3,799.50			$16,701.75
The Classic Deluxe Pizza	$9,696.50	$18,896.00	$9,588.00			$38,180.50
The Five Cheese Pizza	$26,066.50					$26,066.50
The Four Cheese Pizza	$23,622.20	$8,643.50				$32,265.70
The Greek Pizza	$5,227.50	$4,496.00	$3,648.00	$14,076.00	$1,006.60	$28,454.10
The Green Garden Pizza	$1,923.75	$4,832.00	$7,200.00			$13,955.75
The Hawaiian Pizza	$15,163.50	$6,399.75	$10,710.00			$32,273.25
The Italian Capocollo Pizza	$15,006.00	$6,464.00	$3,624.00			$25,094.00
The Italian Supreme Pizza	$15,500.25	$15,526.50	$2,450.00			$33,476.75
The Italian Vegetables Pizza	$3,990.00	$8,140.50	$3,888.75			$16,019.25
The Pepperoni, Mushroom, and Peppers Piz	$6,720.00	$5,756.50	$6,358.00			$18,834.50
The Prosciutto and Arugula Pizza	$9,026.25	$9,867.00	$5,300.00			$24,193.25
The Sicilian Pizza	$12,413.25	$9,327.50	$9,199.75			$30,940.50
The Soppressata Pizza	$8,403.75	$4,422.00	$3,600.00			$16,425.75
The Southwest Chicken Pizza	$21,082.00	$8,944.50	$4,679.25			$34,705.75
The Spicy Italian Pizza	$23,011.75	$6,732.00	$5,087.50			$34,831.25
The Spinach and Feta Pizza	$9,011.25	$8,992.00	$5,268.00			$23,271.25
The Spinach Pesto Pizza	$5,893.00	$4,653.00	$5,050.00			$15,596.00
The Spinach Supreme Pizza	$5,872.25	$4,405.50	$5,000.00			$15,277.75
The Thai Chicken Pizza	$29,257.50	$8,056.75	$6,120.00			$43,434.25
The Vegetables + Vegetables Pizza	$8,646.75	$10,160.00	$5,568.00			$24,374.75
Grand Total	**$375,318.70**	**$249,382.25**	**$178,076.50**	**$14,076.00**	**$1,006.60**	**$817,860.05**

The third sheet in Excel is an order form on which customers can submit their order details by submitting the date and time and selecting the pizza name and size from the drop-down menu and adding in quantity.

After doing that, all the customer has to do is click the submit button. By clicking the submit button, a pop-up will appear with the help of the vba subroutine “order submitted successfully”.



VBA Middleware:

VBA Middleware is actually acting as “middleware”between Microsoft Access and Micrsoft Excel by importing the data first from excel table “Orders Table” then adding in Order ID Details and lastly New Product Details. There are three buttons added on the excel dashboard so users don’t have to access the big database directly.

The first subroutine “ImportData” is designed to define variables first such as (***Dim cn as Object***) which represents connection to the access database, then selecting the worksheet and clear any data (***Set ws = Worksheets("Orders and Pizza Details")*** → (***ws.Cells.Clear***), then establishing a connection to the access database in the user’s computer (***Set cn = CreateObject("ADODB.Connection")***), then defining and executing the SQL query and lastly adding in the “Loop” function so it continues until the end of the data and displaying a user message “Data imported successfully!” through (***MsgBox "Data imported successfully!", vbInformation***).

The second subroutine “Fetchorderdetails” brings in details for a specific order from “Order Details Table” and displays the results in the worksheet by defining variables first such as (***Dim orderID As Long***) then retrieving orderid from the order form sheet the validating and clearing any existing data, creating connection with the user’s access database and executing SQL query (***strSQL = "SELECT * FROM [Order Details Table] WHERE order_id = " & orderID***). Lastly, adding in loop and displaying user message “Order details fetched successfully!”

The last and third subroutine is for user to add new products to the products table in the access database. It starts with defining the variable and gathers user input like (***pizzaID = InputBox("Enter Pizza ID:")***)

then validating the input by (***If pizzaID = "" Or pizzaName = "" Or pizzaSize = "" Or unitPrice <= 0 Then MsgBox "Please fill out all fields correctly.", vbExclamation Exit Sub End If***). After that, it constructs an “INSERT INTO” SQL query debugs error and close the connection (***cn.Close***).

Conclusion

The application that I have developed can be used in multiple ways to help businesses scale upwards. It can be used to give customers a user-friendly interface with drop-down menus for pizza type, pizza size, extra toppings, etc. It can also help inventory regulation and management by giving real-time status updates on the stock. It can be enhanced further by integrating it with advanced payment methods, e.g., online transfers, QR code payments, one-tap payments, and accounting software such as Quickbooks. Furthermore, integrating it with Google reviews can help customers understand the product reviews of the pizza restaurant.

References:

Zhuang S.L., 2015. *Pizza Restaurant Sales* [Dataset] Retrieved 22 January, 2025 https://www.kaggle.com/datasets/shilongzhuang/pizza-sales