

Online Ordering Systems: Development of Order Calculation using a Web-Based Calculator

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Abstract: Customers today seek efficiency and variety in their purchases; thus, restaurant and cafeteria online ordering systems are rapidly expanding. This is because an online ordering system will simplify the meal ordering process. However, we discovered that most online ordering platforms provide a system that is difficult for consumers to understand and use. Therefore, in this research, we developed an online ordering system that is simple to learn and use and may assist users in growing their businesses. The suggested system displays a user interface and updates the menu with all available options to make the customer's work easier. We also develop a valuable database from their customer's transactions that will provide crucial information in terms of sales and quantity by using a suitable chart for users to improve their business. We concentrate on assisting small businesses that do not have an ordering system. We study Microsoft Excel 365 features and visual basic application (VBA) code to develop a complete online ordering system. All relevant data will be stored in the database for analysis in terms of profit, number of customers and so on in graph form. The existence of the graph may assist the users in further growing their business. Finally, we will review the results based on system performance and examine the database that was saved into Microsoft Excel 365. In the future, we will focus on improving the design and adding security features to the Microsoft Excel workbook. Furthermore, we will improve the method of sharing Microsoft Excel 365 workbook so that macro functions may be used.

Keywords: Ordering System, Microsoft Excel, Database

1. Introduction

The line between online and offline has become almost non-existent in recent years, and businesses are taking advantage of it. Online food ordering refers to the mobility of food delivery or takeout from a local restaurant or food cooperative. People have moved away from conventional ordering methods toward online ordering because it is simple, error-free, fast, and entirely transparent [1]. Thus, online food ordering is an emerging trend in Malaysia, and the COVID-19 pandemic has undoubtedly boosted the industry, given that people need to follow standard operating procedures (SOP) that have been set by the government. According to the World Health Organization (WHO), Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus [2]. In 2021, on food delivery application usage, 63% of respondents stated that they would continue ordering food deliveries online as often even after the COVID-19 pandemic [3]. This shows that the pandemic has had a significant impact on online ordering, causing more customers to use the restaurant's online ordering system. The adoption of the online ordering system can assist in preventing the spread of COVID-19. This is due to the fact that just minimum contact will occur between the server and its customers. The food business is always developing to keep up with trends, and the service systems supplied by food businesses must adapt to consumers' lifestyles, one of which is through using technology-based service systems [4]. If the restaurant does not take advantage of this massive change in the trend, it will miss out on a massive opportunity to make more profit for the business.

The system will become an important tool for restaurants to improve management by connecting each food ordering transaction with a computer system rather than keeping a data record. However, nearly 80% of newly opened restaurants close before their fifth anniversary, with over 60% of newly opened restaurants failing within the first year [5]. The reason is the lack of important data, such as monthly profits, sales for each menu, and so on. Restaurant owners need to analyse data based on their sales to secure their company's business. Having the analysed data may assist restaurant owners in communicating and helping their customers decide what to order. By adopting the online ordering system, restaurateurs not only make their customers' life simpler but also ensure that their business can compete in the market.

Motivated by that situation, we decided to develop an online ordering system capable of assisting small sellers in growing their businesses. In this research, we developed an online ordering system with a web-based calculator using Microsoft Excel. It will also provide a graph that will assist users in analysing their business performance. It is a crucial skill that can make the difference between a restaurant staying relevant and going out of business.

2. Materials and Methods

In order to create a functional ordering system, we must first study and understand how to use Microsoft Excel. There are some steps to develop an online ordering system, which are as below:

- i. Upgrade to Microsoft Excel 365.
- ii. Create an ordering system and web-based calculator using Excel's Visual Basic Application (VBA).
- iii. Construct the database.

The explanation and detail of each stated step above will be further discussed in Section 2.1 until 2.3.

2.1 Upgrade to Microsoft Excel 365

Microsoft Excel is a software tool that uses spreadsheets to arrange numbers and data using formulas and functions. Microsoft Excel analysis is used by organisations of all kinds to perform financial analysis across the world. It is utilised in all business functions and at all types of companies. While other pieces of financial software are designed to do certain tasks, the strength of Microsoft Excel

is its flexibility and openness. Microsoft Excel models may be as strong as the analyst desires [6]. We use Microsoft Excel 365 for this system. Microsoft Excel 365 offers free access to the most recent features and upgrades, as well as security updates and bug fixes.

2.2 Create an Ordering System and Web-Based Calculator

A web-based calculator is designed to do calculations in which the admin uses their own variables. Where, an online ordering system is software that allows any restaurant to accept and handle online orders. Thus, we combined both so that food could be ordered and calculated online. We used Microsoft Excel's Visual Basic Application (VBA) to construct this function, since Microsoft Excel VBA is a programming language for Microsoft Office programs. The following are some VBA functions that are frequently used to create an online ordering system. The word "user" in general refers to the owner or employees of the restaurant.

- **Message Box (MsgBox)**
The MsgBox function displays a message. A message box is a crucial element since it is a dialogue box that can be used to notify the user and customers by displaying a custom message.
- **IF-THEN-ELSE**
Admin can use IF-THEN-ELSE statement as a VBA function in macro code written in the Microsoft Visual Basic Editor. It runs one set of code if a specific condition is true, or another set of code if it is false.
- **Loop**
The loop function allows users and customers to repeatedly execute the same code block until a certain point is reached or a given condition is fulfilled.
- **With statement**
With is a statement specifies an object once and then executes multiple statements on it. It begins with "With" and ends with "End with".
- **Call sub**
Admin can execute all the sub-procedures of the same module in a single subroutine. It can simplify life by saving a significant amount of time while running and debugging the code in the case of an error.

2.3 Construct the Database

A database is a collection of information that has been organised for easy access, administration, and updating. Databases often store collections of data entries containing important information. There are numerous benefits to using the database, such as creating graphs for monthly sales and sales for each food category using the data collected. Figure 1 shows the VBA code used to gather important data. For example, the date of each transaction, the product, the product's price, and so on. Following the gathering of data, we will create a graph that will be valuable to the user.

```

For ItemRow = 8 To LastRow - 1
  If .Range("W" & ItemRow).Value = Empty Then
    ItemDBRow = Sheet2.Range("A999999").End(xlUp).Row + 1
    Sheet2.Range("A" & ItemDBRow).Value = .Range("U5").Value
    .Range("W" & ItemRow).Value = ItemDBRow
  Else
    ItemDBRow = .Range("W" & ItemRow).Value
  End If
  Sheet2.Range("B" & ItemDBRow).Value = .Range("R5").Value
  Sheet2.Range("C" & ItemDBRow).Value = .Range("P" & ItemRow).Value
  Sheet2.Range("D" & ItemDBRow).Value = .Range("R" & ItemRow).Value
  Sheet2.Range("E" & ItemDBRow).Value = .Range("S" & ItemRow).Value
  Sheet2.Range("F" & ItemDBRow).Value = Application.WorksheetFunction.VLookup(.Range("P" & ItemRow).Value, myRange, 2, False)
Next ItemRow

```

Figure 1: VBA Code for Database

3. Results and Discussion

3.1 Microsoft Excel Sharing

Sharing a workbook allows multiple users to access the same file at the same time. Using the share features in Microsoft Excel, the admin will provide the link to download the ordering system workbook. Every user who receives the link must download the workbook to use the admin-created ordering system.

3.2 Menu Function for User

In this research, first, the admin has created a form for the user to enter the menu data for their restaurant. The user can be an owner or employee of a restaurant. The user may input information such as food name, cost, selling price, and photo file location in a box provided. The admin has also programmed it such that only numbers may be entered into the cost and sell price boxes. There is also a drop-down button from which the user may make the appropriate selections. There are also five buttons of function and limiting entries to numeric values for the menu function as shown in Figure 2.

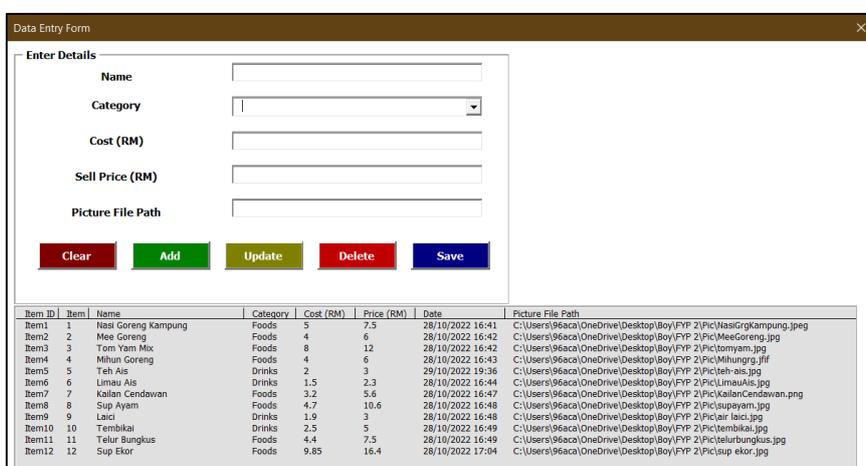


Figure 2: Menu Function

- **Clear button**
The user can remove all information written in the column previously to enter new details for each menu.
- **Add button**
After entering all the menu information, the user must click the add button to insert all the information that has been typed into Microsoft Excel.
- **Delete button**
The user can delete all information for the menu that was selected previously to be removed from the menu list.
- **Update button**
The user must click the menu list at the bottom of the button twice. After correcting the menu's information, the user must click the update button so that the menu is updated in Microsoft Excel.
- **Save button**
This button is to save the entire excel worksheet.

- **Limiting Entries to Numeric Values**
The user only can input numbers into the cost and sell price boxes. If the user enters letters, the system will display an error message and the user will have to re-enter the value.

3.3 Interface for Customer

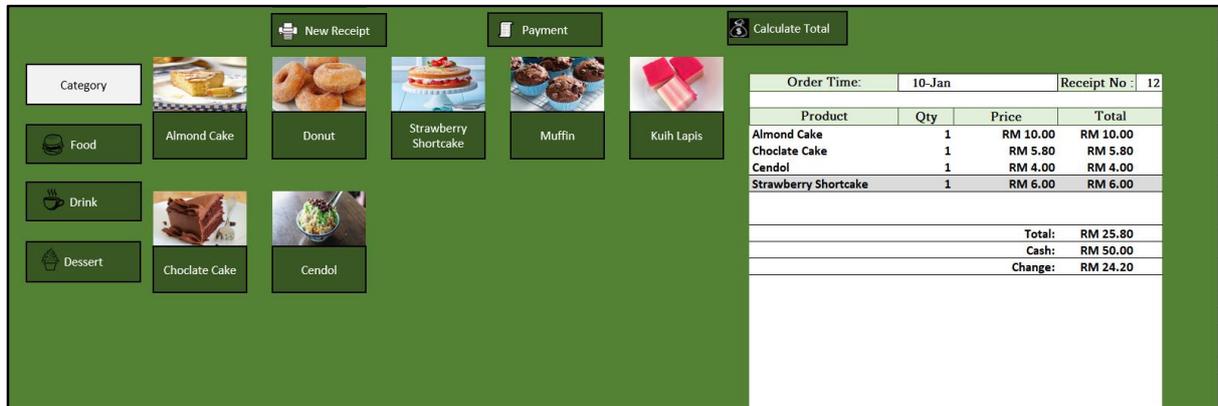


Figure 3: Restaurant POS System

Figure 3 above is the point of sale (POS) system which will display the menu entered by the user according to the category and receipt interface. For the receipt interface, the customer may order food by clicking on the picture or the box with the name of the food. After selecting the menu to be ordered, all the meal details such as menu names, prices, total and quantities will be presented on the white receipt. It also shows the order date, which always changes according to the current date, and the receipt number, which always increases once the customer places their order. The trash can icon at the right end of the meal details allows the customer to delete the selected menu. The customer needs to click the menu to be deleted and click the trash can icon at the right end of the receipt. There are three buttons for POS System.

1. **Calculate total**
The system will compute the total order amount that must be paid. It will also keep records of all purchases in the database.
2. **Payment**
To input the amount paid. The system will automatically compute the customer's payment balance.
3. **New receipt**
The customer can make a new order by clicking the new receipt button.

3.4 Database for User

A database is a structured collection of information or data often kept electronically in a computer system. In order to simplify processing and data querying, data in the most common types of databases being used today are typically structured in rows and columns in a sequence of tables. The data may be readily accessed, managed, modified, updated, controlled, and organised. In this research, there are two

different databases which are the database for restaurant’s menu and the database for each transaction made.

1. Database for Restaurant’s Menu

Figure 4 shows the database for all the restaurant's menus. All the information that was entered by the user, such as menu name, price, cost, menu category, and so on, will be stored into a Microsoft Excel database.

Item ID	Item No	Name	Category	Cost (RM)	Price (RM)	Date	Picture File Path
Item1	1	Nasi Goreng Kampung	Foods	5	7.5	28/10/2022 16:41	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\NasiGrgKampung.jpeg
Item2	2	Mee Goreng	Foods	4	6	28/10/2022 16:42	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\MeeGoreng.jpg
Item3	3	Tom Yam Mix	Foods	8	12	28/10/2022 16:42	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\tomyam.jpg
Item4	4	Mihun Goreng	Foods	4	6	28/10/2022 16:43	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\Mihungrg.jiff
Item5	5	Teh Ais	Drinks	2	3	29/10/2022 19:36	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\teh-ais.jpg
Item6	6	Limau Ais	Drinks	1.5	2.3	28/10/2022 16:44	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\LimauAis.jpg
Item7	7	Kailan Cendawan	Foods	3.2	5.6	28/10/2022 16:47	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\KailanCendawan.png
Item8	8	Sup Ayam	Foods	4.7	10.6	28/10/2022 16:48	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\supayam.jpg
Item9	9	Laici	Drinks	1.9	3	28/10/2022 16:48	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\air laici.jpg
Item10	10	Tembikai	Drinks	2.5	5	28/10/2022 16:49	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\tembikai.jpg
Item11	11	Telur Bungkus	Foods	4.4	7.5	28/10/2022 16:49	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\telurbungkus.jpg
Item12	12	Sup Ekor	Foods	9.85	16.4	28/10/2022 17:04	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\sup ekor.jpg
Item13	13	Asam Boi	Drinks	2.2	3.5	20/12/2022 12:09	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\Asam boi.jpg
Item14	14	Almond Cake	Dessert	5	10	20/12/2022 12:12	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\AmondCake.jpg
Item15	15	Donut	Dessert	0.8	2	20/12/2022 13:28	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\donut.jiff
Item16	16	Strawberry Shortcake	Dessert	4.5	6	20/12/2022 13:28	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\strawberry.jpg
Item17	17	Muffin	Dessert	1.8	3	20/12/2022 13:29	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\muffin.jiff
Item18	18	Kuih Lapis	Dessert	0.7	1.5	20/12/2022 13:30	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\Kuih-Lapis.jpeg
Item19	19	Choclate Cake	Dessert	3.5	5.8	20/12/2022 13:31	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\colatcake.jpg
Item20	20	Cendol	Dessert	2.8	4	20/12/2022 13:31	C:\Users\96aca\OneDrive\Desktop\BoylFYFP 2\Pic\cendol.jpg

Figure 4: Database for Restaurant’s Menu

2. Database for Each Transaction Made

Figure 5 shows some of the customer’s transaction made from the restaurant. After the customer clicks the calculate total button, all information such as the receipt number, date, menu, and so on, will be collected and stored in a database using a VBA code. Admin can use the formula quantity multiplied by price to calculate the total. Admin additionally used the VLOOKUP function to retrieve the cost value from the database for each menu.

Receipt No	Type	Date	Product	Quantity	Price	Type	Total	Cost
4	Sunday	11/12/2022	Tom Yam Mix	1	RM 12.00	Foods	RM 12.00	RM 8.00
4	Sunday	11/12/2022	Telur Bungkus	1	RM 7.50	Foods	RM 7.50	RM 4.40
4	Sunday	11/12/2022	Sup Ekor	1	RM 16.40	Foods	RM 16.40	RM 9.85
4	Sunday	11/12/2022	Laici	1	RM 3.00	Drinks	RM 3.00	RM 1.90
4	Tuesday	11/1/2022	Tembikai	1	RM 5.00	Drinks	RM 5.00	RM 2.50
5	Tuesday	11/1/2022	Limau Ais	1	RM 2.30	Drinks	RM 2.30	RM 1.50
5	Tuesday	11/1/2022	Tembikai	1	RM 5.00	Drinks	RM 5.00	RM 2.50
5	Tuesday	11/1/2022	Laici	1	RM 3.00	Drinks	RM 3.00	RM 1.90
6	Tuesday	11/1/2022	Teh Ais	1	RM 3.00	Drinks	RM 3.00	RM 2.00
6	Tuesday	11/1/2022	Mihun Goreng	1	RM 6.00	Foods	RM 6.00	RM 4.00
6	Friday	11/3/2022	Nasi Goreng Kampung	1	RM 7.50	Foods	RM 7.50	RM 5.00
6	Friday	11/3/2022	Sup Ayam	1	RM 10.60	Foods	RM 10.60	RM 4.70
7	Friday	11/3/2022	Almond Cake	1	RM 10.00	Dessert	RM 10.00	RM 5.00
8	Friday	11/3/2022	Mihun Goreng	1	RM 6.00	Foods	RM 6.00	RM 4.00
8	Friday	11/3/2022	Sup Ayam	1	RM 10.60	Foods	RM 10.60	RM 4.70
8	Thursday	20/10/2022	Asam Boi	1	RM 3.50	Drinks	RM 3.50	RM 2.20
8	Thursday	20/10/2022	Limau Ais	1	RM 2.30	Drinks	RM 2.30	RM 1.50

Figure 5: Database for Restaurant’s Menu

3.5 Chart for User

A chart in Microsoft Excel is used to create a graphical representation of any set of data. Charts are frequently used to help people understand huge amounts of information and the relationships between the data. Charts are frequently easier to read than raw data. The chart type must also be chosen carefully

chosen so that the chart created corresponds to the data. To make this graph, the admin used VBA code to create three buttons that generate different graphs, such as the following.

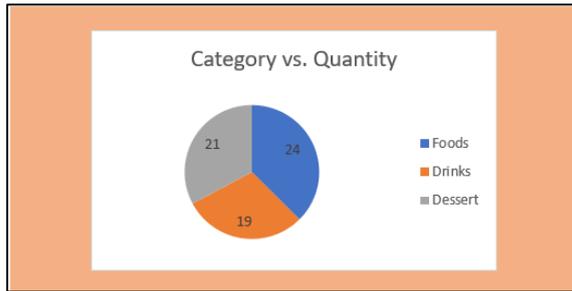


Figure 6: Pie Chart



Figure 7: Clustered Column - Line Chart



Figure 8: Clustered Column Chart

Figure 6 shows the pie chart generated from the database. Graph displaying the quantity of the customer's menu purchase based on the food, drink, and dessert categories. For example, by assuming one food per person since the graph reveals that the majority of customer's order food rather than drinks and desserts, the user can add more interesting food category menu. Furthermore, users may create promotions to boost sales in other categories with lower quantities. For example, consider the evening promotion in which customers buy one dessert and get one free drink. This can encourage people to try dessert in the restaurant and increase dessert sales.

Figure 7 depicts the clustered column and line graph generated by the database. This graph shows the total amount of sales and costs for each month. The bar chart depicts total monthly sales, whereas the orange line depicts total monthly costs. The user may use this graph to identify if the restaurant is profitable or losing money. The user may also identify the year's lowest sales and make strategies to improve it.

Figure 8 depicts the effectively constructed clustered column chart from the database. The chart shows the total sales for each day. Starting on Monday and ending on Sunday. Admin calculates total sales by deducting total sales and total cost for each day. Users may use this graph to determine whether their restaurant is making more profit on working days or holidays. It is also crucial information since sales for restaurants operating inside and outside shopping centres differ. On weekends, for example, most people will eat at restaurants located in shopping malls. As a result of this graph, the restaurant may serve more food throughout the weekend in order to increase sales.

3. Conclusion

In conclusion, we have successfully developed an online ordering system using Microsoft Excel, constructed a database for each menu and transaction and analyse graphs relating to monthly sales, menu categories that are popular among the most customers and Monday through Sunday sales. There are some recommendations that may be made to improve our project, first, in terms of design. We can make the Microsoft Excel 365 design more attractive and elegant to attract the interest of consumers. In addition, in terms of the safety of Microsoft Excel 365, we should develop a security system to make

the database in Microsoft Excel 365 more secure. Lastly, the macro feature cannot be used when the user downloads the ordering system workbook from the URL shared by the admin. The function "Shared Workbooks" is an older feature that lets numerous individuals collaborate on a workbook. We hope that our ordering system will assist more sellers in growing their businesses both online and offline.

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