IT131-8 BM1 ERD Project 12: Xialan Shaomai

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1. INTRODUCTION

1.1 The Importance of Data Management in Businesses

As local businesses continue to go about their money-making and grow to make more profits, the data they collect in terms of who, what, when, where, and how about their customers also take up physical space. Cash books, files, invoices, notes, forms and so much more written records - which are traditional and more mechanical - have become tedious and are costing what most businesses need, resource handling, data management, and most especially time. It takes a while to encode what has been written into spreadsheets even if a bit of information technology has been implemented in the process of data management. So, the better alternative is to create a Database Management System (DBMS) that is much more user-friendly, robust, and widely accessible to its users. Large enterprises and small businesses can make use of this to be more efficient, productive, and competitive.

1.2 Authors' Note

This Entity-Relationship Diagram (ERD) paper project is an investigation into how businesses can implement a DBMS to be more equipped and robust in their data management. Simply by tapping into a local business and examining their data processing with their business processes can business rules be written to produce an Entity-Relationship Model (ERM) that is to be represented by an ERD, be defined by a data dictionary and data catalog. The project team would do the aforementioned as documentation, 'ERD Paper Summary' including a recommendation for the improvement of data management of the business process.

1.3 Background of Business Interviewed

Xialan Shaomai is a recently created online food business as displayed by Figure 1.3.1 that is owned by a relatively small family. The business started in late June in the year 2020, with the mother of that business at the forefront. Currently, like many other online businesses that started when the pandemic hit, the business has no physical store, restaurant or stand as the business is entirely online. It currently has around twenty (20) loyal customers, which is comprised of family friends, neighbors, and the local church goers. They order dim sum from them regularly, so the business is generating moderate traffic. Their food is made-to-order. This means that they store little stocks, just enough for the orders they go through daily. They can serve cooked meals or frozen packs of their products packed for xiomai sellers to sell. They operate six (6) days a week on normal or regular working hours and their main page is published on Facebook as shown by Figure 1.3.2.

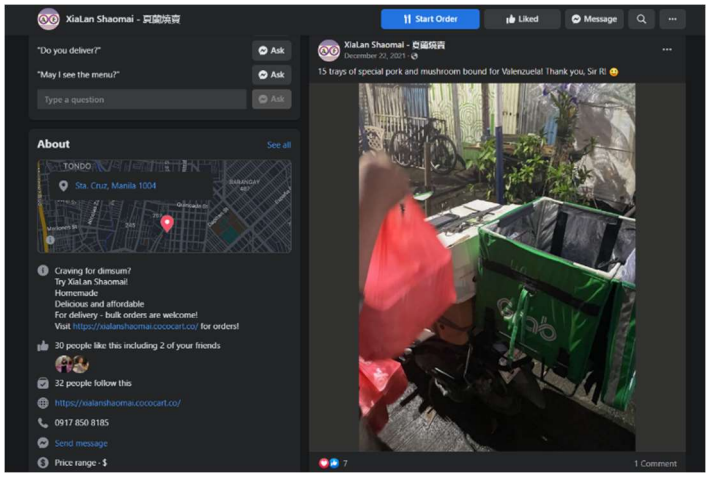


Figure 1.3.1 Locality of Store

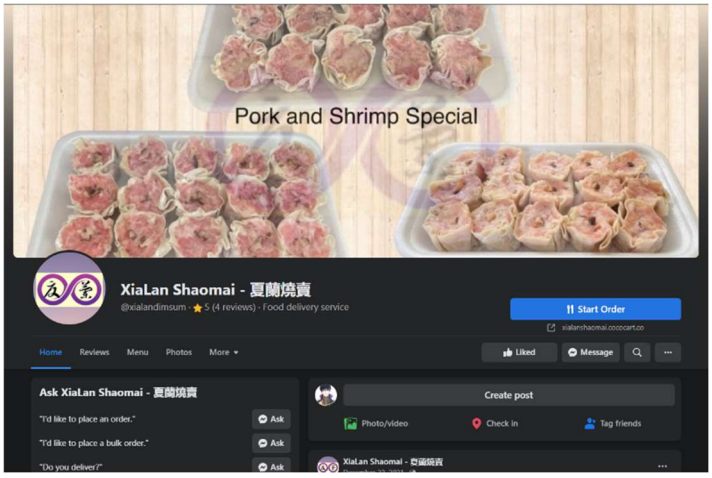


Figure 1.3.2 Facebook Page of Xialan Shaomai

2. DISCUSSION ON THE SELECTED BUSINESS PROCESS

The small online food business is named "XiaLan Shaomai" which specializes in making Filipino takes on the Chinese dim sum. The business' dumplings and xiomais or siomais are highly demanded by its local and loyal customers. Because of its relatively simple processes due to being a small business, the team has chosen to interview the business owner about its business processes. Upon knowing the inner workings of their business, the team has chosen their Order Processing (OP) operation.

Their Order Processing operation includes three (3) main steps. These steps are: (1) collecting necessary customer details, (2) order placement, and (3) transaction recording.

2.1 First Step

Their business process begins from the first step as the customer will have to go to the business's Facebook page and click a link that would redirect the customer to a form, so that they would be able to input their details. The data that would be collected will be the customer's basic information, such as their name, address, and contact number. Once their details have been encoded, they are then ready and able to place orders, which is the second step of their Order Processing Operation as following the business procedure.

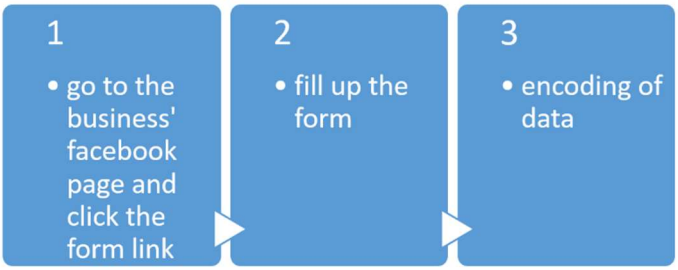


Figure 2.1 Registration and Data Collection

2.2 Second Step

The customers will be able to view a catalog or a menu of the products of the business. Once they take an interest in one of the business' food products, they can click it to add it to their 'carts'. Afterward, the customer would then be asked to enter the quantity of their chosen food product. Once the customer presses the submit button to check out, they would then be asked to pay online or through bank transfer, which is the third step of the operation.

Figure 2.2 Choosing Order

2.3 Third Step

The third step is the verification of the customer's responsibility to check if the information collected corresponds to what was asked from them. After the customer's information is verified, the data that they have provided would be recorded. That concludes their OP procedure.

Figure 2.3.1 Verification

With the process of creating business rules, entity names and corresponding attributes were made. The team wrote their findings in tabular format in order to organize and visualize the database and the Entity-Relationship Diagram to give an example of what data is processed and its flow. A data dictionary and data catalog will assist in defining and discussing the ERD of the business process that was chosen - OP.

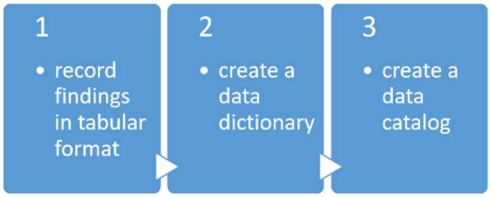


Figure 2.3.2 Data Processing

3. ER DIAGRAM WITH DESCRIPTION OF RELATIONSHIPS

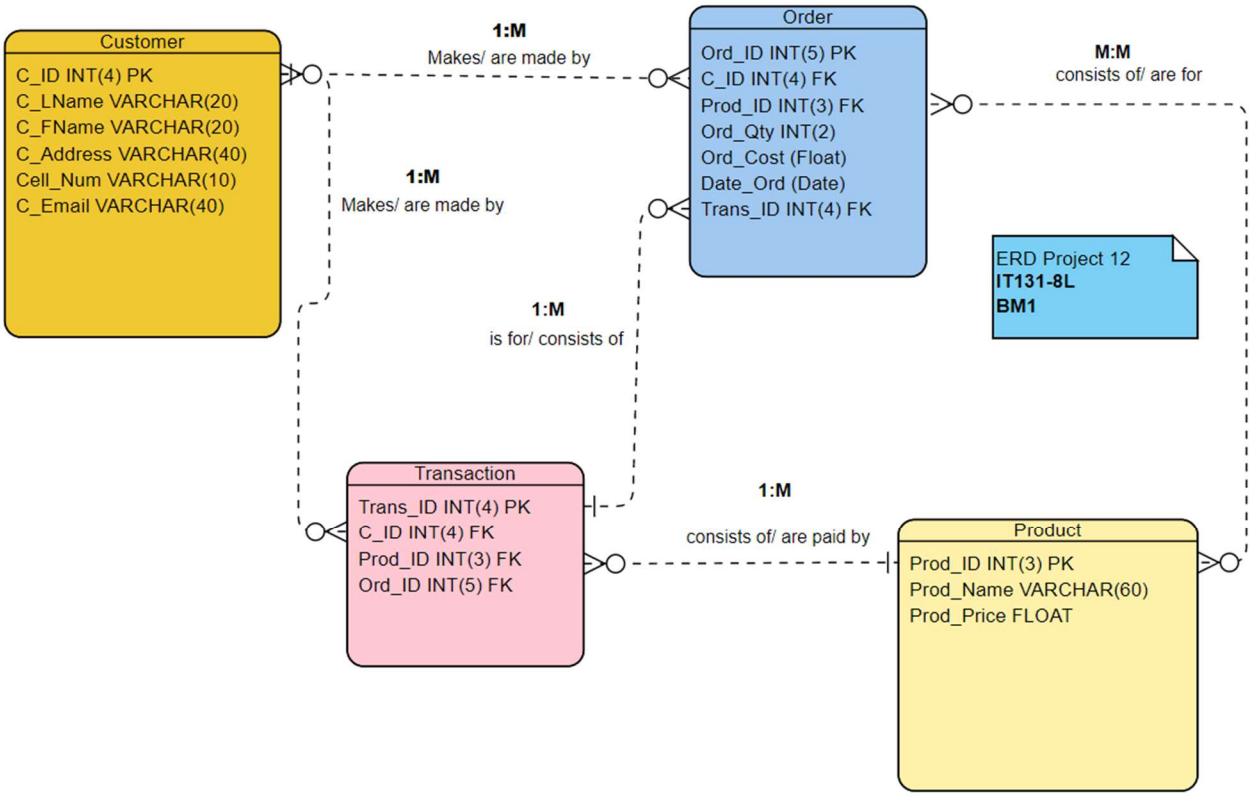


Figure 3 Entity-Relationship Diagram for Siomai Database

3.1 Preliminary

The ERD of the chosen business process from the interviewed organization, 'Xialan Shaomai' is shown here in Crow's Foot notation. There is a short description of the flow of data that each table has, its directions, and its relationships.

3.2 Relationship Description

There are four (4) main tables in the ordering process that are composed of (starting from) Order, Customer, Transaction, and Product. When a customer makes an order, this will request a product and be recorded as a transaction.

As a customer makes many orders (1:M), so will many orders be made by a customer (M:1).

As this order is made, it will consist of many products (M:M) or also as many products are for many orders (M:M).

Then many products are paid by a transaction (M:1) as each transaction consists of many products and orders (1:M).

Many transactions are made by a customer (M:1) as the customer makes many transactions (1:M).

3.3 Data Flow

The data flows from the customer and order, order and product, product and transaction, transaction and order, then lastly, transaction and customer.

The ERD shows the direction of where the data goes to and from as brought by the 1:M, M:1 and M:M relationships and flow lines.

In addition, the primary keys connect each of the tables as they become foreign keys and bring into other tables their dependents.

A note is shown as 'ERD Project 12' as the identification that the ERD is made by ERD Project 12 of IT131-8L section BM1.

4. DATA DICTIONARY

Table 4 Data Dictionary for the Siomai Database created

Table	Field Name	Data Type	Data Format	Field Size	Description	Example
Customer	C_ID	INT (**PRIMARY KEY**)	**NNNN**	4	Unique identification of each customer	1001
	C_LName	VARCHAR	N*20	20	Last name of the customer	Asperilla
	C_FName	VARCHAR	N*20	20	First name of the customer	Archangel
	C_Address	VARCHAR	N*40	40	Address of customer	Rizal Avenue
	Cell_Number	VARCHAR	N*10	10	Contact number of customer	9295556354
	C_Email	VARCHAR	N*40	40	Official email of the customer	archangelis20@hotmail.com
Transaction	Trans_ID	INT (**PRIMARY KEY**)	NNNN	4	Unique transaction number for each query	1111
	C_ID	INT	NNNN	4	Customer ID that is connected to the **Customer Table**	1001
	Prod_ID	INT	NNN	3	Product ID that is connected to the **Product Table**	111
	Ord_ID	INT	NNNNN	5	Order number that is special, and it is connected to the **Order Table**	12345
Order	Ord_ID	INT (**PRIMARY KEY**)	NNNNN	5	Special ID for every order of each customer	12345
	C_ID	INT	NNNN	4	Customer ID that is connected to the **Customer Table**	1001
	Prod_ID	INT	NNN	3	Product ID that is connected to the **Product Table**	111
	Ord_Qty	INT	NN	2	Number of items/orders that was requested by a certain customer	4
	Ord_Cost	FLOAT	NNN		The total cost of the order(s)	880
	Date_Ord	DATE	YYYY-MM-DD	8	Date issued of the order	2022-02-12
	Trans_ID	INT	NNNN	4	Transaction ID of the order, and is connected to the **Transaction Table**	1111
Product	Prod_ID	INT (**PRIMARY KEY**)	NNN	3	Special code of the product that can identify what kind of product and act as a bar code	111
	Prod_Name	VARCHAR	N*60	60	Name of the product	Pork and Shrimp Xiomai (15 pcs)
	Prod_Price	FLOAT	NNN		Price of the product	220

4.1 Description and Discussion

The data dictionary as displayed by Table 4 consists of the different types of data and entries that are used for running the business. It consists of 4 tables that has specific names for specific uses. The customer table consists of the required data for each customer who wants to buy some products.

The transaction table only has 4 data entities that are connected to three tables in order to track the purchased products and the customer who ordered it. The order table consists of the number of products that are purchased and the total cost of each customer's basket. Lastly, the product table contains the products that are embedded by a special ID, the name of the products, and the cost of each product.

5. SYSTEM CATALOG

Table 5 System Catalog for the Siomai Database created

Siomai Database							
#	**Title**	**Data Type**	**Null**	**Constraints**	**Description**	**Summary**	**Relationship**
1	C_ID	INT(4)	NO	Primary Key	Customer ID.	A unique identity document that identifies a specific customer where the customer is a current recipient or buyer of the products or services offered by the business.	From table Customer
2	C_LName	VARCHAR(20)	YES		Customer last name.	An entry of the last name of a specific customer where the customer is a current recipient of products or buyer of the products or services offered by the business.	From table Customer
3	C_FName	VARCHAR(20)	YES		Customer first name.	An entry of the first name of a specific customer where the customer is a current recipient of products or buyer of the products or services offered by the business.	From table Customer
4	C_Address	VARCHAR(40)	YES		Customer address.	An entry of the current address of a specific customer where the customer is a current recipient of products or buyer of the products or services offered by the business.	From table Customer
5	Cell_Num	VARCHAR(10)	YES		Customer cellphone number.	An entry of the current cellphone number of a specific customer where the customer is a current recipient or buyer of the products or services offered by the business. Excludes phone numbers that are inactive or fraudulent.	From table Customer
6	C_Email	VARCHAR(40)	YES		Customer email address.	An entry of the current email address of a specific customer where the customer is a current recipient or buyer of the products or services offered by the business. Excludes email addresses that are inactive or fraudulent.	From table Customer
7	Prod_ID	INT(3)	NO	Primary Key	Product ID.	A unique identity document that identifies a specific product where the product is currently being sold by the business and where the product can be ordered and purchased by a customer.	From table Product

8	Prod_Name	VARCHAR(60)	YES		Product name.	An entry of the current name of a specific product where the product is currently being sold by the business and where the product can be ordered and purchased by a customer.	From table Product
9	Prod_Price	FLOAT	YES		Product price.	An entry of the current price of a specific product as denoted by the official value of the product and where the product is currently being sold by the business and where the product can be ordered and purchased by a customer.	From table Product
10	Ord_ID	INT(5)	NO	Primary Key	Order ID.	A unique identity document that identifies a specific order where the customer has committed to pay the business for the sale of a specific product currently offered by the business to be delivered and fulfilled in the future.	From table Order
11	C_ID	INT(4)	YES	Foreign Key	Customer ID.	A unique identity document that identifies a specific customer where the customer is a current recipient or buyer of the products or services offered by the business.	From table Order References to Customer(C_ID)
12	Prod_ID	INT(3)	YES	Foreign Key	Product ID.	A unique identity document that identifies a specific product where the product is currently being sold by the business and where the product can be ordered and purchased by a customer.	From table Order References to Product(Prod_ID)
13	Ord_Qty	INT(2)	YES		Order quantity.	An entry of the quantity of the current orders of a specific customer for a specific product as denoted by the number of orders requested and where the product is currently being sold by the business and where the product can be ordered and purchased by a customer.	From table Order
14	Ord_Cost	FLOAT	YES		Order Cost.	An entry of the cost of the current order of a specific customer as denoted by the sum of the price of all products ordered where the price is denoted through the official value of each product and where the product is currently being sold by the business and where the product can be ordered and purchased by a customer.	From table Order

15	Date_Ord	DATE	YES		Order Date.	An entry of the current date as denoted by the month, day, and year, when the customer established an order for a product from the business	From table Order
16	Trans_ID	INT(4)	YES	Foreign Key	Transaction ID.	A unique identity document that identifies a specific transaction to fulfill the order of a customer as denoted by the commitment of the customer to the purchase of the product of the business where the purchase is validated through means of a physical channel.	From table Order References to Transaction(Trans_ID)
17	Trans_ID	INT(4)	NO	Primary Key	Row ID.	A unique identity document that identifies a specific transaction to fulfill the order of a customer as denoted by the commitment of the customer to the purchase of the product of the business where the purchase is validated through means of a physical channel.	From table Transaction
18	C_ID	INT(4)	YES	Foreign Key	Customer ID.	A unique identity document that identifies a specific customer where the customer is a current recipient or buyer of the products or services offered by the business.	From table Transaction References to Customer(C_ID)
19	Prod_ID	INT(3)	YES	Foreign Key	Product ID.	A unique identity document that identifies a specific product where the product is currently being sold by the business and where the product can be ordered and purchased by a customer.	From table Transaction References to Product(Prod_ID)
20	Ord_ID	INT(5)	YES	Foreign Key	Order ID.	A unique identity document that identifies a specific order where the customer has committed to pay the business for the sale of a specific product currently offered by the business to be delivered and fulfilled in the future.	From table Transaction References to Order(Ord_ID)

5.1 Description and Discussion

The system or data catalog as displayed by Table 5 establishes the inventory of the data assets including their classifications in the Siomai database. The data catalog consists of 8 columns and 20 rows. The first column presents the order of each entity denoted by an incrementing number. The second column presents the title or name of each entity. The third column presents the data type of each entity with their corresponding character length. The fourth column presents the classification of null of each entity. The fifth column presents the constraints present in each entity. The sixth column presents the description of each entity. The seventh column presents the summary of each entity. The eight column presents the relationship present in each entity.

6. RECOMMENDATION FOR IMPROVEMENT

Having a business can boost a person's paycheck if ever it takes off and stabilizes. However, running one is tough as it comes with its own risks. But, the hardships of running a business are offsetted by its advantages, such as profiting from it, having a sense of accomplishment as it flourishes, and gaining knowledge and experience as business owners can utilize their innovativeness in creating and designing not only their products and services, but also their business model and operations. Owning a small business is tough not because it requires large amounts of money to keep it afloat as it also requires sufficient management and well-designed operations.

Consistent improvements can help the sustenance of businesses to further develop their capability, achieve business goals and be competitive in their corresponding markets. Such improvements are (but not limited to) auditing cash flow, riding on the trending waves of social media for a more efficient marketing strategy, and innovating the business model to be more effective than was before.

This applies even more to small and local businesses as they are comparatively different to such big brands and franchises that operate across the marketplace. It is observed that the broad opportunities brought by the use of Information Technology especially with data handling and management can assist even local businesses for their improvement.

In this day and age, business operations can run more smoothly if databases were used. Business owners could utilize this tool to become more efficient and productive. Instead of physical books and papers taking up space, especially when the amount of data is very large, businesses can opt to record their data digitally. Another advantage of recording data digitally in databases is that businesses would not have to manually search each file for specific bits of data.

This would undoubtedly increase their profit margins as they could save time in doing menial and tedious tasks, which could be easily automated and digitalized using a machine. For this reason, many business owners who see the advantages of databases, whether big or small, take advantage of this technology as opposed to the traditional way of bookkeeping or transaction recording with a pen and paper – which are tedious and use up space and resources that could be for other uses.

Because of the numerous benefits that it could bring, the team decided to look further into how a business could operate with a database by designing an ER diagram of an existing business' operations. Only the Ordering Process of the business named "Xialan Shaomai" was observed, analyzed, and studied. The ER diagram that the team designed is in Crow's Foot Notation. Each relationship indicated was discussed. According to the team's findings the Ordering Process of that business is divided into three (3) parts, which are collecting necessary customer details, order placement, and transaction recording.

After further analyzation of the business process, and as the final piece of this ERD paper the recommendations for Xialan Shaomai's improvement is as follows:

1. Adding another step to their operations, which is recording the customer payments to the business (cash inflow) into a database that collects all their business transactions with the use of a database management system.

2. Using more of high-impact and low-cost advertising as to ride the trending waves of social media for product promotion and allow for partnerships with influencers and complementary businesses.

3. Employing strategies for effective sales by:

    a. Showing testimonials of customers.

    b. Adding seasonal and special products.

    c. Promos, packages and discounts.

    d. Utilizing Facebook ads.

4. Studying data provided by customers' feedback and surveys to improve certain aspects of products as to appeal to consumer demands. It is proven that businesses that communicate with their customers build lasting relationships as they become advocates.

7. ACKNOWLEDGEMENTS

The research team of ERD Project 12 would like to thank Xialan Shaomai through their representative and our team member, Katrina Soo. This ERD project paper would not be possible without the business giving the team permission to analyze and research into their organization's process.

8. REFERENCES

[1] Images gathered from Xialan's Shaomai Facebook page. https://www.facebook.com/xialandimsum

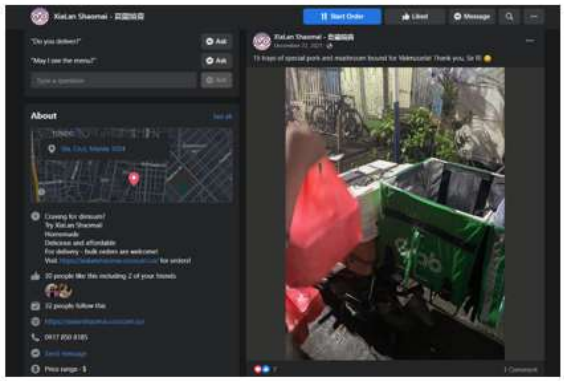


Figure 1.3.1 Locality of Store

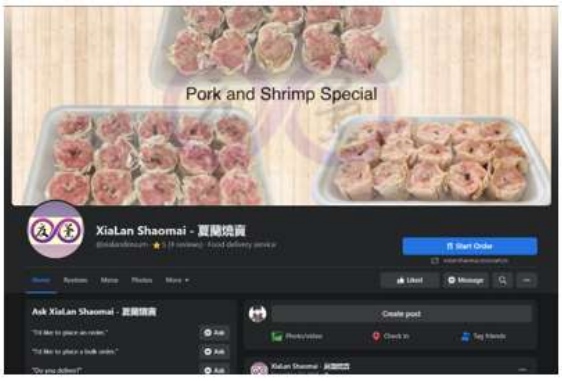
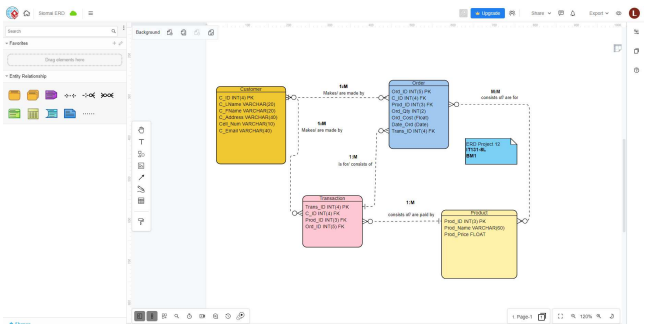


Figure 1.3.2 Facebook Page of Xialan Shaomai

[2] ERD made through Visual Paradigm Online. https://online.visual-paradigm.com/share.jsp?id=313931343432362d32



[3] Business rules made from Xialan's Shaomai website. https://xialanshaomai.cococart.co/?fbclid=IwAR2Q5HlCzgEFIgUc2EWXzLO3kA51bv2A93z_rXkte277tUprF3jprUmncF4