Adamson University
College of Engineering
Computer Engineering Department

A Narrative Report on

Designing and Developing a Database with a User Interface for DDD Café

In Partial Fulfillment
of the Requirement of the Subject
Database Design and Development Lab

Submitted by:

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Schedule:
MW / 7:00 – 10:00 / CL 19

Submitted to:

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Instructor

I. Introduction

Using the point of sale (POS), the DDD Café will have its cashier and its customers. In this case study, we will be using the cashier's point of view and only the cashiers who are on duty will be able to access the system, customers can choose their orders among the available products in the Café. The system will allow the cashier to take multiple orders and the quantity of each product until the satisfaction of the customer. The cashier will also do all transactions in connection with the Café's database. Maximizing the usage of SQL commands and queries along with stored procedures, the system is created.

II. Plan of Work

We want to spend the remaining weeks of the month of April planning and participating in an active discussion about our assigned case study, we want to learn first about the scope of it and the relevance of every data needed to be considered. Starting with the UML Diagram is necessary because we would be using it as basis for anything related to our database and our system, furthermore, we will proceed in constructing the database that will be used since we can't proceed in creating the system without it, after that is the system flow, how would the system will start, the transactions it contains, and what will happen when the program is terminated.

Table 1
Gantt Chart

MONTH	**APRIL**		**MAY**				
WEEK	**4**	**5**	**1**	**2**	**3**	**4**	**5**
ACTIVITIES							
1. Planning							
2. UML Diagram							
3. SQL Database							
4. System flow							
5. Log-in form (Cashier's perspective)							
6. Order System (Updating stocks and computation for subtotal)							
7. Transaction (Computation for total and change)							
8. End of transaction (Saving the whole transaction to database) and completing the checklist							

With what we've planned, a log-in form is supposed to be created first which will be used by the cashier to access the system. Having our database that contains the information of the cashiers in our Cafe, only cashiers who are *on duty* will be granted access. Following that that is the order system, this is where the cashier will be operating the system according to the customer's order, from choosing the product, inputting how many the customers would like to have, and computing the subtotal—in which this is supposed to fill the *dbo.Orders* table. Next to that is the overall transaction. By that, it means getting the total amount of the purchased products, receiving the payment of the customer, and giving the change since most of these variables are required in the *dbo.Receipt*, this is supposed to do the work. Lastly, the end of the transaction where every operation in the system will be reflected in the database, and all of the remaining in the checklist.

III. Progress Report

Date: April 22, 2020

After having the introduction of how our case study was supposed to be, we started by first discussing how our system would work. We also searched about the UML Diagrams, how it is created, and what are the possible data that should be included there. We also planned our timeline for doing this case study, and we gave opinions on what are the things that we should prioritize for a smooth flow of creating this case study.

Date: April 23, 2020

This day, we started planning for our UML Diagram. We looked for tools we could use to create it and found a software application that enables to create entity relationship diagrams (ERD's), we found that it is not much complicated to use and agreed to use it in creating the UML Diagram. We also watched some tutorial videos regarding that software to fully understand that tool.

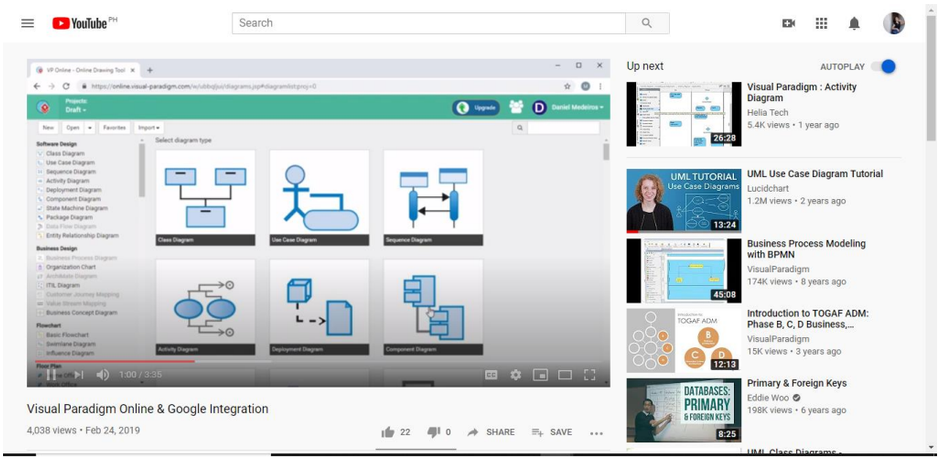

Figure 1: Sample of a tutorial video used

Date: April 24, 2020

We created a draft of our ERD and understand the process flow of our system. We haven't finalized yet the data that we will be needing for our system and decide if there are any other data we should add for our system. We decided to go for three tables: CUSTOMER, CASHIER, and INVENTORY.

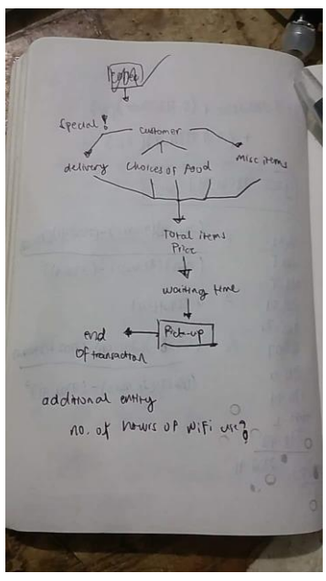

Figure 2: ERD Draft

Date: April 25, 2020

We planned on the things that we need to do. We discussed the operations we need and reviewed previous lab activities that might be helpful for our case study. We also found an existing ERD Diagram that is somehow similar in our project and used it as a guide. In line with that, we decided to add another table for our system namely *purchaseorder*—this is the table that kind of resembles the receipt from the usual stores. Once the *customer* has purchased the orders, and the *cashier* verified and sold the product, the *purchaseorder* will display the transaction.

Date: April 26, 2020 – May 5, 2020

During these days, the members have decided to focus on complying with the loads of requirements that needed to be submitted to other subjects.

Date: May 6, 2020

Today, we created our very first ERD draft—various tables are included on it such as the inventory, order transaction, customer, cashier, company profile, and the payment transaction. After further discussion, we've decided to add another table named miscellaneous items making it as the second draft of our ERD and linked it to the order transaction table because we thought that the miscellaneous items are supposed to be there since that is where the customer is ordering the products and miscellaneous items are only optional.

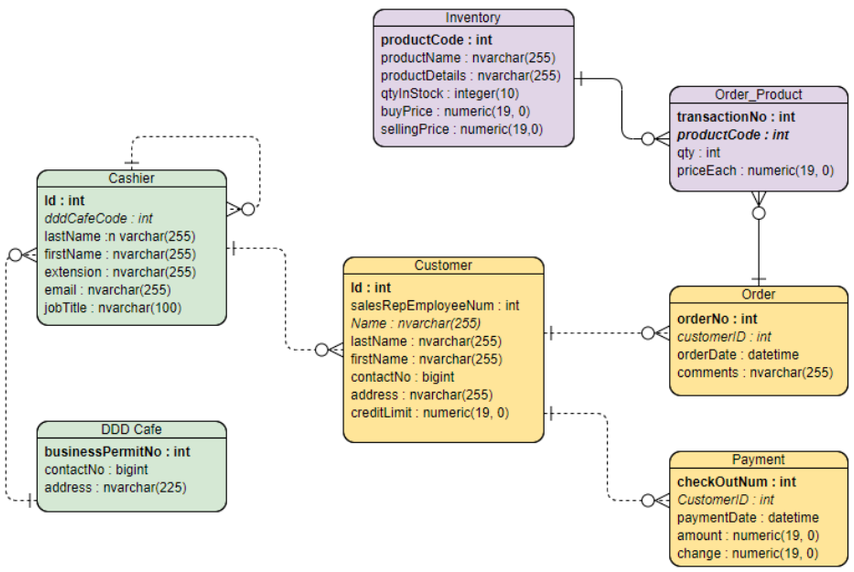

Figure 3: ERD Draft via online tool

Date: May 7, 2020

Populating and revising data for the tables (after discussing what the tables are needed for our programs), we then start adding data onto the tables that requires multiple data. For the inventory table, we have variations of coffee and doughnuts—we have 15 different drinks, some drinks have options for sizes while others don't. In regards with the doughnuts, we have 10 flavors that are classified into two sizes, the regular ones and the small ones (Pops). We also included the stock quantity and price for each product. Aside from the inventory table, we also have a separate table for the miscellaneous items that has 5 different items, as for the cashier, we have 4.

Date: May 8, 2020

Friday came and we checked, arranged, and finalized the data that we are going to put into our program. First, we determined if the coffee table was separated from the donuts table. Then,

we talked about how we should combine these tables together, in which we have decided to just separate them. This is also the day that we made the databases for the products that we're going to put in our program. We talked about how much the stocks of our products would be and its sizes.

Then, the data of the tables were put in the ERD draft. Alongside with the members, Sir JV discussed and gave comments on our first ERD draft. He asked us some questions regarding the data that was put in it. Since it was our first draft, we are really not sure what are the things that should be included in the diagram and so, Sir JV suggested that we should use the PDF that he uploaded as a guide. We also brainstormed the terms in relation to a cafe so that we could analyze and use the following terms that we discussed into the program itself.

Date: May 9, 2020

Saturday, May 9th, Sir JV suggested that we hold out a conference call via Facebook Messenger to discuss the ERD that we did. He told us that he will call us when we're most available.

Date: May 10, 2020

Sunday, after the suggestion on holding a conference call, all of the members have decided on when and exactly what time we should do it. We also stated the following reasons for the discrepancies on the time and each member has later on decided for the final date and time in which we are all available.

Date: May 11, 2020

It was the 11th day of May where we held the conference call together with Sir JV wherein clarifications for our case study was held, we discussed what variables are relevant and urge the members to voice out each other's opinion that might be useful or could make the system much better, aside from that, we also finalized the ERD we would be using, he thoroughly explained its purpose and importance regarding our system, he also give a short briefing of what an ERD is, the relations and meaning of the symbols, making sure that everyone is able to follow the discussion, referring to the first ERD we had, we eliminate unnecessary data until we are left with the important ones. Creating a new ERD that everyone agreed. We are also able to clarify the tables in our database, the constraints and indexes of each variable.

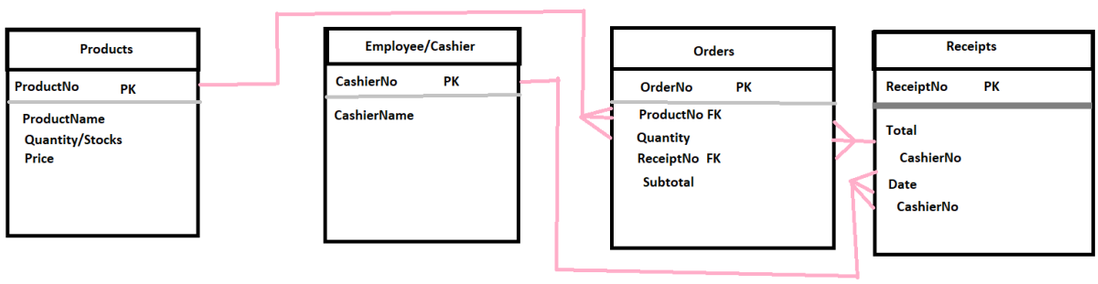

Figure 4: Drafte ERD from the conference call

Date: May 12, 2020

Tuesday, the meaning of Front End finally came to light since some of the members were really confused about its definition. It was suggested that we could use Windows Forms and the front end through C# since both Visual Studio and SSMS were from Microsoft. And since the SQL Server is supported by Visual Studio we could use them as one platform for the front and

back end. The details about the data on the table were also put into question and the fourth draft of the ERD was created.

Date: May 13, 2020

Wednesday, a question was raised regarding the data source and how to know what kind of server is going to be used in order to connect it to the program which was thankfully answered by Sir JV. Then, the data for the tables are finalized/ completed. After watching numerous tutorials on YouTube on how to design a Windows Form on Visual studio, a draft of the UI design was finally planned by the members.

Date: May 14, 2020

Thursday came and we had started on creating a design of the UI using Windows Forms. It was just a draft so that we could visualize the system and to know the syntax of it. We also discussed and planned about the system's flow and design. Finally some changes were made regarding the ERD Draft—the *receiptNo* is changed into *receiptId*.

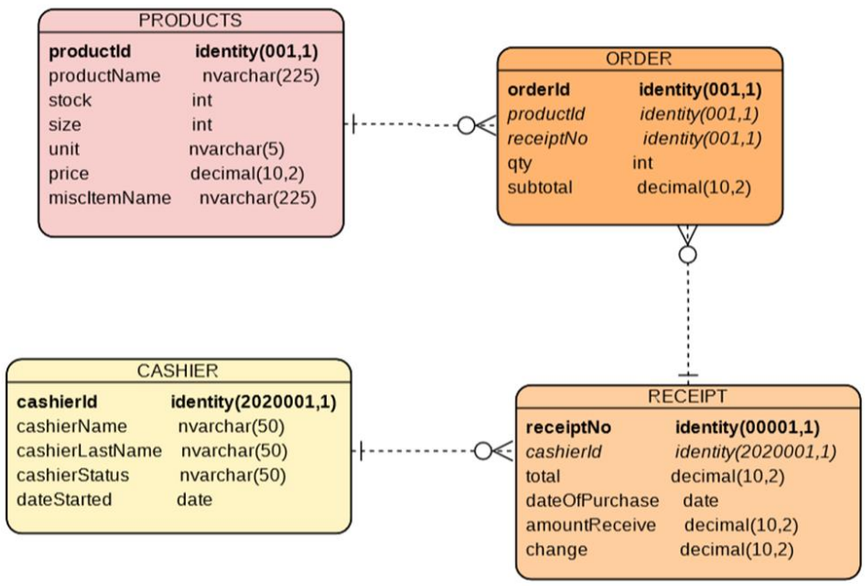

Figure 5: Third ERD Draft

Date: May 15, 2020

Another Friday came by and we finalized the things that are needed to be indicated/ put in each form. We thought of putting a welcome banner and a button alongside of it as the first form to make it more...welcome-y. We also chose from Starbucks' app as a reference on what to put on the main form itself. We thought of using checkboxes for the menu since it was easier. A panel was put on the side and used as a navigation for the following categories—Coffee, Doughnuts, Miscellaneous, and for the checkout. All of these are in one form.

Creating another form was also put into mind—an introduction form to welcome the user. Database connection was also tested—since we're all not familiar with the syntax—to know how it works out if you put it into C#.

Date: May 16, 2020

We sought for the answers on how to connect the database into Visual Studio and studied it carefully to see if it works. Problems have surfaced when the data sent from the SQL server seems to be empty when the database was executed. We checked for the possible errors that would be the cause of the tables being empty. Second problem is that we can't seem to connect with the database to the front end when all of the credentials are correct. Meanwhile, Windows Forms for the products are created along with the comboboxes for the selection of sizes and checkboxes for the selection of the products.

Date: May 17, 2020

Sunday. There's a minimal revision from the column (database) in *dbo.products*. The size is removed and we decided to display it using labels. We also finished the login form for the cashiers. Then, we decided to remove the combobox for the selection of the products' sizes since it will complicate things for the group and then added a textbox for the quantity of the products instead to make it easier.

The syntax for the payment transaction and a form for the receipt was also started this time, however, the receipt form's syntax was not yet finalized.

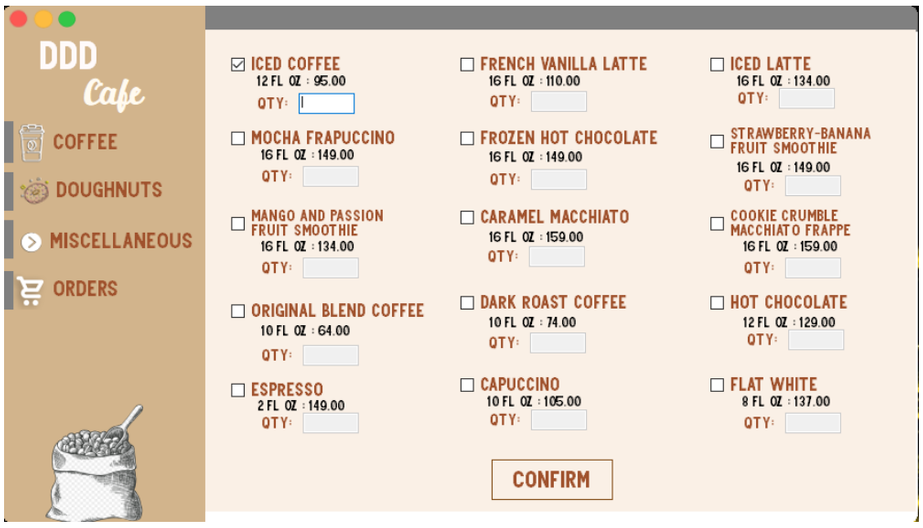

Figure 6: Quantity selection in textboxes

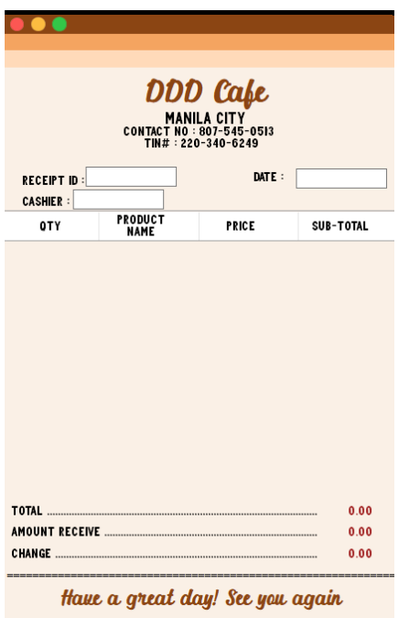

Figure 7: Receipt form

Date: May 18, 2020

Monday, we did some changes for the database, the size and unit tables are removed from *dbo,.Products* since it will complicate the program and make things hard for us. We completed the log-in transaction using the cashierName (cashier's POV). We also worked on how the data from *dbo.Order* will be stored in the Windows Form. Finally, we revised the order process—the user cannot put anything in the quantity text box unless the checkbox from the products is checked and also, it will not accept characters and will only be accepting numerical numbers from 1 to 0 since the quantity is only intended for the numbers

Date: May 19, 2020

Tuesday, we did another revision for the ERD, the size and the unit columns were removed. We attempted to update the stock using the textbox for inputting the quantity. We added another button named *Order Complete* that redirects to another form—the receipt—that was supposed to be clicked when the order is finished. The order panel was also revised, we left the *Total, Amount Received, Change, Reset* textboxes, *Pay,* and *Order Complete* buttons.

Some errors occurred, *dbo.Products* has only 33 rows but it was duplicated resulting to have 66 rows, and the textbox for *Amount Received* is disabled. The error was then accomplished and the textboxes can now be used. Then, finally, we planned on the cashier login. The cashier ID of the cashiers on duty can only be used for the login and a message box will show if the cashier ID entered is from the cashier off duty.

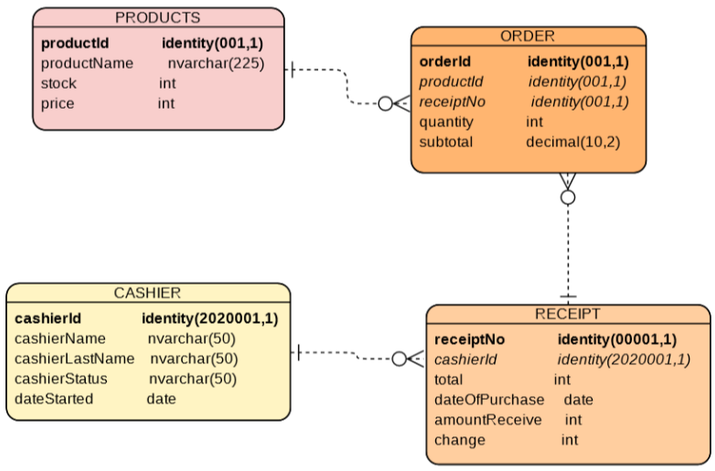

Figure 8: Finalized ERD

Date: May 20, 2020

This day, we attempted to use a class for commands but we encountered some difficulties regarding it. We learned about *datafill* and retrieve records. The login form was a success using the *cashierName*, but the off duty cashiers were still able to login despite the fact that they're off duty.

Date: May 21, 2020

Thursday, we altered the cashier login. When the *cashierId* is inputted on the textbox, another one will show its cashier status. We also started with the documentation and methodology of the whole case study. The quantity stock was successfully updated when a number entered in the textbox for the quantity, it also reflects in the database. The draft documentation was also created. Lastly, we attempted on how to get the price of the item checked from the database.

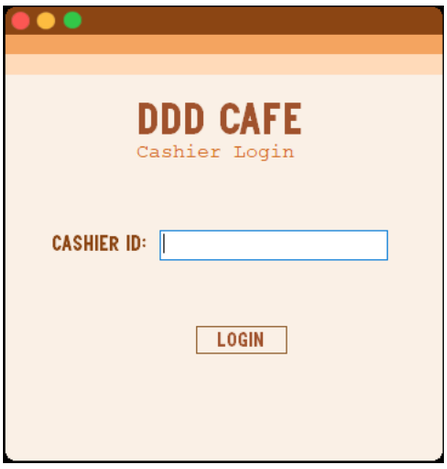

Figure 9: Log-in form attempt

Date: May 22, 2020

Another documentation draft was sent to our group chat. Then, we accomplished how to update the stocks from Database to Visual Studio. Meanwhile, on the cashier login, only the *cashierId* of on duty employees may be only used for login. Otherwise, a message box will show the cashier is off duty and will therefore not proceed on the system.We can now display the price of the checked item in the textbox in the *Orders* panel but, we can't calculate for the subtotal of each item. We then decided to change the main form by inserting the receipt that's going to be displayed with the main form.

It was a very tough decision but, we decided to start from scratch as we've been facing difficulties regarding the whole system itself. By doing so, we did a new form, but instead of multiple checkboxes and text boxes for each product, we decided to put only one text box for the quantity. The flow of it would be the following:

1. Select order from the combobox.
2. Insert the quantity of the products chosen.
3. Compute for subtotal using the subtotal button.
4. Click the *Add Order* button to compute the total.
5. Enter the *Amount Received* from the customer.
6. Click *Pay* to compute for the change.
7. Print invoice.

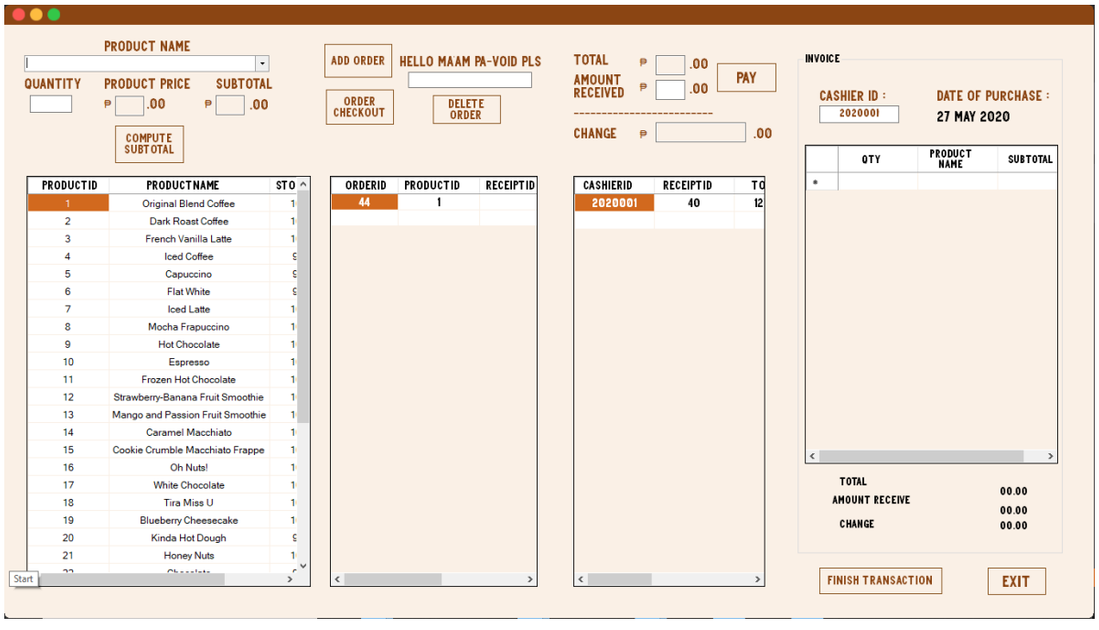

Figure 10: Revised UI design

Date: May 23, 2020

Saturday, we changed the datatype for the *price* from decimal(0,2) to int. We also accomplished so many things in this day including the passing of the inputted cashier id from one form to another, displaying the price of the selected product in its respective textbox, inputting the number of products in the quantity textbox and compute for its subtotal, managed to update the stocks, added another button named *Delete Order* to delete the selected order. When the *Add Order* button is pressed, the products chosen will then be shown in the *datagridview*. The total will be computed if the *Order Complete* is pressed. The *Pay* button works—when the amount received is inputted, the change will then be computed and be shown in the textbox.

The cashier can now delete an order when he clicks the product the customer wishes to be removed from the *datagridview* of the invoice group box. A password is also required in order to remove the item. Otherwise, it cannot be deleted. We also added a button for finished transactions, as we execute the system, it reflects with our database particularly for the *Receipt* table.

Date: May 24, 2020

Sunday came again and another question was raised in our group chat. It was about an error about the cashier ID that was inputted correctly but showed a message box saying *No matching ID. Please try again.* The error was then resolved. There were some minor changes in the program itself like removing some irrelevant comments. Evening came and this document was created with all the important information that is needed to be put in here. It was mostly draft and the narrative reports are in bulleted form but the document was later on filled with information.

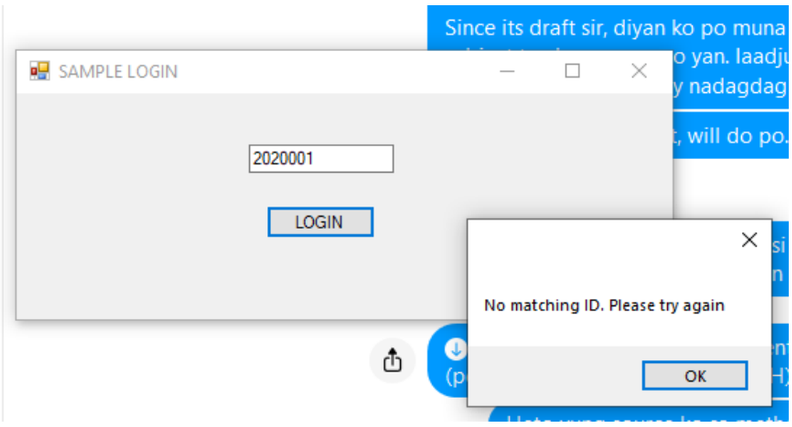

Figure 11: Error occurred

Date: May 25, 2020

This day, the UML Diagrams draft was created with the Entity Relationship, Use-Case, and Sequence Diagrams. There are some information that needs to be put in the document including the definitions of the diagrams, and how it is used. Also, the documentation is also updated and is yet to be finalized.

IV. Summary of Progress

Table 2
Summary of Progress

Date	Activities	Person involve and percentage of completion	
		Person	%
Apr. 23, 2020	Research about UML Diagrams	All	60
Apr. 24, 2020	Planning of Program Output	Jamaica & Jene	70
Apr. 26, 2020	Rest Day	All	-
May 7, 2020	Populating the DDD Café Database	Nicole, Gela, & Jamaica	100
May 14, 2020	Research about the syntax that will be using in the system	All	80
May 19, 2020	ERD Diagram	Nicole & Jamaica	100
	Syntax	All	80
May 22, 2020	Revision of Program Output Plan	Nicole, Gela, & Jamaica	100
	UI design	Jamaica	100
May 24, 2020	DDD Café POS Log-in form Syntax	All	100
	DDD Café POS Mainform Syntax	Nicole, Gela, & Jamaica	80
May 26, 2020	Debugging/Trouble Shooting of DDD Café System	Nicole & Jamaica	80
May 27, 2020	Narrative Report	Nicole & Jamaica	80
	UML Diagrams	Nicole	100
	Documentation	All	100
	Video	All	100