

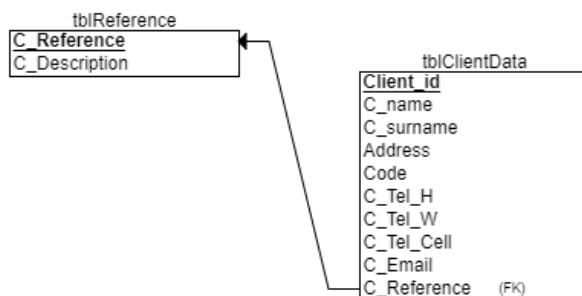
This document contains detailed discussion and suggested solutions for Section B Q4 and Q5 of assignment 2.

It is important that your ERD is correct and that the links between the tables are correct. Some of you have already included a complete ERD in Assignment 1. Verify that your ERD is correct and specifically look at the tables where there are JOINT tables (tables that resolve many-to-many relations).

## Question 4 – ERD

Your ERD may look different, however, it is important that you resolve the issues relating to many-to-many relations. If you are not sure how to normalise a table to 3NF, refer to the suggested solutions for Assignment 1.

What we currently have is the ERD for tblClientData and tblReference (from Assignment 1).



[Note: I've used a free online tool, <https://erdplus.com> (relational schema option), to create and demonstrate the relationships between the tables.]

Before you start with normalising the rest of the tables and linking them, keep in mind that some tables should be created before the rest. For instance, you need to create the Suppl\_info (Supplier) table before you can use the information in the Supplement table. In a similar way, should you decide to split the Banking information from the Suppl\_Info table then you need to create the Banking table before you can use the information in the Suppl\_Info table.

### a. **tblSuppl\_info [this table stores the information of the suppliers] [ Worksheet: Suppl\_Info]**

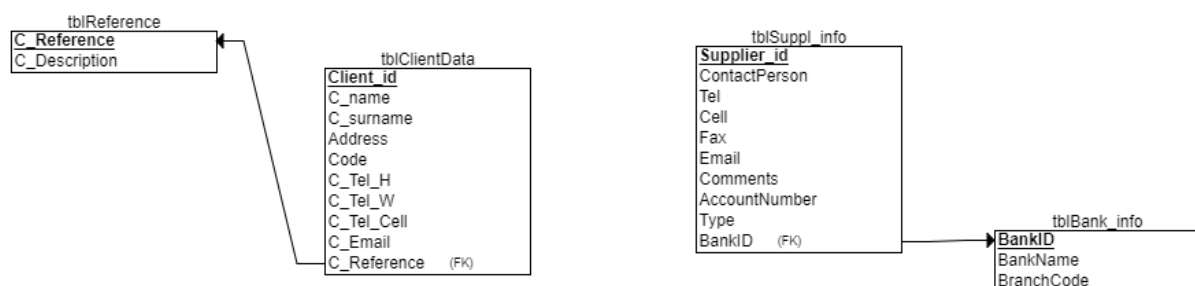
There is a field Bank in this table. I am going to split the table and capture the Bank details in a separate table. The AccountNumber and Type stays with the Supplier table as this will be unique to the specific Supplier.

Field name	Example of data	Note to myself	Possible field type	Can I do validation on this field?
Supplier_id (PK)	SUPPLIER A		Text. PK.	
ContactPerson	John Adams		Text	
Tel				Yes. Pre-defined format. RegExp
Cell			Text	Yes. Pre-defined format. RegExp

Fax			Text	Yes. Pre-defined format. RegExp
Email			Text	Yes. Pre-defined format. RegExp
BankID (FK)			Text	Yes. DropDown list from another table
AccountNumber	01887092		Text	
Type	Cheque	(I may create a separate table for this as well)	Text	Dropdown list.

**tblBank\_info** [this table stores the information of the banks and can be used as a drop down in the tblSuppl\_info in the BankID field] [Worksheet: Suppl\_info]

Field name	Example of data	Note to myself	Possible field type	Can I do validation on this field?
BankID (PK)	SB11813	<i>Make a combination of the BankName and BranchCode the BankID</i>	Text	
BankName	Standard Bank			
BranchCode	11813		Text	



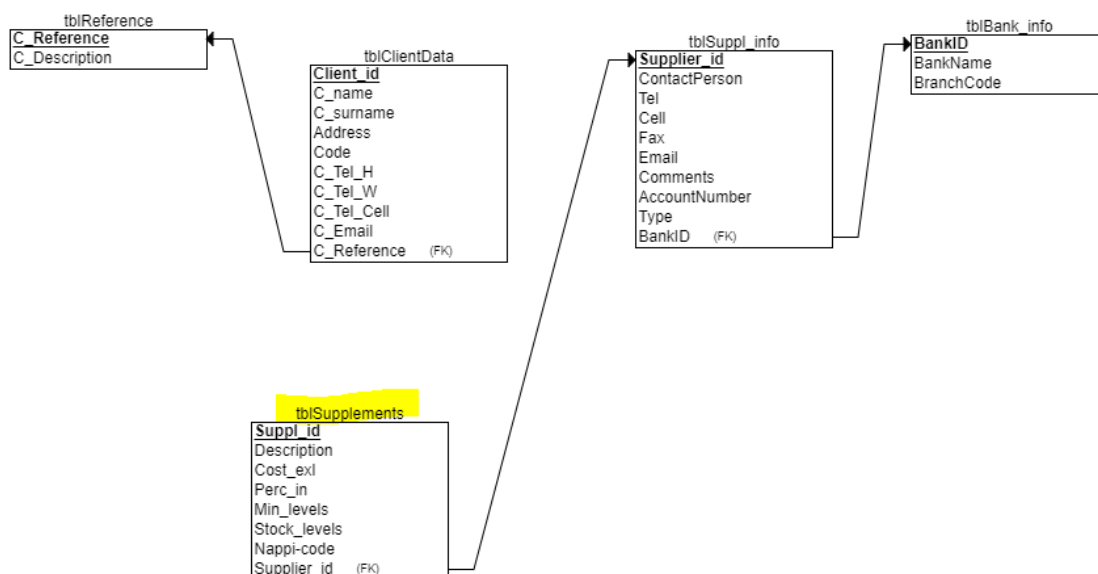
Create the tables in your preferred database, e.g. MySQL and import the data from the Spreadsheet Suppl\_info into the tblSuppl\_info and tblBank\_info tables. Add the required data for the tblBank\_info first!

Now we can proceed to create the Supplements table.

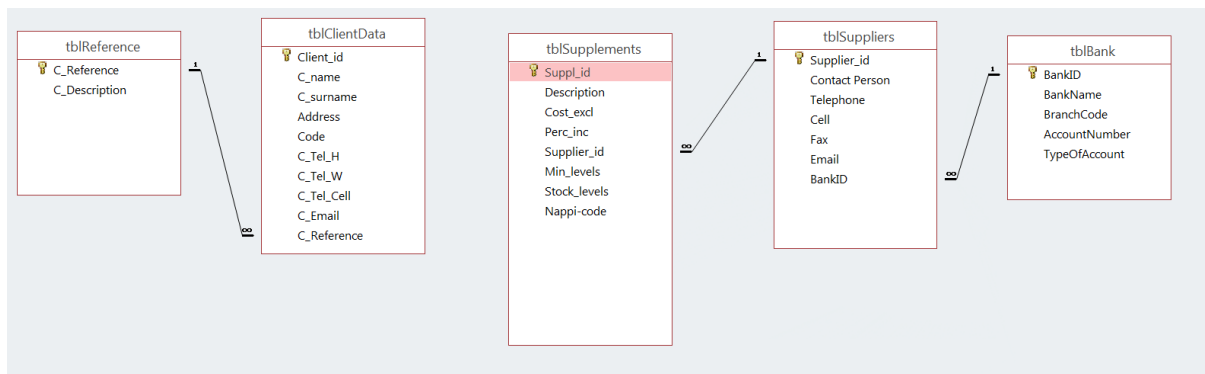
**b. tblSupplements [this tables stores the information of the supplements] [Worksheet: Supplements]**

Field name	Example of data	Note to myself	Possible field type	Can I do validation on this field?
Suppl_id (PK)	Supplement-1 or something such as Vitamin A.		PK	No. But it must be unique
Description	Any text			
Cost_excl	Currency / Numbers		Currency or Number(6,2)	No
Perc_inc	Currency / Numbers		Currency or Number(6,2)	
Supplier_id	SUPPLIER A SUPPLIER B	Seems to be a fixed list of information.	Text	Yes. Drop-down list from another table
Min_levels	10		Number	
Stock_levels	28		Number	
Nappi-code		There is no example, look for examples of Nappi-code on the internet		Possible.

For the purposes of this project, I am going to keep the tblSupplements table as with the fields as indicated. The Supplier\_id field is a FK and links to the Supplier\_id (PK) in the tblSuppl\_Info table. Note: I am not including the fields Cost\_incl and Cost\_client as I can use a formula at any stage to determine this. [Think of the increase of VAT]. The tables thus far:



## In MS Access



Export the data from the Spreadsheet and Import in tblSupplements. Remember to remove the columns Cost\_incl and Cost\_client when you export and import and take care that the columns are in the correct order. When you are done, verify that the data was imported correctly!

### Now for the last part. The INVOICE sections.

Let's look at the Invoice worksheet very carefully.

It consists of different sections: the first section captures the information of the INVOICE (INVNUM, INV\_DATE and CONSULTATION FEE) including the details of the client (CLIENT\_ID).

Then there are multiple sections that captures for that specific invoice the supplement information, Suppl1 ... Suppl7. From this I can determine that more than one supplement can be purchased and should be listed on the invoice. The information (Suppl\_ID, Price (at that given instance - remember I need to capture the information at that given time) and quantity ordered (in the system you will need to verify that there is indeed still stock available of that specific supplement and have some kind of a flag that will warn the user of the system when the stock runs low – see the Min\_levels field in the tblSupplements). The field PriceSuppl can be calculated – not necessary to create a field in the database for it.

A	B	C	D	E	F	G	H	I	J	K	L	M
INVNUM	Inv_date	Client_id	Consultation	Suppl1	Price	Quantity	PriceSuppl1	Suppl2	Price	Quantity	PriceSuppl2	St
7 INV01456	03 January 2017	2303030988083	480.00	Supplement-56	4825.72	1	4825.72	Supplement-51	192.83	4	771.31	
8 INV01457	03 January 2017	531127094084	480.00	Supplement-142	178.72	5	893.60					
9 INV01458	13 January 2017	4103240120082		Supplement-229	218.07	3	654.20					
0 INV01459	17 January 2017	7202270202087	480.00	Supplement-195	328.94	2	657.88					
1 INV01460	18 January 2017	47120603088		Supplement-243	195.56	2	391.12	Supplement-139	184.78	2	369.56	
2 INV01461	18 January 2017	6310200940086		Supplement-76	353.50	4	1414.00					
3 INV01462	23 January 2017	5608240727082	480.00	Supplement-244	360.34	4	1441.36	Supplement-18	214.42	5	1072.10	
4 INV01463	26 January 2017	8104260177081	480.00	Supplement-211	280.54	3	841.62	Supplement-100	145.83	5	729.14	
5 INV01464	28 January 2017	3610150249083	480.00	Supplement-46	238.36	2	476.72					
6 INV01465	03 February 2017	9710230788081	480.00	Supplement-18	214.42	3	643.26					
7 INV01466	03 February 2017	7312170466084	480.00	Supplement-3	282.16	4	1128.65					
8 INV01467	09 February 2017	3211200919082		Supplement-244	360.34	1	360.34	Supplement-17	287.58	2	575.15	
9 INV01468	12 February 2017	5602060518087		Supplement-226	150.48	3	451.44					
0 INV01469	12 February 2017	51022203245081		Supplement-227	361.30	2	1083.00	Supplement-16	204.20	1	204.20	

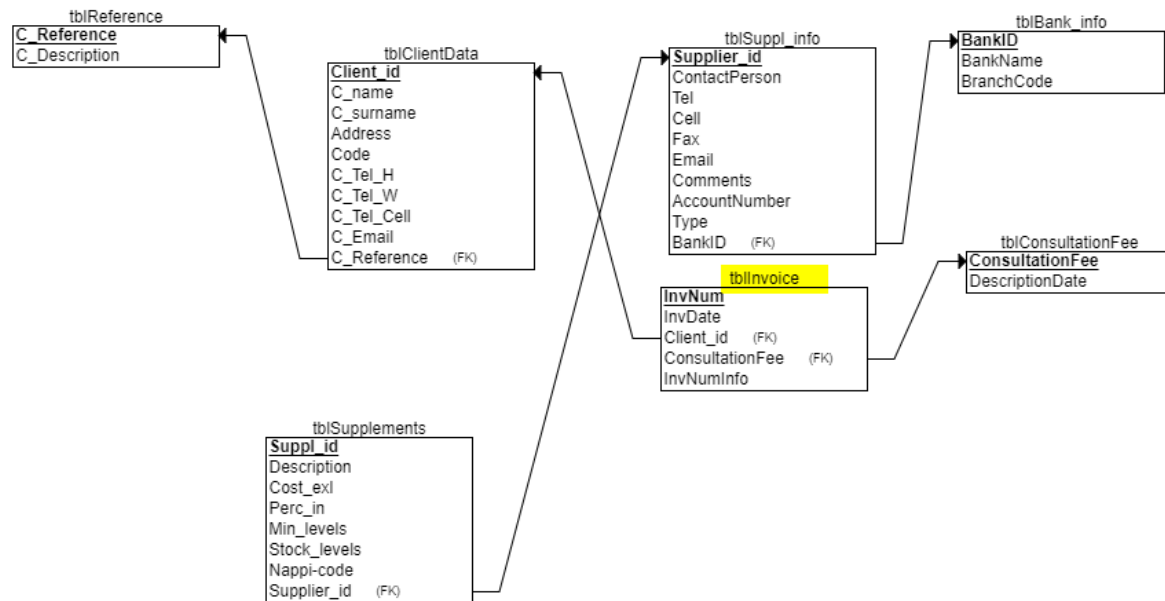
From the information just mentioned, create a separate table to capture the main tblInvoice details and create a separate table that will capture the invoice items, tblInvItems.

**c. tblInvoice [this table will capture the main details for the INVOICE] [Worksheet: Invoice\_info]**

Field name	Example of data	Note to myself	Possible field type	Can I do validation on this field?
InvNum (PK)	INV00001	Made-up of INV + a 5 digit number converted to text.	Text	PK. Yes, the next invoice number should follow the last invoice number. E.g. INV01516 → INV01517
InvDate	CurrentDate			
ClientID (FK)	6308240548084	13 characters long		Yes. Drop-down from tblClientData
ConsultationFee (FK)		Seems to be consistent and only changes after a time – then the same for each consultation	Currency	Yes. Drop-down list from another table – create a tblConsulationFee
InvNumInfo		To keep comments on the invoice???		

**d. tblConsultationFee [ this table keeps a record of all the consultation fees and when it was updated. Used to populate the ConsultationFee field in the tblInvoice] [Worksheet: Invoice\_info]**

Field name	Example of data	Note to myself	Possible field type	Can I do validation on this field?
ConsultationFee (PK)	Currency			
DescriptionDate	Date	Indicate date that new fee was initiated	Date	

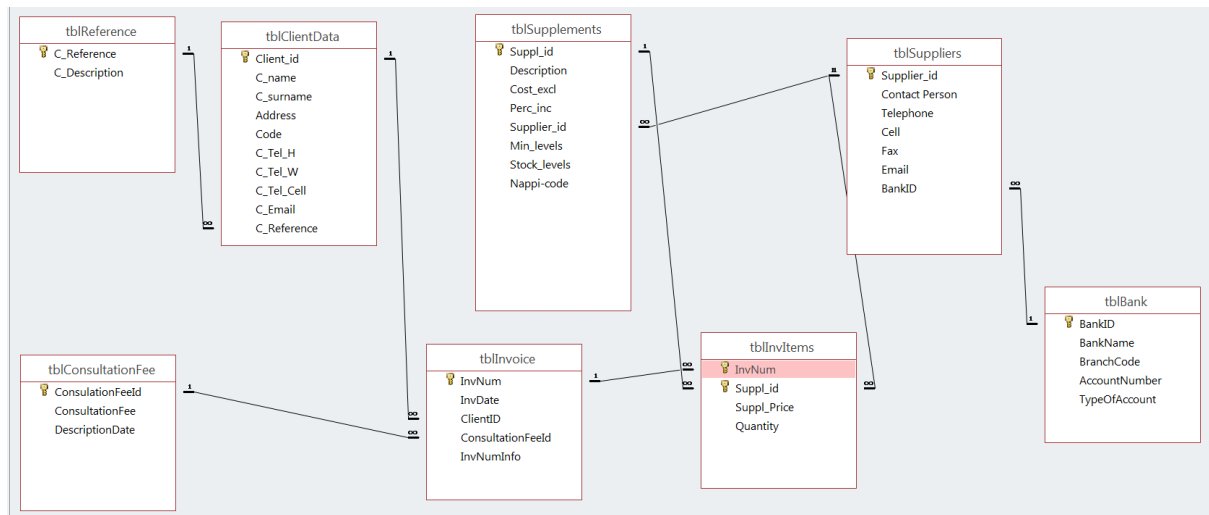


- e. **tblInvItems** [ this tables keep record of the different items (supplements) for each of the invoices. The price quoted for each client is also recorded in this table as it should not change when the new prices for a supplement is recorded. The Quantity field should be checked against the stock levels and the minimum order levels] [Worksheet: Invoice\_info]

Field name	Example of data	Note to myself	Possible field type	Can I do validation on this field?
InvNum (PK1) (FK1)	INV000Suppl01	Links back to tblInvoice the INVNUM	Text	Dropdown
Suppl_id (PK) (FK2)	Supplement-1 or something such as Vitamin A.	Links back to tblSupplements to to the Suppl_id field	Text	Dropdown
Suppl_Price		The price that appears on the invoice of the client: (Cost_excl + Perc_inc) * VAT	Currency	Formula
Quantity		Number		Check that there is still stock. If stock there is stock, allocated it. Otherwise allocate the stock available.

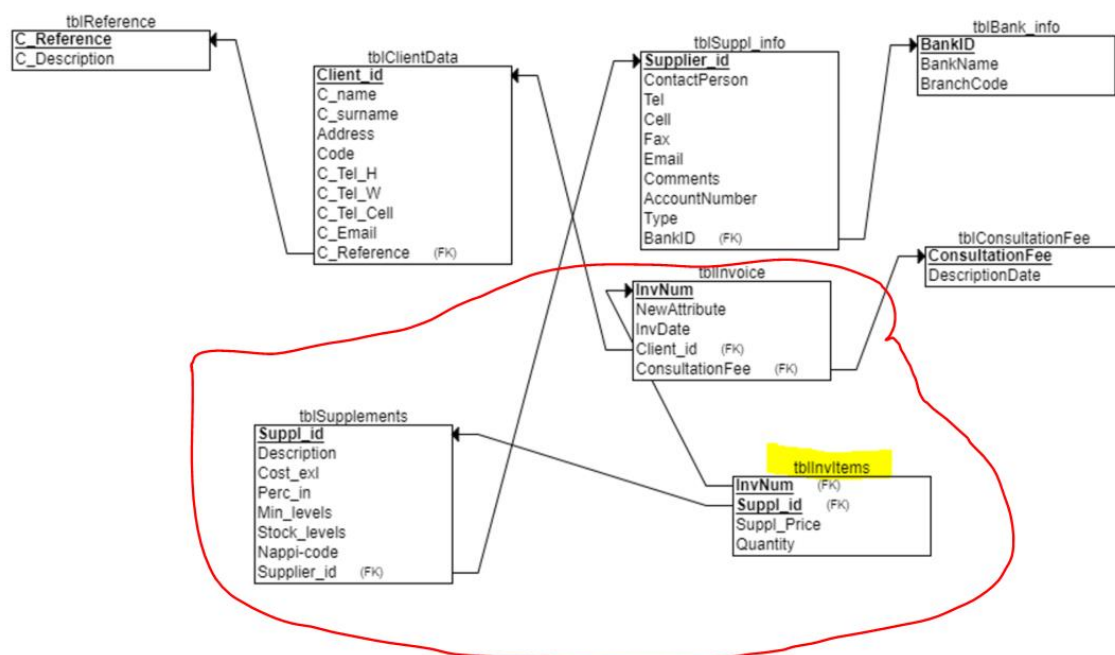
				Create a flag or table to list the items that are below stock_level.
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This tables thus far:



The same ERD created in <https://erdplus.com/#/standalone>. It gives an indication of the FKs as well.

This is most probably one of the most important components in the ERD. The **tblInvItems** is the **JOINT** table between **tblSupplements** and **tblInvoice**. Thus, an Invoice can have multiple supplement items (this is captured in the **tblInvItems** table).

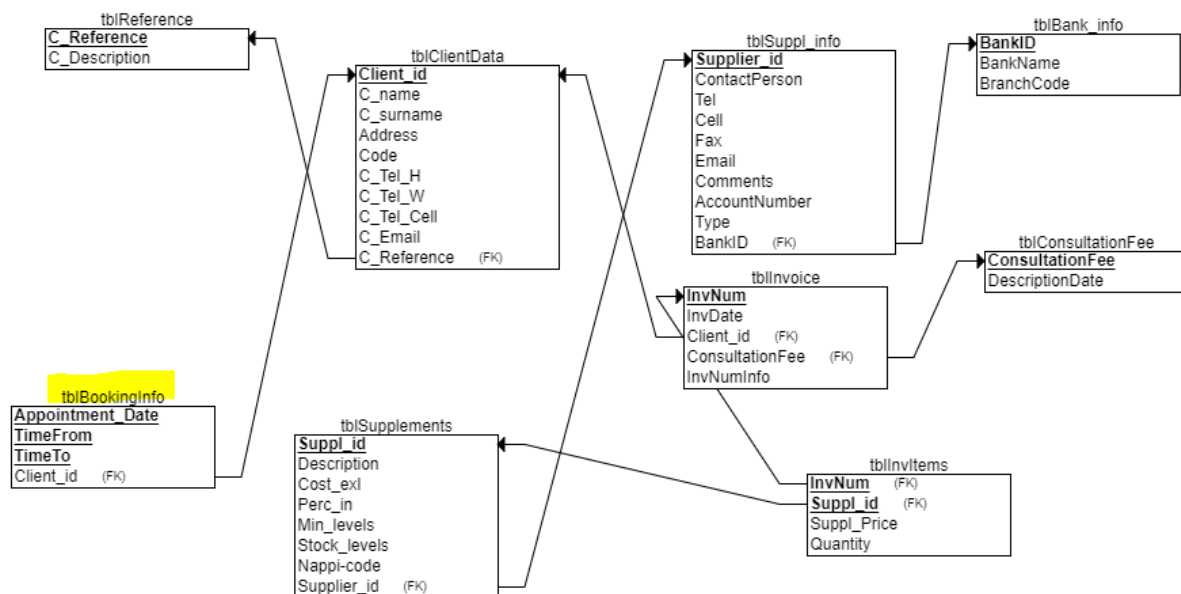


The FUN part is now to extract the data from the Invoice\_info worksheet and exporting it to tblInvItems. [Suggestion – create a separate worksheet and work with (manipulate) the data in that worksheet before exporting to a .csv file].

**f. tblBookingInfo [ this tables keep record of the bookings / appointments made]**

Field name	Example of data	Note to myself	Possible field type	Can I do validation on this field?
<b>Appointment_Date (PK)</b>	<b>Date</b>		<b>Date</b>	<b>YYYYMMDD</b>
<b>Client_ID (FK)</b>				
<b>TimeFrom (PK)</b>	<b>14:00</b>		<b>Text</b>	
<b>TimeTo (PK)</b>	<b>15:00</b>		<b>Text</b>	

The ERD thus far:



[Hint: I've used some Excel functions to split the time presented in the BookingInfo.xlsx in two. What I've also decided to do was to allocate hourly slots, thus if an appointment is from 14:00 to 16:00, then the appointment is split. For example:

Original Entry:

Appointment_Date (PK)	Client_ID	TimeFrom (PK)	TimeTo (PK)
<b>20120526</b>	1307090536085	<b>7:00</b>	<b>9:00</b>



New Entry:

Appointment_Date (PK)	Client_ID	TimeFrom (PK)	TimeTo (PK)
<b>20120526</b>	1307090536085	<b>7:00</b>	<b>8:00</b>
<b>20120526</b>	1307090536085	<b>8:00</b>	<b>9:00</b>

In this process I've realised that there are many "duplicate" entries, that is, clients are booked during the same time slots. I have decided to not "delete" any of the entries and rather adjust some of the time slots. Figuring that it is worth more for the Healthcare practitioner to know that a specific client was indeed there than the actual time slot.]

## Q5 – DDD – For the phase that you are going to develop

There are many examples of DDD on the internet and you have covered it your second year level and 3<sup>rd</sup> year level database module.

The purpose of the DDD is to give us an indication that you understand the **dependencies** of the data within your system. The ERDs that you've been developing thus far, would also help you in this process. As we have already created an ERD that is in 3NF, we will only present the DDD already in 3NF. In your DDD make sure that you indicate how the one piece of data is dependent on another piece of data. For example, the CLIENT\_ID in the table tblBookingsInfo is dependent on whether the CLIENT\_ID is entered in tblClientData. Another example, the BankID in tblBank\_info is a combination of the BankName and the BranchCode., etc. In the DDD you should also indicate that you understand what data should be captured first, before a next step can be taken. You have already covered some of it in the ERD and DFD, now present it as DDD.

We will look at each DDD separately as it will depend on YOUR ERD and the phase of the system that you've decided to develop.