



University of the Philippines Tacloban College
Division of Management

BA 183.1 - MN

Introduction to Information Technology (FS 2023-2024)

First Semester SY 2023-2024

DOCUMENTATION

Term-end Project:

Prototyping of a Simple Macro Application

Submitted by

Artoza, Lhian Jie T.

Cañas, Juv F.

Dayo, Danna Trisha Q.

Verunque, Harley

Submitted to

Engr. Noel Elizaga

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INTRODUCTION

Prototyping is simply the experiment of creating a product to test a process and ideation (Britannica Dictionary, n.d.). Moreover, the concept of prototyping goes beyond what product is interesting, rather it encapsulates rational reasons why people pitch ideas to create something beneficial to the industries and the society. Hence, students from BA 183.1 section MN, Group 3 had come up with an idea as their Term-end Project, which is the final requirement of the course. Further, with the help of their instructor, Engr. Noel Elizaga, the proposed idea has finally been realized.

AquaFlow Management Program is a multi-functional macro-based dialogue system that computes given data and inputs by the end user. After the internal computation, the system then delivers the information to its designated sheets. For this program, the group chose the Water For Less establishment as their subject. The Water For Less is a water refilling station located at Sto. Niño St. Extension, Barangay 2, Tacloban City 6500, Leyte. The organization's business nature is to provide goods and services to their customers, most likely residences near their vicinity.

The consolidated purposes of this ideation are to immerse local businesses in advancements, adapt to emerging digital technology, and increase efficiency and productivity among businesses. Thus, realizing the importance of progress and taking advantage of it will be of help to the community.

OVERVIEW

Pointers	Description
Prototype Specifications	<p>Name: AquaFlow Management Program</p> <p>Main Features:</p> <ul style="list-style-type: none"> • Inventory System • Delivery System • Cash Flow System • Information Summary <p>Prospect: Water For Less Refilling Station</p> <p>Nature of Business: Goods and Services</p> <p>Address: Sto. Niño St. Extension, Barangay 2, Tacloban City 6500, Leyte</p> <p>Software used: LibreOffice Calc (LibreOffice Basic)</p> <p>Programming Language: Visual Basic</p> <p>No. of Modules: 4 modules</p> <p>No. of Dialogue: 4 dialogue boxes</p>
List of Functions	<ol style="list-style-type: none"> 1. <i>posWaterLess (Inventory)</i> <ul style="list-style-type: none"> ○ In this function, it calls the object (dialogue box) designated for its functionalities. 2. <i>delWaterLess (Delivery)</i> <ul style="list-style-type: none"> ○ In this function, it calls the object (dialogue box) designated for its functionalities. 3. <i>cashWaterLess (Cash Flow)</i> <ul style="list-style-type: none"> ○ In this function, it calls the object (dialogue box) designated for its functionalities. 4. <i>cellVarHandling</i> <ul style="list-style-type: none"> ○ This function connects the macro codes from the back-end to the database (spreadsheet) by calling the value of cells (columns and rows). 5. <i>buttonHome</i> <ul style="list-style-type: none"> ○ This is the main page of information on the AquaFlow Management Program. It also provides an interface for its features and other group-related information. 6. <i>buttonClose</i> <ul style="list-style-type: none"> ○ When executed, close the object. 7. <i>buttonCalculate</i> <ul style="list-style-type: none"> ○ This function holds control of the inventory, delivery, and cash flow system. From the declaration of variables, conversion of text characters to numeric ones, conditional, and formula.

Table 1 Overview of the Prototype

PROCEDURE

1. Identify the systems needed and research more about them.

Dictionary
Definitions from Oxford Languages | Learn more

in·ven·to·ry
/ɪn'ven,tɔrɪ/

noun

a complete list of items such as property, goods in stock, or the contents of a building.

Similar: list, listing, catalog, directory, record, register, checklist

verb

make a complete list of.
"I inventoried his collection of drawings"

cash flow | Business English
the movement of money into and out of a company's accounts, used as a measure of how much money the company spends and receives and how much profit it makes over a particular period of time: good/healthy/strong cashflow It is a well-run company with strong cashflow.

Cambridge Dictionary
<https://dictionary.cambridge.org> › dictionary › cash-flow

Meaning of cash flow in English - Cambridge Dictionary

What is the service delivery system?

Service delivery is a system or framework that provides products or services to customers in need. This framework can also include the channels of communication and interaction between a consumer and a service provider. Mar 18, 2023

Indeed
<https://ca.indeed.com> › ... › Career Development

What Is Service Delivery? (With Importance and Types) - Indeed

2. Gather information about the prospect and how their operations work.



3. Create and design the desired interface of the dialogue boxes.

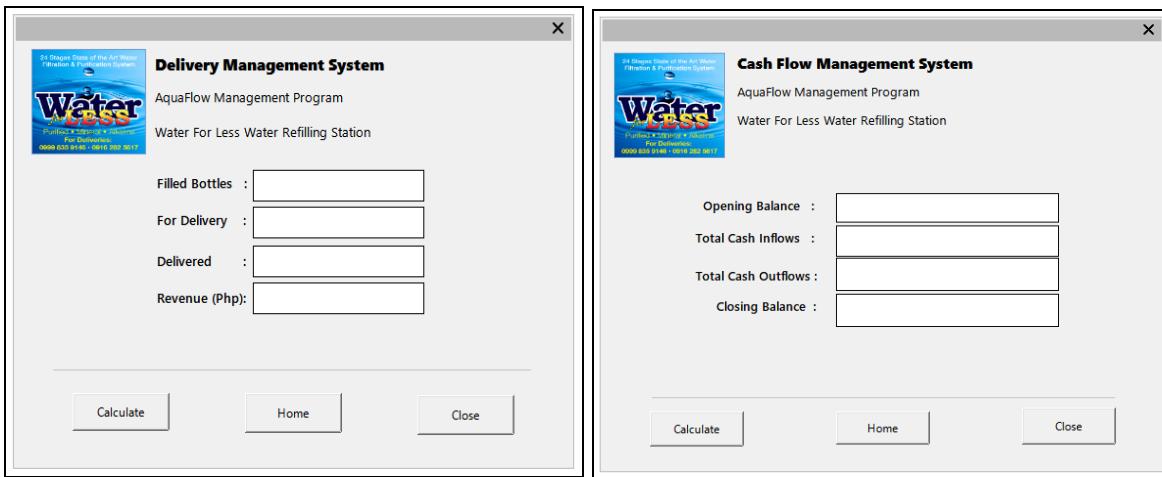
AquaFlow Management Program
Water For Less Water Refilling Station
BA 183.1 MN - Group 3 Solutions
Artoza, Lhian Jie T. Dayo, Danna Trisha
Canas, Juv F. Verunque, Harley N

Inventory System **Delivery System** **Cash Flow System**

All content and information on the program is for informational and educational purposes only.

Inventory Management System
AquaFlow Management Program
Water For Less Water Refilling Station

Total Bottles :
New Bottles :
Delivered :
Ending Inventory :



4. Create, add, modify, and manipulate the source code given based on the functions of the features.

(Group3BA183.1TermEndPrototypeProject.ods) Standard

```

Object Catalog
  Standard
    Module1
      main
      posWaterLess
      buttonClose
      buttonCalculate
      cellVarHandling
    Module2
      main
      delWaterLess
      buttonClose
      buttonCalculate1
      cellVarHandling
    Module3
      main
      buttonHome
      buttonClose
    Module4
      main
      cashWaterLess
      buttonClose
      buttonCalculate2
      cellVarHandling
      CashFlow
      DeliverySys
      Home
      Inventory

```

```

41 ***** Group 3_AquaFlow Management Program *****
42 REM ******
43 option explicit
44 ' defines objInventory variable as global variable for the Dialog window
45 dim objInventory as object
46
47 sub main()
48   dim objInventory as object
49   call posWaterLess()
50 end sub
51
52 sub posWaterLess()
53   ' establishes interface between Calc Macro interpreter and Dialog window; opens the Dialog1 window
54   objInventory = CreateUnoDialog(DialogLibraries.getByName("Standard").getByName("Inventory"))
55   objInventory.execute()
56 end sub
57 REM ******
58
59 sub buttonClose()
60   ' closes the dialog window upon clicking the CommandButton1 [Close]
61   dim y as integer
62   y = msgbox ("Do you want to quit the program?", 1)
63   if y = 1 then
64     objInventory.endExecute
65     msgbox "Please save the worksheet before closing the program!"
66   endif
67 end sub
68
69 REM ******
70
71 function cellVarHandling(d, e, f)
72   dim oSheet as object
73   dim oCell as object
74   dim v as string
75
76   oSheet = ThisComponent.getSheets().getByIndex(5)           ' sets control to Sheet6
77   oCell=oSheet.getCellByPosition(0,0)                         ' focuses on cell A1
78   v=oCell.getValue()                                         ' gets the number at A1 that corresponds to the last
79
80   oCell.setValue(int(v)+1)                                    ' sets the number at A1 for the next empty row at Sheet6
81
82   oSheet = ThisComponent.getSheets().getByIndex(4)           ' sets control to Sheet5
83   oCell=oSheet.getCellByPosition(0,v)                         ' sets the TransID for the current transaction at next row
84   oCell.setValue(v)
85
86   oCell=oSheet.getCellByPosition(1,v)                         ' sets the Opening Balance for the current transaction
87   oCell.setValue(d)
88
89   oCell=oSheet.getCellByPosition(2,v)                         ' sets the Total Cash Inflow for the current transaction
90   oCell.setValue(e)
91
92   oCell=oSheet.getCellByPosition(3,v)                         ' sets the Total Cash Outflow for the current transaction
93   oCell.setValue(f)
94
95   oCell=oSheet.getCellByPosition(4,v)                         ' sets the Date for the current transaction at next row
96   oCell.setString(now())
97
98   oCell=oSheet.getCellByPosition(5,v)                         ' sets the Closing Balance for the current transaction at next row
99   oCell.setValue(d+(e-f))
100

```

Module1 Module2 Module3 Module4 | CashFlow | DeliverySys | Home | Inventory | Group3BA183.1TermEndPrototypeProject.ods.Standard.Module1.posWaterLess | Ln 15, Col 1 | 110%

(Group3BA183.1TermEndPrototypeProject.ods) Standard

```

Object Catalog
  Standard
    Module1
      main
      posWaterLess
      buttonClose
      buttonCalculate
      cellVarHandling
    Module2
      main
      delWaterLess
      buttonClose
      buttonCalculate1
      cellVarHandling
    Module3
      main
      buttonHome
      buttonClose
    Module4
      main
      cashWaterLess
      buttonClose
      buttonCalculate2
      cellVarHandling
      CashFlow
      DeliverySys
      Home
      Inventory

```

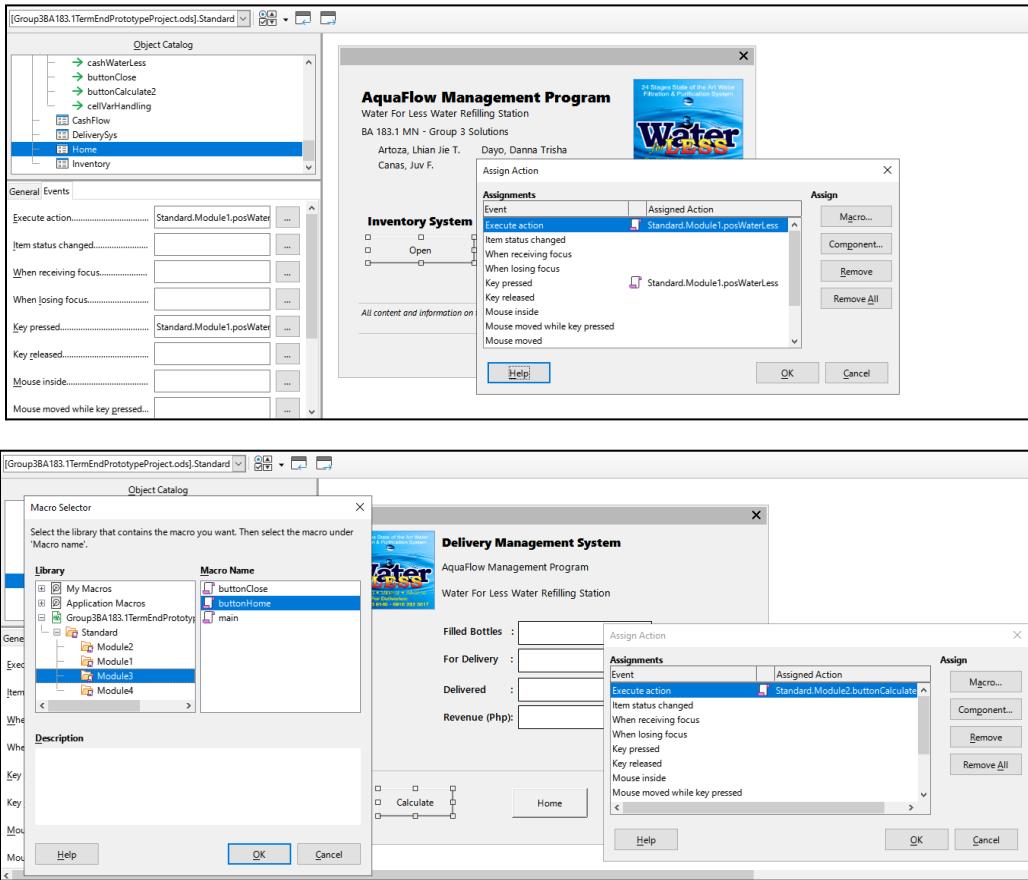
```

69 REM ******
70
71 function cellVarHandling(d, e, f)
72   dim oSheet as object
73   dim oCell as object
74   dim v as string
75
76   oSheet = ThisComponent.getSheets().getByIndex(5)           ' sets control to Sheet6
77   oCell=oSheet.getCellByPosition(0,0)                         ' focuses on cell A1
78   v=oCell.getValue()                                         ' gets the number at A1 that corresponds to the last
79
80   oCell.setValue(int(v)+1)                                    ' sets the number at A1 for the next empty row at Sheet6
81
82   oSheet = ThisComponent.getSheets().getByIndex(4)           ' sets control to Sheet5
83   oCell=oSheet.getCellByPosition(0,v)                         ' sets the TransID for the current transaction at next row
84   oCell.setValue(v)
85
86   oCell=oSheet.getCellByPosition(1,v)                         ' sets the Opening Balance for the current transaction
87   oCell.setValue(d)
88
89   oCell=oSheet.getCellByPosition(2,v)                         ' sets the Total Cash Inflow for the current transaction
90   oCell.setValue(e)
91
92   oCell=oSheet.getCellByPosition(3,v)                         ' sets the Total Cash Outflow for the current transaction
93   oCell.setValue(f)
94
95   oCell=oSheet.getCellByPosition(4,v)                         ' sets the Date for the current transaction at next row
96   oCell.setString(now())
97
98   oCell=oSheet.getCellByPosition(5,v)                         ' sets the Closing Balance for the current transaction at next row
99   oCell.setValue(d+(e-f))
100

```

Module1 Module2 Module3 Module4 | CashFlow | DeliverySys | Home | Inventory | Group3BA183.1TermEndPrototypeProject.ods.Standard.Module4.cellVarHandling | Ln 71, Col 1 | 110%

5. Integrate the macro codes into the dialogue boxes such as the text fields, buttons, and other elements.



6. Debug the program if errors persist.

```

32 end sub
33
34
35 REM*****
36
37 Sub buttonCalculate1()
38     ' Defines the respective types of variables local to the buttonCalculate() subroutine
39     Dim fBottles As Object, forDel As Object, beDel As Object, inRev As Object ' Data from textfields
40     Dim fBottlesValue As Single, forDelValue As Single, beDelValue As Single
41     Dim toinRev As Double ' Variable to hold values from the textfields
42
43     ' Establishes read control
44     Set fBottles = objDeliverySys
45     Set forDel = objDeliverySys
46     Set beDel = objDeliverySys
47     Set inRev = objDeliverySys
48
49     ' Converts text from Text
50     fBottlesValue = CSng(fBottles.text)
51     forDelValue = CSng(forDel.text)
52     beDelValue = CSng(beDel.text)
53
54     ' Evaluates the contents of fBottles, forDel, and beDel variables using IF statement; both of them have to be
55     If fBottlesValue > 0 And forDelValue > 0 And beDelValue > 0 Then
56
57         ' If "qtyValue > 0 And uPriceValue > 0" condition is TRUE, then the code calculates the ending inventory
58         toinRev = (fBottlesValue - forDelValue - beDelValue) * 30
59
60         ' Places the toendingInv value into Textfield4 for display
61         inRev.text = toinRev
62         ' call it with the correct parameters
63         cellVarHandling fBottlesValue, forDelValue, beDelValue

```

An error dialog box is overlaid on the code editor, showing a BASIC runtime error: "Object variable not set." The error message points to line 44, specifically the line "Set fBottles = objDeliverySys".

7. Create different test cases for each system and experiment.

- Total Bottles: 100
 - New Bottles: 50
 - Delivered: 135
 - Ending Inventory: 15

- **Filled Bottles:** 150
 - **For Delivery:** 46
 - **Delivered:** 30
 - **Revenue:** Php 2,220.00

8. The prototype has been realized.

The screenshot shows a Microsoft Excel spreadsheet titled "G11" with a tab bar at the bottom containing "Inventory Management System", "Sheet2", "Delivery Management System", "Sheet4", "Cash Flow Management System", "Sheet6", and "Information Summary". The main table has columns: Transaction No., Total Bottles, New Bottles, Delivered, Date of Transaction, and Ending Inventory. Rows 1 through 12 show data starting from row 2. Row 13 is blank. Rows 14 through 28 show a repeating pattern of 100, 50, 135, 12/14/2023, and 15 respectively.

Inventory Management System
AquaFlow Management Program
Water For Less Water Refilling Station

	A	B	C	D	E	F
1	Transaction No.	Total Bottles	New Bottles	Delivered	Date of Transaction	Ending Inventory
2	1	100	50	135	12/14/2023 00:19:33	15
3	2	100	50	135	12/14/2023 00:21:22	15
4	3	145	63	78	12/14/2023 00:43:07	130
5	4	145	78	94	12/14/2023 00:43:55	129
6	5	100	50	142	12/14/2023 00:46:20	8
7	6	100	50	135	12/14/2023 06:41:57	15
8	7	100	50	135	12/14/2023 09:11:36	15
9	8	100	50	135	12/14/2023 09:20:13	15
10	9	100	50	135	12/14/2023 11:23:18	15
11	10	100	56	89	12/15/2023 00:12:15	67
12	11	100	56	89	12/15/2023 00:22:38	67
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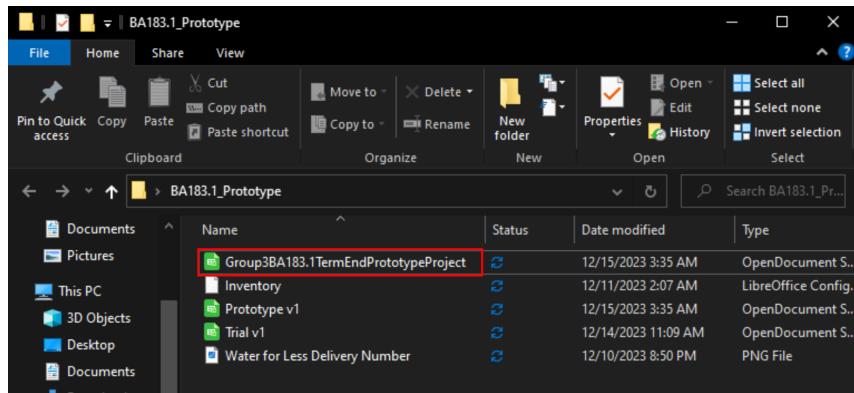
Total Bottles : 100
New Bottles : 56
Delivered : 89
Ending Inventory : 67

Calculate **Home** **Close**

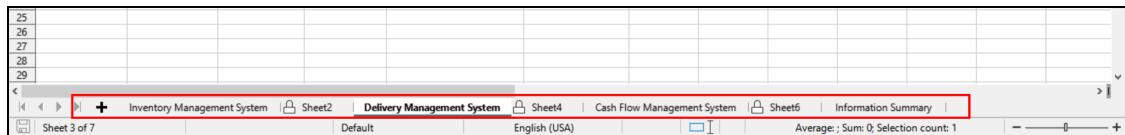
TRY IT YOURSELF!

Step 1: Open the spreadsheet containing the macrocodes e.g.,

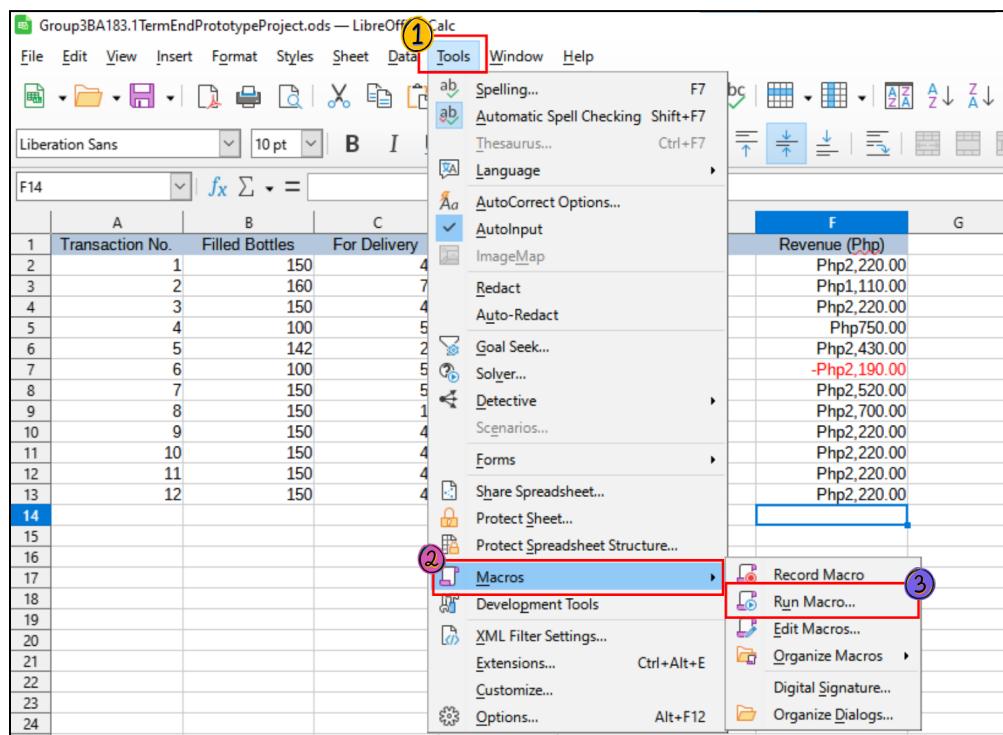
[Group3BA183.1TermEndPrototypeProject.ods](#)

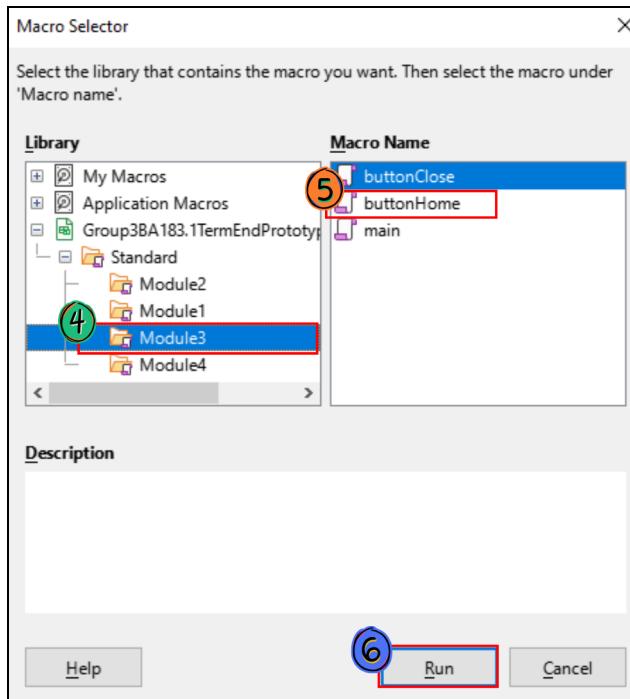


Step 2: Click on the sheet you want to try.

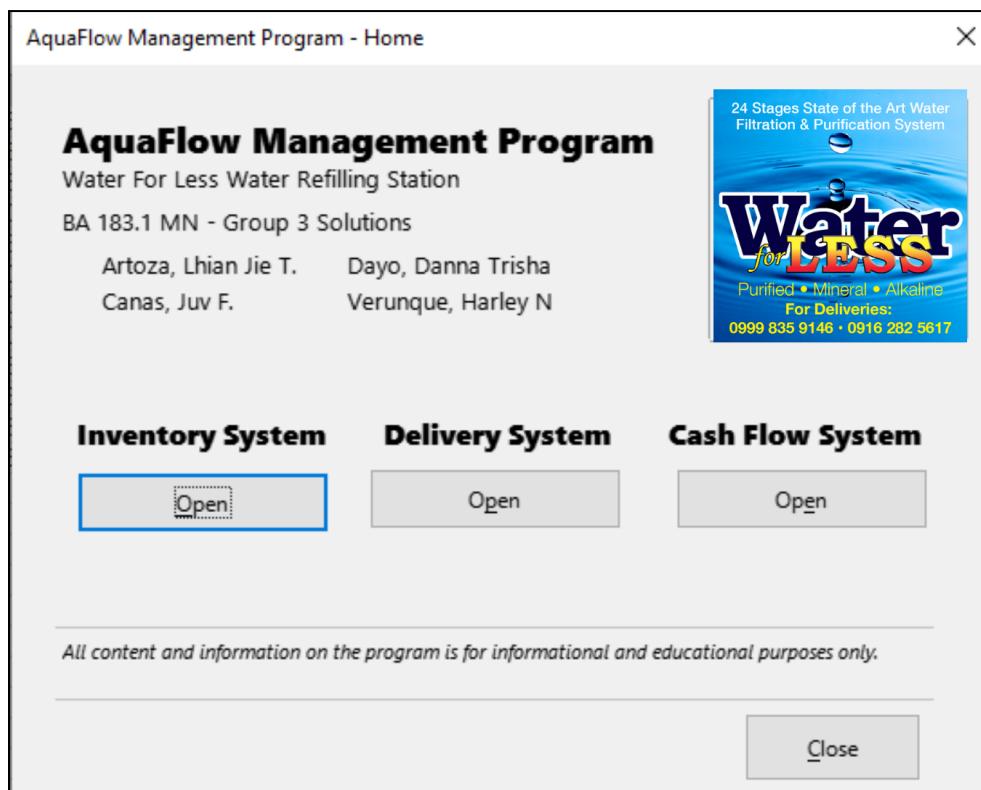


Step 3: Click Tools > Macros > Run Macro > Module 3 > buttonHome > Run





Step 4: A dialogue box will pop up. Choose what system to open.



TEST CASES

This section presents a series of test cases to guarantee that the system performs well according to its designated features and functions. The following test cases will also provide insights into what other possible and viable developments should be done to the program, in this way, the program would be up-to-date regarding the needs of the business organization.

- **Inventory Management System**

- The inventory system organizes information on the quantity of total bottles, newly purchased water bottles, and the delivered ones. Thus, the proponents devised a function primarily concerned with identifying the total number of inventory items (bottles) that have remained unsold.

Devised Formula:

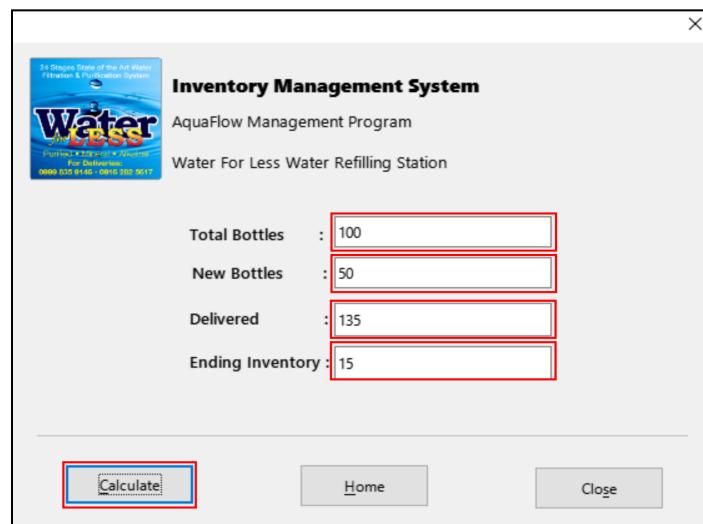
$$\text{Total Bottles} + \text{New Bottles} - \text{Delivered} = \text{Ending Inventory}$$

$$endInv = t + n - d$$

Test Case 1 Total Bottles: 100 New Bottles: 50 Delivered: 135 Ending Inventory: 15	Test Case 2 Total Bottles: 150 New Bottles: 55 Delivered: 140 Ending Inventory: 65
Test Case 3 Total Bottles: 120 New Bottles: 51 Delivered: 125 Ending Inventory: 46	Test Case 4 Total Bottles: 167 New Bottles: 20 Delivered: 180 Ending Inventory: 7

Based on the table, particularly with test case 1, the formula $endInv = t + n - d$, the resulting ending inventory, which is the output of the entries $[(100 + 50) - 135]$, has **15 remaining bottles**. This indicates that after delivering 130 bottles from 100 and 50 new bottles, the water refilling station still has 15 remaining unsold bottles.

Figure 1



- **Cash Flow/Finance Management System**

- The cash flow system will keep track of the opening balance, total cash inflow, total cash outflow, and expenses for the weekly, and monthly operations. In this function, the dialogue box will ask for input from the end user and it will compute them if executed.

Devised Formula:

Opening Bal. + Cash Inflow - Cash Outflow = Closing Balance

$$\text{cloBal} = \text{opBal} + \text{tCashIn} - \text{tCashOut}$$

Test Case 1 Opening Balance: 10,000 Cash Inflow: 30,750 Cash Outflow: 22,000 Closing Balance: 18,750	Test Case 2 Opening Balance: 18,750 Cash Inflow: 31,625 Cash Outflow: 22,250 Closing Balance: 28,125
Test Case 3 Opening Balance: 28,125 Cash Inflow: 32,500 Cash Outflow: 22,300 Closing Balance: 38,325	Test Case 4 Opening Balance: 38,325 Cash Inflow: 33,800 Cash Outflow: 22,500 Closing Balance: 49,625

Cash is continually flowing in and out of a business. Therefore, it is crucial to determine and compute the cash coming in and out of the business before determining the net balance for the period. The following test cases were developed for the cash flow management system to ensure that the formula is fully operational. With a closer look at test case 3, the closing balance comes out to be **Php 38,325.00** with the entries [(28,125 + 32,500 - 22,300)]. This means that the business has **Php 38,325.00** available at the end of the week. The following table will provide a more detailed and comprehensive sheet of information.

Water for Less Weekly Cash Flow Statement			
	Week 1	Week 2	Week 3
Opening Balance	P 10,000	P 18,750	P 28,125
Cash Inflows			
Sales	P 26,250	P 27,125	P 28,000
Owner's Equity	P 2,500	P 2,500	P 2,500
Others	P 2,000	P 2,000	P 2,000
Total Cash Inflows	P 30,750	P 31,625	P 32,500
Cash Outflows			
Maintenance	P 2,500	P 2,750	P 2,800
Utilities Expense	P 2,000	P 2,000	P 2,000
Salaries	P 17,500	P 17,500	P 17,500
Total Cash Outflows	P 22,000	P 22,250	P 22,300
Net Cash Flows	P 8,750	P 9,375	P 10,200
Closing Balance	P 18,750	P 28,125	P 38,325

Figure 2

Cash Flow Management System	
AquaFlow Management Program	
Water For Less Water Refilling Station	
Opening Balance :	10000
Total Cash Inflows :	30750
Total Cash Outflows :	22000
Closing Balance :	18750

- **Delivery System Test Sample**

- The delivery system will organize the request for delivery to certain locations and sum up the total number of delivered products.

Devised Formula:

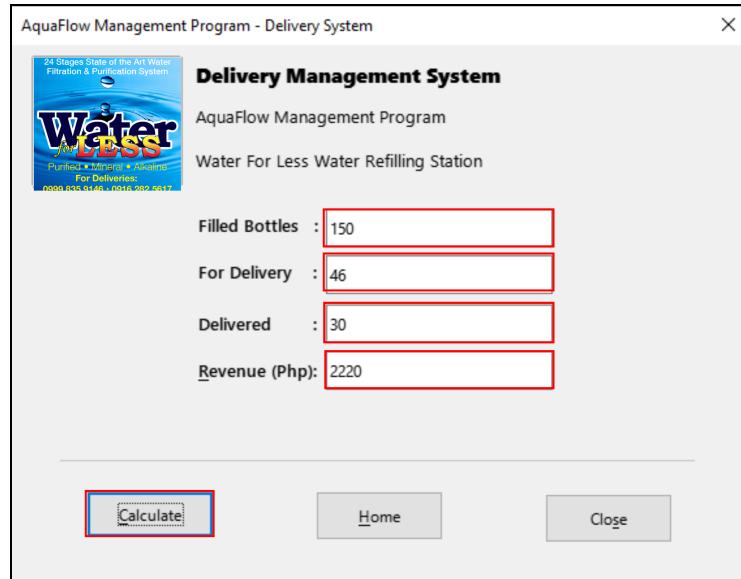
$$\text{Revenue} = \text{Filled Bottles} - \text{For Delivery} - \text{Delivered} * 30$$

$$\text{rev} = (\text{f} - \text{fd} - \text{dl}) * 30$$

Test Case 1 Filled Bottles: 150 For Delivery: 46 Delivered: 30 Revenue: Php2,220.00	Test Case 2 Filled Bottles: 200 For Delivery: 50 Delivered: 40 Revenue: Php3,300.00
Test Case 3 Filled Bottles: 120 For Delivery: 47 Delivered: 33 Revenue: Php1,200.00	Test Case 4 Filled Bottles: 90 For Delivery: 22 Delivered: 19 Revenue: Php1,470.00

Substituting the values of $[(150 - 46 - 30) * 30]$ with the formula $\text{rev} = (\text{f} - \text{fd} - \text{dl}) * 30$, the result should come out as **Php 2,220.00** of revenue daily. The **30** in the formula, is the default main price of the filled water to be delivered by the WaterFor Less refilling station.

Figure 3



CONCLUSION

The success and dependability of system formulas are, in summary, critically dependent on the development and execution of test cases. Testing makes sure the macro works the way it's supposed to, satisfies the requirements, and runs without a hitch in Calc. Through methodical investigation of many input scenarios and possible edge cases, proponents are able to detect hidden defects, mistakes, or discrepancies that could otherwise remain undetected.

In addition, ensuring the effectiveness and reliability of the inventory, delivery, cash flow, and information summary systems within the *Water for Less Water Refilling Station* is crucial for the seamless operation of the business. The creation and execution of comprehensive test cases for each of these systems provide a robust mechanism to guarantee that the underlying formulas perform well according to their designated features and functions. One of the test cases that was highlighted and focused on the transaction accuracy of each system. The proponents tested various transaction scenarios to ensure accurate recording of sales and other financial transactions.

In conclusion, by implementing thorough test cases for these systems, Water for Less can be confident that the underlying formulas are well-designed and perform optimally in various scenarios. Regular testing not only identifies potential issues but also ensures that these systems can handle the complexities of day-to-day operations in a water refilling station. This approach contributes to the overall efficiency of the business, enhances customer satisfaction, and facilitates informed decision-making by the management team.

REFERENCES

The Britannica Dictionary Editors. (n.d.). *Prototype Definition & Meaning*. Britannica. Retrieved December 14, 2023, from <https://www.britannica.com/dictionary/prototype>.

Viggiano, F., Kriek, K., & Weber, J. H. (2021, May). LibreOffice Community. Chapter 3 Creating Charts and Graphs. Retrieved December 15, 2023, from <https://books.libreoffice.org/en/CG71/CG7103-ChartsAndGraphs.html>.

Water For Less. (2019). *Water for Less Tacloban | Tacloban City*. Facebook. Retrieved December 15, 2023, from <https://www.facebook.com/waterforlesstacloban>.

LibreOffice (Calc and Basic)