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Design and Implementation of a Hybrid Barangay Information Management System

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Abstract— in pursuant to the republic Act No. 6975 by the Department of the Interior and local Government Act of 1990, through the (NBOO) the National Barangay operations Office as mandated to establish and update the master list of Barangays, Barangay officials and Barangay Socio-economic profiles. thus, in compliance thereto the proponents Developed a Hybrid Barangay Information Management System to rapidly gather,encode,store and maintain data of the Barangay which in effect may result to a systematize manner of accumulating and retrieving relevant information that is essential in coming up with informed decisions on various possible local governance issues. As observed, there were a number of problems associated with the current adopted laborious manual methods on a day to day Basis such as, retrieving huge numbers of file Folders of their Constituents Data and this causes delay in the delivery of services and had some inaccuracies in the completion of tasks and so on. Nowadays, with the advent of modern technology it opens wider opportunities for barangay to serve its constituents better through computerization of the documents as it provides such as barangay clearance, certificate of indulgency, letter of recommendation, generate report and others. Motivated by the vision of empowering this self-governing political system digitally, the proponents aimed to determine this advantages and could developed a Hybrid Barangay Information Management System that will hasten the transactions performed and documents provided by the barangays. This system is designed to be accessed only by the authorized users to ensure the integrity of all transactions. It will be designed and implemented using Microsoft Visual Basic 2010 as the front-end while running Microsoft Access Server as the back-end and also it has as embedded responsive Intra web Portal that can be utilized by the barangay functionaries.
Keywords— Integrated System, Barangay Information System, Intra-Web Portal, Menu-Driven, Mobile Registrations, GUI.

I. INTRODUCTION

Poblacion-1 is a local barangay area located at Cauayan Negros Occidental, Philippines. Poblacion-1 was established by the former Brgy. Captain Decerna. It is a small community that houses a population of 3,420 as of 2015. It sustains itself through its established vision and mission. The barangay hall is accessible and it opens around 8 am to 5 pm. The current Punong Barangay is Hon. Ernie B. Magbanua. It is recognized for its transformative and participatory governance serving its constituents and the community. Their mission is to

provide a dynamic and supportive political and socio-economic environment through the highest standard of public administration that is a bureaucratic system committed to democratizing to public service which is in compliance with The Local Government Code of 1991 which envisions local government units to be self- reliant and effective partners in the attainment of national development. As such they should have programs, project, activities and services for the benefit of their constituents. To do so, this requires information. Therefore, data is indispensable in sound decision-making. To perform effectively, each barangay should maintain database holding different information about the barangay such as population, records on the disbursement of funds, grievance cases filed, houses constructed in the community and citizen's socio-economic profile. However, these tasks could not be carried out by the Barangay Chairman alone. Thus, with the power vested on him as the local chief executive, he appoints the Barangay Secretary and the Barangay Treasurer to serve as his hands in dealing with administrative and fiscal relations.

During the 3 day detailed Study, Poblacion has Blotter reports, the process of this report is recording the incidents between a two parties or more, using a logbook to save the said incidents the said report includes respondents, the mediator of the two parties, complaints of the complainant. Moreover, they have also services such as requesting barangay clearance, cedula (community tax certificate), and other certification. The barangay personnel heavily relies on papers and use the computer for encoding barangay accounts and other information through office application. Most of their records and documents are located in their physical file cabinets. Whenever a request is made, the procedure is heavily relied upon the The Barangay Secretary which performs most of the administrative operations of the barangay. Though, selected barangays already made use of computers and electronic devices to carry out official transactions, conversely, most are still caged with the manual-based operations. Clearances and certifications are prepared with less to no base-line data to assure reliability. During regular days, every request made by the client would take minutes, but there is a possibility of longer waiting time for the client in order to process because of tedious search on records found in their cabinets which paralyzes client service. In addition, weak barangay data management and monitoring hinder the implementation of selected local programs as barangays lack reliable and accurate baseline data. Same thing to their project/program monitoring of the Barangay, it solely rely on papers. All of the relevant information are encoded to a spreadsheet application. These are placed on a long folder. With this proponents would like to introduce the system of document management to keep track of records in a modern approach where computers are primarily the medium that reduces the consumption on paper.

II. SYSTEM OBJECTIVES

The Study generally aims to develop a Hybrid Barangay Information Management System to support and augment the day to day operations of the barangay. It specifically aims to Developed as follows:

The Barangay Poblacion Document Request System which implements the procedure of issuing document request that satisfies client's requirements and is based on the Barangay Citizen's Charter. This gives priority to the client's request.

The Barangay Poblacion Incident Recording System is where the complaints of the client is kept record in a local computer.

The Barangay Poblacion Project Monitoring System is where the effective monitoring of projects are taken into consideration. It plays a role on preventing overspending or underspending in implementing barangay projects. This system promotes transparency and accountability in the barangay.

The Barangay Poblacion Profiling System is where the collecting, analysing and documenting necessary information that defines the current barangay profile. It covers the census, organizational chart, vision and mission and barangay status. This proposal doesn't mention about closing an incident case (hearing), payroll and healthcare.

A. System Benefits

The proponents would like to propose a system for the Barangay in order to

- Reduce client request waiting time
- Produce a controlled forms and documents on each request

- Verify client request faster
- Easy lookup on records
- Reduce paper dependency
- To Input resident's profile registration electronically
- Effectively manage or monitor projects and programs.
- Speedy transactions on all client requests as it manage the efficiency and productivity

B. System Scope

The Hybrid Barangay Information Management System will automate the current manual process and transactions in the barangay. Apart from effective recording and monitoring of data, the system has a functional embedded responsive Intra Web Portal which all barangay functionaries can explore the Latest event and or Project of Barangay.

III. LITERATURE REVIEW

A literature review is a scholarly paper that presents the current knowledge including substantive findings as well as theoretical and methodological contributions to a particular topic founded by many of the studies and research, including the establishment of an a Hybrid Barangay information system.

The following is a summary of each study which relate to the subject matter in terms of its goals and the conclusions reached by.

A. According to *Zeithami & Bateman (),* "In today's business environment, planning has become a widespread management function, involving people throughout the organization in the analysis, identification, and selection of goals and priorities. "Authors of the book state that planning is very important for every individual, work group, or organization because it helps the systematic process during which decisions are made about the goals and activities, just like companies using a manual system method to carefully plan on what would be the possible solution to make the system work faster so that there is less probability of errors in the activities, and in considering the need for a computerized system in order to better answer the problem

B. As stated by *Eithne Rhoads (2011),* information system has a variety of offers that would benefit every association. There are many things to understand within the organization and it was understood with the use of IT information, procedures, peoples, and documents.

C. According to *Aquino (2005),* importance of computer application is increasing dayby day. In the latest decades of the Millennium winning organization are those which are willing to integrate business strategy and computer information technology in plying their respective trades. The use of computer information technology results for them to be able to develop products fast and make decisions fast, ability to have fluid organization structures, able to cope with the demanding work force and external environment by the rapid development of innovative approaches and lastly using information system confirms the company's mission vision.

D. *Liu, Wang & Zan, (2010),* this study demonstrates the functional and architecture design of the system, highlights the functionality of the system, database design and functional modules. They concluded that general functions and global variables could be stored in public module throughout projects in Visual Basic and it can be greatly improve the efficiency of the code by calling module functions, variables in the project. The system modules use varieties data in the database often it requires a public data manipulation function to achieve a variety of SQL statements.

E. Based to the study of *Lim and Goyenechea (2017),* stated that "Records security is also one of the primary objectives and all the information received from its clients are confidential." The proponents created and designed a software program for the company to make the system perfect where all the sales and client

records should be kept, thus giving the assurance that these files are secured and accessible for the advancement of the company

F. *Ciborra (2005)* uses a framework when describing the use of e-government in developing countries; where the focus of technology is the ordering of the relationship between the administration and the citizen, in setting the boundaries between the state and the market, and in ensuring of greater accountability and transparency. He said that this is often the reason for developing countries to partake in egovernment projects, as having such a system is believed to equate to models of' good governance' and increased development, and hence affects the levels of aid that they receive from wealthy nations.

IV. METHODOLOGY

In this section, the researchers deal with the different methods, techniques and systematic approaches that utilized in the analysis and the design of the representation. This involved the System Development Life Cycle (SDLC) which is a conceptual model used in project management that describes the stages involved in an information system development project, from an initial feasibility study through maintenance of the completed application. Various SDLC methodologies have been developed to guide the processes involved from the waterfall model (the original SDLC method), and rapid application development (RAD), both models are used to combined into some sort of hybrid methodology.

The proponents followed the appropriate rules of System Development Life Cycle (SDLC). This will serve as a guide to the proponents in their proposed system and its network infrastructure.

Phases of the SDLC model includes System Planning, System Analysis, System Design, System Implementation, and System Support

A. *Elements of the DBMS Environment:* It has been identified in the DBMS environment five major elements: people, procedures, data, software and hardware.

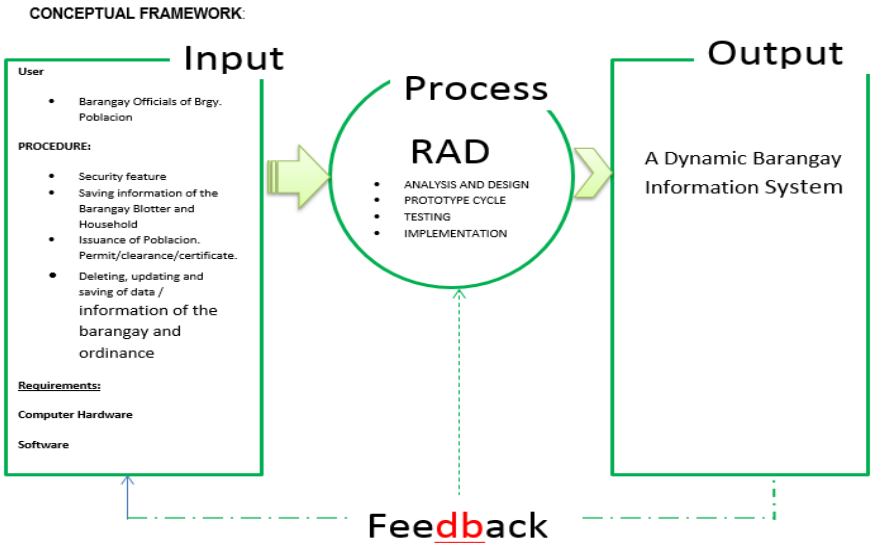


Figure-1 Database Management System (DBMS)

People: The first component is the people involved with the system. There are four different types of people who are involved in the environment of a DBMS, application developers, database administrators, end-user and database designers.

Procedures: This component refers to the rules and instructions which manages the design and use of the database. The staff and the user of the system who run the database need to document the procedures on how to use or operation of the system. This may be composed of instructions on how to:

o Use of a particular database management system or application program.
o Start and stop database management systems.
o Create backups of the database.
o dealing with the failure of software and hardware.
o Highlight the database across multiple disks, change a table structure, store data
o to secondary storage and improve performance.

Data: Maybe the most significant part of the DBMS environment is the data, where data is a collection of facts stored in the database.

Software: Software element consists of database management system software and application software, in addition to the operating system and contains software network in the case that the DBMS used through the network.

Hardware: The applications and the DBMS need the hardware to run. Hardware can range from a single personal computer to a single central or the network of computers. Hardware depends on the specific requirements of the organization and database management systems are used. In some DBMSs run only on specific operating systems or hardware, while others run on a variety of operating systems and hardware. Requirements of the organization and database management systems are used. In some DBMSs run only on specific operating systems or hardware

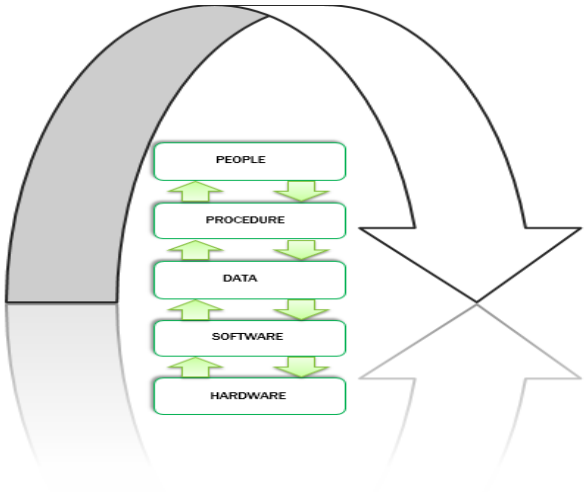


Figure-2 Phases of SDLC

B. *Data Analysis* The key model behind the Management Information System is to know the System Development Life Cycle (SDLC) Model for the development of study. In order to create the Hybrid Barangay Management Information System for Poblacion-1 Cauayan Negros Occidental, the proponents followed the appropriate rules of System Development Life Cycle (SDLC). This will serve as a guide to the proponents in their proposed system and its network infrastructure. Phases of the SDLC model includes System Planning, System Analysis, System Design, System Implementation, and System Support

Planning Phase: The planning phase is the most critical step in completing software development. In planning, the problem in the existing system is identified to understand the operation of the present. The objectives are one again considered in planning to develop a system that will enhance the present system.

Analysis Phase: In the analysis phase, the researcher analyses the difference between the present system and the developed system. The problem in the current system was studied to compare the existing system and the developed system. This was made part of the investigation of the inputs and outputs.

Design Phase: In this stage the information gathered in the previous stage allows the researcher to write about the elements of the new and improved system. The input and output record during the design was prepared, forms are laid out, and file specifications was written. Major aspect of design phase includes structuring the kind of interface used for the software.

Development Phase: The developed system was built based on the designs conceived an earlier phase and through the use of the developed programming language which is Visual Basic 2010 and the used MS ACCESS Server which serves as database management system.

Testing Phase: This phase covers the process of testing the efficiency, accuracy, reliability, speed and security of the developed software. After the facilities has been installed, programs, software, and hardware will be tested to ensure design specifications was met.

Implementation Phase: The system was implemented with minimum requirements. It fully utilizes by the user. All users was trained on how to use and implement the system.

Maintenance Phase: In this stage the last phase of the cycle that deals with the changeover to a new improved system. Final changes and modifications was incorporated in the new system at this stage.

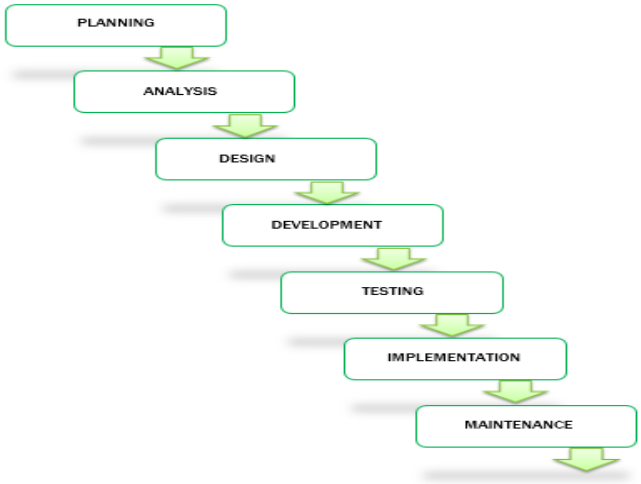


Figure-3 Waterfall Model

C. *The System Administrator Roles:* As long as the Hybrid Barangay information management system is a windows application and not on the Internet, the system administrator (the system administrator which is a top ranking Local official in Barangay) holds all rights in the process of adding and modifying the information of the system. These amendments include, information adding, modifying and deleting on the Database management System, in addition making modifications on course management that including, adding, modifying and deleting courses information also. Figure (4) shows the UML use case diagram for the system administrator roles.

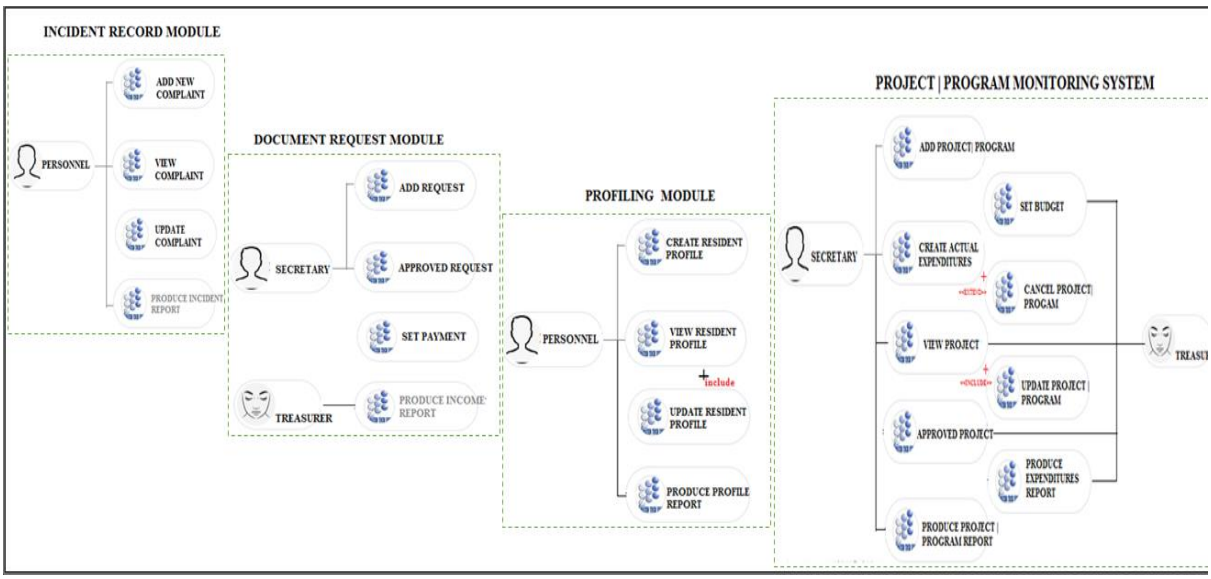


Fig-4 UML use case diagram for admin roles

D. *Database Description:* According to identify the requirements of Hybrid Barangay information system, a database of the system consists some of the four entities "Resident entity, Transaction entity, Personnel entity and settlement entity". Entities and their relationship must be designed to meet various types of student information and to design basis for the logical structure later. These entities include varied specific information and interaction each other as information flow. In the following figure (5) shows the ERD of the entities and their relationships.

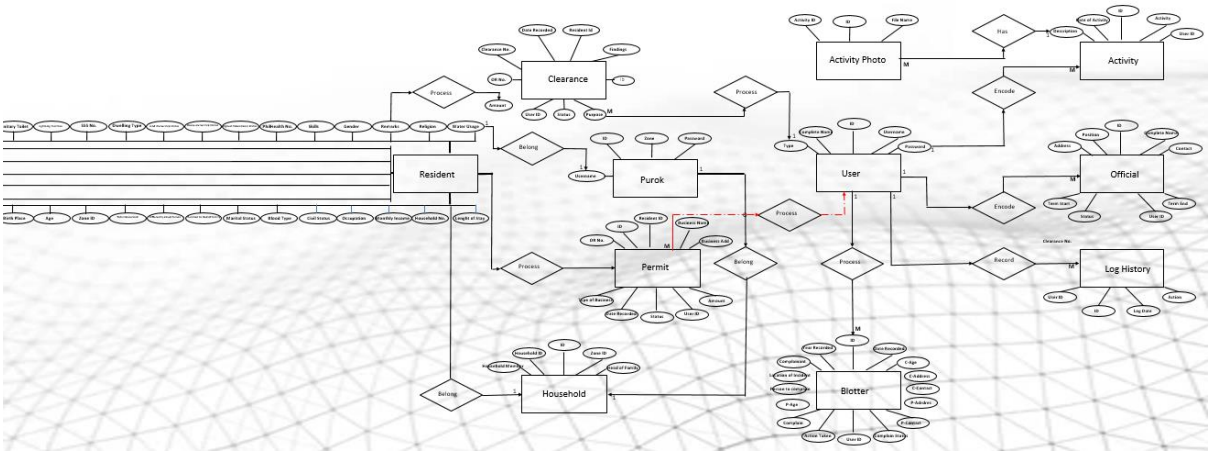


Fig-5 ERD Diagram

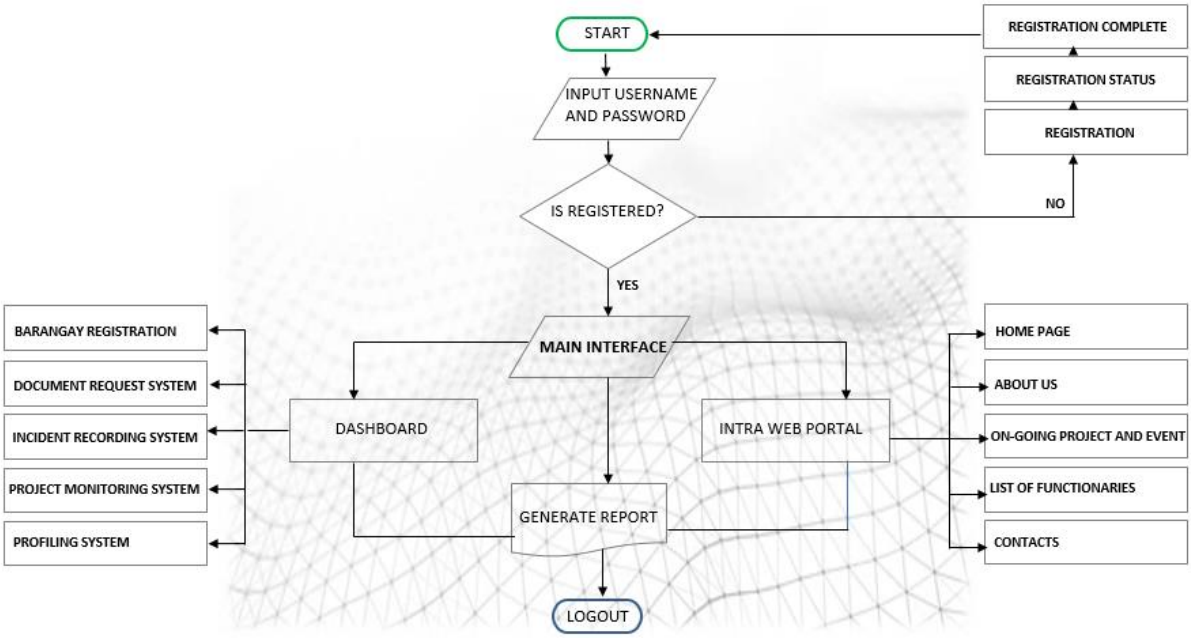


Fig-6 System Flow Chart

E. *Algorithm:* The system was protected from unauthorized users. This can be done by allowing each system user to set user name and password which will be approved by the administrator. This should be used in gaining access to the system. In line with this, every user will have different level of access to the system which is dependent on the tasks assigned to the user.


```
Public Class AdminLogin

    Dim LogincountAdmin As Integer = 0
    Dim LockcountAdmin As Integer = 300
    Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles Button1.Click
        LogincountAdmin += 1
        Dim RecordExistLogin As Boolean
        Dim cnLogin As New OleDb.OleDbConnection
        Dim ConDataLogin As New OleDb.OleDbConnection
        Dim cmLogin As New OleDb.OleDbCommand
        Dim drLogin As OleDb.OleDbDataReader
        Dim dbProviderLogin As String = "Provider=Microsoft.ACE.OLEDB.12.0;"
        DimdbSourceLoginAsString="DataSource=C:\ProgramFiles\Common
Files\BarangayInfoSystem\Database\BarangayInfoSys.accdb;Jet OLEDB:Database Password=Paterio111"
        cnLogin.ConnectionString = dbProviderLogin & dbSourceLogin
        cnLogin.Open()
        If LogincountAdmin <> 6 Then
            Try
                'cm = New OleDb.OleDbCommand
                With cmLogin
                    .Connection = cnLogin
                    .CommandType = CommandType.Text
                    .CommandText = "SELECT * FROM UserLoginAccount WHERE (Username = '" & TextBox1.Text & "'
And Accounttype = '" & "SuperAdministrator" & "')"
                    drLogin = .ExecuteReader
                End With
                While drLogin.Read()
                    Dim foundcorrect As String = drLogin("Password").ToString
                    'String.Compare(strA, strB, ignoreCase), Boolean
                    If StrComp(TextBox2.Text, foundcorrect, 0) = 0 Then
                        RecordExistLogin = True
                    End If

                End While
                cnLogin.Close()
                'Exit Sub
                If RecordExistLogin = True Then
                    SuperAdminControl.Show()
                    Me.Close()
                End If
                If RecordExistLogin = False Then
                    MsgBox("Please check username and password and try again", MsgBoxStyle.Information, "Unable to login")
                End If
            Catch ex As Exception
                MsgBox(ex.InnerException)
            End Try
        Else
            Me.Label3.Visible = True
            Me.TextBox1.Enabled = False
            Me.TextBox2.Enabled = False
            Me.Button1.Enabled = False
            Me.Button2.Enabled = False
            MsgBox("Intruder Detected", MsgBoxStyle.Information, "Warning")
            Timer1.Start()

        End If
    End Sub

    Private Sub Button2_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles Button2.Click
        'Confirmdialogue.Show()
        Me.Close()
    End Sub

    Private Sub Timer1_Tick(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles Timer1.Tick
        If LockcountAdmin <> 0 Then
            LockcountAdmin -= 1
            Label3.Text = "Intruder Detected!!!"
```



```
            If LockcountAdmin = 299 Then
               Label3.ForeColor = Color.Transparent
            End If
            If LockcountAdmin = 298 Then
               Label3.ForeColor = Color.Red
            End If
            If LockcountAdmin = 297 Then
               Label3.ForeColor = Color.Transparent
            End If
            If LockcountAdmin = 296 Then
               Label3.ForeColor = Color.Red
            End If
            If LockcountAdmin = 295 Then
               Label3.ForeColor = Color.Transparent
            End If
            If LockcountAdmin = 294 Then
               Label3.ForeColor = Color.Red
            End If
            If LockcountAdmin = 293 Then
               Label3.ForeColor = Color.Transparent
            End If
            If LockcountAdmin = 292 Then
               Label3.ForeColor = Color.Red
            End If
            If LockcountAdmin = 291 Then
               Label3.ForeColor = Color.Transparent
            End If
            If LockcountAdmin = 290 Then
               Label3.ForeColor = Color.Red
            End If
            If LockcountAdmin = 289 Then
               Label3.ForeColor = Color.Transparent
            End If
            If LockcountAdmin = 288 Then
               Label3.ForeColor = Color.Red
            End If
         Else
            Label3.Visible = True
            LogincountAdmin = 0
            LockcountAdmin = 60
            'Me.Enabled = True
            Me.TextBox1.Enabled = True
            Me.TextBox2.Enabled = True
            Me.Button1.Enabled = True
            Me.Button2.Enabled = True
            Me.Label3.Visible = False
            Me.Timer1.Stop()
         End If
         'Me.Label3.ForeColor = Color.Transparent
      End Sub

      PrivateSubTextBox2_KeyPress(ByValsenderAsSystem.Object,ByValeAs
System.Windows.Forms.KeyPressEventArgs) Handles TextBox2.KeyPress
         If e.KeyChar = Microsoft.VisualBasic.ChrW(Keys.Return) Then
            Call Button1_Click(sender, e)
            'SendKeys.Send("{TAB}")
            'e.Handled = True
         End If
      End Sub

      PrivateSubTextBox1_KeyPress(ByValsenderAsSystem.Object,ByValeAs
System.Windows.Forms.KeyPressEventArgs) Handles TextBox1.KeyPress
         If e.KeyChar = Microsoft.VisualBasic.ChrW(Keys.Return) Then
            SendKeys.Send("{TAB}")
            e.Handled = True
         End If
      End Sub
```


F. Logical Structure Design of the Data: In the following tables show the logical construction of the data for the main tables "User login Account, Personnel credential, logs, Transaction History.

TABLE I
USER LOGIN ACCOUNT

Field	Data Type	Key	Description	Length
userID	Number	PRIM	Primary key of the table and is set to be incremented by one for every recorded item.	Long Integer
Username	Short Text		– This will store the user name of the user.	255
Password	Short Text		The desired password of the user.	255
Securityquestion	Long Text		Personal questions for password recovery of the user.	255
Answer	Short Text		Confid answer for password recovery of the user.	255
Accounttype	Short Text		This refers to account authorization level of the user in the barangay.	255
date_created_modified	Date/Time		Date modified	Short date
time_created_modified	Date/Time		time modified	Short Date
created_modified_by	Short Text		pertain to user who modified	Short Time

TABLE II

Personnel Credentials

Field	Data Type	Key	Length
persID	Auto Number	PRIM	Long Integer
persFName	Short Text		255
persMName	Short Text		255
PersLName	Short Text		255
uName	Short Text		255
pWord	Short Text		255
position	Short Text		255

TABLE III

Logs

Field	Data Type	Key	Length
logID	Short Text	PRIM	255
logYear	Short Text		255
logNo	Number		Long Integer
logName	Short Text		255
log_date	Date/Time		Short Date
log_time	Date/Time		Short Date
useratthemoment	Short Text		255

TABLE IV

Transaction History

Field	Data Type	Key	Length
transactionID	Short Text	PRIM	255
transactionYear	Short Text		255
transactionNo	Number		Long Integer

transactionType	Short Text		255
transactionAmount	Number		Long Integer
firstName	Short Text		255
middleName	Short Text		255
lastName	Short Text		255
dateofTransaction	Short Text		255
timeofTransaction	Date/Time		Short Time
transactBy	Short Text		255

G. *Technologies Chosen to Design and Develop the System:* To design a computer-based system, it must use some modern techniques of computer programs used for this purpose. In the following topics will illustrate these techniques and how to use them to build a Hybrid Barangay information management system.

1. *Microsoft Access* is a database management system (DBMS) from Microsoft combines the relational Microsoft Jet Database Engine with a graphical user interface and software-development tools.

   The original concept of MS Access was for end users to be able to access data from any source. Other features include: the import and export of data to many formats including Excel, Outlook, ASCII, dBase, Paradox, FoxPro, SQL Server and Oracle. It also has the ability to link to data in its existing location and use it for viewing, querying, editing, and reporting. This allows the existing data to change while ensuring that Access uses the latest data. It can perform heterogeneous joins between data sets stored across different platforms. Access is often used by people downloading data from enterprise level databases for manipulation, analysis, and reporting locally.

   Proponent select MS Access as its supported by Visual Basic for Applications (VBA), an object-based programming language that can reference a variety of objects including the legacy DAO (Data Access Objects), ActiveX Data Objects, and many other ActiveX components. Visual objects used in forms and reports expose their methods and properties in the VBA programming environment, and VBA code modules may declare and call Windows operating system operations.

2. *Visual Basic* is a third-generation event-driven programming language from Microsoft known for its Component Object Model (COM) programming model first released in 1991 and declared legacy during 2008. Microsoft intended Visual Basic to be relatively easy to learn and use.[1][2]

   Visual Basic was derived from BASIC and enables the rapid application development (RAD) of graphical user interface (GUI) applications, access to databases using Data Access Objects, Remote Data Objects, or ActiveX Data Objects, and creation of ActiveX controls and objects.

   Visual Basic can create executables (EXE files), ActiveX controls, or DLL files, but is primarily used to develop Windows applications and to interface database systems. Dialog boxes with less functionality can be used to provide pop-up capabilities. Controls provide the basic functionality of the application, while programmers can insert additional logic within the appropriate event handlers. For example, a drop-down combination box automatically displays a list. When the user selects an element, an event handler is called that executes code that the programmer created to perform the action for that list item. Alternatively, a Visual Basic component can have no user interface, and instead provide ActiveX objects to other programs via Component Object Model (COM). This allows for server-side processing or an add-in module.

3. *Bootstrap* is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains CSS- and (optionally) JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components.

4. *HTML5* is a markup language used for structuring and presenting content on the World Wide Web. It is the fifth and last [3] major HTML version that is a World Wide Web Consortium (W3C) recommendation. The current specification is known as the HTML Living Standard. It is maintained by a consortium of the major browser vendors (Apple, Google, Mozilla, and Microsoft), the Web Hypertext Application Technology Working Group (WHATWG).

5. *JavaScript* is a text-based programming language used both on the client-side and server-side that allows you to make web pages interactive. Where HTML and CSS are languages that give structure and style to web pages, JavaScript gives web pages interactive elements that engage a user.

6. *Visual Studio Code* is a freeware source-code editor made by Microsoft for Windows, Linux and macOS.[9] Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Users can change the theme, keyboard shortcuts, preferences, and install extensions that add additional functionality.

Visual Studio Code is a source-code editor that can be used with a variety of programming languages, including Java, JavaScript, Go, Node.js, Python and C++.[15][16][17][18] It is based on the Electron framework,[19] which is used to develop Node.js Web applications that run on the Blink layout engine.

V. SPECIFICATION

This section describes the various database, input, output, as well as program module specifications used.

A. *Database Specification*

The goals of this database design are:

• Create a database that provides for efficient storage, update, and retrieval of data.
• Create a reliable database that stored data with high integrity.
• Create an adaptable and scalable database that meets a new and unforeseen requirements and applications. For the purpose of achieving the goals of the ACCESS database was used for the implementation of this work.

B. Interface Specification This section demonstrates the various input and output designs of the proposed system. Below is the designed interface.

Figure-7: Loading Screen and Splash Screen

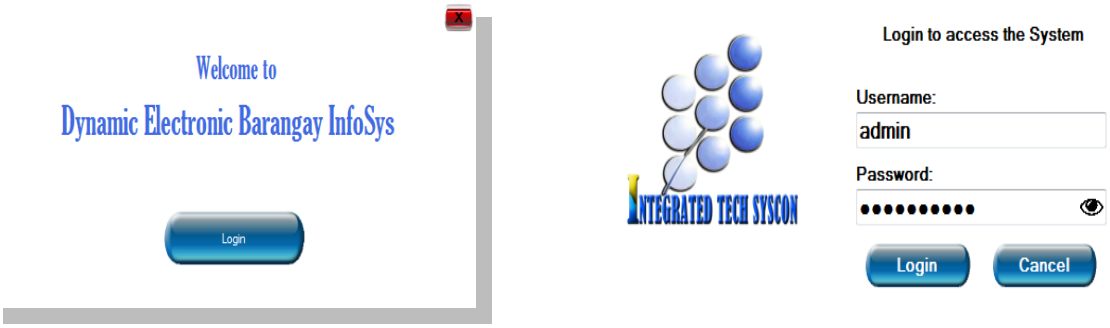


Figure-8: Login Menu

- Loading Screen

  A loading screen is a picture shown by a computer program, often a video game, while the program is loading or initializing

- Splash Screen

  The purpose of splash screen is to give the user immediate indication that the app is being launched. It also gives your application, time to initialize itself and prepare its initial set of views for display. When your app is ready to run, the system removes the image and displays your application's home screen.

- Login Screen.

  A login screen asking users credentials to open a session with an account that has already created.

Mobile App- Integrating the use of portable electronic devices with software applications to provide Fast services and manage Barangay information. Approximately almost All Poblacion residents are mobile phone users so this System will make a difference for future enhancement in terms of usability and portability which mobile technologies to be known for.

Prototype 1. Resident Registration | Login Mobile Application

Prototype 2. Resident Registration | Mobile Application

Fig.-9 Main Interface with Description

A. Main Graphical User Interface:

The graphical user interface allow user to easily interact with the computer in an easily manner as well as to understand what he need to do in order to use the program.

The developed system was intended to be used by non-IT personnel such as the barangay captain, secretary and treasurer. To easily be understood by the users, the graphical user interface was designed to be simple and self–explanatory. The screen layouts were customized. Likewise, the forms and its components include buttons and menus that are easy to- recognize. Aside from that, data entry has intuitive user interface and flowing navigation. Most importantly, the reports are well filtered.

Fig-10 Main Graphical User Interface

The main interface of the system contains all the sub- interfaces, sub interfaces are the Automizer queuing System, scheduler and a dashboards which interactively linking to Different modules of the Hybrid Barangay information Management System. Figure (10) shows the main interface of the system.

- Resident Information.
- Certificate Issuance.
- Blotter Records.
- Settlement Schedule.
- Reports
- Barangay Configuration

B. *Resident information Management:* This sub-interface consists of several forms such as adding new Resident records, which then be useful on the below modules.

- Barangay Clearance
- Business Clearance
- Clearance
- other certification

Figure-11, Added features to right click with an intentions to get a drop-down list, linking the four modules that was mentioned above respectively:

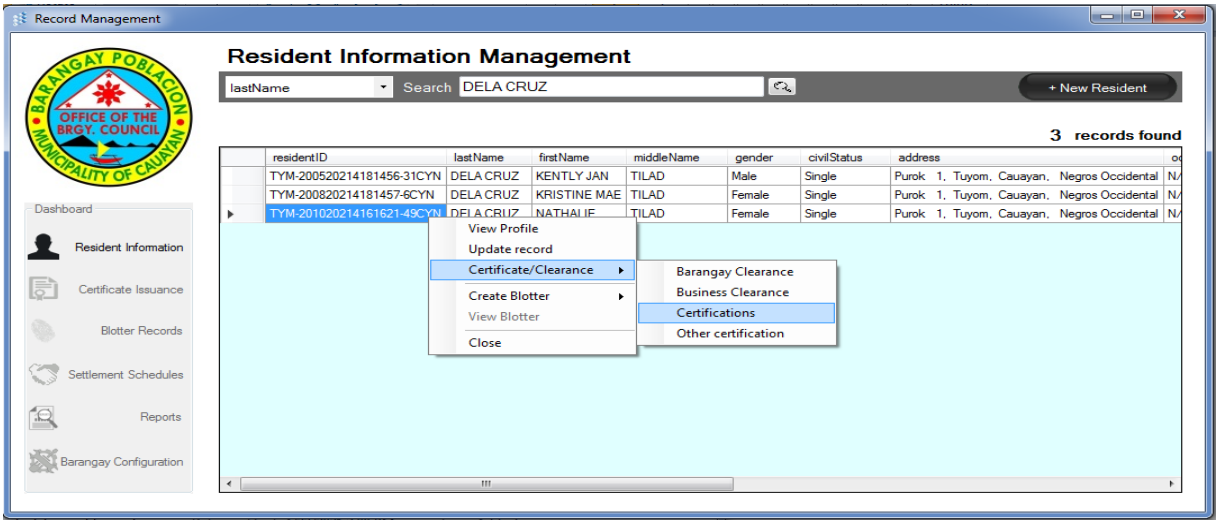


Fig-11 Resident Information Management

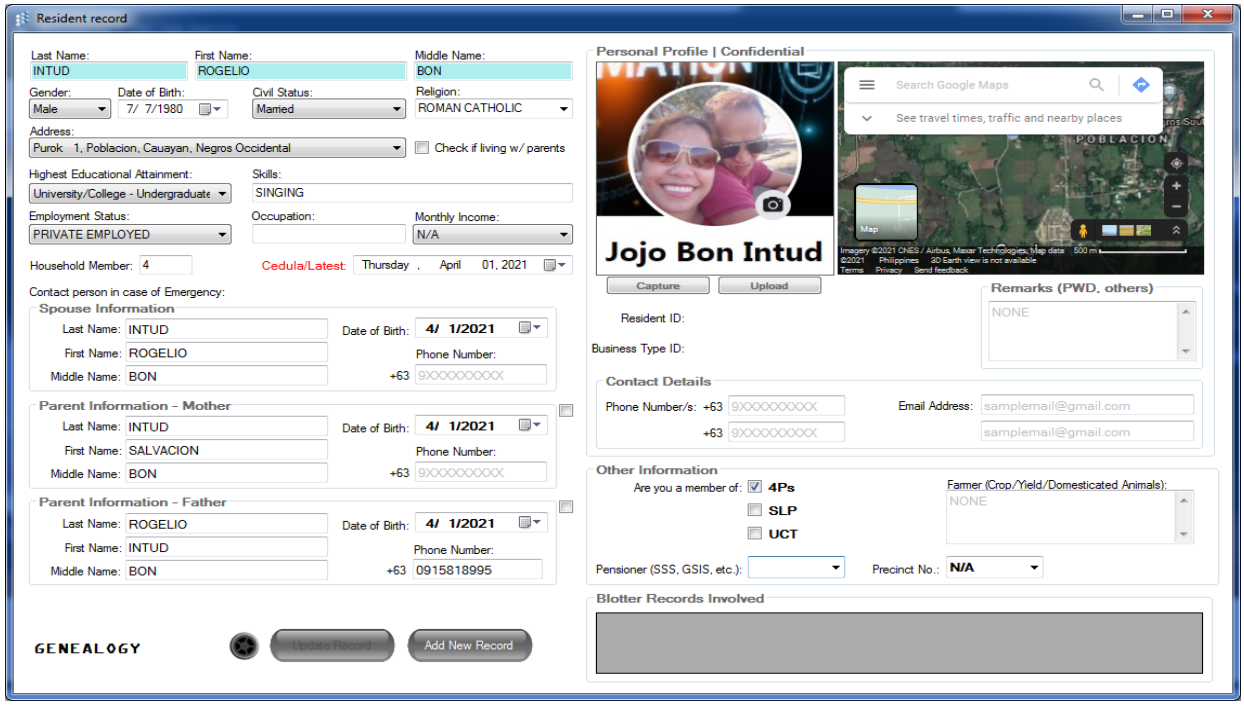


Fig-12 Adding Resident record

In case we want to display the details or the profile of the Resident, that include Resident basic information, identity, contact information, plotted Address google maps, and school information with the Resident Genealogy. Users can double click on a resident ID to open full details pertaining to a single Resident information as shown as in the figure (13) with an UPDATE button.

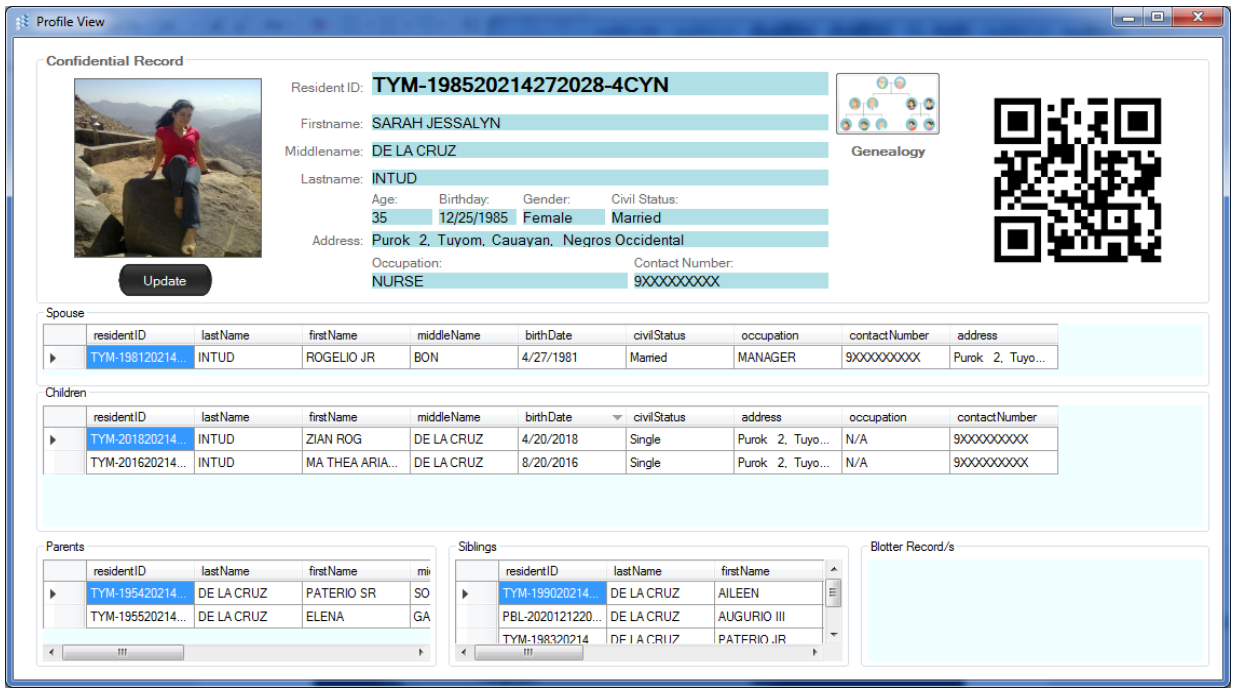


Fig-13 Profile View with QRT Features.

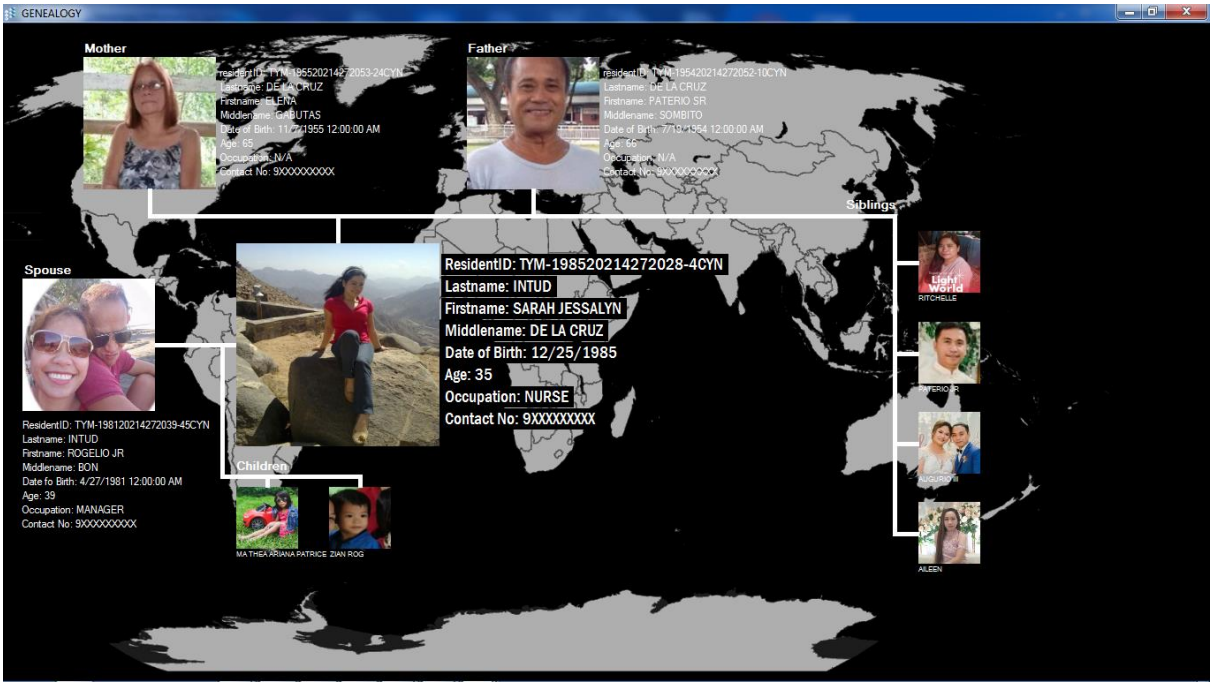


Fig-14 Genealogy View

C. *Certificate of Issuance:* The system generates different certificates, clearances and reports of the barangay. Among the clearances and certificates that the system is capable of generating are: barangay clearance; business permit; indigence certificate; residency certificate; certificate of recommendation and can add later depending on the clients request for occupancy permit; excavation permit; and building permit. Likewise, COVID Clearance can now be generated:

- Barangay Clearance
- Business Clearance
- Clearance
- other certification

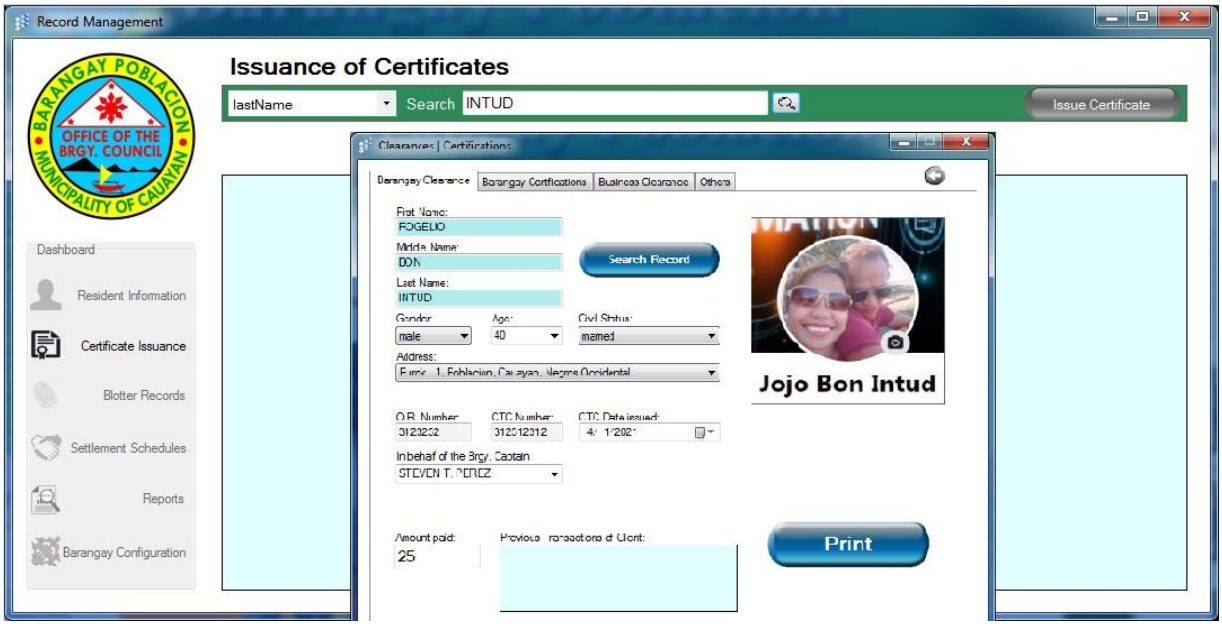
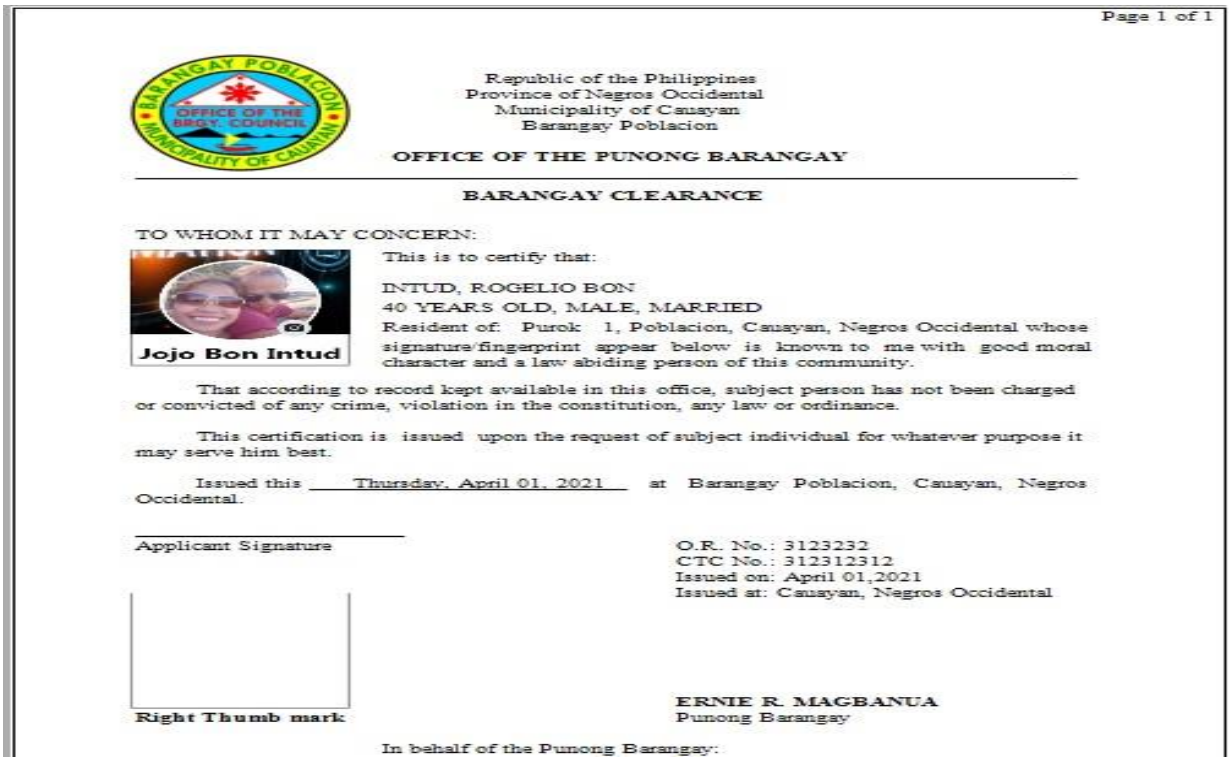


Fig-15 Issuance Certificate



Page 1 of 1

Republic of the Philippines
Province of Negros Occidental
Municipality of Cauayan
Barangay Poblacion

OFFICE OF THE PUNONG BARANGAY

BARANGAY CLEARANCE

TO WHOM IT MAY CONCERN:

This is to certify that:

INTUD, ROGELIO BON
40 YEARS OLD, MALE, MARRIED
Resident of: Purok 1, Poblacion, Cauayan, Negros Occidental whose signature/fingerprint appear below is known to me with good moral character and a law abiding person of this community.

That according to record kept available in this office, subject person has not been charged or convicted of any crime, violation in the constitution, any law or ordinance.

This certification is issued upon the request of subject individual for whatever purpose it may serve him best.

Issued this Thursday, April 01, 2021 at Barangay Poblacion, Cauayan, Negros Occidental.

Applicant Signature

O.R. No.: 3123232
CTC No.: 312312312
Issued on: April 01,2021
Issued at: Cauayan, Negros Occidental

Right Thumb mark

ERNIE R. MAGBANUA
Punong Barangay

In behalf of the Punong Barangay:

Fig-16 Issuance Certificate

D. *Blotter Records:* residents will be able to send their barangay level complaints.

- Incident details and Narrative
- Complainant
- Respondents
- Victims

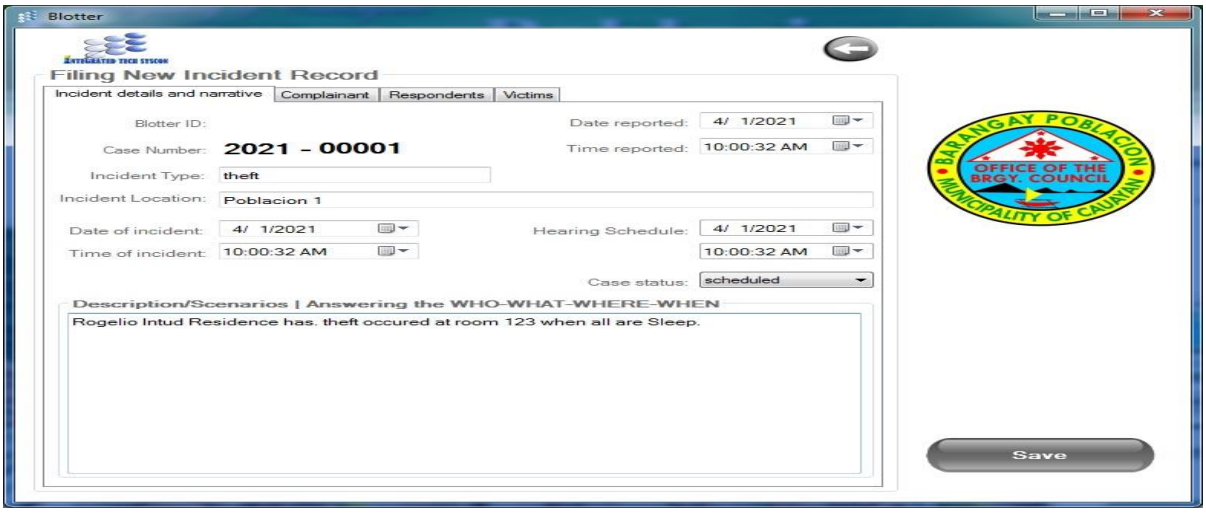


Fig-16.A Blotter Record- Incident Details

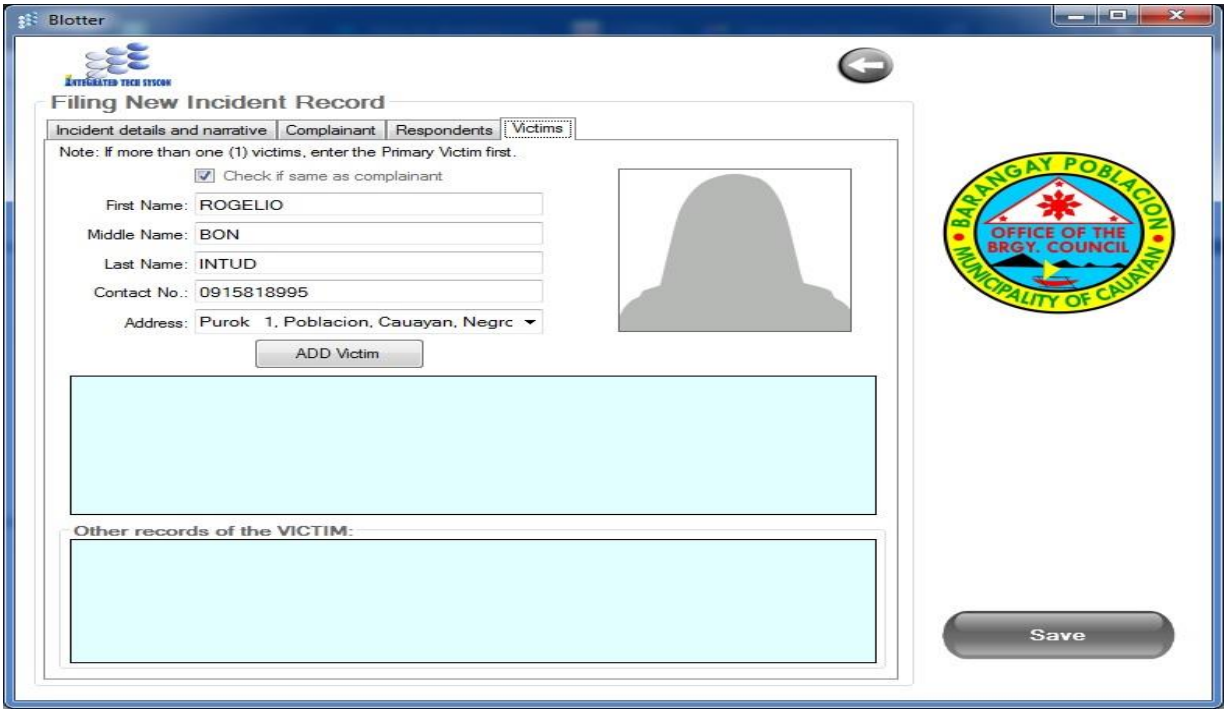


Fig-16.B Blotter Records- Victim

E. *Generate Report:* The system generates different certificates, clearances and reports of the barangay. Among the clearances and certificates that the system is capable of generating are: barangay clearance; business permit; indigence certificate; residency certificate; certificate of recommendation; occupancy permit; excavation permit; and building permit. Likewise, the following reports can be generated: purchase request and order report; inspection report; disbursement and requisition report; liquidation report; and Accomplishment report.

- Residents
- Certificates/Clearances
- Blotter
- Project
- Transactions

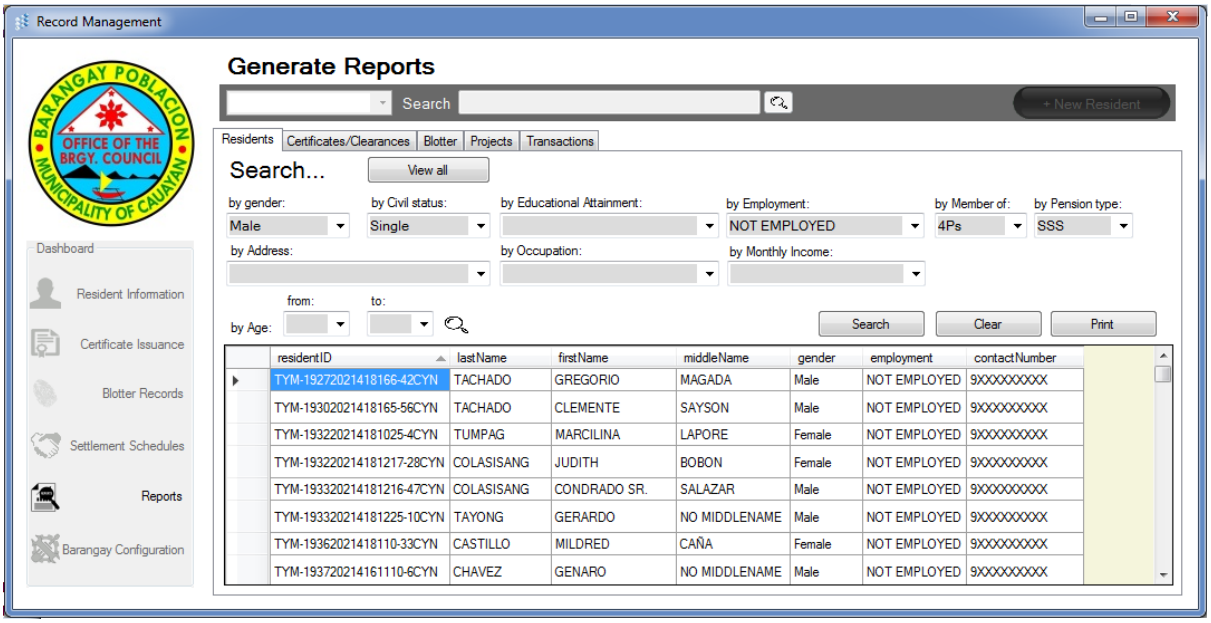


Fig-17 Generate Reports

F. *Configuration Panel:* A component of the systems that provides the ability to view and change system settings. It consists of a set of applets that include adding or removing hardware and software, controlling user accounts, changing accessibility options.

- Personalize
- Themes
- Barangay Configuration
- User Account
- System Maintenance

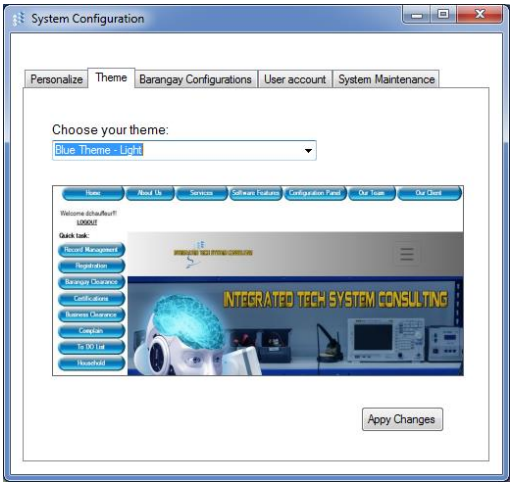


Fig-18 Themes

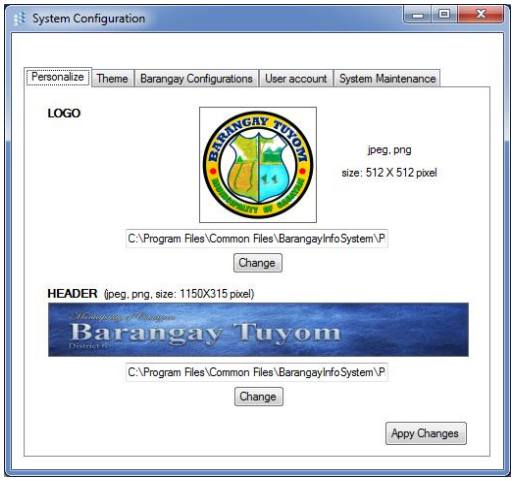


Fig-19 Personalize

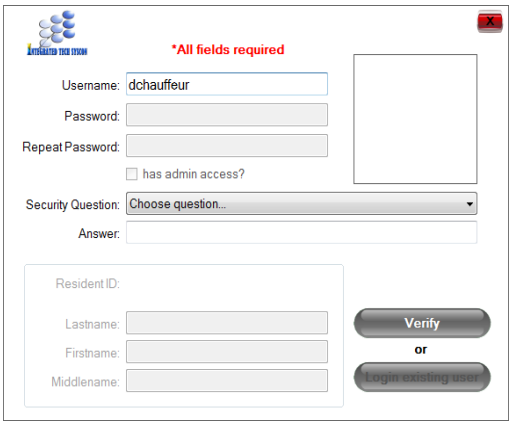


Fig-20 Users Account

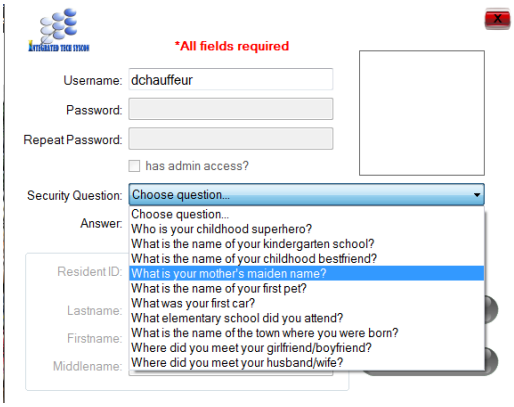


Fig-21 Security Question

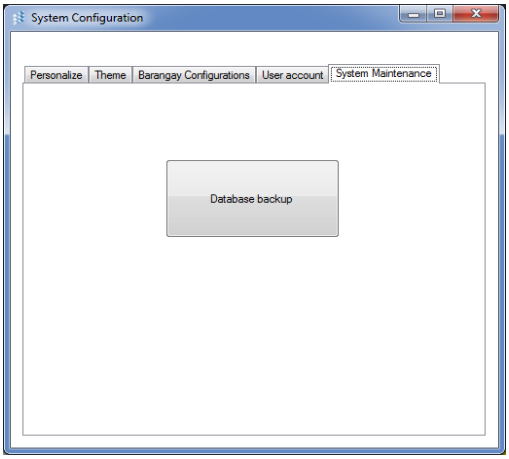


Fig-22 System Maintenance

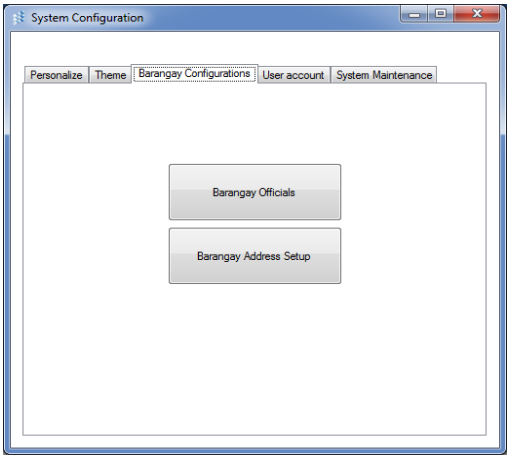


Fig-23 Barangay Configuration

VI. IMPLEMENTATION AND MAINTENANCE PLAN

A. Development Approach: This development model V-shaped also an extension to waterfall model.it was adopted because it allows for effective planning and requirement analysis phase which then lead to both architectural and detailed design of the system to implement which enable and aid in the implementation and execution of the system, another important feature of this model is the testing phase which integrate the unit testing, integration testing and the system testing, all of these enable and avoid flaws in the system.

- Unit Testing
  A unit is the smallest piece of software that can be tested. A typical example in a procedural programming language would be a function/procedure or a group of these contained in a source file. In an object-oriented programming language, this typically refers to simple classes and interfaces.

- Integration Testing
  This is to test the communication between various modules to make sure data is flowing across various components correctly (Hooda, Scholar, & Singh Chhillar, 2015). At this stage we begin to combine the different tested units or components to form a working subsystem.

- System Testing
  At this stage of testing, the overall system is tested to ensure that it is behaving or functioning as intended and as specified in requirement document.

  ✓ Execution of a White box Testing Approach:

Assessment:
1. Check if username/password fields exist and show default values
2. Type in username without password or vice versa, user receives error
3. Type in username that does not exist in system user receives error
4. Type in password less than 8 chars user receives error
5. Type in username that exists and password over 8 chars user logged in
6. Empty username || password

Testing Random Codes as Follows:

```
Public Class AdminLogin
    Dim LogincountAdmin As Integer = 0
    Dim LockcountAdmin As Integer = 300
    Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles
Button1.Click
        LogincountAdmin += 1
        Dim RecordExistLogin As Boolean
```

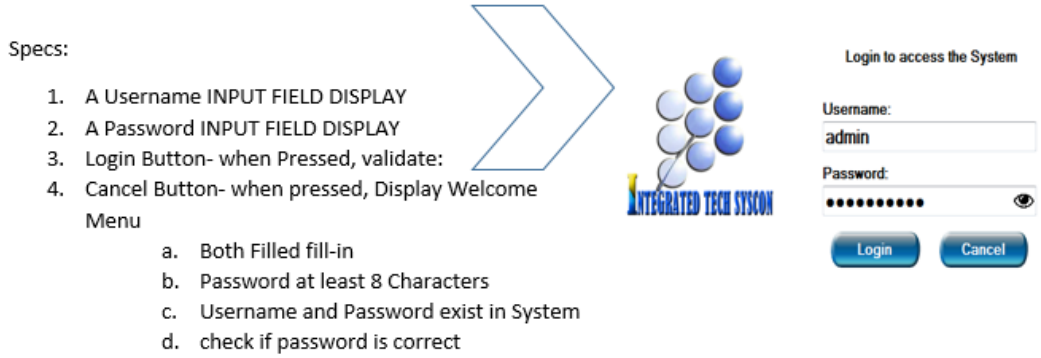


```
        Dim cnLogin As New OleDb.OleDbConnection
        Dim ConDataLogin As New OleDb.OleDbConnection
        Dim cmLogin As New OleDb.OleDbCommand
        Dim drLogin As OleDb.OleDbDataReader
        Dim dbProviderLogin As String = "Provider=Microsoft.ACE.OLEDB.12.0;"
        Dim dbSourceLogin As String = "Data Source =C:\Program Files\Common
    Files\BarangayInfoSystem\Database\BarangayInfoSys.accdb;Jet OLEDB:Database Password=Paterio111

    Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles
    Button1.Click
        LogincountAdmin += 1
        Dim RecordExistLogin As Boolean
        Dim cnLogin As New OleDb.OleDbConnection
        Dim ConDataLogin As New OleDb.OleDbConnection
        Dim cmLogin As New OleDb.OleDbCommand
        Dim drLogin As OleDb.OleDbDataReader
        Dim dbProviderLogin As String = "Provider=Microsoft.ACE.OLEDB.12.0;"
        Dim dbSourceLogin As String = "Data Source =C:\Program Files\Common
    Files\BarangayInfoSystem\Database\BarangayInfoSys.accdb;Jet OLEDB:Database Password=Paterio111
cnLogin.ConnectionString = dbProviderLogin & dbSourceLogin
        cnLogin.Open()
        If LogincountAdmin <> 6 Then
          Try
            'cm = New OleDb.OleDbCommand
            With cmLogin
              .Connection = cnLogin
              .CommandType = CommandType.Text
              .CommandText = "SELECT * FROM UserLoginAccount WHERE (Username = '" &
    TextBox1.Text & "' And Accounttype = '" & "SuperAdministrator" & "')"
              drLogin = .ExecuteReader
            End With
            While drLogin.Read()
              Dim foundcorrect As String = drLogin("Password").ToString
              'String.Compare(strA, strB, ignoreCase), Boolean
              If StrComp(TextBox2.Text, foundcorrect, 0) = 0 Then
                RecordExistLogin = True
              End If

            End While
            cnLogin.Close()
            'Exit Sub
            If RecordExistLogin = True Then
              SuperAdminControl.Show()
              Me.Close()
            End If
            If RecordExistLogin = False Then
              MsgBox("Please check username and password and try again", MsgBoxStyle.Information,
    "Unable to login")
            End If
          Catch ex As Exception
            MsgBox(ex.InnerException)
```


Block Box Testing Approach



B. Questionnaires for Functionality Evaluation

- The System is easy to Log-in
- The System has a Data backup capability
- The System has a Security feature
- The System can register, view and update residents profile or account
- The System is capable of receiving, recording and printing documents request
- The System is capable of receiving and recording of complaints
- The System can generate the correct and complete reports
- The system is able to complete the task without delay

C. Questionnaires for Usability Evaluation

- Ease of use
- Orderliness of the System contents
- System Interface Design
- Clear Links and Buttons
- Readability of Major heading and Body Text
- A person with less computer skills can be able to use the system

D. Result of testing Interpretation of Data: Based on ISO 9126

RANGE OF MEAN	*VERBAL INTERPRETATION*
4.21-5.00	Very Satisfied
3.41-4.20	Satisfied
2.61-3.40	Dissatisfied
1.81-2.60	Very Dissatisfied
1.00-1.80	Poor

TABLE VI. Summary of Weighted Mean

	Barangay Captain	Secretary	Residents
Functionality Test	4.44	4.35	4.49
Usability Test	4.38	4.12	4.20
Efficiency	4.44	4.35	4.49
Maintainability	4.38	4.12	4.20
Portability	4.44	4.35	4.49

TABLE VI. Summary of Weighted Mean

E. User's Manual & Training Program

Integrated Barangay Management infoSystem Development Module 1 – Introduction
Integrated Barangay Management infoSystem Development Module 2 – Database Design
Integrated Barangay Management infoSystem Development Module 3 – Project Components
Integrated Barangay Management infoSystem Development Module 4 – Database Connection
Integrated Barangay Management infoSystem Development Module 5 – Login Form
Integrated Barangay Management infoSystem Developmnt Module 6 –Interface- Drop down Menu Structure
Integrated Barangay Management infoSystem Development Module 7 – Sidebar and Dashboards
Integrated Barangay Management infoSystem Development Module 8 – Intra-Web Portals
Integrated Barangay Management infoSystem Development Module 9 – Barangay Registration and Profiling
Integrated Barangay Management infoSystem Development Module 10 – Record Management Module
Integrated Barangay Management infoSystem Development Module 11 – Barangay Complain Management
Integrated Barangay Management infoSystem Development Module 12 – Report Generation Module
Integrated Barangay Management infoSystem Development Module 13 – Certificate Issuance Module
Integrated Barangay Management infoSystem Development Module 14 – History Log
Integrated Barangay Management infoSystem Development Module 15 – System Configurations

F. Conversion Method

Direct cutover: an entire organization stops using the old system at one time and begins using the new one immediately thereafter.

Barangay Poblacion ended-up using the old system, and currently begins start using the new Integrated Barangay Information System.

Below are the activities considered during Conversion Planning.

G. Conversion Overview

- System Overview
- Conversion Task
- Conversion Schedule
- Security

H. Conversion Support

- Hardware
- Software
- Facilities
- Materials and Personnel.

VII. CONCLUSION

Based from the series of tests conducted on the functionality and usability of the system, the performance of the newly Developed system was found to be fully functional and usable. The effort has been able to achieve the core aim of the work which implement a Hybrid Barangay Information Management System. The Development of this system can be a great help in performing local government transactions reliably and with greater ease. Among the advantages of the system are upgraded security, improved data integrity, better data consistency with accuracy as well as saving time and money.

The system was perceived to be useful in increasing the efficiency and effectiveness of managing and performing barangay transactions. With the latest technological breakthrough and by adopting new advancement in ICT, the existing manual process would drastically improve. Hence, the developed system would provide better alternative to the existing current process. The significant features of the system which are relevant to the functionality of the system include: the user-friendly environment; high system security; better manageability of files; and accurate and quick report generation with a built-in responsive Intra web portal. Furthermore it will help in speed decision-making, where this system has made it possible to use real-time data when making critical decisions.

ACKNOWLEDGEMENT

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To my beloved wife Sarah Jessalyn D. Intud for supporting this endeavour, to my kids Ate Yanyan and Kuya Zian, a constant source of my inspiration. Lastly, Mr. Augorio dela Cruz, for helping and giving all the assistance during development of the system.

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