

**EBARANGAY: AN APPLICATION MANAGEMENT SYSTEM
WITH PUROK INTEGRATION AND
FLOW OF WORKLOAD**

A Capstone Project Presented to the Faculty of
College of Computer, Information and Communication Technology Department
Cebu Technological University - Main Campus

In Partial Fulfillment of the Requirements
for the degree Bachelor of Science in Information Technology

By:

Craige Jonard N. Baring
Sajid O. Cadavero
Rosvie R. Pepito

Narcisan Galamiton, Ph. D
Adviser

May 2021

APPROVAL SHEET

The Capstone Project entitled eBARANGAY: AN APPLICATION MANAGEMENT WITH PUROK INTEGRATION AND FLOW OF WORKLOAD prepared and submitted by Craige Jonard N. Baring, Rosvie R. Pepito, and Sajid O. Cadavero has been examined and is recommended for approval and acceptance.

Recommended:


NARCISAN GALAMITON, Ph. D

Adviser

APPROVED by the Committee on PROPOSAL HEARING with a verdict of APPROVED WITH MAJOR REVISIONS on June 15, 2021.

PET ANDREW P. NACUA, MIT

Chairman


BELL S. CAMPANILLA, Ph. D

GIBE S. TIROL, MIT

Panel Member

Panel Member

ACCEPTED and **APPROVED** in partial fulfillment of the requirement for the degree of **Bachelor of Science in Information Technology**.

GERRY RITZ R. DENSING, Ph. D

Associate Dean, CCICT

JOSE MARIA S. GARCIA II, Ph. D

DEAN, CCICT

ACKNOWLEDGMENT

The Team RJS would like to extend our deepest appreciation to the people who helped and contributed to the success in this study.

First of all, we would like to thank the Almighty God for giving us courage and strength while working with this study. This study would not be done without his guidance.

We also extend our deepest gratitude to those who support this work especially our parents, supporting us emotionally and financially, trusting and believing us all throughout the way. We also thank our close friends, and classmates, who gave advice, and opinions for the improvements of this study.

To our adviser, **Ms. Narcisan Galamiton**, for giving us assistance and support with the research.

To our professor, **Mr. Bell Campanilla**, for guiding us with our research, and to give out necessary feedback for us to grow better.

To us, the researchers, **Rosvie R. Pepito, Sajid Cadavero, and Craige Jonard N. Baring** for working together as a team in creating this study.

DEDICATION

This study is dedicated to the people who believed in our skills and determination. To our loving parents for their undying support, guidance, and understanding along the way. Also, the people, workmates and friends who helped us in their own little ways in this study. To the faculty members who shared their knowledge and experiences to us. To our supportive adviser who has supported and guided us along the way. And especially to our Creator, the Almighty God for giving us strength, and faith to conduct this study.

TABLE OF CONTENTS

TITLE PAGE	i
APPROVAL SHEET	ii
ACKNOWLEDGEMENT	iii
DEDICATION	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
CHAPTER I	1
INTRODUCTION	1
Rationale of the Study.....	1
Objectives of the Study.....	3
Significance of the Study	5
Flow of the Study.....	6
Definition of Terms	7
CHAPTER II	8
REVIEW OF RELATED LITERATURE AND STUDIES	8
Related Literature	8
Related Studies	9
CHAPTER III	13
RESEARCH METHODOLOGY	13
Scope and Limitations	13
Software Engineering Methodology	14
Planning Phase.....	16
Business Model Canvas.....	16
Program Workflow	17

Gantt Chart.....	23
Functional Decomposition Diagram	25
Analysis Phase	26
Use-Case Diagram	26
Storyboard	33
Database Design	58
Entity-Relationship Diagram	58
Data Dictionary	59
Network Design	65
Network Model	65
Network Topology	66
Development Phase	67
Technology Stack Diagram	67
Software Specification	68
Hardware Specification	68
Program Specification	69
List of Modules	69
REFERENCES	74
APPENDICES	75
Appendix A. Capstone 1 Oath of Confirmation	75
Appendix B. Research Working Title Form	78
Appendix C. Capstone 1 Consultation Logs Form	79
CURRICULUM VITAE	81

LIST OF TABLES

Table 1: Comparative Matrix	12
Table 2: Capstone 1 Gantt Chart: Projected	23
Table 3: Capstone 1 Gantt Chart: Completed	23
Table 4 Capstone 2 Gantt Chart: Projected.....	24
Table 5: eBarangay Data Dictionary.....	64
Table 6: Manage Account Module	69
Table 7: Request Document Module	70
Table 8: Ebulletin Module	70
Table 9: Manage Complaints Module	71
Table 10: Manage Residents Module	71
Table 11: Manage Organizations Module	72
Table 12: Manage Notifications/Messages Module	72
Table 13: Manage Barangay Module	73
Table 14: Voting Module	73

LIST OF FIGURES

Figure 1: BeST Barangay System.....	10
Figure 2: e-Barangay visual of their functionality	11
Figure 3: Iterative Model - Design.....	14
Figure 4: Business Model Canvas.....	16
Figure 5: Program Workflow - Resident.....	17
Figure 6: Program Workflow – Purok	18
Figure 7: Program Workflow – Treasurer.....	19
Figure 8: Program Workflow – Secretary.....	20
Figure 9: Program Workflow – Captain	21
Figure 10: Program Workflow – Admin.....	22
Figure 11: Function Decomposition Diagram	25
Figure 12: Use Case – Barangay Resident.....	26
Figure 13: Use Case – Barangay Purok	27
Figure 14: Use Case – Barangay Secretary.....	28
Figure 15: Use Case – Barangay Treasurer	29
Figure 16: Use Case – Barangay Captain	30
Figure 17: Use Case – Admin.....	31
Figure 18: Use Case – Resident Verification.....	32
Figure 19: Storyboard – Webpage - Homepage.....	33
Figure 20: Storyboard – Choose Account.....	33
Figure 21: Storyboard – Register Page	33
Figure 22: Storyboard – Login Page	33

Figure 23: Storyboard – Resident Acc Request	33
Figure 24: Storyboard – Confirmation Page	33
Figure 25: Storyboard – Resident eBulletin.....	34
Figure 26: Storyboard – Request Prompt.....	34
Figure 27: Storyboard – Request Form.....	34
Figure 28: Storyboard – Payment Request Form.....	34
Figure 29: Storyboard – Receipt	34
Figure 30: Storyboard – Document Request Form	34
Figure 31: Storyboard – eReklamo prompt.....	35
Figure 32: Storyboard – Concern.....	35
Figure 33: Storyboard – Concern request sent.....	35
Figure 34: Storyboard – Request	35
Figure 35: Storyboard – Request sent	35
Figure 36: Storyboard – Organization	35
Figure 37: Storyboard – Join Org	36
Figure 38: Storyboard – Upload Requirements	36
Figure 39: Storyboard – Join Request sent	36
Figure 40: Storyboard – Org member	36
Figure 41: Storyboard – Org Content	36
Figure 42: Storyboard – Notification	36
Figure 43: Storyboard – Message Compose	37
Figure 44: Storyboard – Message sent.....	37
Figure 45: Storyboard – Document Requests (PUROK LEADER).....	37

Figure 46: Storyboard – My Profile	37
Figure 47: Storyboard – Post content.....	37
Figure 48: Storyboard – Request content.....	37
Figure 49: Storyboard – Resident’s message	38
Figure 50: Storyboard – Resident Info.....	38
Figure 51: Storyboard – Purok Leader Signature	38
Figure 52: Storyboard – Request/Concerns info.....	38
Figure 53: Storyboard – Notification	38
Figure 54: Storyboard – Report	38
Figure 55: Storyboard – Report Content.....	39
Figure 56: Storyboard – Treasurer homepage.....	39
Figure 57: Storyboard – Payment	39
Figure 58: Storyboard – Payment Details	39
Figure 59: Storyboard – Report	39
Figure 60: Storyboard – Report Content.....	39
Figure 61: Storyboard – Report	40
Figure 62: Storyboard – Secretary homepage.....	40
Figure 63: Storyboard – Secretary request sign	40
Figure 64: Storyboard – Secretary request sign	40
Figure 65: Storyboard – Secretary request sign	40
Figure 66: Storyboard – Secretary eReklamo	40
Figure 67: Storyboard – Secretary eReklamo content	41
Figure 68: Storyboard – Secretary residents	41

Figure 69: Storyboard – Secretary verify account list	41
Figure 70: Storyboard – Account verification page.....	41
Figure 71: Storyboard – Report content.....	41
Figure 72: Storyboard – Brgy Captain homepage	41
Figure 73: Storyboard – Signature requests.....	42
Figure 74: Storyboard – Document requests.....	42
Figure 75: Storyboard – Request content.....	42
Figure 76: Storyboard – Concern/Request list.....	42
Figure 77: Storyboard – Resident’s message.....	42
Figure 78: Storyboard – Resident list	42
Figure 79: Storyboard – Resident list	43
Figure 80: Storyboard – Organization	43
Figure 81: Storyboard – Reports.....	43
Figure 82: Storyboard – Report content.....	43
Figure 83: Storyboard – Notifications	43
Figure 84: Storyboard – Android - Homepage	44
Figure 85: Storyboard – User account	44
Figure 86: Storyboard – Login.....	44
Figure 87: Storyboard – Register	44
Figure 88: Storyboard – Account created	45
Figure 89: Storyboard – eBulletin.....	45
Figure 90: Storyboard – Menu	45
Figure 91: Storyboard – Request	45

Figure 92: Storyboard – Request Docu.....	46
Figure 93: Storyboard – Payment	46
Figure 94: Storyboard – Receipt	46
Figure 95: Storyboard – Request Document (NON -VOTER).....	46
Figure 96: Storyboard – eReklamo	47
Figure 97: Storyboard – eReklamo Concern.....	47
Figure 98: Storyboard – eReklamo Request	47
Figure 99: Storyboard – eReklamo sent.....	47
Figure 100: Storyboard – Organization	48
Figure 101: Storyboard – Join Org	48
Figure 102: Storyboard – Request Join sent	48
Figure 103: Storyboard – Map.....	48
Figure 104: Storyboard – eSchedule	49
Figure 105: Storyboard – Notification.....	49
Figure 106: Storyboard – Messages.....	49
Figure 107: Storyboard – Compose message.....	49
Figure 108: Storyboard – Resident Profile	50
Figure 109: Storyboard – LEADER eBulletin.....	50
Figure 110: Storyboard – Menu	50
Figure 111: Storyboard – Document Request.....	50
Figure 112: Storyboard – Document Request Content	51
Figure 113: Storyboard – Signature	51
Figure 114: Storyboard – eReklamo	51

Figure 115: Storyboard – Resident message.....	51
Figure 116: Storyboard – Resident list	52
Figure 117: Storyboard – Account requests.....	52
Figure 118: Storyboard – Reports.....	52
Figure 119: Storyboard – Report content.....	52
Figure 120: Storyboard – Secretary Profile	53
Figure 121: Storyboard – Secretary Profile	53
Figure 122: Storyboard – Account request	53
Figure 123: Storyboard – eBulletin.....	53
Figure 124: Storyboard – menu	54
Figure 125: Storyboard – Payment	54
Figure 126: Storyboard – Payment Details	54
Figure 127: Storyboard – Report	54
Figure 128: Storyboard – Report Detail.....	55
Figure 129: Storyboard – Brgy. Treasurer profile	55
Figure 130: Storyboard – Purok Leader profile	55
Figure 131: Storyboard – eBulletin.....	55
Figure 132: Storyboard – Menu.....	56
Figure 133: Storyboard – Report details	56
Figure 134: Storyboard – Menu.....	56
Figure 135: Storyboard – Report	56
Figure 136: Storyboard – Notification.....	57
Figure 137: Storyboard – Brgy. Captain profile	57

Figure 138: Entity-Relationship Diagram.....	58
Figure 139: Network Model.....	58
Figure 140: Network Topology	59
Figure 141: Techonology Stack Diagram	59

CHAPTER I – INTRODUCTION

Rationale of the Study

The barangay is one of the smallest administrative government division in the Philippines. It is the foundation for a growing community. This serves as the primary planning and implementing unit of government policies, plans, programs, projects, and activities in the community, and as a forum wherein the collective views of the people may be expressed, crystallized, and considered, and where disputes may be amicably settled. It offers multiple services and programs that will help the residents with the issues they encounter.

The practice of implementing a barangay is not only seen here in the Philippines but can also be observed in other countries, they call them towns. They are designed and authorized to perform certain governmental functions on the local level, and its main purpose is to exercise the power of the state to promote greater prosperity, safety, convenience, health, and the common good of the general community.

A barangay captain is an elected position by the residents in an area and supported by the government. Purok area is composed of fifty to 100 households. Purok leader is a chosen volunteer by the residents and therefore accepted and respected. A purok leader can be the bridge of information between the barangay captain and residents. (Matthies, 2017).

The eBarangay application will be proposed and distributed to the municipality of Mandaue City, Cebu utilizing the proposed revenue stream by the researchers to help manage the barangay that are under the municipality. The eBarangay application aims to divide the workload of the barangay with purok integration to achieve successful flow of workload. The management system of eBarangay helps to downgrade the services of the barangay which will receive, sort and send the complaints and concerns to the appropriate people for the concern such as the *purok* leader towards the barangay captain and other leader of an organization depending on the level of concern. Legal information is a very important news to every individual, with the eBarangay application, the barangay captain can post announcements, the purok leader can settle things of their

responsibilities towards the residents and towards the barangay captain, and residents will be able to send their concerns and complaints, such as road integrity, electricity, water, noticing new faces, tracing and other upcoming concerns. The residents could also request for barangay documents remotely. The eBarangay application includes the geographical map of the area and voting system by the residents to vote of such position.

Objectives of the Study

The main objective of this study is to design and develop a system that will bring the services of a barangay into electronic form with purok integration and flow of workload

1. To develop an application that will enable residents to:

- manage own account
- access to eBulletin
- view the geographical map
- send their concerns and complaints
- request for barangay documents
- set schedules and appointments
- **vote for nominees**

2. To develop an application that will enable the *purok* leader to:

- manage own account
- access to eBulletin
- verify new user accounts
- manage resident's profiles within their *purok* area
- set schedules and appointments
- receive the concerns and complaints and requests
- assess and perform necessary minor actions
- send the reports, requests and major concerns and complaints over to the barangay captain when they deem it out of their hands
- **vote for nominees**

3. Develop an application that will enable the barangay treasurer to:

- manage own account
- access to eBulletin
- receive payments
- confirm payments

- send reports and confirmation of payments
- generate receipts
- **vote for nominees**

4. Develop an application that will enable the barangay secretary to:

- manage own account
- verify new user accounts
- access to eBulletin
- set schedules and appointments
- create document
- manage resident's profiles within the *purok area*
- receive major concerns and complaints, the concerns and complaints from the resident users and requests from *purok* leaders
- send reports, requests and major concerns and complaints of resident users
- **vote for nominees**

5. Develop an application that will enable the barangay captain to:

- manage own account
- verify accounts
- access to eBulletin
- manage resident's profiles within the *purok area*
- update on geographical view and barangay details
- send documents
- set schedules and appointments
- create new organization
- receive reports, requests, and major concerns from *purok* leaders and secretary
- **promote, demote or nominate user**

6. Develop an application that will enable the admin to:

- manage barangay accounts
- manage barangay details

Significance of the Study

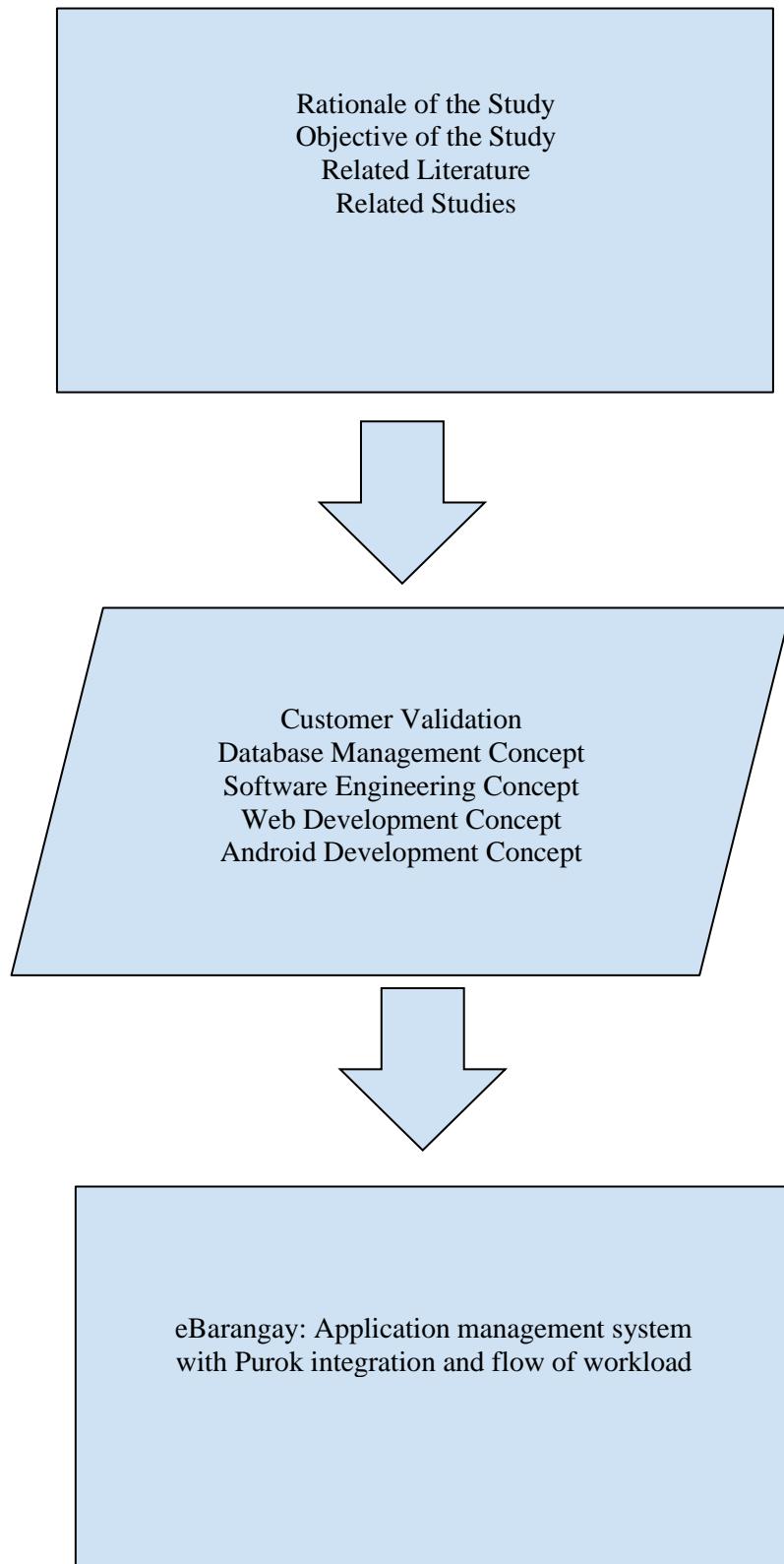
Residents: The study will help strengthen the connection and gap of communication between the barangay staff and its residents. It aims to give residents a platform to voice out what's on their mind, and to access the services remotely for better convenience.

Purok Leader: The system will help the purok leader outline their duty within the purok they're assigned to, and will aid with managing the information that's being given to them. This allows them to appraise every concern and decide if these concerns should be forwarded towards the barangay captain. This aims to conveniently track the residents' information living in their area.

Barangay members: The system will help the barangay members be able to immediately determine who is in need with the services a barangay can give, concisely. This includes being able to see who has concerns related to electricity, water, proper roads, and etc. The barangay members can also see the result of data concurred from the barangay census.

The system will help the barangay member for the reduction of workload and easy to announce news with bigger scope of audience that all residents can easily be informed, conveniently track the status and details of every *purok* and immediately determine and access the needs of the residents. The barangay member can also see the result of data concurred from the barangay census.

Flow of the Study



Definition of Terms

Barangay – Refers to a small administrative division of the Philippines that is lead by a team composed of a Barangay captain, Secretary, Treasurers, Auditors and Councilors

Purok – It is a division within a barangay; it often serves as a unit for delivering services and administration within a barangay

CHAPTER II - REVIEW OF RELATED LITERATURE AND STUDIES

Related Literature

Part of purok's function is to receive, disseminate and act on information including the petty fights from the residents before passing over to the barangay captain. The United States hailed the purok system as the best practice of harnessing as the couriers of information to residents to implement strategies for disaster risk reduction (Curato & Calamba, 2018).

According to Cheng (2019), the formative years in establishing the purok system with an emphasis of volunteerism and self-help provided the necessary learning process for residents and municipal officials to overcome the challenge of coordination within the community and to the different levels of government.

Through systematic qualitative analysis, it is found that residents of a fishing village in San Francisco, Camotes could contextualize warning information to spur actions. The residents also evacuated without waiting for the Typhoon Haiyan to worsen, as well as the tourist (Ponce de Leon, 2021).

According to the CebuDailyNews (2017), the first iteration of institutionalizing of the Purok system similar to the Bohol province model was on San Francisco town on Camotes Island, Cebu. In fact, the implementation of the Purok system is what helped them survive during the Super Typhoon Yolanda's devastation back on November 8, 2013. This is all thanks to Alfredo Arquillano Jr. for setting it up back in 2004 which purok system was originally formed in 2004 for projects on education, livelihood, and waste segregation (Curato & Calamba, 2018). So, it was only a matter of time before Cebu province found a way to institutionalize the purok system that may or may not be modeled after Bohol province, which found the purok system quite valuable in its recent encounter with unwanted visitors going by the group name Abu Sayyaf. Were it not for the purok system that inculcated a sense of vigilance among residents in Bohol's Inabanga town, these bandits would have had their way and kidnapped foreign delegates who were in the province for the ministerial round of the Association of Southeast Asian Nations (ASEAN) summit meeting

The CebuDailyNews stated that, “A reliable purok system consists, among other things, of residents registering themselves in the purok and the purok leaders gaining a database of the residents living within their area along with knowledge of their background. This database can be used in cases of emergencies, where a household with family members specializing in certain skills can be tapped for the purok’s programs in health, security, and so on. Not only would it help identify the residents within a given community, the purok database can also be useful in cracking down on criminal elements like drug dealers and cyberpornography dens.”

Related Studies

Goals

Empower officials with an information system that allows them to manage the activities of the barangay. The Computerized record system is also beneficial for the residents since it generate reports and documents.

Opportunities

Cost effective, user-friendly and affordable system that is also internet-ready. Barangay database integration for Local Goverment System administration.

[DOWNLOAD BROCHURE](#) [SIGN IN](#)

Figure 1: **BeST Barangay System**

BeST is a Barangay e-System that provides tools that can aide the needs to operate. This system boasts a management system for Records electronically; Information Management System for their Residents Profile, Judicial and Disaster Risk Reduction; and a Document Processing module that helps with Residents barangay clearance, Barangay ID, Business permits and transaction reports.



Figure 2: e-Barangay visual of their functionality

The objective of OnDemand eBarangay Information System is to organize local barangay information into a media where information becomes readily available and accessible upon demand or request. Since local information cannot just be acquired anywhere, the need to build the information in electronic format is required. Guidelines and procedures are in place in order to attain this objective. History and previous information together with the current events and other information that is shared publicly will be encoded or scanned and saved in the system. Logged books can still be used and information is updated in the system. Thus, a dictionary or encyclopaedia will be created and continuously updated as reference for current and future times. The contents of the eBarangay Information System will be a legacy for the future generations.

Building of information from the barangay level is a better way to create a database of residents' information. Barangay database can be linked or shared to a bigger database system where selected information is made available to the public. Information from the barangay can be scaled to municipality, provincial or even national

Having online information for the locality offers a lot of benefits not only to the local constituents but to visiting guests and future generations. Information can be used to create statistics, a tool for progress and event in the management of the local barangay. Partner eBIS with an ID system where unique number is assigned per individual can help crime prevention or event offers job opportunities to individuals where mix and match search can be requested.

	BeST	WarpVision ISS	eBarangay
Create Account	✓	✓	✓
Manage Account	✓	✓	✓
Manage Complaints			✓
Manage Requests			✓
Request Documents	✓	✓	✓
Profiling	✓		✓
Purok Integration	✓		✓
Public eBoard			✓
Schedule Activities			✓
Geographical View			✓
Create Organization/Groups			✓

Table 1: Comparative Matrix

CHAPTER III - RESEARCH METHODOLOGY

Scope and Limitations

This study focuses on developing a web and mobile-based platform for barangay management system. This system will help barangay users manage resident records, complaints, reports, and barangay services. In addition, residents can receive notifications and be able to use the barangay services. This study will be first conducted here in Mandaue City.

The limitations of eBarangay are the following:

- The system cannot verify if the details inputted by the residents for their profile is accurate.
- The system will not handle the management of organizations.
- The system will only cater document requests for Barangay clearance, and Cedula.
- The system will only handle complaints and requests regarding lights, roads, residents, electricity, and water.
- The proposed study will only focus on barangays that are situated within the Mandaue City area.
- The system is not compatible with IOS.
- Android 4.0.3 and higher for Mobile devices.
- Windows 7 and higher for desktop/web.

Software Engineering Methodology

Software Engineering Methodology is a series of systematic process used in software projects. It comprises features of either building in a sequence, refining of current versions or tweaking of the system.

Iterative model design is a particular design that is broken down into iterations. It starts with the requirements where system related information is gathered and analyzed. Then the design phase is next, to utilized the design of the system. After that is the implementation phase, coding process is involved and executed from the designs and specifications to implement the initial iterations. Testing phase will then be done to test the code that was implemented. This is to identify and locate potential bugs and issues. Evaluation is the final phase of the iterative model design. This is to examine the project status and validate the initial requirements as well as the suggestions for the next possible iteration.

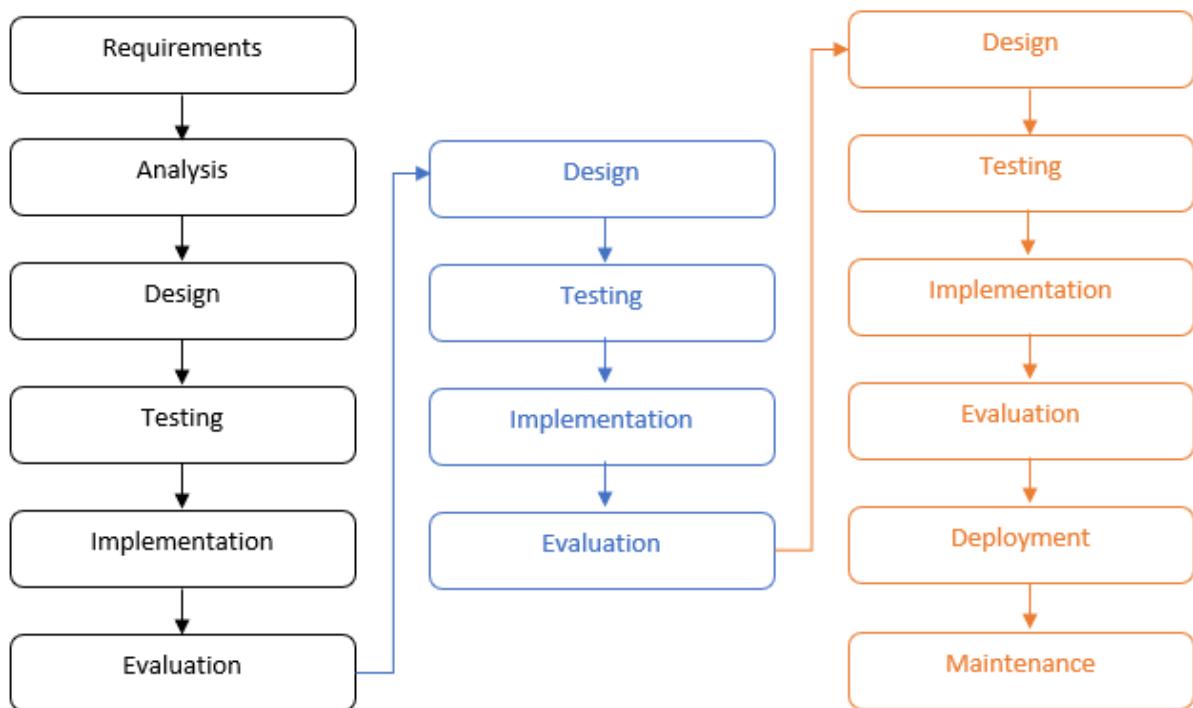


Figure 3: Iterative Model – Design

The researchers chose waterfall model design as this method will help them collect, evaluate, and process each phase carefully and steadily. The researchers plan to develop the system in a step-by-step process, until the features and goals of each phase are completely delivered as this method helps the researchers identify the problems that might arise in the future, and will intend to fix it beforehand.

Planning Phase

Business Model Canvas

Business Model Canvas is a strategic management and lean startup template for developing new or documenting existing business models. It is a great tool to help us understand a business model in a straightforward, structured way. It is a visual chart with elements describing a product's value proposition, infrastructure, customers, and finances

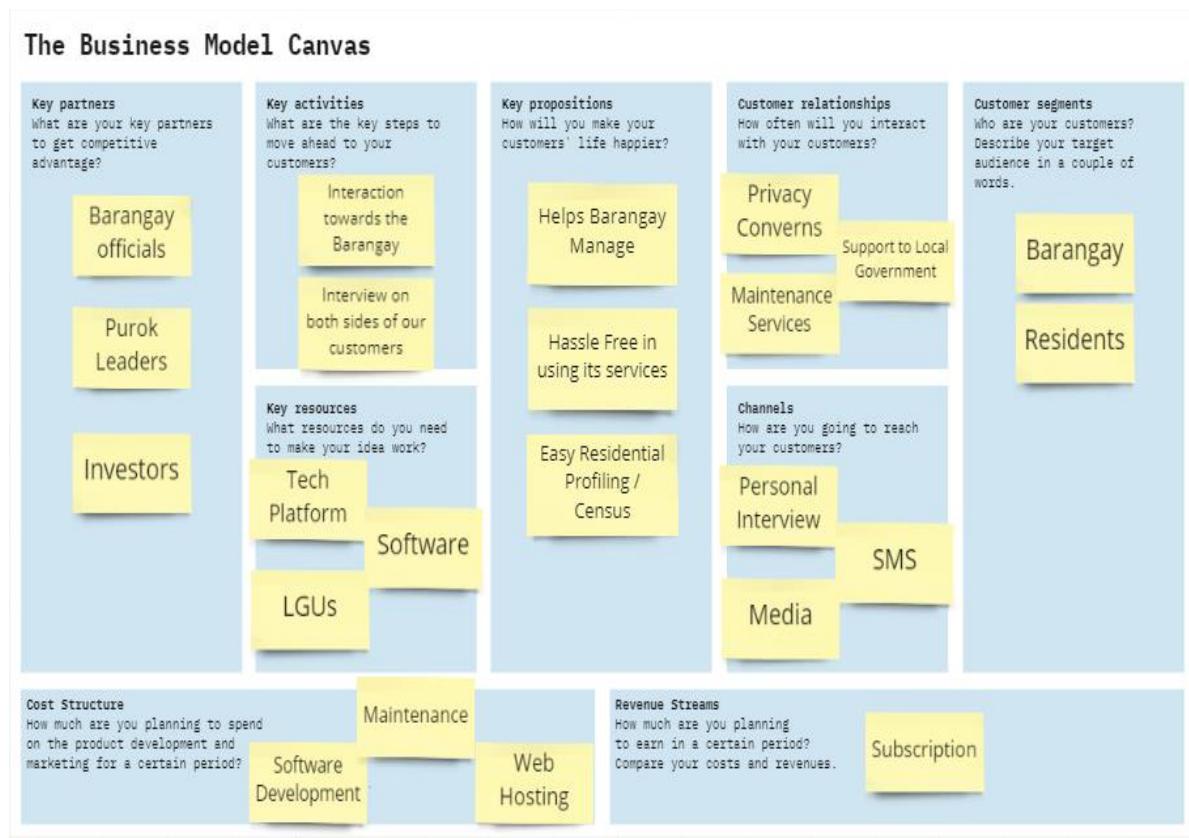


Figure 4: **Business Model Canvas**

The figure above is the business model canvas used by the eBarangay. There are two customer segments involved: Barangay and Residents. As for Residents, they need to register in order to gain access to the services, while Barangay users will have their accounts be created by the admin. The revenue streams rely on the subscriptions from barangays who want to use the system, and service charges from every document requests.

Program Workflow

A program workflow is a demonstration of an application that represents a step-by-step process of software that is executed accordingly.

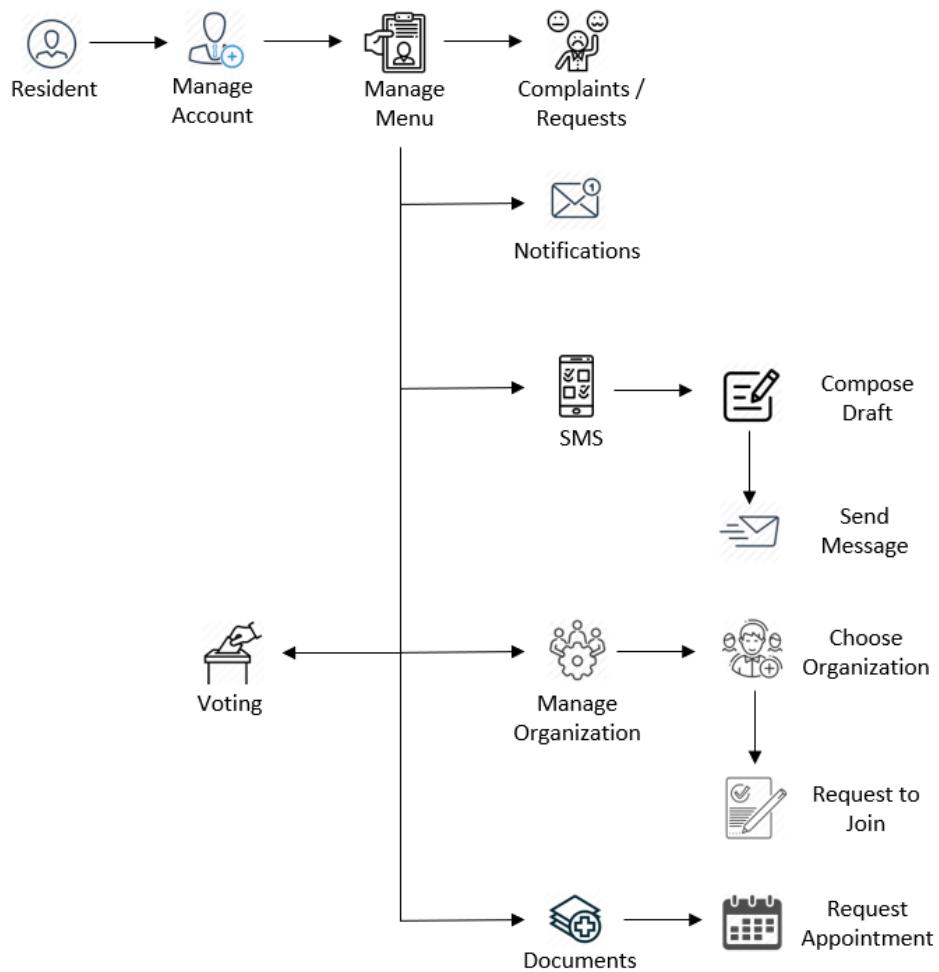


Figure 5: Program Workflow – Resident

The Residents can send complaints and requests to the purok. They can also manage their notifications to either receive or send them. They can also manage SMS or short message services, mostly towards the assigned purok. They can also manage the barangay organization they are in. They can also manage documents like asking for requirements or asking for the documents itself with the request of appointments. They are also able to see the nominees of the purok in their area and vote for them.

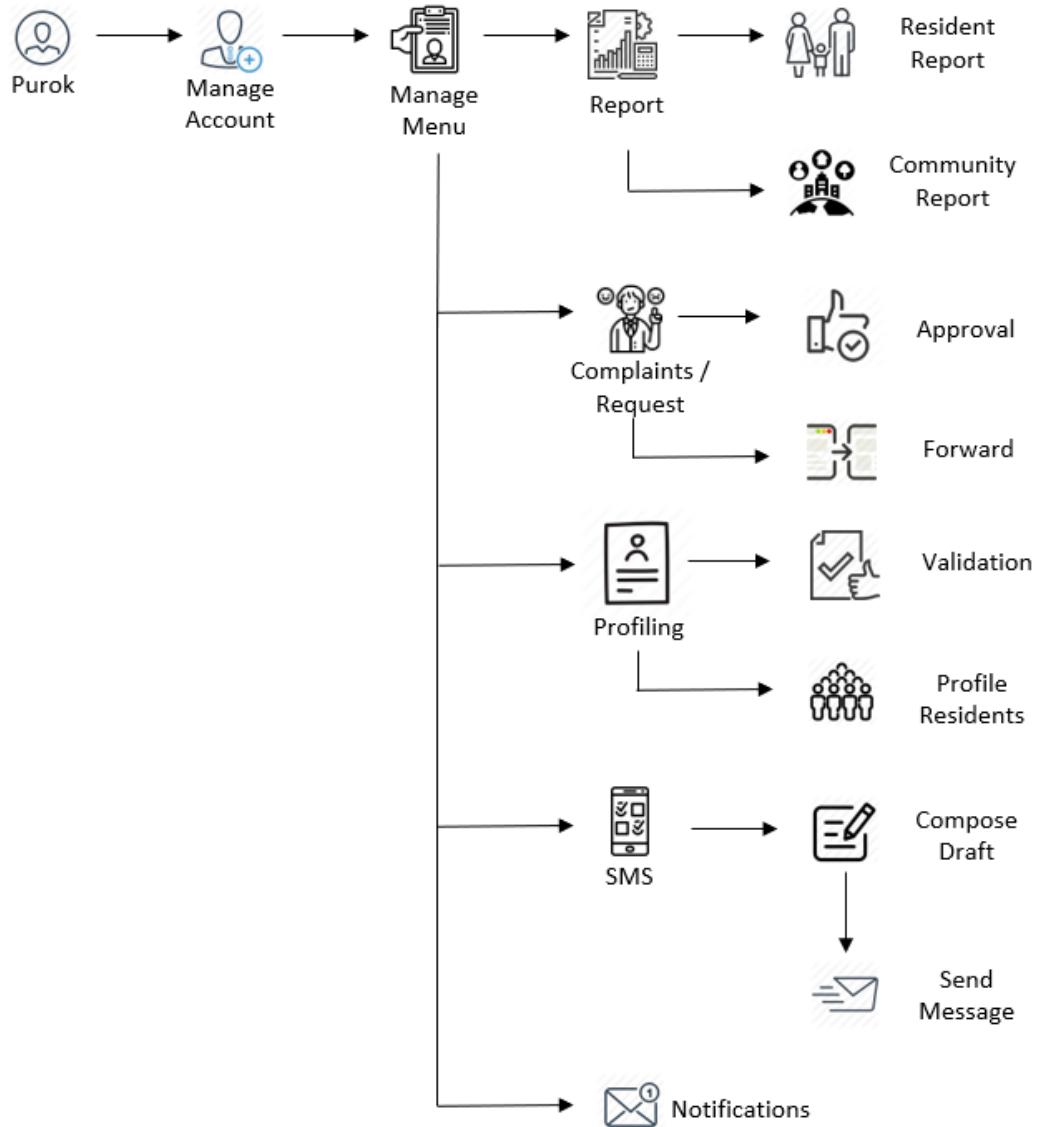


Figure 6: **Program Workflow – Purok**

The Barangay Purok can manage reports of the residents under them or the assigned community in general. They can also manage the complaints or request of their residents for approval or to forward them if deemed unable or level of complaints and request is out of their authority. They can also manage SMS or short message service with their assigned residents. Lastly would be to manage profiling residents. They can validate if the information of the residents is authentic or not, and they are also able to record non-users that are unfortunate to neither have internet nor the device for residents to use.

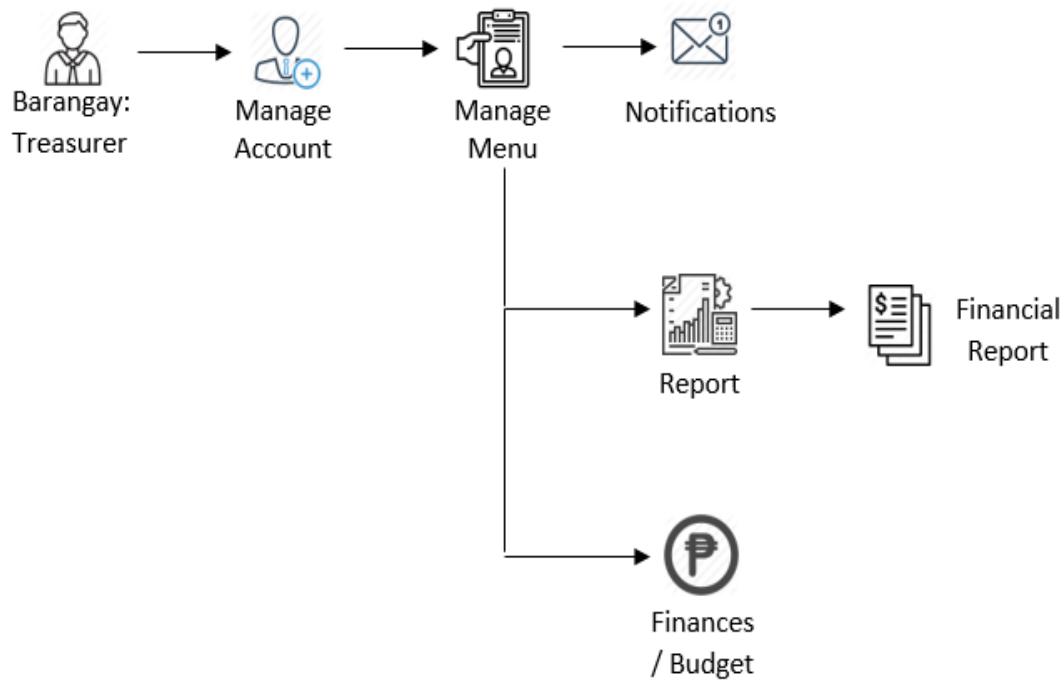


Figure 7: **Program Workflow – Treasurer**

The treasurer mostly handles the finances of the barangay, so anything that concerns money like their budget, collecting and issuing official receipts for taxes, fees, contributions materials and other resources that is used and deposited in the account of the Barangay. The user will also send out reports according to all the records they collected and estimated incomes or expenditures for the preceding and ensuing time.

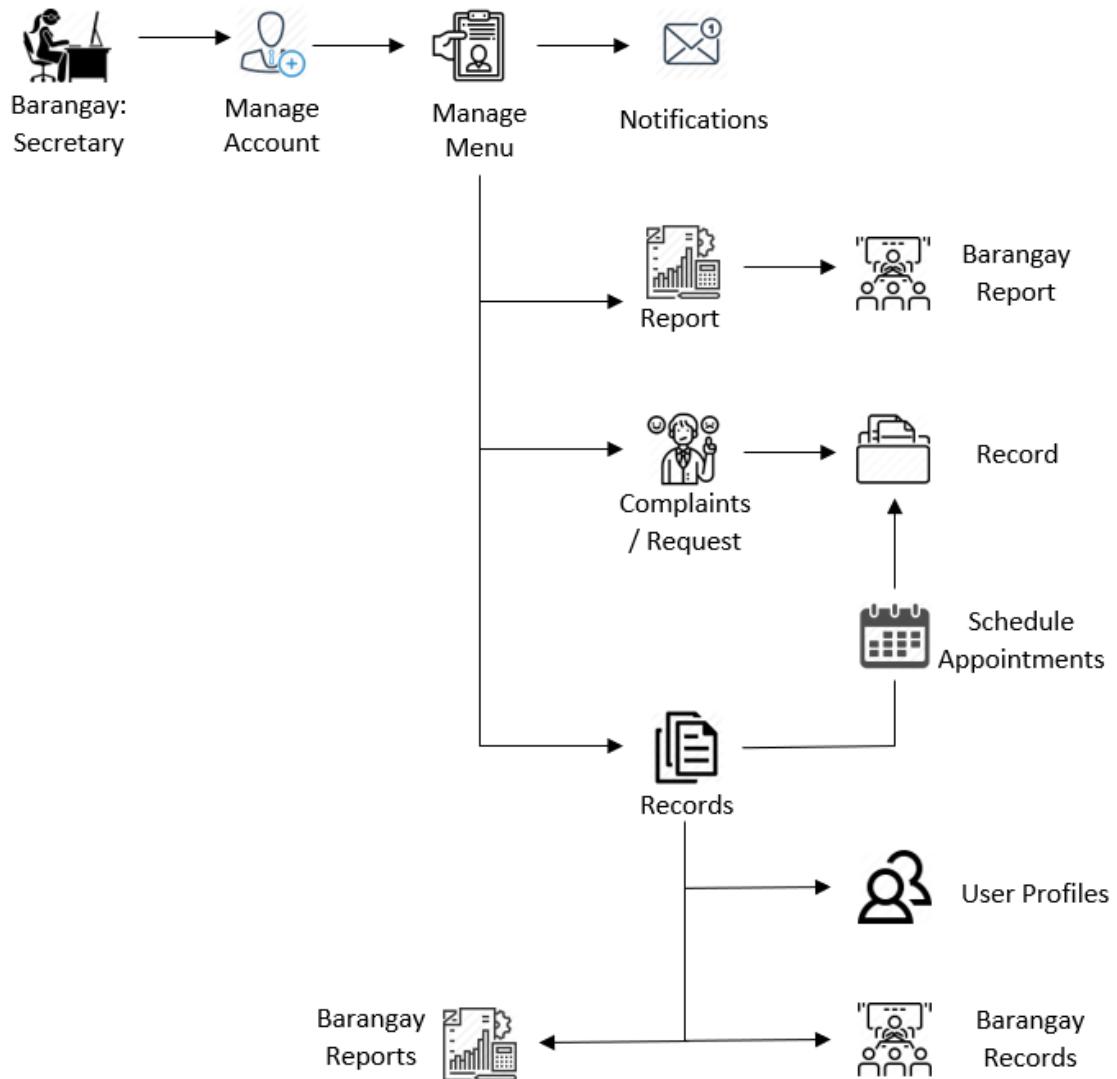


Figure 8: **Program Workflow – Secretary**

The Barangay Secretary receives notifications from multiple people, from the residents to the barangay captain. The user receives complains, requests, reports and profiles for them to record. The user can also set appointments to the requests and the complaints of their residents. The secretary also handles posting some of the announcements depending on the barangay captain.

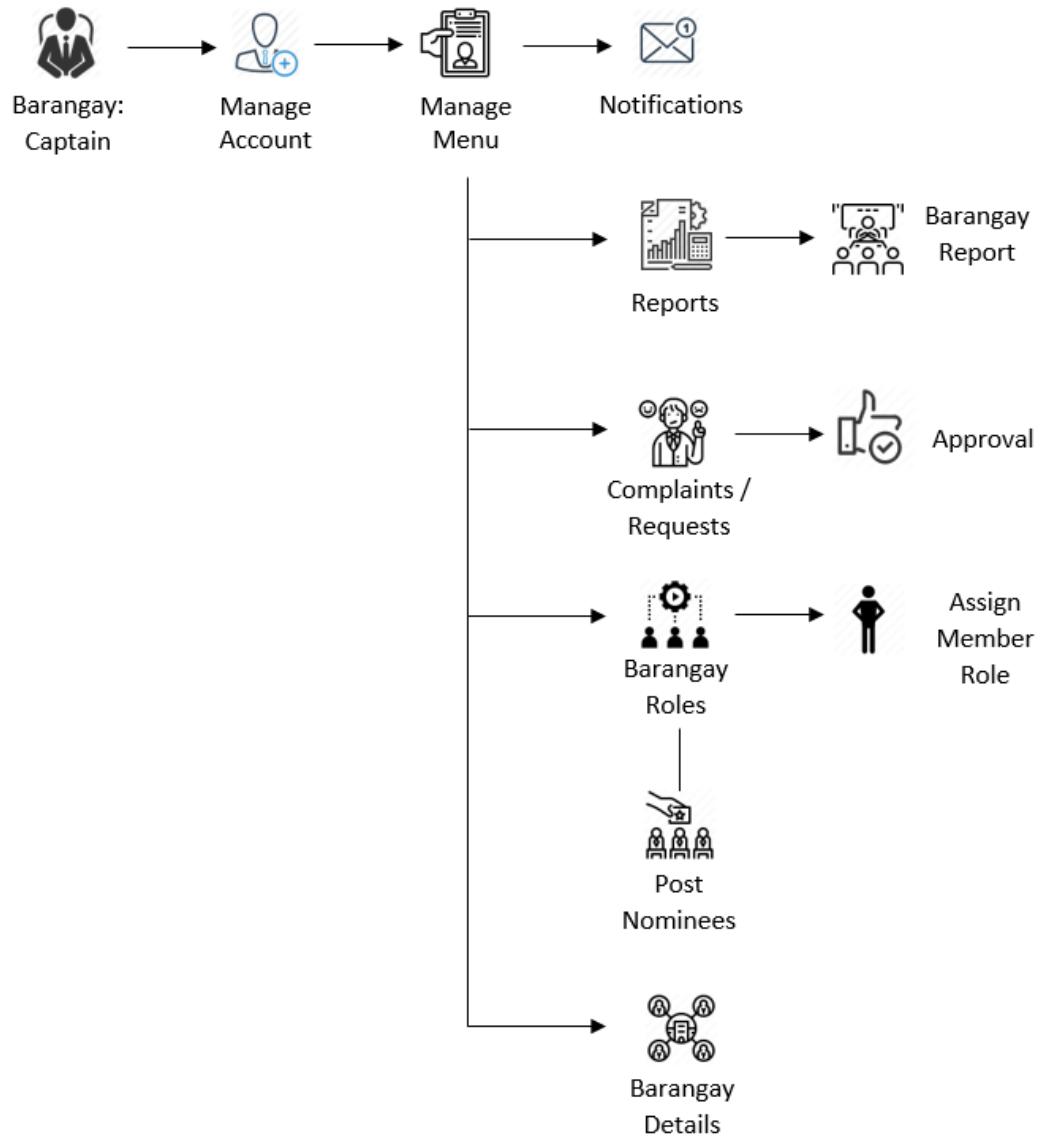


Figure 9: **Program Workflow – Captain**

The figure above demonstrates the function of the system towards the Barangay Captain users. The user can manage to either receive or send notifications. Managing reports is also available to the user. It can also manage approvals of complaints and request that are forwarded from the purok leaders. The barangay captain also handles the barangay roles where he can assign the roles of the users that he wants to choose for the secretary and the treasurer. It can also manage to post nominees of the different purok leaders for the residents to vote for.

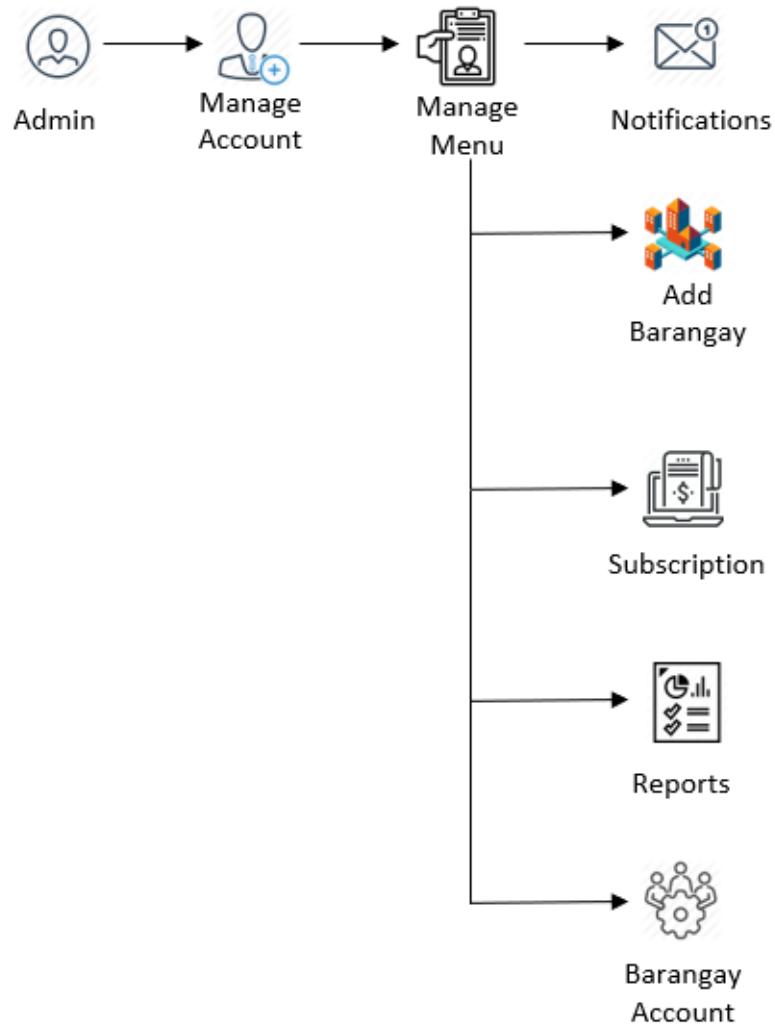


Figure 10: **Program Workflow – Admin**

The figure above is the program workflow for the admin. The admin can manage notifications, barangay details, subscriptions and reports. The admin can also manage the barangay account wherein the account is given to the role of the captain.

Gantt Chart

These is the Gantt chart of the researchers which shows the amount of work done or production completed in certain periods of time in relation to the amount planned for those periods.

Task ID	Task Name	Start Date	End Date	1	2	1	2	3	4
1	Rationale of the Study	04/05/2021	04/06/2021						
2	Objectives of the Study	04/07/2021	04/08/2021						
3	Scope and Limitations of the Study	04/09/2021	04/10/2021						
4	Significance of the Study	04/11/2021	04/11/2021						
5	Flow of the Study	04/11/2021	04/11/2021						
6	Definition of Terms	04/11/2021	04/11/2021						
7	Related Literature	04/12/2021	04/13/2021						
8	Related Studies	04/12/2021	04/13/2021						
9	Comparative Matrix	04/13/2021	04/13/2021						
10	Software Engineering Methodology	04/19/2021	04/19/2021						
11	Business Model Canvas	05/03/2021	05/03/2021						
12	Program Workflow	05/03/2021	05/05/2021						
13	Gantt Chart	05/05/2021	05/05/2021						
14	Functional Decomposition Diagram	05/06/2021	05/06/2021						
15	Use Case Diagrams	05/07/2021	05/10/2021						
16	Storyboard	05/09/2021	05/12/2021						
17	Database Design	05/13/2021	05/15/2021						
18	Data Dictionary	05/15/2021	05/15/2021						
19	Network Design	05/17/2021	05/18/2021						
20	Network Model	05/18/2021	05/19/2021						
21	Network Topology	05/20/2021	05/21/2021						
22	Technology Stack Diagram	05/22/2021	05/23/2021						
23	Software Specification	05/24/2021	05/24/2021						
24	Hardware Specification	05/24/2021	05/24/2021						
25	List of Module	05/24/2021	05/25/2021						

Table 2: Capstone 1 Gantt Chart: Projected

Task ID	Task Name	Start Date	End Date	1	2	1	2	3	4
1	Rationale of the Study	04/05/2021	04/06/2021						
2	Objectives of the Study	04/07/2021	04/08/2021						
3	Scope and Limitations of the Study	04/09/2021	04/10/2021						
4	Significance of the Study	04/11/2021	04/11/2021						
5	Flow of the Study	04/11/2021	04/11/2021						
6	Definition of Terms	04/11/2021	04/11/2021						
7	Related Literature	04/12/2021	04/13/2021						
8	Related Studies	04/12/2021	04/13/2021						
9	Comparative Matrix	04/13/2021	04/13/2021						
10	Software Engineering Methodology	04/19/2021	04/19/2021						
11	Business Model Canvas	05/03/2021	05/03/2021						
12	Program Workflow	05/03/2021	05/05/2021						
13	Gantt Chart	05/05/2021	05/05/2021						
14	Functional Decomposition Diagram	05/06/2021	05/06/2021						
15	Use Case Diagrams	05/07/2021	05/10/2021						
16	Storyboard	05/09/2021	05/12/2021						
17	Database Design	05/13/2021	05/15/2021						
18	Data Dictionary	05/15/2021	05/15/2021						
19	Network Design	05/17/2021	05/18/2021						
20	Network Model	05/18/2021	05/19/2021						
21	Network Topology	05/20/2021	05/21/2021						
22	Technology Stack Diagram	05/22/2021	05/23/2021						
23	Software Specification	05/24/2021	05/24/2021						
24	Hardware Specification	05/24/2021	05/24/2021						
25	List of Module	05/24/2021	05/25/2021						

Table 3: Capstone 1 Gantt Chart: Completed

Task ID	Task Name	Start Date	End Date	July					August			
				2	3	4	5	1	2	3	4	
1	Assign Task	07/05/2021	07/06/2021									
2	Define Requirements	07/05/2021	07/06/2021									
3	Acquiring Requirements	07/05/2021	07/06/2021									
4	Designing the interface	07/07/2021	08/02/2021									
5	Manage Account Module	07/07/2021	07/09/2021									
6	Integrate and Test	07/07/2021	07/09/2021									
7	Request Document Module	07/09/2021	07/11/2021									
8	Integrate and Test	07/09/2021	07/11/2021									
9	eBulletin Module	07/12/2021	07/14/2021									
10	Integrate and Test	07/12/2021	07/14/2021									
11	Manage Complaints Module	07/15/2021	07/17/2021									
12	Integrate and Test	07/15/2021	07/17/2021									
13	Manage Residents Module	07/18/2021	07/20/2021									
14	Integrate and Test	07/18/2021	07/20/2021									
15	Manage Organizations Module	07/21/2021	07/23/2021									
16	Integrate and Test	07/21/2021	07/23/2021									
17	Manage Notifications Module	07/24/2021	07/26/2021									
18	Integrate and Test	07/24/2021	07/26/2021									
19	Vote Nominees Module	07/27/2021	07/29/2021									
20	Integrate and Test	07/27/2021	07/29/2021									
21	Manage Barangay	07/30/2021	08/02/2021									
22	Integrate and Test	07/30/2021	08/02/2021									
23	Finalizing Modules	08/03/2021	08/07/2021									
24	Revising Chapters	08/08/2021	08/10/2021									
25	Finalization of System	08/11/2021	08/15/2021									
24	Completion of Requirements	08/15/2021	08/16/2021									
25	Submission of Capstone Project											

Table 4: **Capstone 2 Gantt Chart: Projected**

Functional Decomposition Diagram

Functional decomposition is defined as a top-down representation of process or function. The Functional Decomposition Diagram shows that there are eight managements which are: Services, Profiling, Accounts, Information, Organization, Complaints, Barangay, and Voting. These managements can be accessed by varied users. The legend shows you which functionalities are accessed by whom. Basically, this is used for representing business function and operation in hierarchical manner.



Figure 11: **Function Decomposition Diagram**

Analysis Phase

Use – Case Diagram



Figure 12: **Use Case – Barangay Resident**



Figure 13: **Use Case – Barangay Purok**

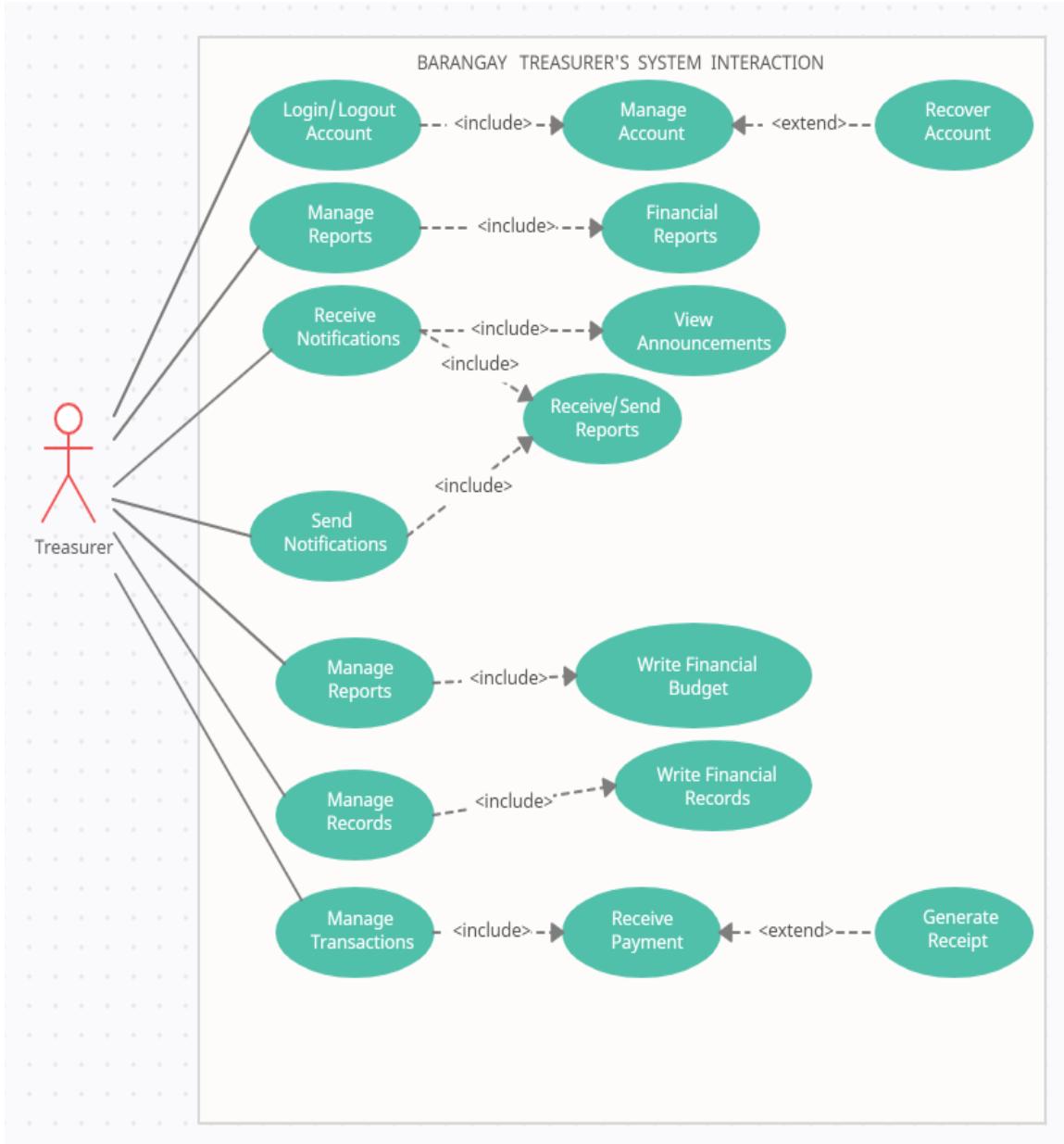


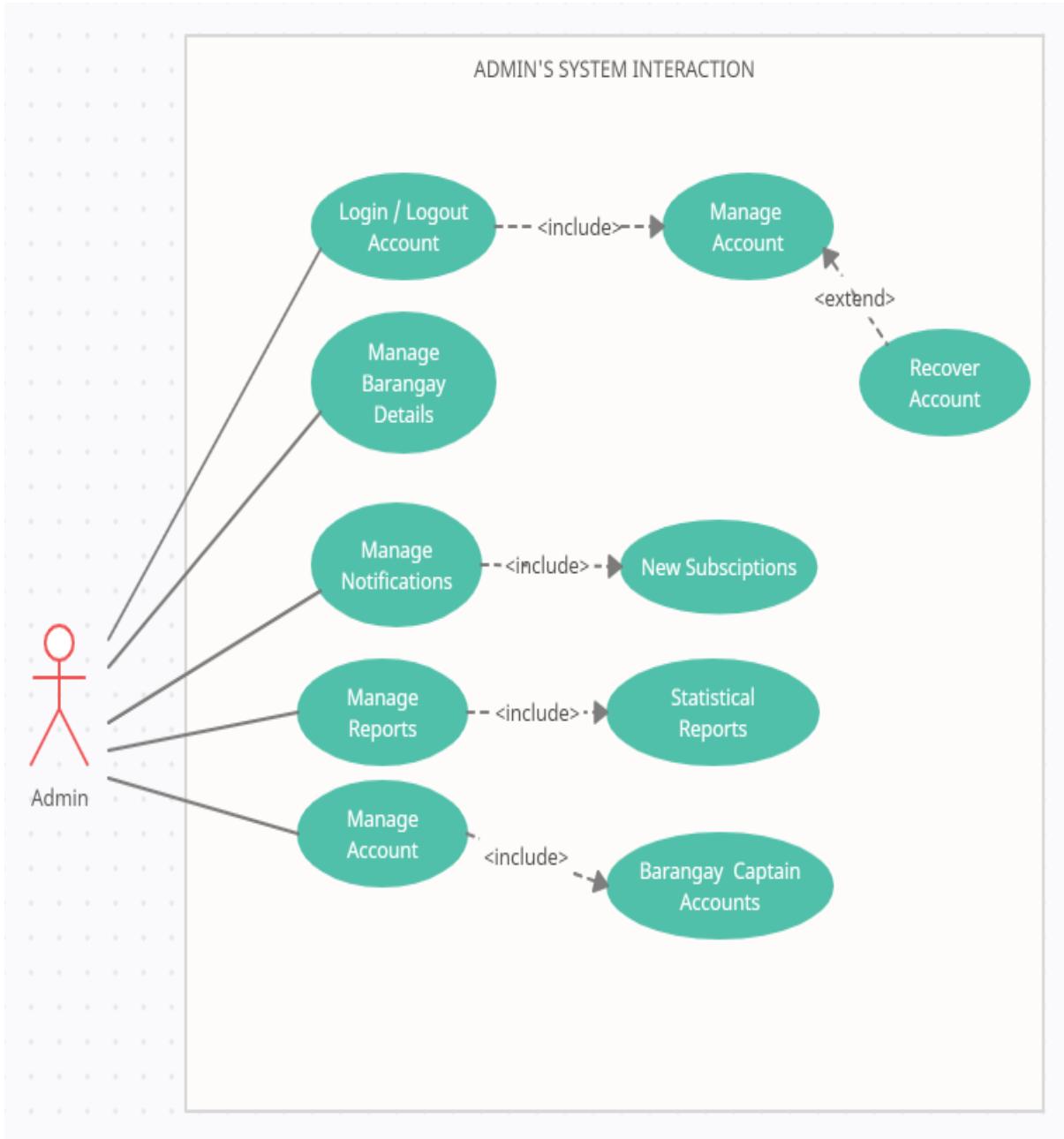
Figure 14: Use Case – Barangay Treasurer



Figure 15: Use Case – Barangay Secretary



Figure 16: Use Case – Barangay Captain

Figure 17: Use Case – Admin

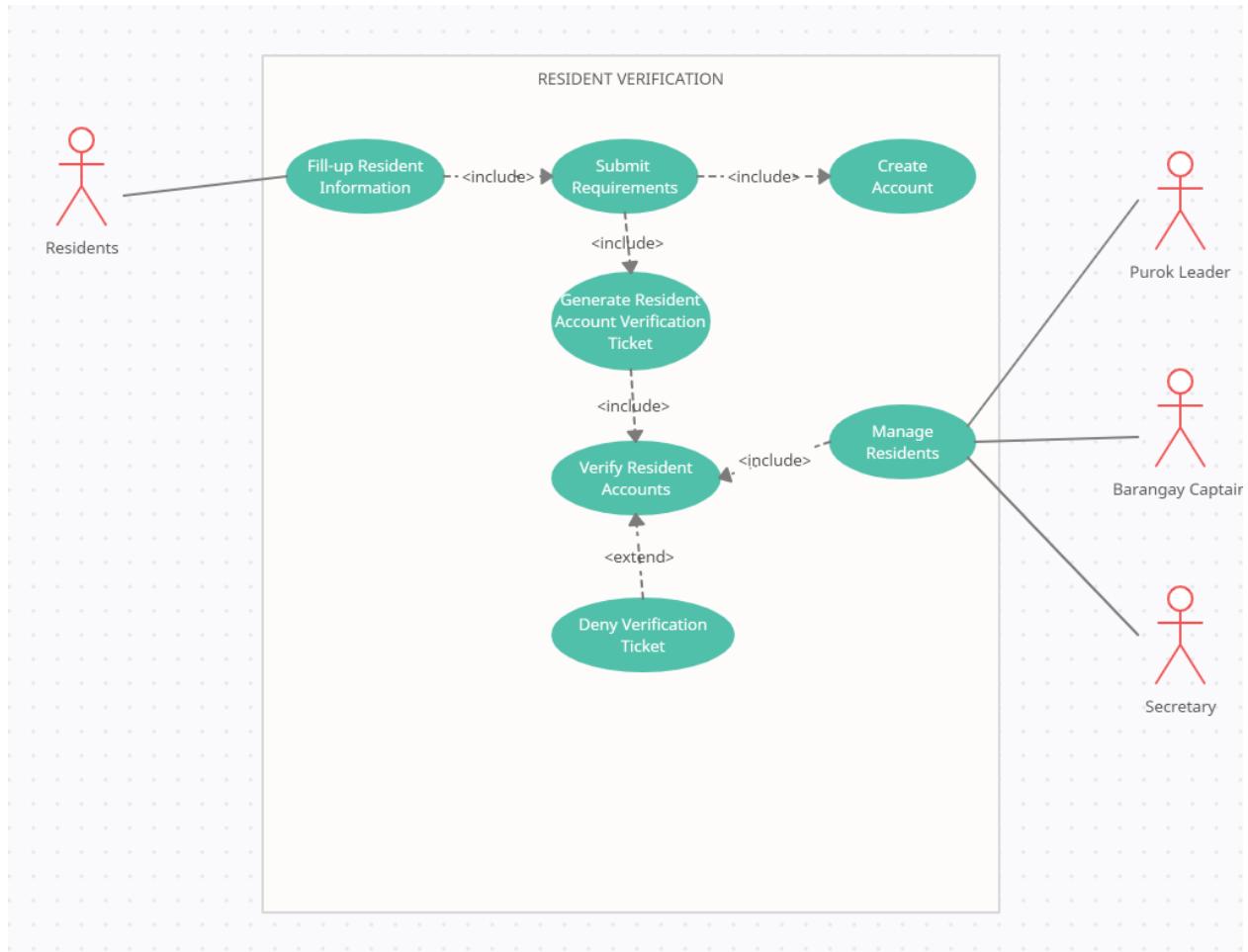


Figure 18: **Use Case – Resident Verification**

Storyboard

Web

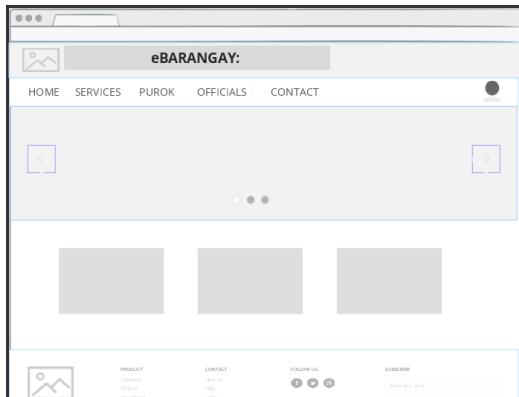


Figure 19: Storyboard – Webpage - Homepage

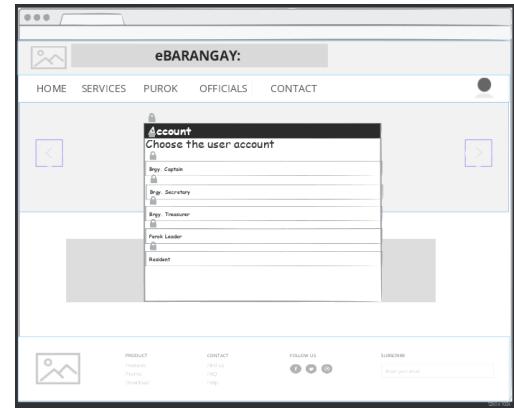


Figure 20: Storyboard – Choose Account

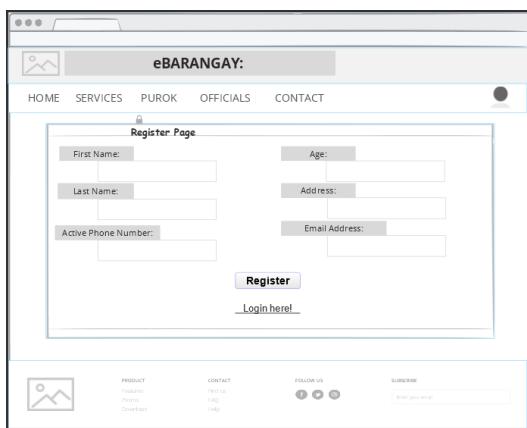


Figure 21: Storyboard – Register Page

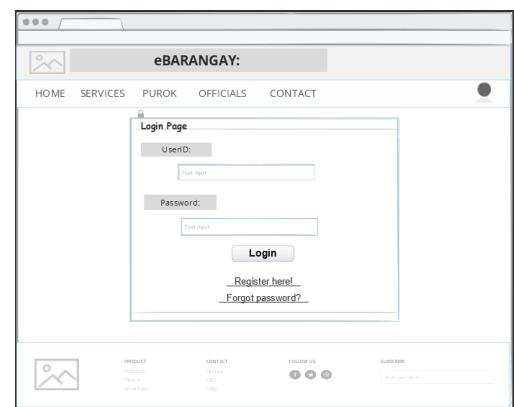


Figure 22: Storyboard – Login Page

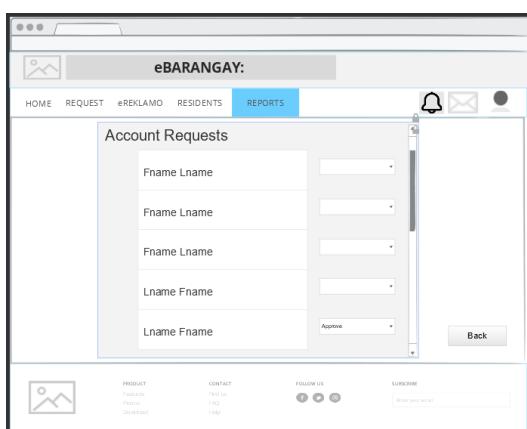


Figure 23: Storyboard – Resident Acc Request

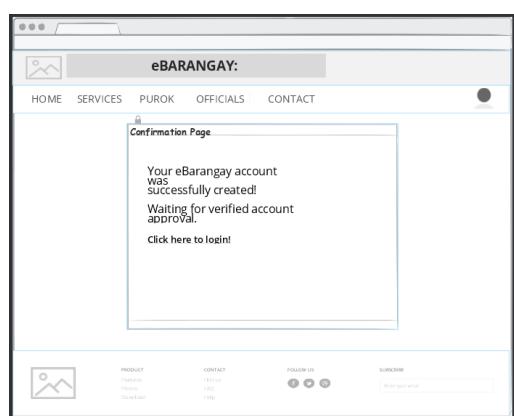
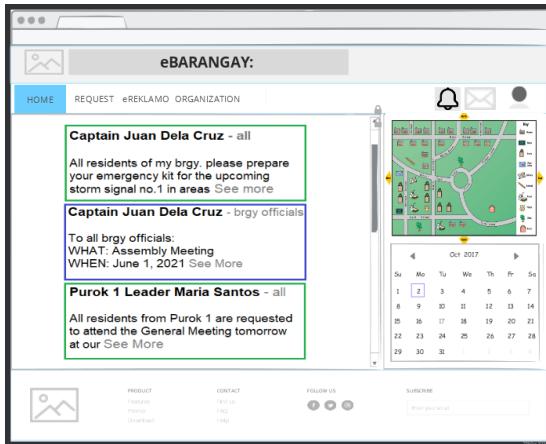
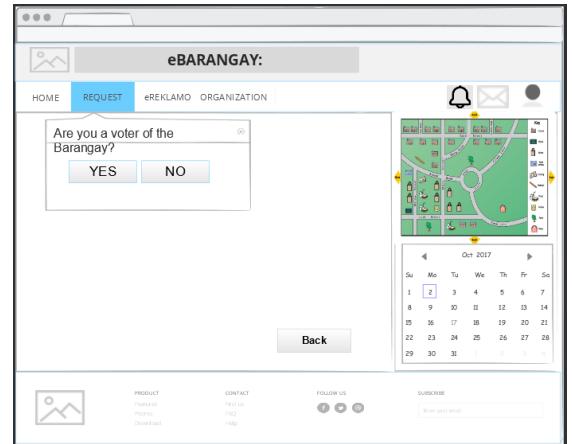
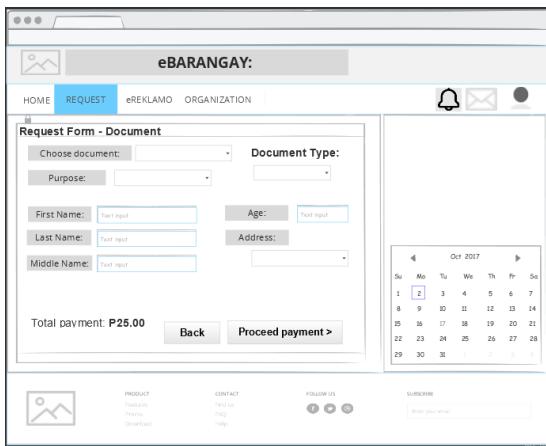
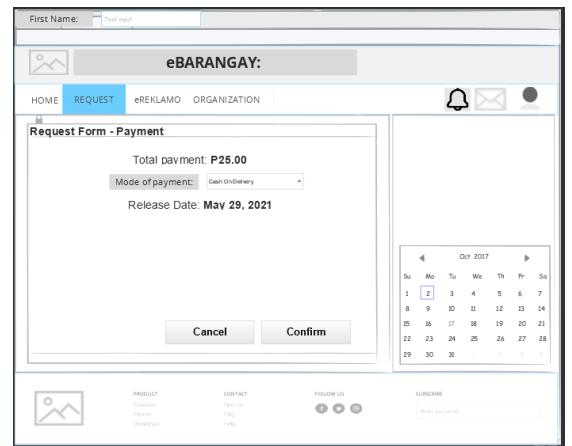
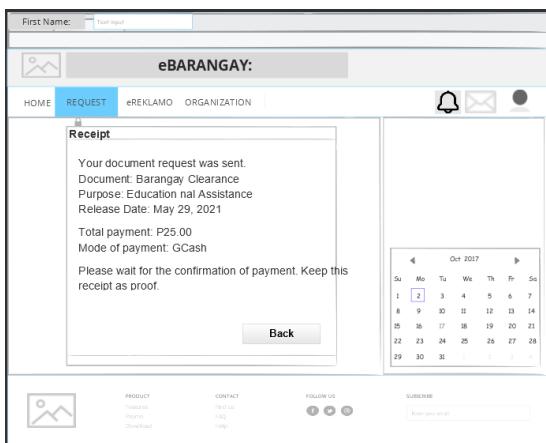
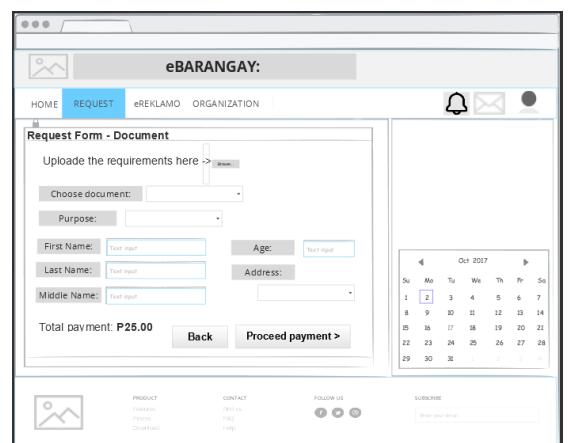
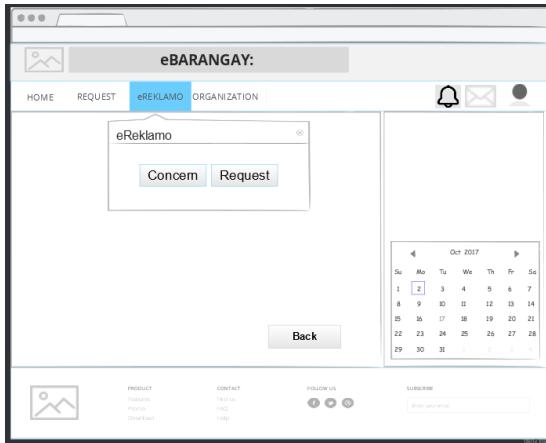
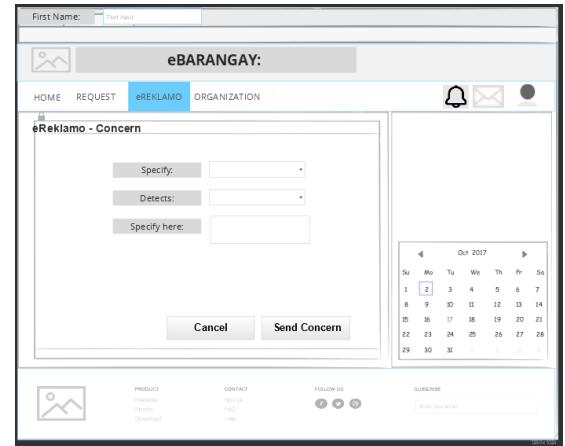
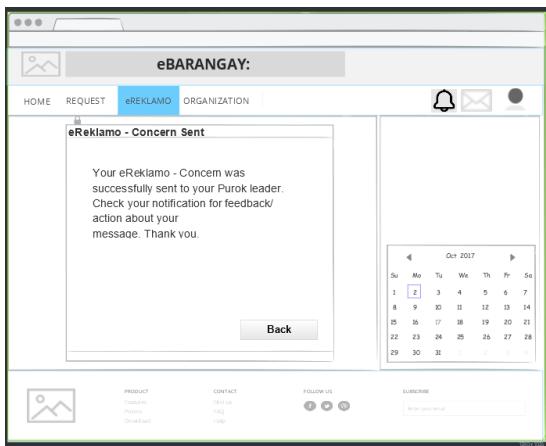
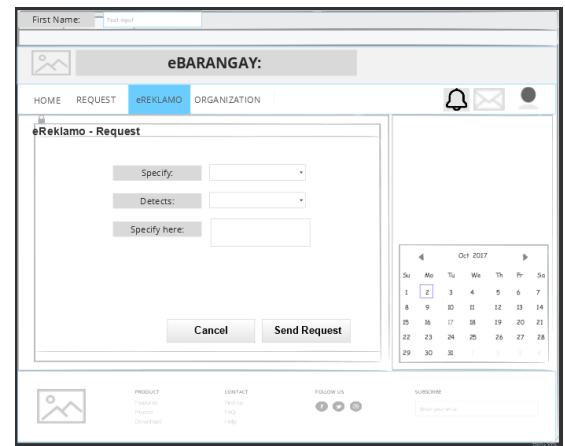
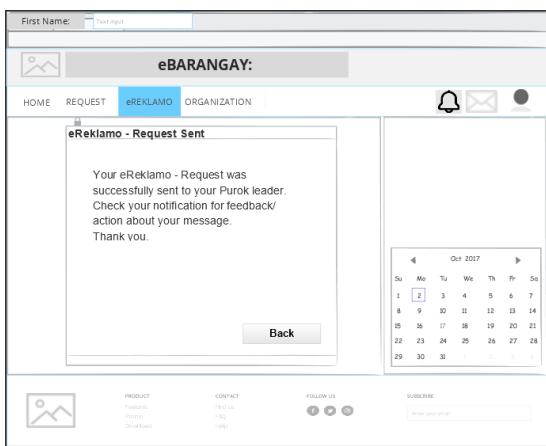
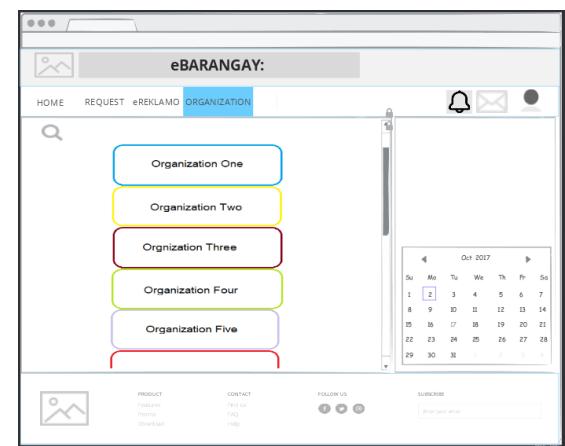
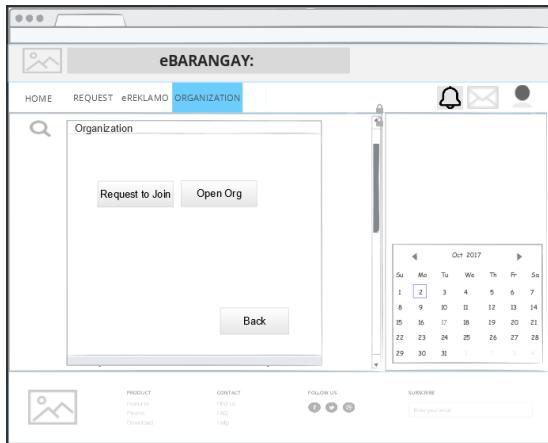
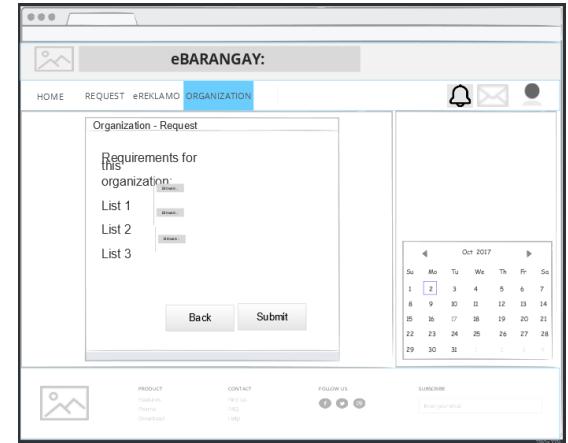
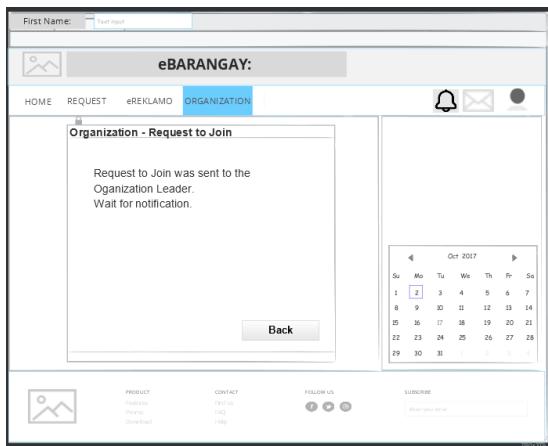
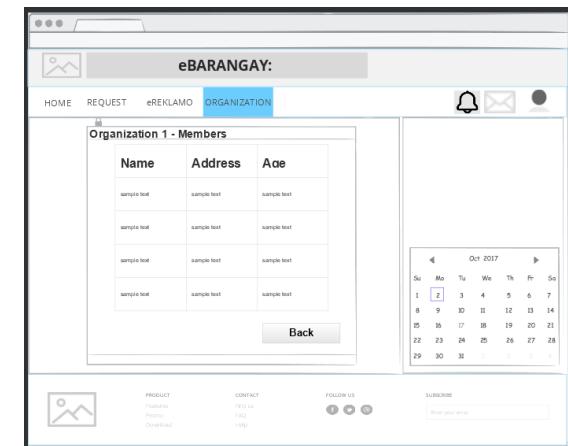
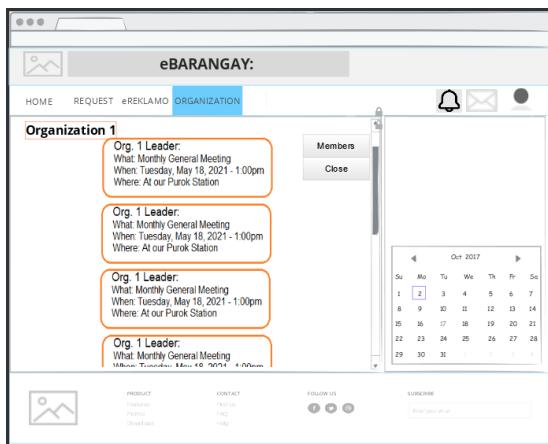
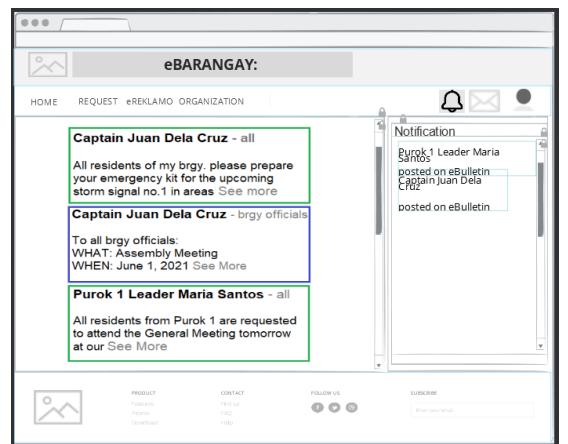


Figure 24: Storyboard – Confirmation Page

Figure 25: Storyboard – Resident eBulletinFigure 26: Storyboard – Request PromptFigure 27: Storyboard – Request FormFigure 28: Storyboard – Payment Request FormFigure 29: Storyboard – ReceiptFigure 30: Storyboard – Document Request Form

Figure 31: Storyboard – eReklamo promptFigure 32: Storyboard – ConcernFigure 33: Storyboard – Concern request sentFigure 34: Storyboard – RequestFigure 35: Storyboard – Request sentFigure 36: Storyboard – Organization

Figure 37: Storyboard – Join OrgFigure 38: Storyboard – Upload RequirementsFigure 39: Storyboard – Join Request sentFigure 40: Storyboard – Org membersFigure 41: Storyboard – Org ContentFigure 42: Storyboard - Notification

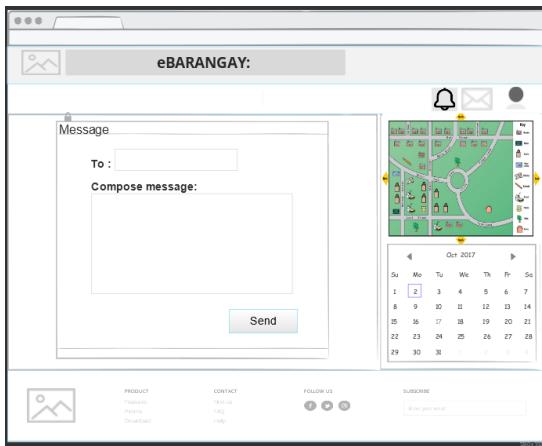
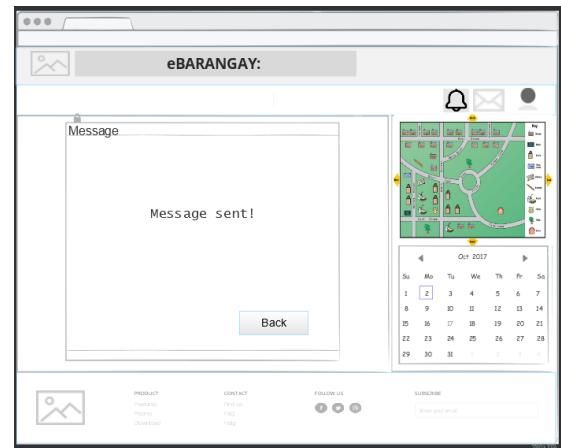
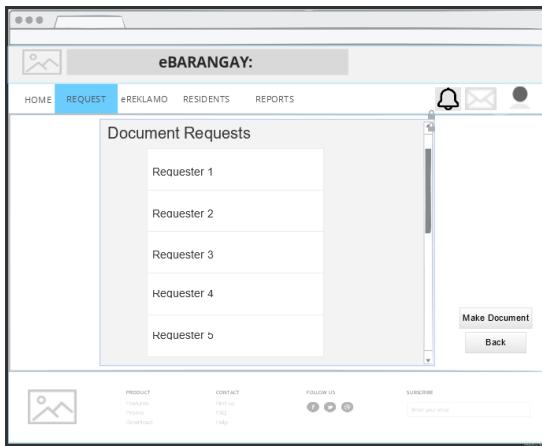
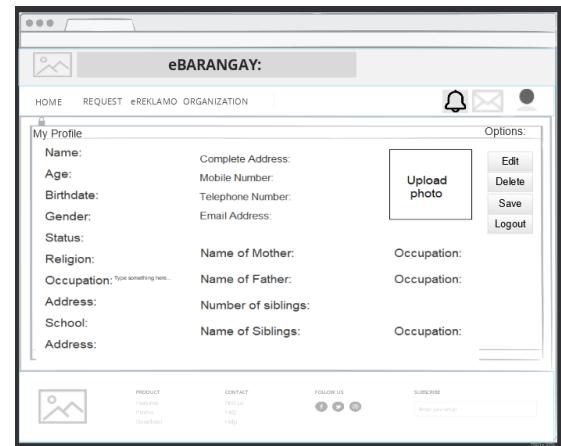
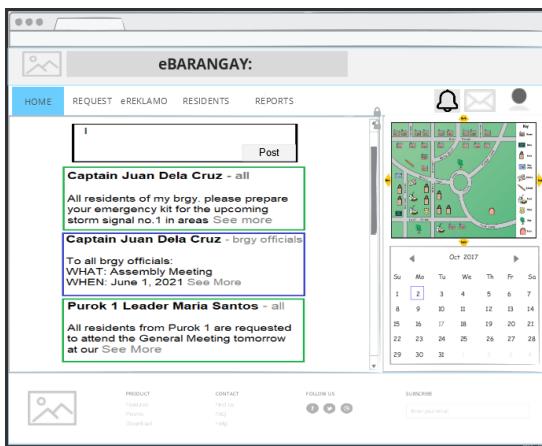
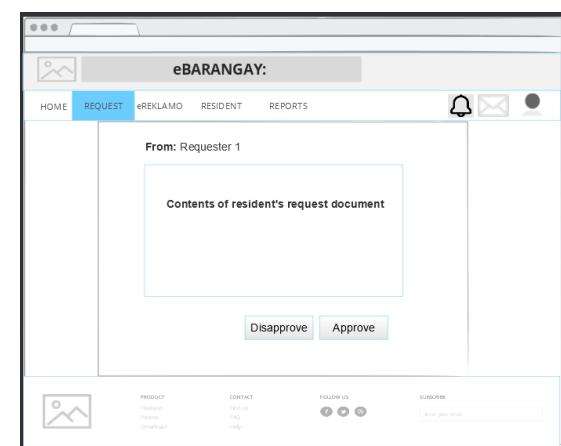
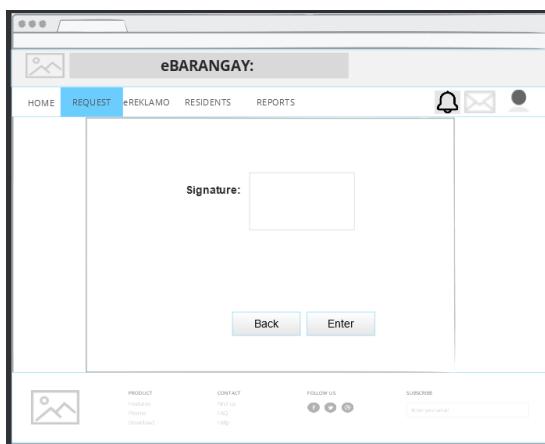
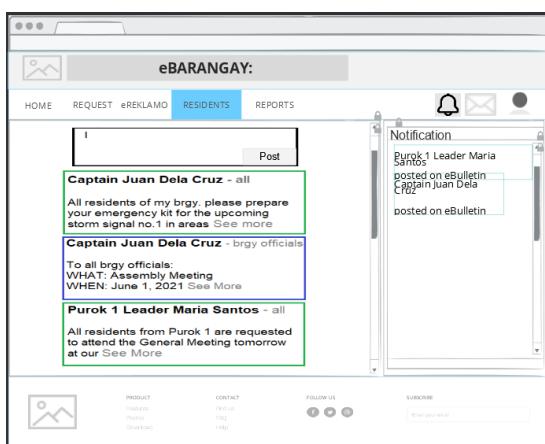
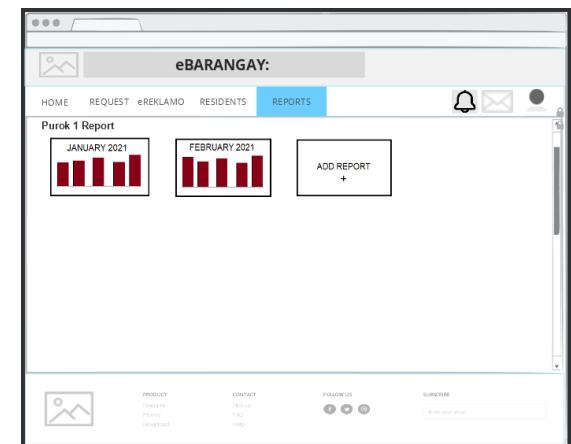
Figure 43: Storyboard – Message ComposeFigure 44: Storyboard – Message sentFigure 45: Storyboard – Document Requests (PUROK LEADER)Figure 46: Storyboard – My ProfileFigure 47: Storyboard – Post contentFigure 48: Storyboard – Request content

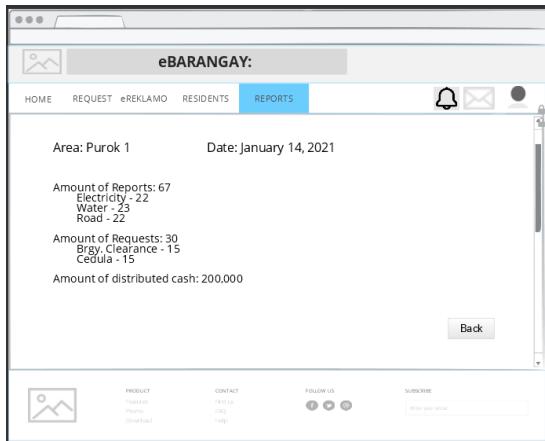
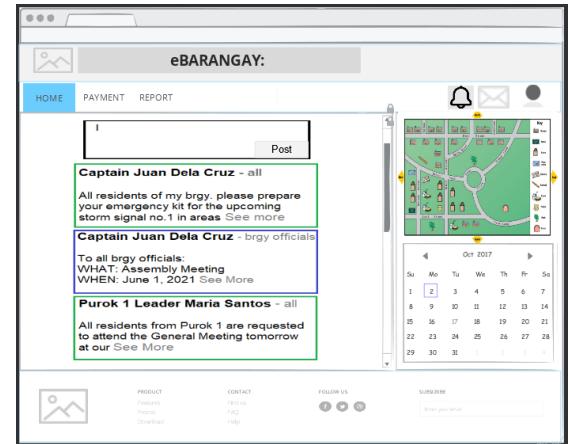
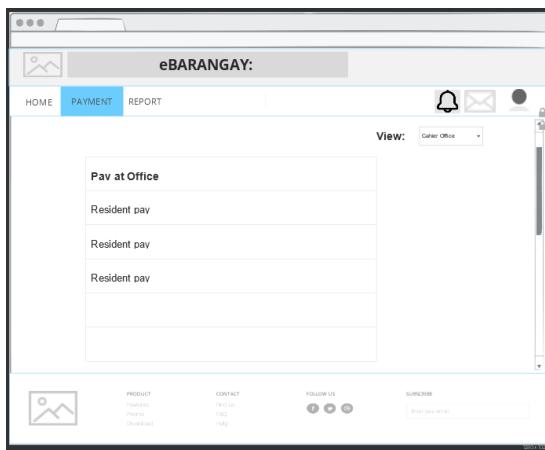
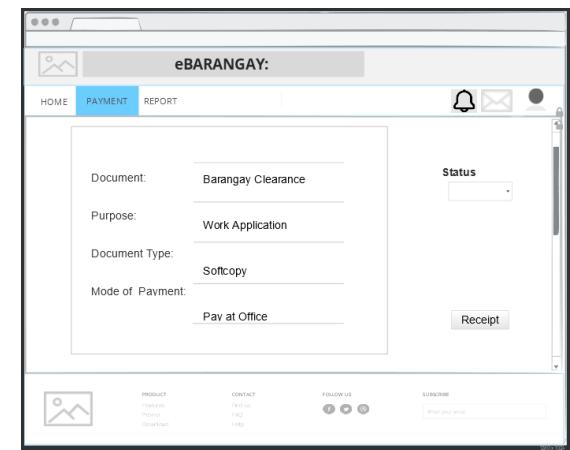
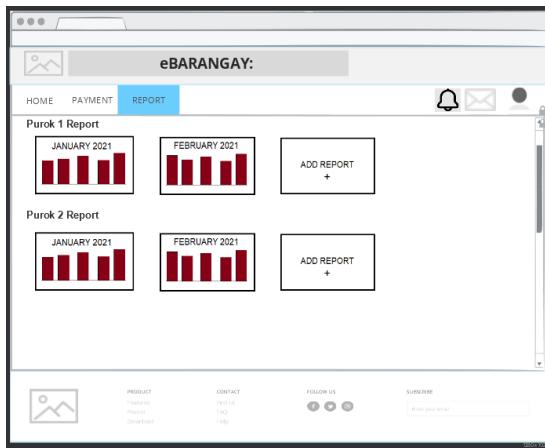
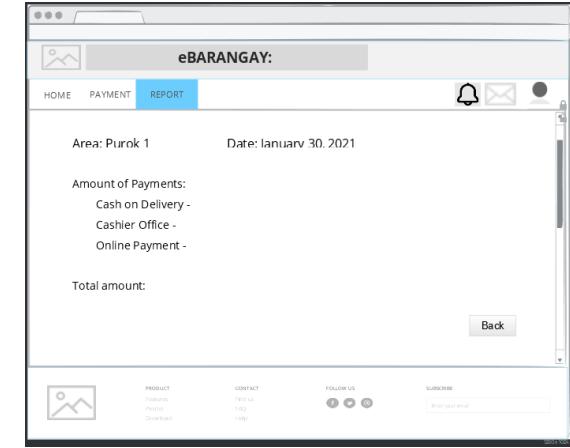
Figure 49: Storyboard – Resident’s message

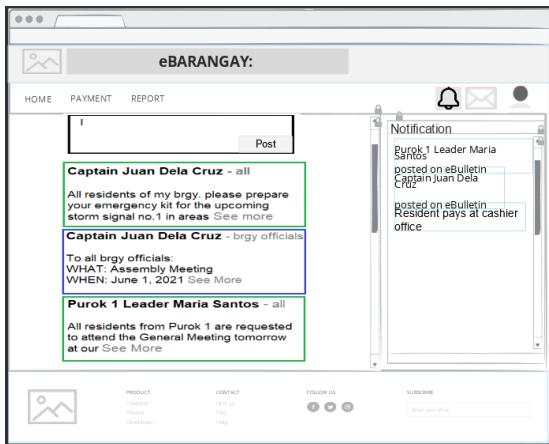
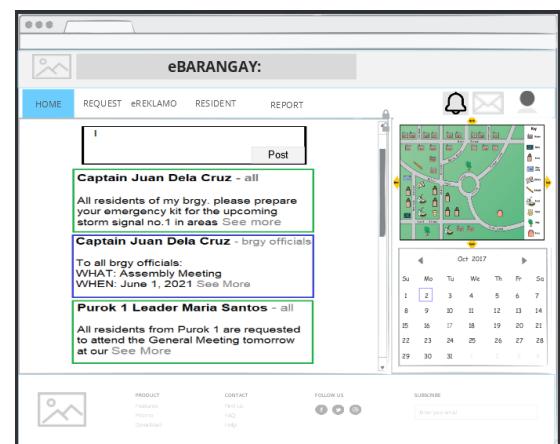
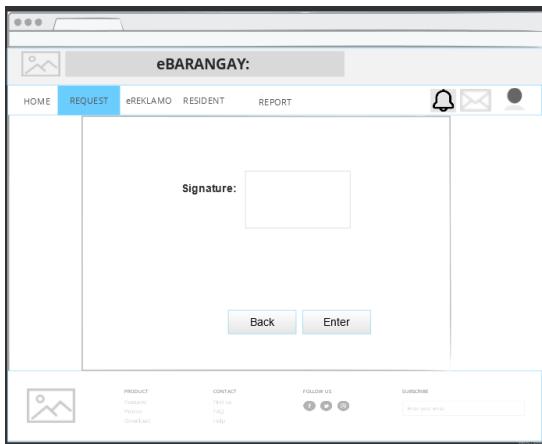
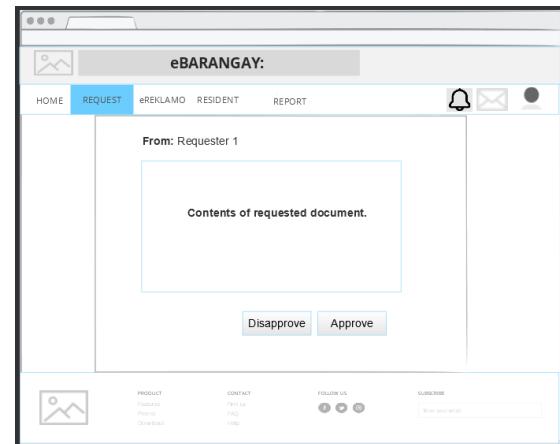
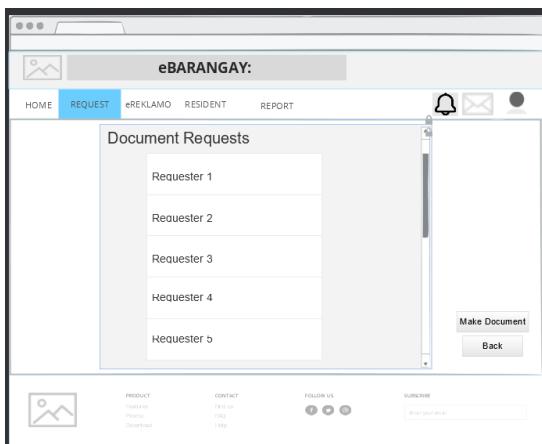
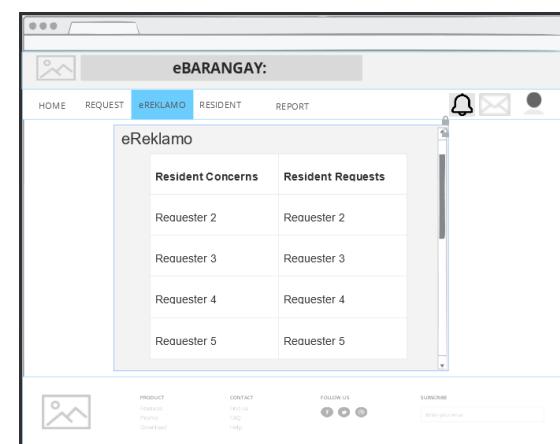
Purok 1 Residents:						
Firstname	Lastname	Middle name	Gender	Age	Occupation	Address
sample text	sample text	sample text	sample text	sample text	sample text	sample text
sample text	sample text	sample text	sample text	sample text	sample text	sample text
sample text	sample text	sample text	sample text	sample text	sample text	sample text
sample text	sample text	sample text	sample text	sample text	sample text	sample text
sample text	sample text	sample text	sample text	sample text	sample text	sample text

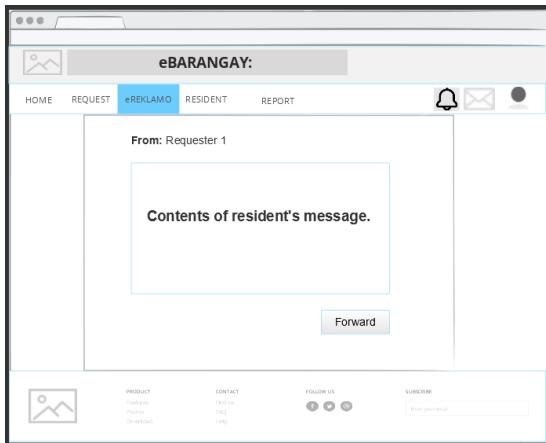
Figure 50: Storyboard – Resident InfoFigure 51: Storyboard – Purok Leader Signature

eReklamo	
Resident Concerns	Resident Requests
Requester 2	Requester 2
Requester 3	Requester 3
Requester 4	Requester 4
Requester 5	Requester 5

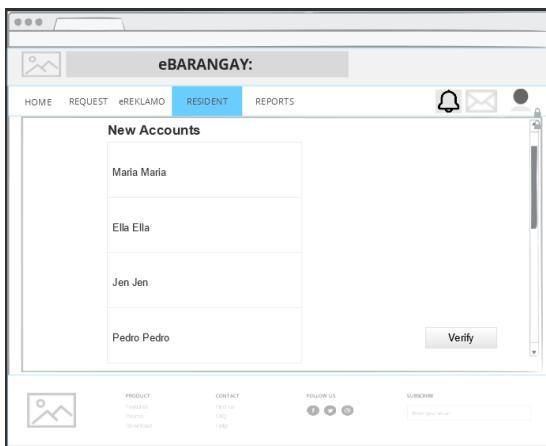
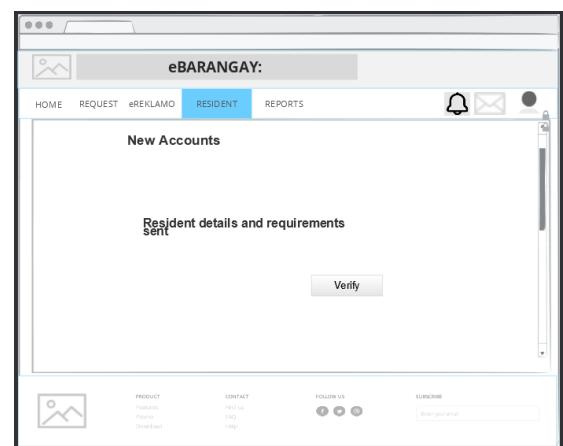
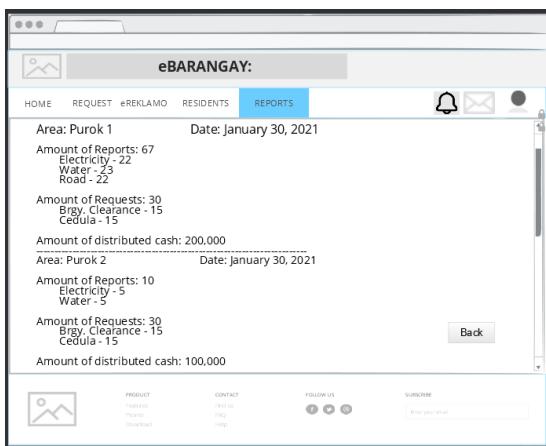
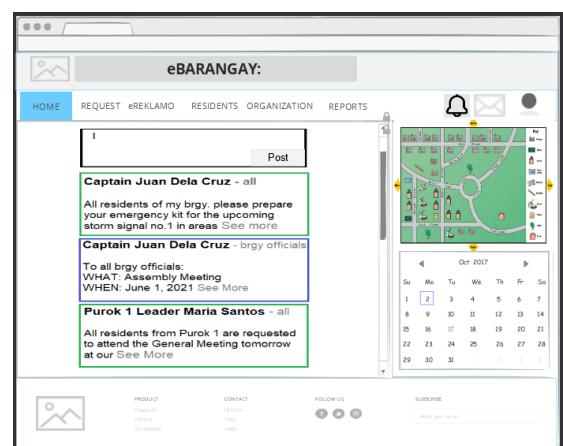
Figure 52: Storyboard – Request/Concerns infoFigure 53: Storyboard - NotificationFigure 54: Storyboard - Report

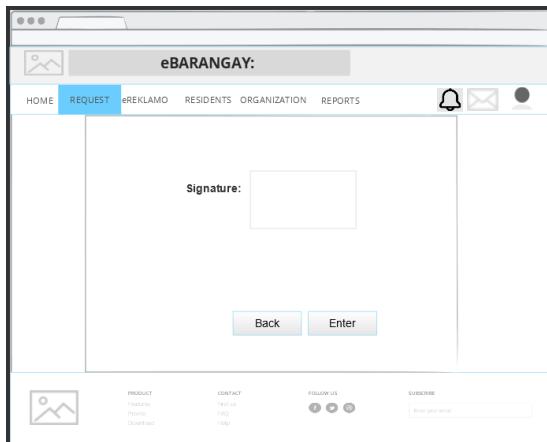
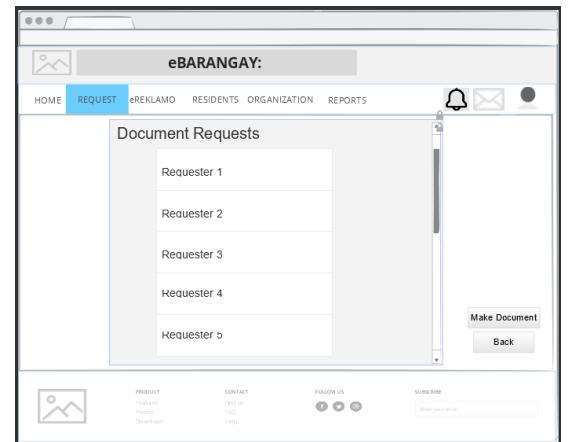
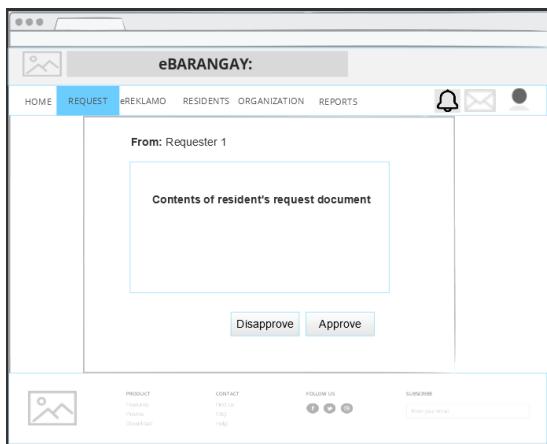
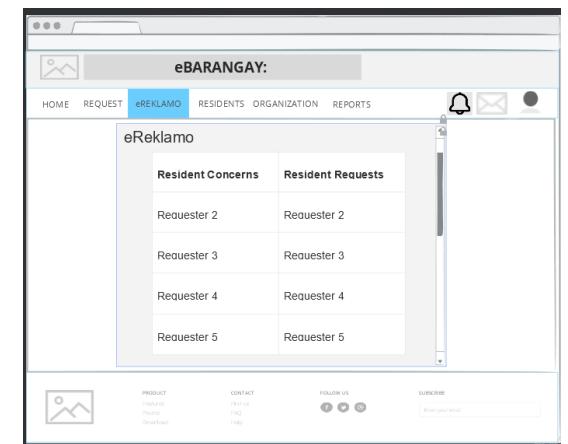
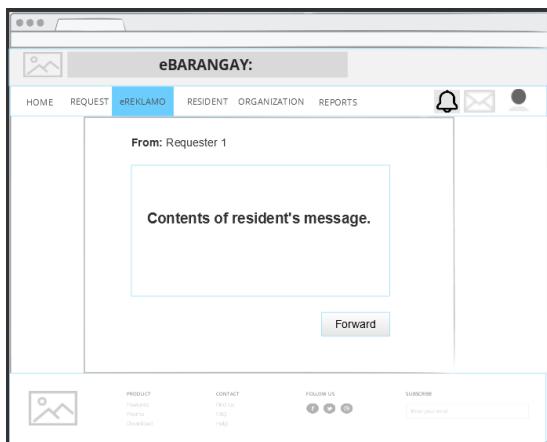
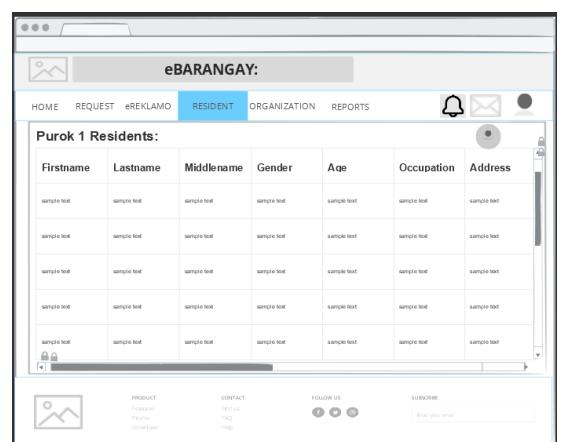
Figure 55: Storyboard – Report ContentFigure 56: Storyboard – Treasurer homepageFigure 57: Storyboard – PaymentFigure 58: Storyboard – Payment DetailsFigure 59: Storyboard – ReportFigure 60: Storyboard – Report Content

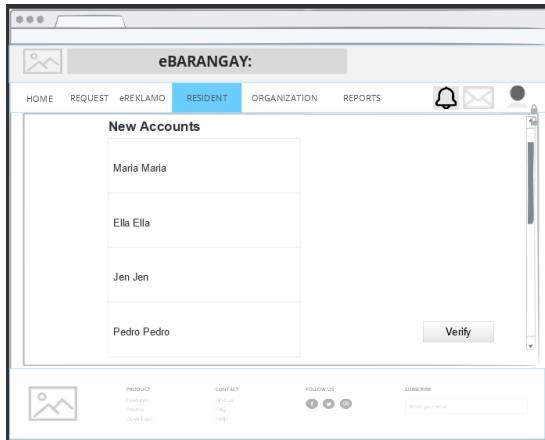
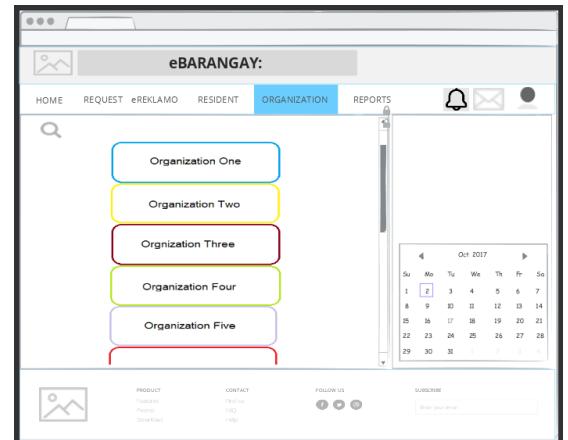
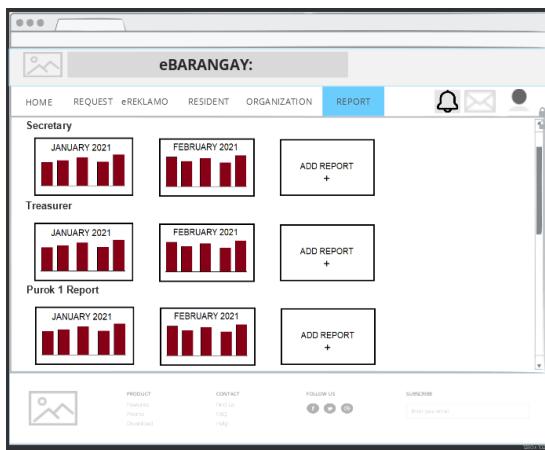
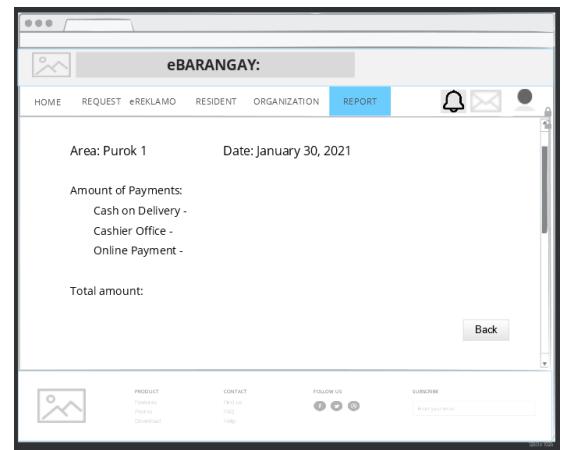
Figure 61: Storyboard – ReportFigure 62: Storyboard – Secretary homepageFigure 63: Storyboard – Secretary request signFigure 64: Storyboard – Secretary request signFigure 65: Storyboard – Secretary request signFigure 66: Storyboard – Secretary eReklamo

Figure 67: Storyboard – Secretary eReklamo content

Purok 1 Residents:						
Firstname	Lastname	Middle name	Gender	Age	Occupation	Address
sample test	sample test	sample test	sample test	sample test	sample test	sample test
sample test	sample test	sample test	sample test	sample test	sample test	sample test
sample test	sample test	sample test	sample test	sample test	sample test	sample test
sample test	sample test	sample test	sample test	sample test	sample test	sample test
sample test	sample test	sample test	sample test	sample test	sample test	sample test
sample test	sample test	sample test	sample test	sample test	sample test	sample test

Figure 68: Storyboard – Secretary residentsFigure 69: Storyboard – Secretary verify account listFigure 70: Storyboard – Account verification pageFigure 71: Storyboard – Report contentFigure 72: Storyboard – Brgy Captain homepage

Figure 73: Storyboard – Signature requestsFigure 74: Storyboard – Document requestsFigure 75 Storyboard – Request contentFigure 76: Storyboard – Concern/Request listFigure 77: Storyboard – Resident's messageFigure 78: Storyboard – Resident list

Figure 79: Storyboard – Resident listFigure 80: Storyboard – OrganizationFigure 81: Storyboard – ReportsFigure 82: Storyboard – Report contentFigure 83: Storyboard – Notifications

Android

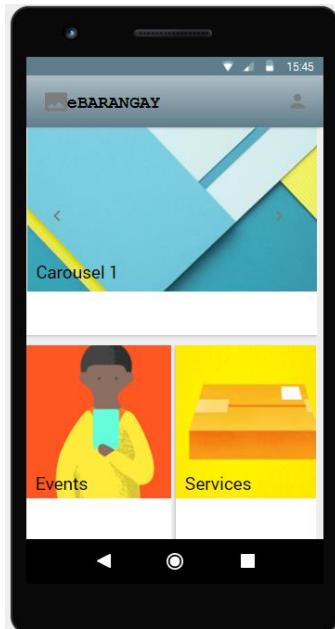


Figure 84: [Storyboard – Android - Homepage](#)

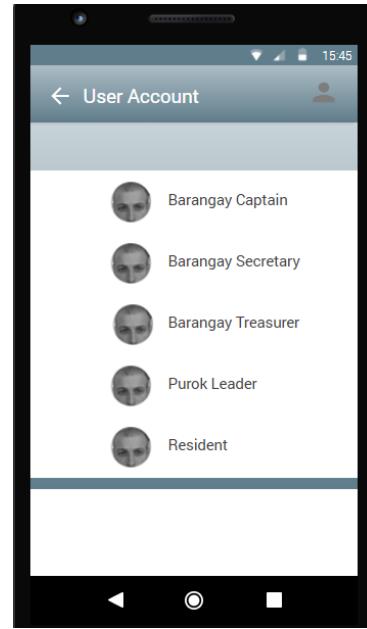


Figure 85: [Storyboard – User account](#)

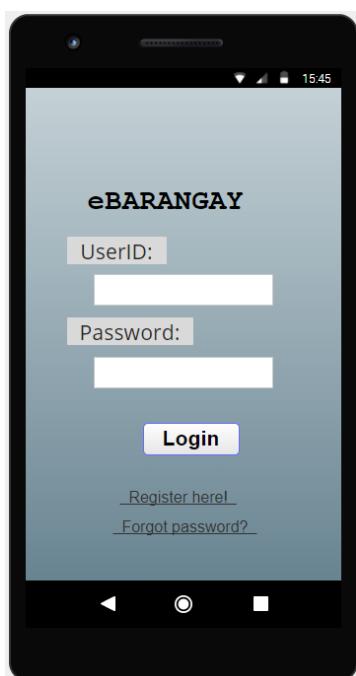


Figure 86: [Storyboard – Login](#)

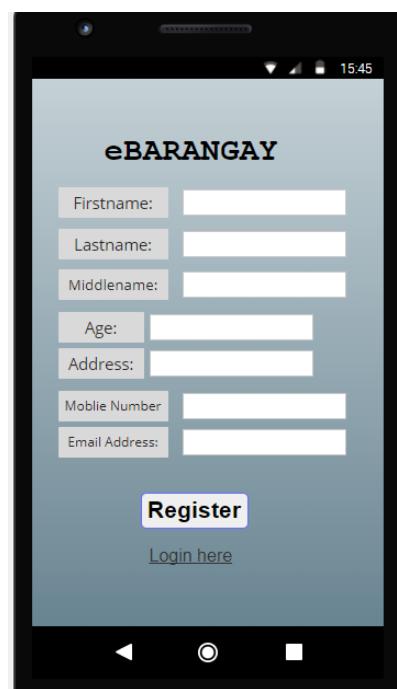
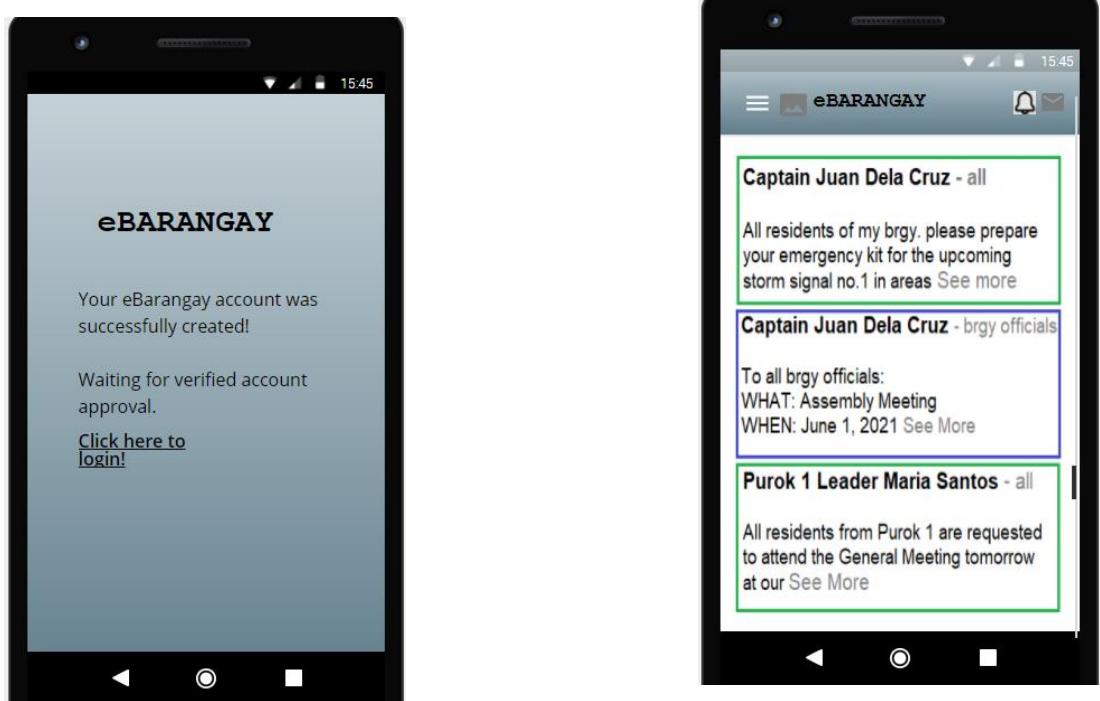
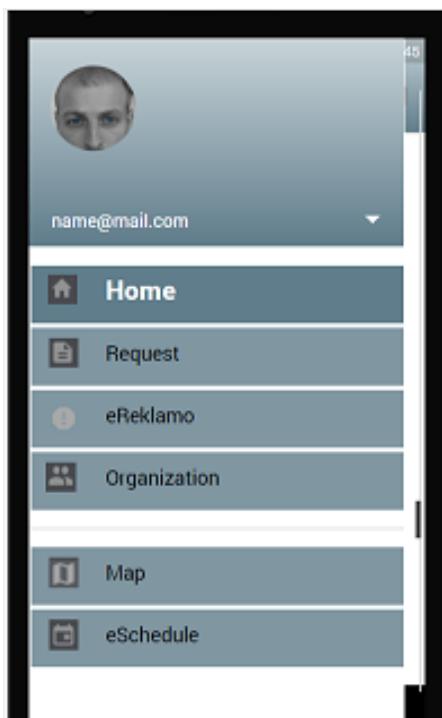


Figure 87: [Storyboard – Register](#)

Figure 88: **Storyboard – Account created**Figure 89: **Storyboard – eBulletin**Figure 90: **Storyboard – Menu**Figure 91: **Storyboard – Request**

Request Form - Document

Choose document:

Purpose:

Document Type:

Firstname: _____

Lastname: _____

Middle name: _____

Age: _____

Address:

Document: **P25.00**

Proceed

Figure 92: Storyboard – Request Docu

Request Form - Payment

Document: **P25.00**

Other fees: **P15.00**

Total payment: **P40.00**

Mode of Payment:

Release Date: **May 29, 2021**

Confirm

Figure 93: Storyboard – Payment

Receipt

Your document request was sent.

Document: Barangay Clearance
Purpose: Education nal Assistance

Release Date: May 29, 2021

Total payment: P40.00
Mode of payment: GCash

Please wait for the confirmation of payment. Keep this receipt as proof.

Back

Figure 94: Storyboard – Receipt

Request Form - Document

Upload requirements:

Choose document:

Purpose:

Document Type:

Firstname: _____

Lastname: _____

Middle name: _____

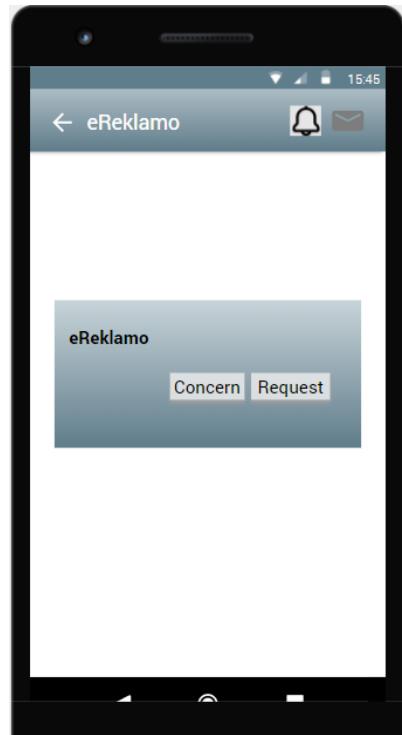
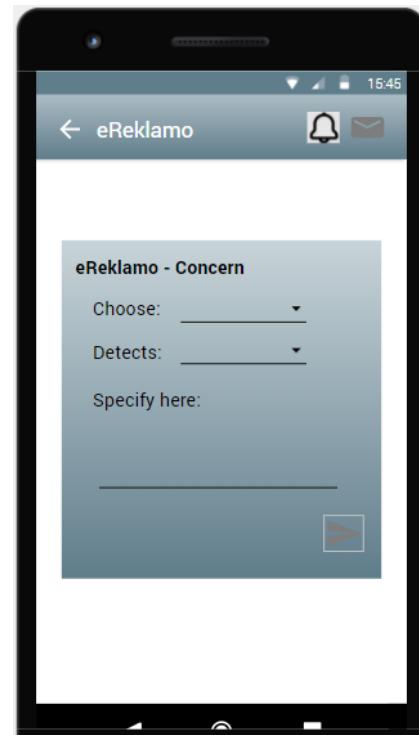
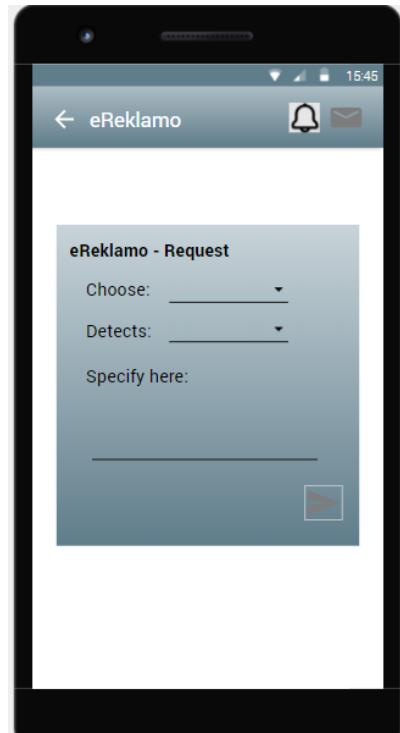
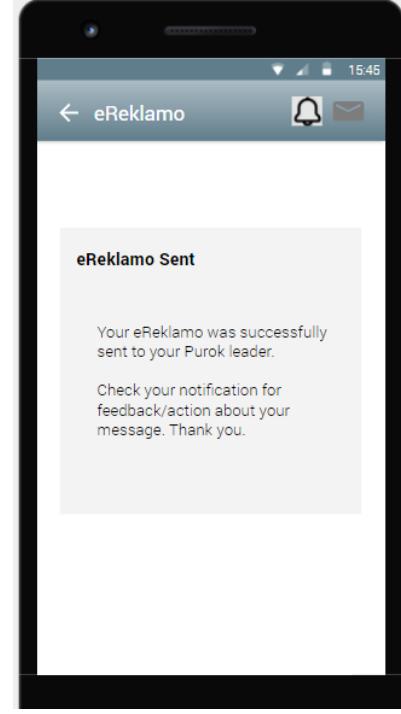
Age: _____

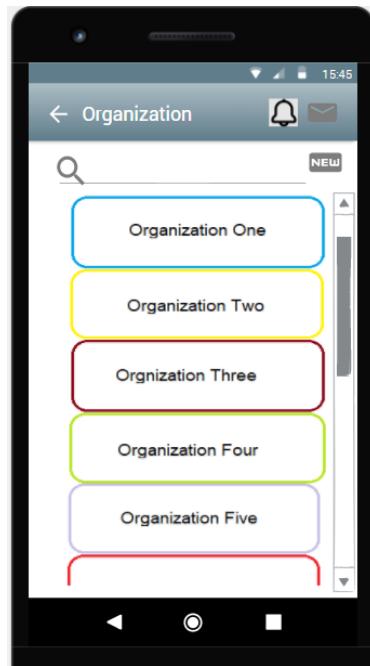
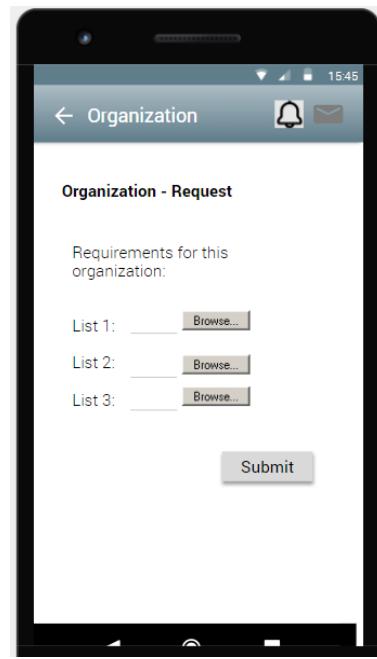
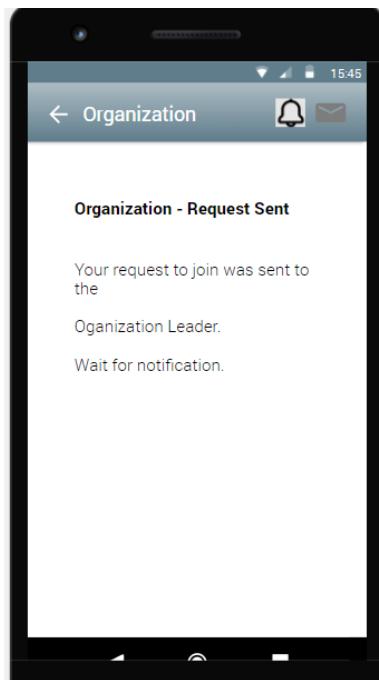
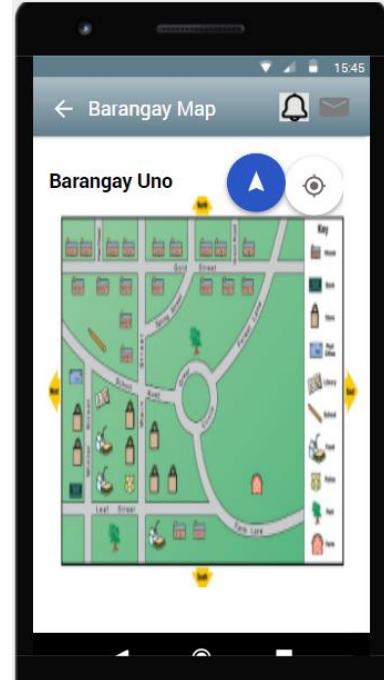
Address:

Document: **P25.00**

Proceed

Figure 95: Storyboard – Request Document (NON-VOTER)

Figure 96: Storyboard – eReklamoFigure 97: Storyboard – eReklamo ConcernFigure 98: Storyboard – eReklamo RequestFigure 99: Storyboard – eReklamo sent

Figure 100: Storyboard – OrganizationFigure 101: Storyboard – Join OrgFigure 102: Storyboard – Request Join sentFigure 103: Storyboard – Map

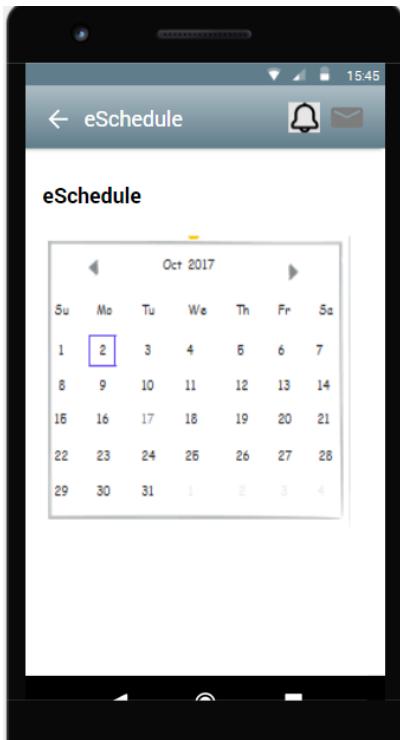


Figure 104: Storyboard – eSchedule

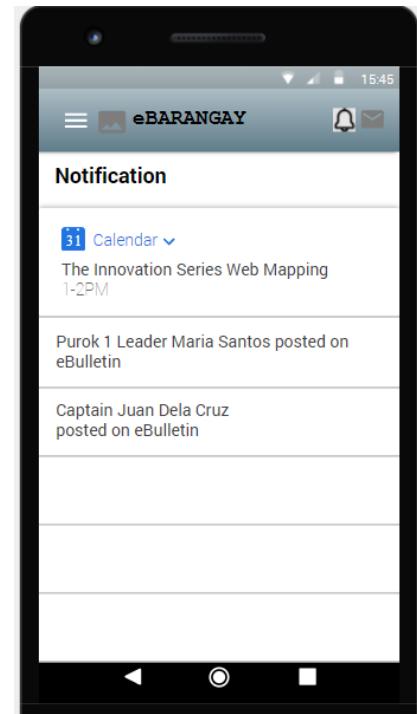


Figure 105: Storyboard – Notification

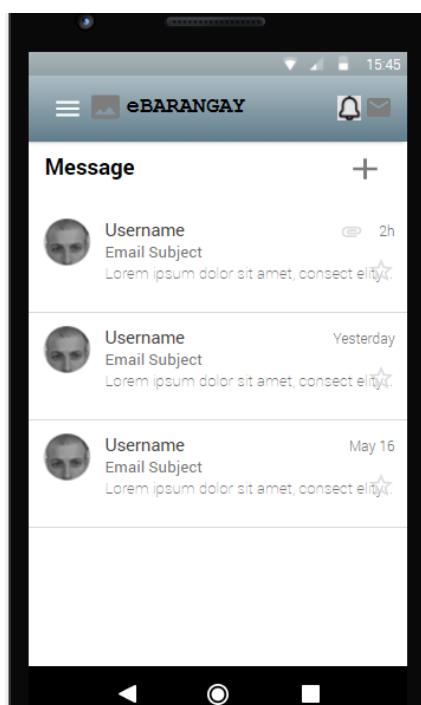


Figure 106: Storyboard – Messages

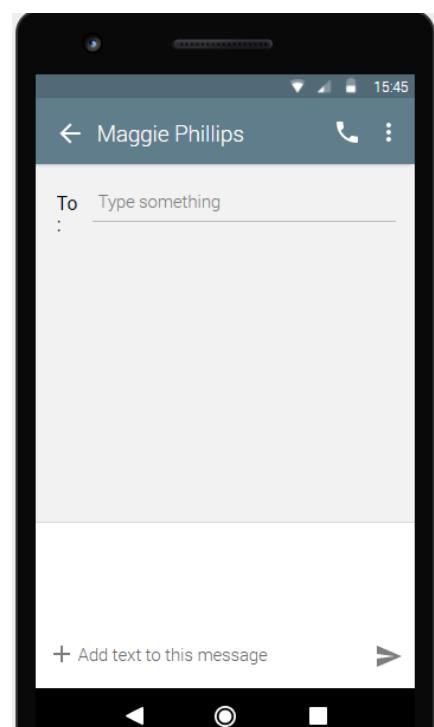
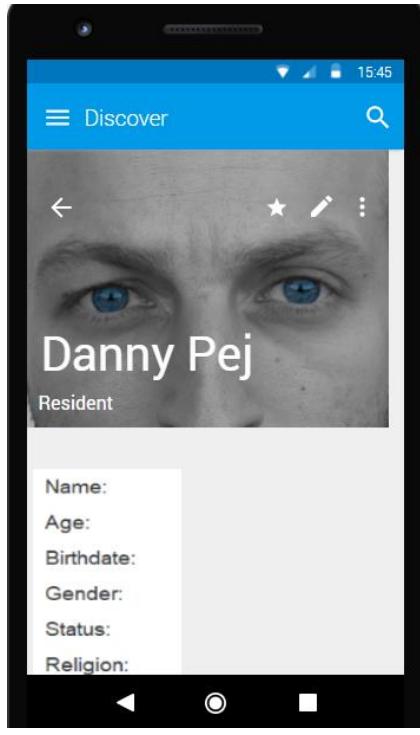
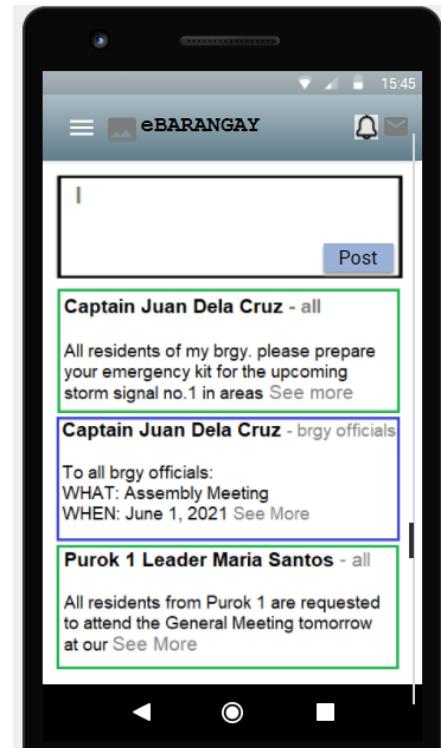
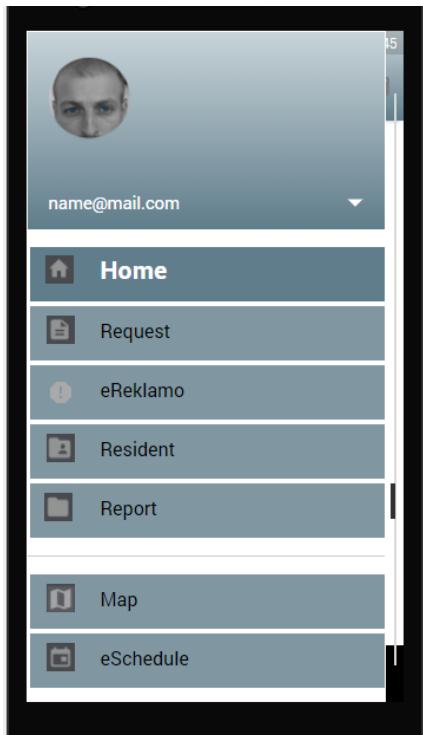
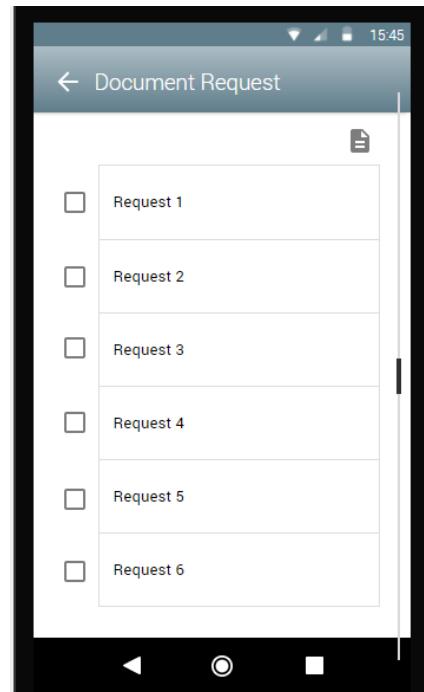


Figure 107: Storyboard – Compose message

Figure 108: Storyboard – Resident ProfileFigure 109: Storyboard – LEADER eBulletinFigure 110: Storyboard – MenuFigure 111: Storyboard – Document Request

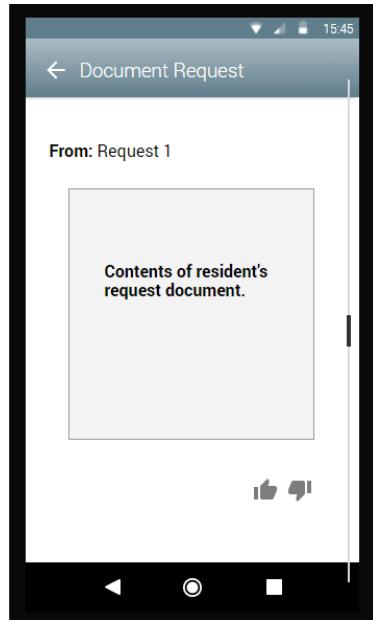


Figure 112: **Storyboard – Document Request Content**

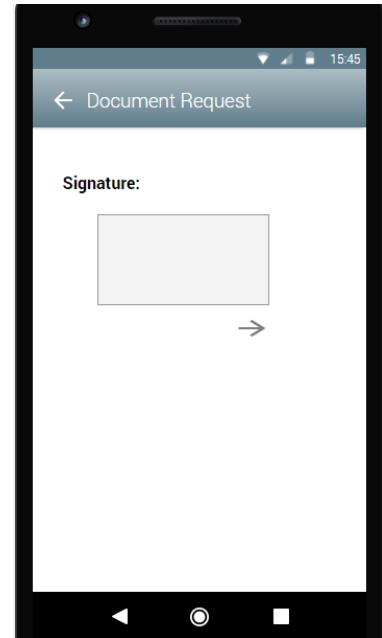


Figure 113: **Storyboard – Signature**

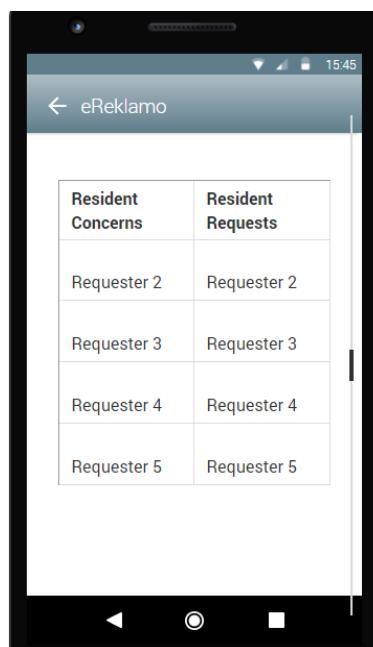


Figure 114: **Storyboard – eReklamo**

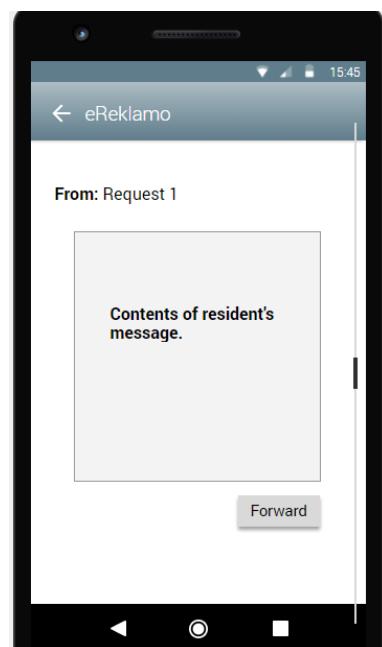
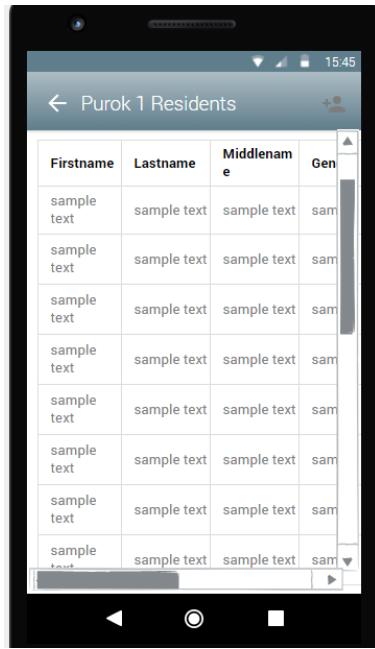
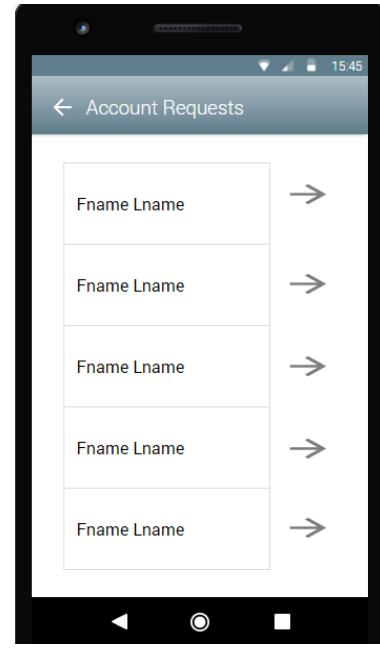
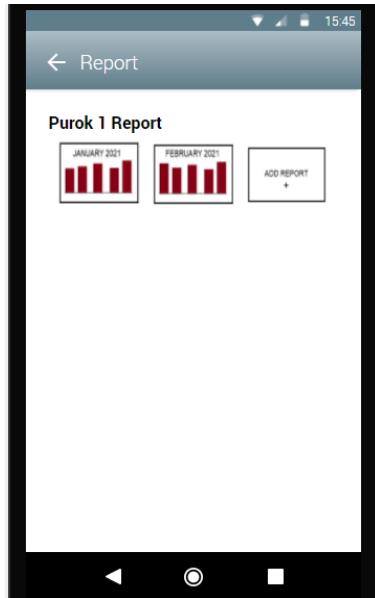
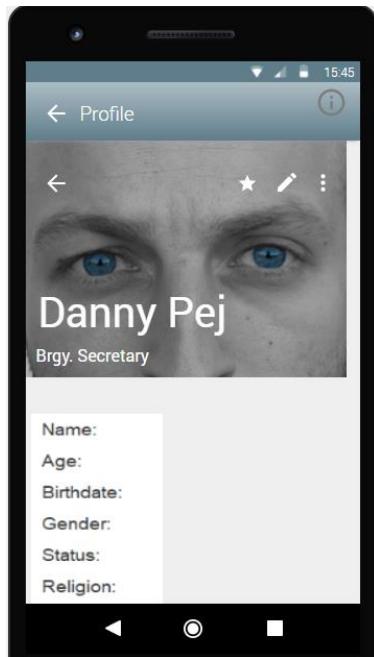
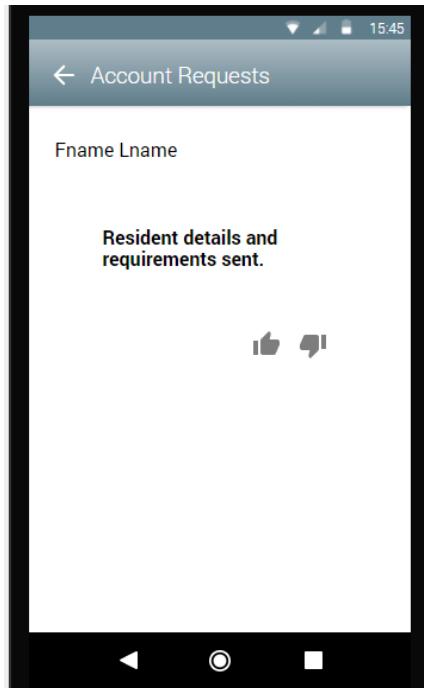
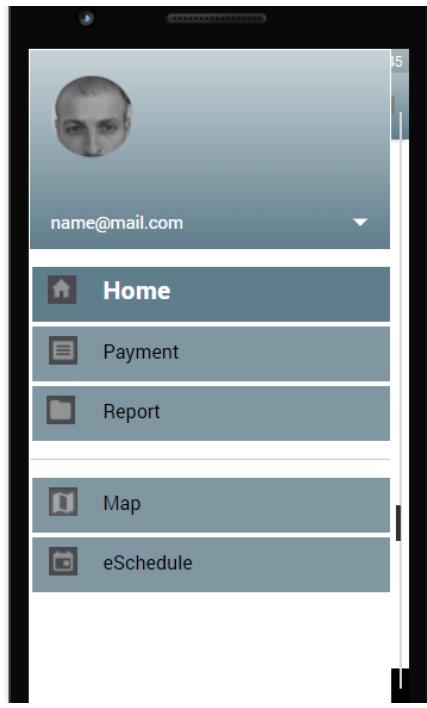
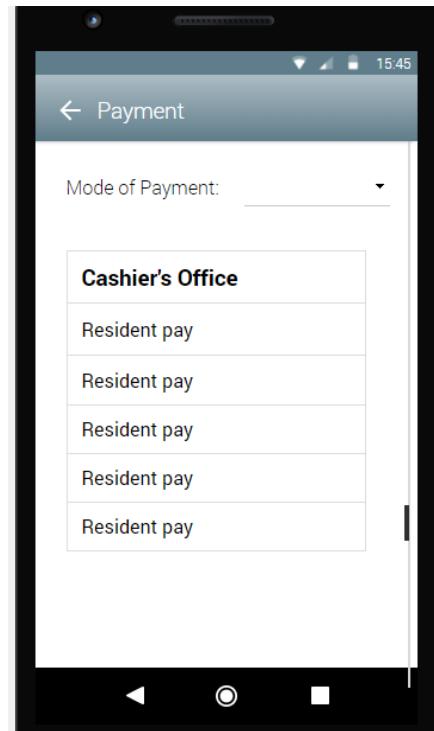
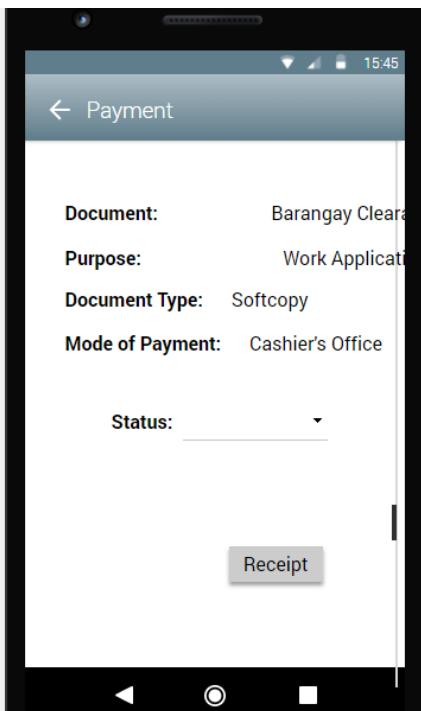
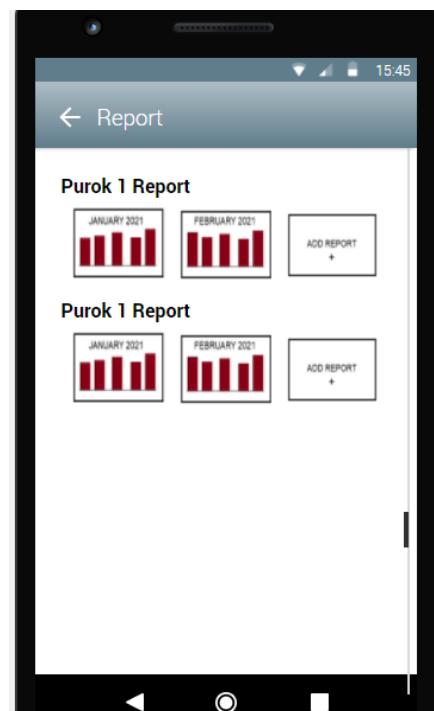
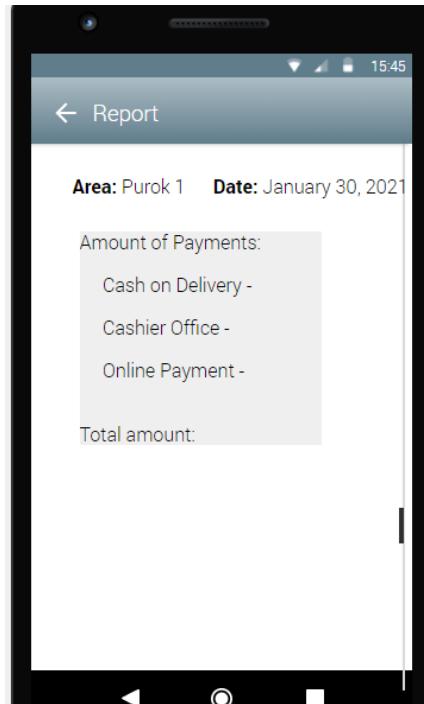
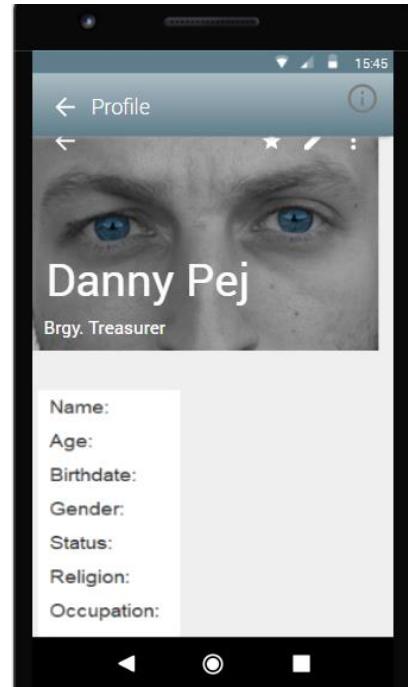
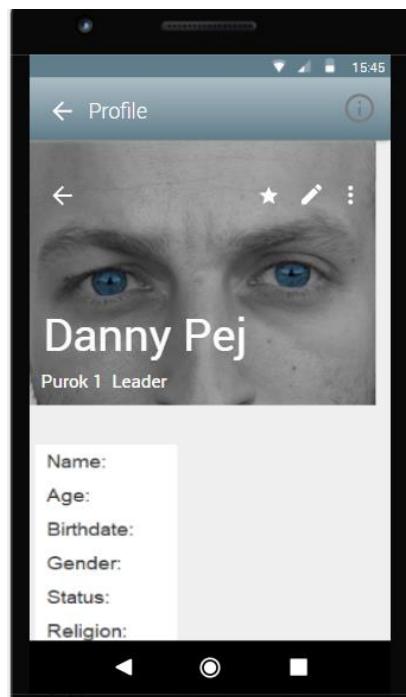
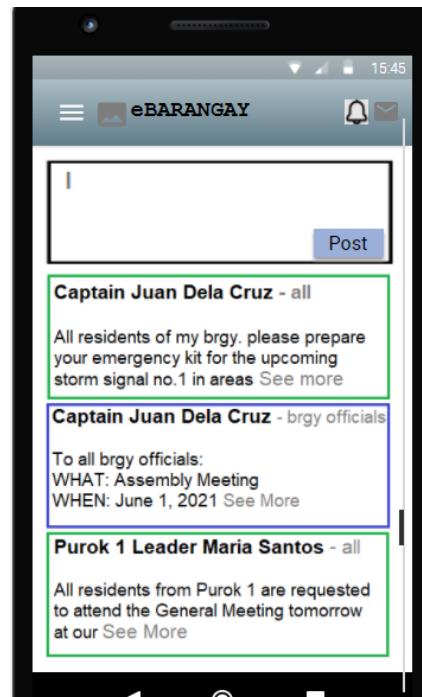


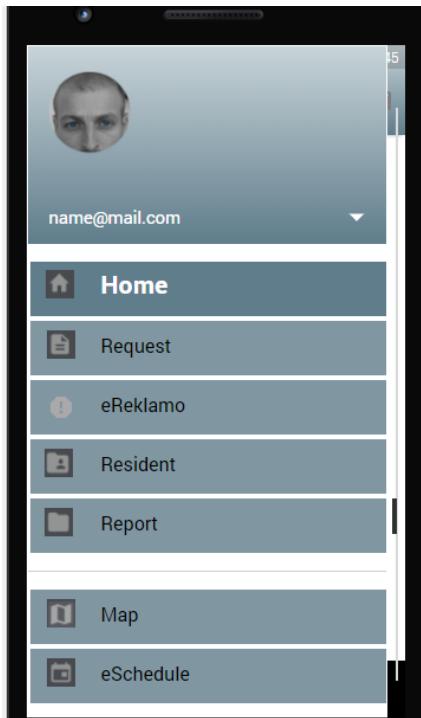
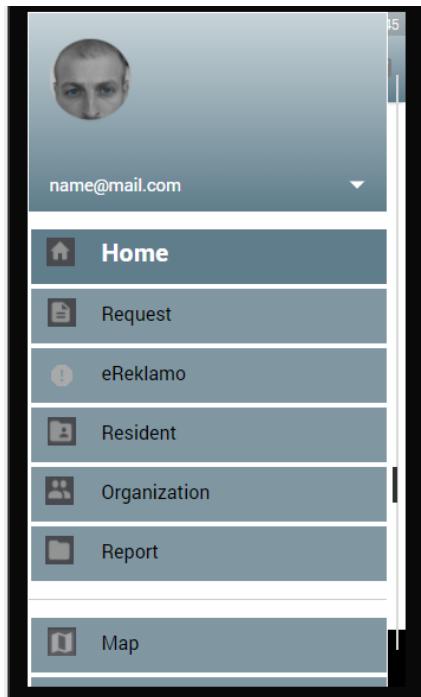
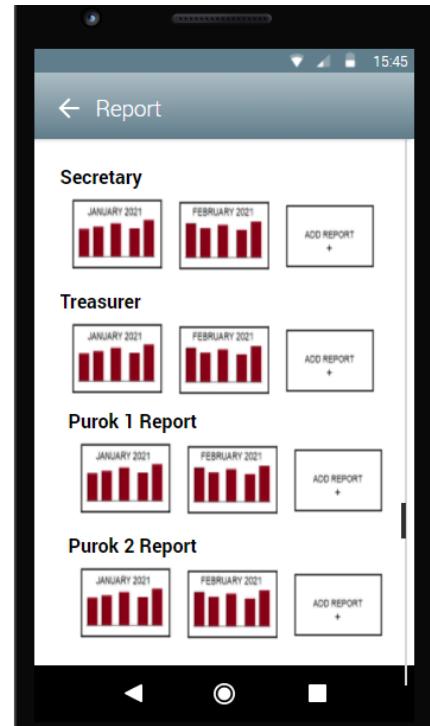
Figure 115: **Storyboard – Resident message**

Figure 116: Storyboard – Resident listFigure 117: Storyboard – Account requestsFigure 118: Storyboard – ReportsFigure 119: Storyboard – Report content

Figure 120: Storyboard – Secretary ProfileFigure 121: Storyboard – Secretary ProfileFigure 122: Storyboard – Account requestFigure 123: Storyboard – eBulletin

Figure 124: Storyboard – menuFigure 125: Storyboard – PaymentFigure 126: Storyboard – Payment DetailsFigure 127: Storyboard – Report

Figure 128: Storyboard – Report DetailFigure 129: Storyboard – Brgy. Treasurer profileFigure 130: Storyboard – Purok Leader profileFigure 131: Storyboard – eBulletin

Figure 132: Storyboard – MenuFigure 133: Storyboard – Report detailsFigure 134: Storyboard – MenuFigure 135: Storyboard – Report

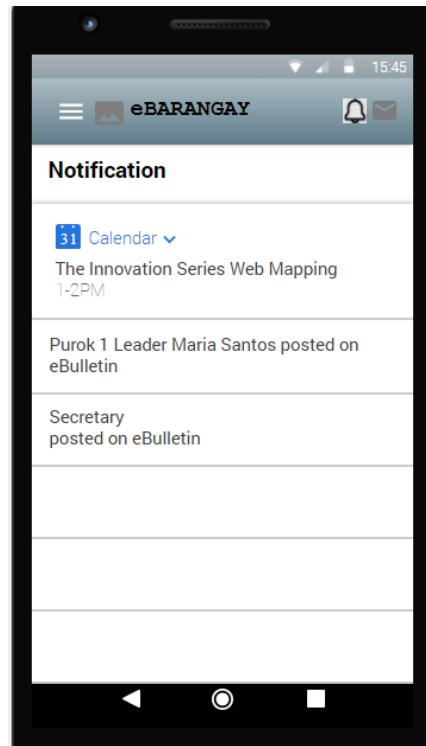


Figure 136: **Storyboard – Notification**

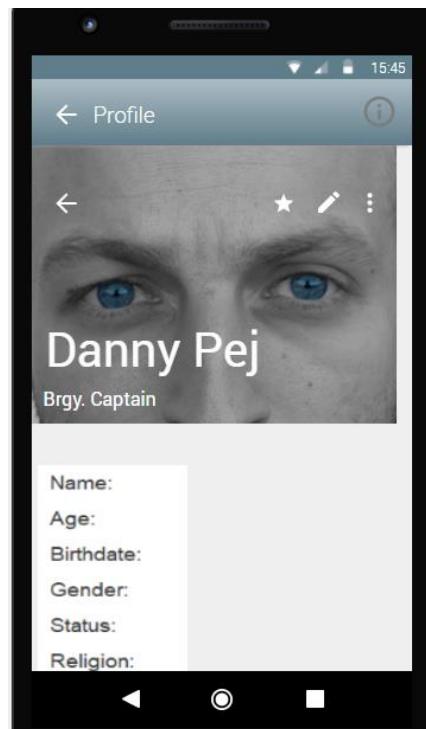


Figure 137: **Storyboard – Brgy. Captain profile**

Database Design

Entity-Relationship Diagram

An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database. An entity in this context is an object, a component of data. An entity set is a collection of similar entities. These entities can have attributes that define its properties.

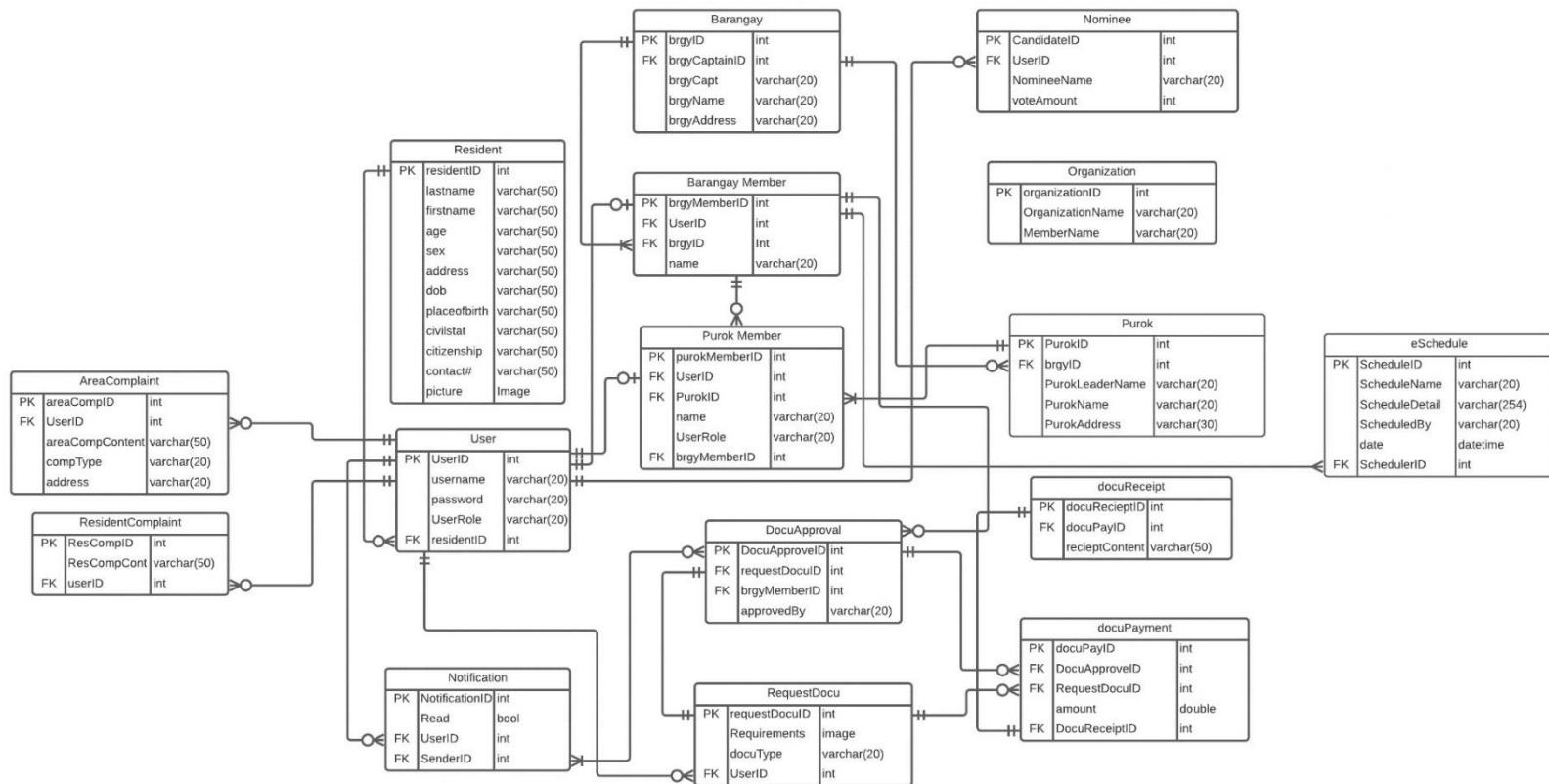


Figure 138: Entity-Relationship Diagram

Data Dictionary

A data dictionary is a collection of the names, definitions, and attributes for data elements and models. The data in a data dictionary is the metadata about the database. These elements are then used as part of a database, research project, or information system.

Table Name	Attribute Name	Contents	Type	Format	Range	Required	PK OR FK	FK REFERENCE D TABLE
Resident	ResidentID	Resident ID	INT	999999	000001-999999	Y	PK	
	Lastname	Resident's Lastname	VARCHAR(50)	Xxxx xxxxx		Y		
	Firstname	Resident's Firstname	VARCHAR(50)	Xxxx xxxxx		Y		
	Age	Resident's Age	VARCHAR(50)	Xxxx xxxxx		Y		
	Sex	Resident's Sex	VARCHAR(50)	Xxxx xxxxx		Y		
	Address	Resident's Age	VARCHAR(50)	Xxxx xxxxx		Y		
	Date of Birth	Resident's DOB	VARCHAR(50)	Xxxx xxxxx		Y		
	Place of Birth	Resident's Place of Birth	VARCHAR(50)	Xxxx xxxxx		Y		
	Civil Status	Resident's Civil Status	VARCHAR(50)	Xxxx xxxxx		Y		
	Citizenship	Resident's Citizenship	VARCHAR(50)	Xxxx xxxxx		Y		
	Contact#	Resident's Contact#	VARCHAR(50)	Xxxx xxxxx		Y		
	Picture	Resident's 2x2 Pic	IMAGE					
User	UserID	User's ID	INT	999999	000001-999999	Y	PK	
	Username	Username for login	VARCHAR(20)	Xxxx xxxxx		Y		
	Password	Password for login	VARCHAR(20)	Xxxx xxxxx		Y		
	UserRole	Roles of the User	VARCHAR(20)	Xxxx xxxxx		Y		
	residentID	Resident ID linked	INT	999999	000001-999999		FK	Resident
Notification	NotificationID	Notification's ID	INT	999999	000001-999999	Y	PK	
	Read	Read status	BOOL	X		Y		
	UserID	User's ID	INT	999999	000001-999999	Y	FK	User
	SenderId	Sender's ID	INT	999999	000001-999999	Y	FK	DocuApprova l
Barangay	BrgyID	Barangay ID	INT	999999	000001-999999	Y		
	BrgyCaptainID		INT	999999	000001-999999	Y	Y	

	BrgyCaptName BrgyName BrgyAddress	Brgy captain's brgymemberID Barangay Captain's Name Barangay Name Barangay Address	VARCHAR(20) VARCHAR(20) VARCHAR(20)	Xxxx xxxxx Xxxx xxxxx Xxxx xxxxx		Y Y Y		Barangay Member
Barangay Member	BrgyMemberID UserID BrgyID Name	Barangay member's ID User's ID Barangay ID Barangay Member's name	INT INT INT VARCHAR(20)	999999 999999 999999 Xxxx xxxxx	000001-999999 000001-999999 000001-999999	Y Y Y Y	PK FK FK Y	User Barangay

Purok	PurokID BrgyID PurokName PurokAddress	Purok ID Barangay's ID Purok's Name Purok's Address	INT INT VARCHAR(20) VARCHAR(20)	999999 999999 Xxxx xxxxx Xxxx xxxxx	000001-999999 000001-999999	Y Y Y Y	PK FK	Barangay
Purok Membe r	purokMemberID UserID PurokID Name UserRole	Purok Member's ID User ID Purok's ID Purok Member's Name Purok Member's Role	INT INT INT VARCHAR(20) VARCHAR(20)	999999 999999 999999 Xxxx xxxxx Xxxx xxxxx	000001-999999 000001-999999 000001-999999	Y Y Y	PK FK FK	User Purok Member
Nomin ee	NomineeID UserID VoteAmount	Nominee's ID User's ID Amount of votes they got	INT INT INT	999999 999999 999999	000001-999999 000001-999999 000001-999999	Y Y Y	PK FK	User
Organi zation	OrganizationID OrganizationName MemberName	Organization's ID Organization's Name Member's Name	INT VARCHAR(20) VARCHAR(20)	999999 Xxxx xxxxx Xxxx xxxxx	000001-999999	Y Y Y	PK	
Notific ation	NotificationID Read UserID SenderId	Notification's ID Check user read status User's ID Sender's ID	INT BOOL INT INT	999999 X 999999 999999	000001-999999 0-1 000001-999999 000001-999999	Y Y Y	PK FK FK	User DocuApproval
DocuA pproval	DocuApprovalID RequestDocuID BrgyMemberID ApprovedBy	Approved document's ID Requested document's ID Barangay Member's ID Approved By	INT INT INT VARCHAR(20)	999999 999999 999999 Xxxx xxxxx	000001-999999 000001-999999 000001-999999 Y	Y Y Y Y	PK FK FK	RequestDocu Purok Member

		Approved by name of brgy member						
RequestDocu	RequestDocuID Requirements DocuType UserID	Requested Document's ID Requirements needed Document type User's ID	INT IMAGE VARCHAR(20) INT	999999 Xxxx xxxx 999999	000001-999999 000001-999999	Y Y	PK FK	User
DocuPayment	DocuPayID DocuApproveID RequestDocuID Amount DocuReceiptID	Docupay's ID Approved document's ID Requested Document's ID Amount to be paid Receipt for transaction	INT INT INT NUMBER(9,2) INT	999999 999999 999999 999999999.99 999999	000001-999999 000001-999999 000001-999999 000000001.00- 999999999.99 000001-999999	Y Y Y Y Y	PK FK FK FK FK	DocuApproval RequestDocu DocuReceipt
DocuReceipt	DocuReceiptID DocuPayID ReceiptContent	DocuReceipt's ID DocuPay's ID Receipt's Content	INT INT VARCHAR(20)	999999 999999 Xxxx xxxx	000001-999999 000001-999999	Y Y	PK FK	DocuPayment
eBulletin	eBulletinID PostContent PostImage PosterID PostedOn	eBulletin's ID Content of the Post Image of the Post brgyMemberID of the poster Date posted on	INT VARCHAR(254) IMAGE INT DATETIME	999999 Xxxxx xxxx 999999 999999 MMMM/dd/YY HH:MM	000001-999999 000001-999999	Y Y Y Y	PK FK	Barangay Member
eSchedule	ScheduleID ScheduleName ScheduleDetail ScheduledBy Date SchedulerID	Schedule's ID Name of the event Details of the event Name of the scheduler Date of the event Barangay Member's ID	INT VARCHAR(20) VARCHAR(254) VARCHAR(20) DATETIME INT	999999 Xxxxx xxxx Xxxxx xxxx Xxxxx xxxx MMMM/dd/YY HH:MM 999999	000001-999999 000001-999999	Y Y Y Y Y Y	PK FK	Barangay Member

Table 5: **eBarangay Data Dictionary**

Network Design

Network design is a representation of the implementation of the systems network infrastructure. This design includes Network Topology and Network Model.

Network Model

The network model is a database model conceived as a flexible way of representing objects and their relationships. Its distinguishing feature is that the schema, viewed as a graph in which object types are nodes and relationship types are arcs, is not restricted to being a hierarchy or lattice.

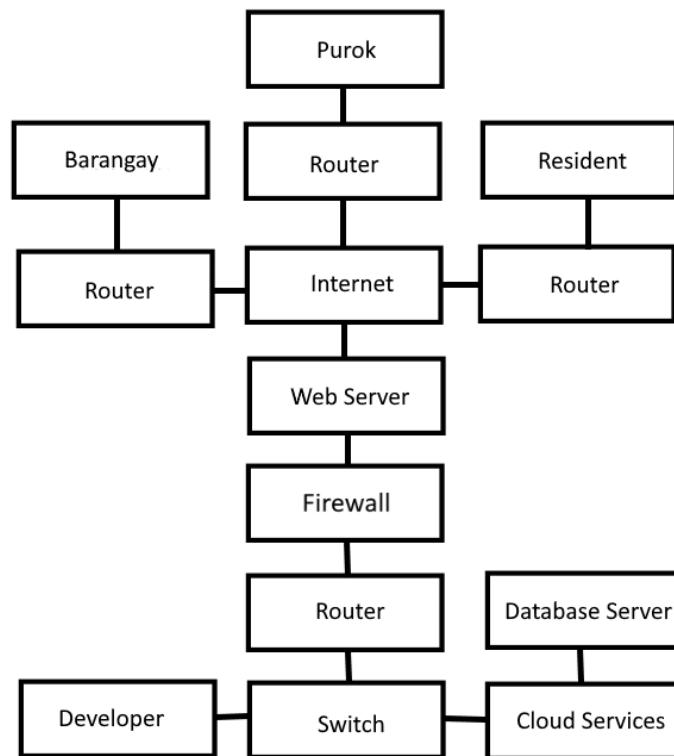


Figure 139: **Network Model**

eBarangay uses the TCP/IP as a framework for its network model. It serves as a peer-to-peer network connectivity for the developer, barangay, purok, and residents. It also uses Local Area Network (LAN) among computers and other devices that are connected within the same router.

Network Topology

Network topology refers to the manner in which the links and nodes of a network are arranged to relate to each other. Topologies are categorized as either physical network topology, which is the physical signal transmission medium, or logical network topology, which refers to the manner in which data travels through the network between devices, independent of physical connection of the devices.

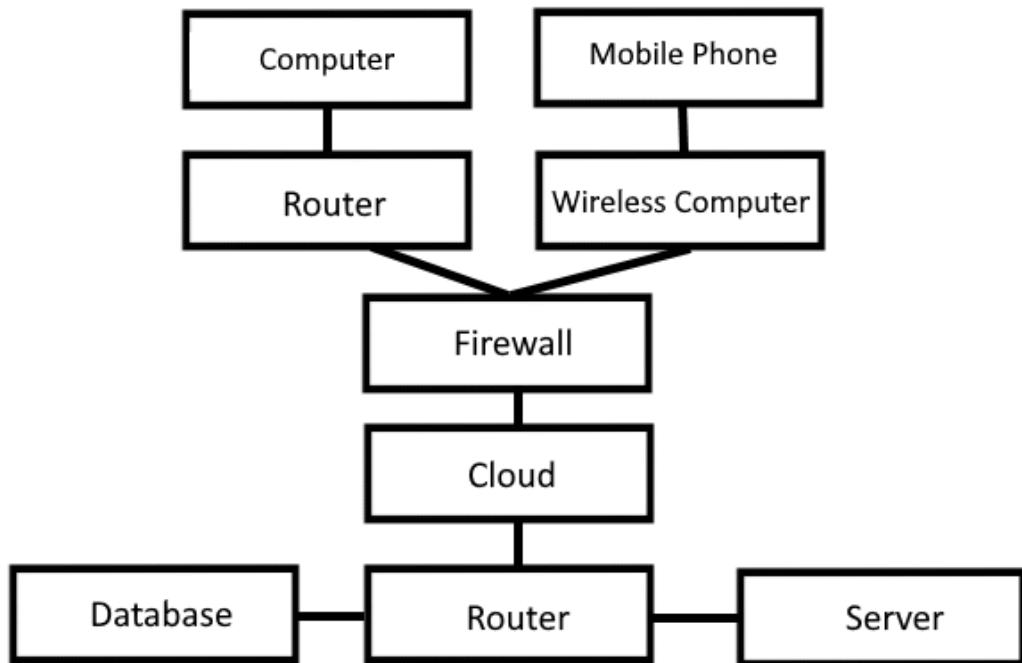


Figure 140: **Network Topology**

eBarangay uses a Star topology as its Network Topology. Users, such as the residents, purok leaders, and barangay officials can use can access the system online through desktop computers, and through their mobile devices such as laptops and mobile phones utilizing the accessibility of the internet.

Development Phase

Technology Stack Diagram

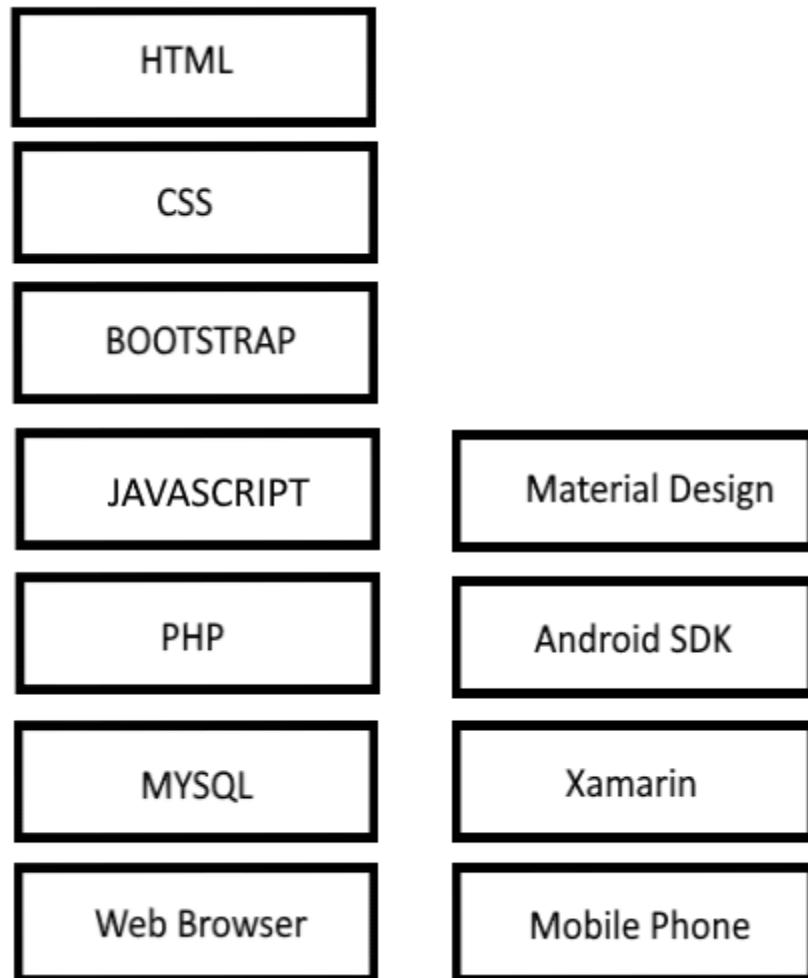


Figure 141: Techonology Stack Diagram

eBarangay will be developed with a sufficient amount of software. The software will be used in web developing for front end are Boostrap 4, CSS 3, Javascript, and HTML 5 while for backend the system will be using PHP and MYSQL. On mobile devices, eBarangay will utilize Material Design, Android SDK and Xamarin for its frontend and backend.

Software Specification

SYSTEM SPECIFICATION DEVELOPMENT STAGE

Software Specification Development

Browser: Google Chrome, Mozilla Firefox, and/or Microsoft Edge

Operating System: Windows 7 or up

Internet Speed: 3 Mbps or higher

Application Tools: Visual Studio 2019

Hardware Specification

Hardware Specification refers to the requirement of the device hardware in order to perform functions.

Development Stage

Processor	Intel® Core™ i5-4460 CPU @3.20GHz 3.20GHz
Memory/RAM	8192mb or Higher
Hard Disk Drive	500gb or Higher
Monitor	15 inches 1366x768 60Hz
Video Adapter	Intel ® HD Graphics 3000
Keyboard	Generic Keyboard
Mouse	Generic Mouse
Ethernet Adapterx	Realtek PCIe FE Family Controller
Disk Drive	DVD-R/W Driver
USB Port	2.0 USB port or 3.0 USB port

Program Specification

List of Modules

Programmer	MODULES	RESIDENTS	PUROK	BARANGAY	ADMIN
MANAGE ACCOUNT	CREATE ACCOUNT	*			
	VIEW ACCOUNT	*	*	*	*
	UPDATE ACCOUNT	*	*	*	*
	DELETE ACCOUNT				*
	VERIFY PROFILE	*	*	*	
	LOGIN & OUT	*	*	*	*
	Number of Points (1 Point per module per user)	1	1	1	1

Table 6: Manage Account Module

Programmer	MODULES	RESIDENTS	PUROK	BARANGAY	ADMIN
REQUEST DOCUMENT	CREATE REQUEST	*			
	VIEW REQUEST	*	*	*	*
	UPDATE REQUEST	*	*	*	
	CANCEL REQUEST	*			
	APPROVE/DISAPPROVE REQUEST		*	*	
	Number of Points (1 Point per module per user)	1	1	1	1

Table 7: Request Document Module

Programmer	MODULES	RESIDENTS	PUROK	BARANGAY	ADMIN
	EBULLETIN				
	VIEW POST	*	*	*	*
	CREATE POST	*	*	*	
	UPDATE POST	*	*	*	
	DELETE POST	*	*	*	*
Number of Points (1 Point per module per user)		1	1	1	1

Table 8: eBulletin Module

Programmer	MODULES		RESIDENTS	PUROK	BARANGAY	ADMIN
	MANAGE COMPLAINTS					
	VIEW COMPLAINT		*	*	*	*
	EDIT COMPLAINT		*			
	SEND COMPLAINT		*			
	RECORD COMPLAINTS			*	*	
Number of Points (1 Point per module per user)			1	1	1	1

Table 9: Manage Complaints Module

Programmer	MODULES	RESIDENTS	PUROK	BARANGAY	ADMIN
	MANAGE RESIDENTS				
	VIEW RESIDENTS	*	*	*	*
	UPDATE RESIDENTS		*	*	
	ADD RESIDENTS		*	*	
	DELETE RESIDENTS			*	*
	VERIFY RESIDENTS		*	*	
Number of Points (1 Point per module per user)	1	1	1	1	1

Table 10: Manage Residents Module

Programmer	MODULES	RESIDENTS	PUROK	BARANGAY	ADMIN
	MANAGE ORGANIZATIONS				
	CREATE ORGANIZATION	*		*	*
	VIEW ORGANIZATIONS	*	*	*	*
	UPDATE ORGANIZATION			*	*
	DELETE ORGANIZATION			*	*
	CANCEL REQUEST	*			
	APPROVE/DISAPPROVE REQUEST		*	*	
Number of Points (1 Point per module per user)	1	1	1	1	1

Table 11: Manage Organizations Module

Programmer	MODULES	RESIDENTS	PUROK	BARANGAY	ADMIN
	MANAGE NOTIFICATION/MESSAGES				
	PUSH	*	*	*	
	SEND MESSAGE	*	*	*	
Number of Points (1 Point per module per user)	1	1	1	0	

Table 12: Manage Notification/Messages Module

Programmer	MODULES	RESIDENTS	PUROK	BARANGAY	ADMIN
	MANAGE BARANGAY				
	VIEW BARANGAY	*	*	*	*
	CREATE BARANGAY				*
	UPDATE BARANGAY			*	*
	DELETE BARANGAY				*
Number of Points (1 Point per module per user)	1	1	1	1	

Table 13: Manage Barangay Module

Programmer	MODULES	RESIDENTS	PUROK	BARANGAY	ADMIN
	VOTING				
	ADD CANDIDATE			*	*
	UPDATE CANDIDATE			*	*
	REMOVE CANDIDATE			*	*
	VIEW CANDIDATE	*	*	*	*
	VOTE CANDIDATE	*	*	*	
Number of Points (1 Point per module per user)		1	1	1	1
Number of Modules Per User		9	9	9	8

Table 14: Voting Module

REFERENCES

- Ramirez, N. (2017, May 16). San Fran's purok system, a deterrent against criminals. CebuDailyNews. Retrieved from <https://bit.ly/3x5vlpa>
- Matthies, A. (2017). "Community-Based Disaster Risk Management in the Philippines: Achievements and challenges of the Purok System." Austrian Journal of South-East Asian Studies, 10(1), 101-108. Retrieved from <https://bit.ly/3qmtMkg>
- Cheng, R. R. (2019). Building Community-based Resilience in the Municipality of San Francisco, Cebu, Philippines. GDI. Retrieved from <https://bit.ly/3vSHYmr>
- Curato, N., Calamba, S. T. (2018). Surviving Disasters by Suppressing Political Storms: Participation as Knowledge Transfer in Community-Based Disaster Governance. Sage Journals. Retrieved from <https://bit.ly/2T0SDOn>
- Ponce de Leon, I. Z. (2021). International Journal of Disaster Risk Reduction. ScienceDirect. Retrieved from <https://bit.ly/2TYSFGC>
- Institutionalizing the purok system. (2017, October). CebuDailyNews. Retrieved from <https://bit.ly/3gYoRSt>

APPENDICES

Appendix A. Capstone 1 Oath of Confirmation



Appendix A. Capstone 1 Oath of Confirmation

Date: March 10, 2021

OATH OF CONFIRMATION

This is to confirm that I, Craig Jonard N. Baring, a BSIT-3 student, currently enrolled in the course of Capstone Project and Research 1, have aptly received a copy; religiously read and understood its contents; and openly submit to the terms, rules, conditions and regulations stated in the Capstone Project Manual 2021 document implemented by the Subject Teacher. This is also to affirm that said guidelines were judiciously discussed and explicitly elaborated in a forum conducted by the Subject Teacher.

CONFORME:


Craig Jonard N. Baring

(Signature of Student over Printed name)/ Date

Date: March 10, 2021

OATH OF CONFIRMATION

This is to confirm that I, Craig Jonard N. Baring, a BSIT-3 student, currently enrolled in the course of Capstone Project and Research 1, have aptly received a copy; religiously read and understood its contents; and openly submit to the terms, rules, conditions and regulations stated in the Capstone Project Manual 2021 document implemented by the Subject Teacher. This is also to affirm that said guidelines were judiciously discussed and explicitly elaborated in a forum conducted by the Subject Teacher.

CONFORME:


Craig Jonard N. Baring

(Signature of Student over Printed name)/ Date

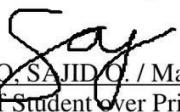
Date: March 10, 2021

OATH OF CONFIRMATION

This is to confirm that I, Sajid O. Cadavero, a BSIT-3 student, currently enrolled in the course of Capstone Project and Research 1, have aptly received a copy; religiously read and understood its contents; and openly submit to the terms, rules, conditions and regulations stated in the Capstone Project Manual 2021 document implemented by the Subject Teacher.

This is also to affirm that said guidelines were judiciously discussed and explicitly elaborated in a forum conducted by the Subject Teacher.

CONFORME:


CADAVERO, SAJID O. / March 10, 2021
(Signature of Student over Printed name)/ Date

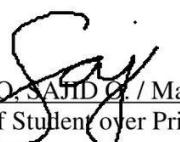
Date: March 10, 2021

OATH OF CONFIRMATION

This is to confirm that I, Sajid O. Cadavero, a BSIT-3 student, currently enrolled in the course of Capstone Project and Research 1, have aptly received a copy; religiously read and understood its contents; and openly submit to the terms, rules, conditions and regulations stated in the Capstone Project Manual 2021 document implemented by the Subject Teacher.

This is also to affirm that said guidelines were judiciously discussed and explicitly elaborated in a forum conducted by the Subject Teacher.

CONFORME:


CADAVERO, SAJID O. / March 10, 2021
(Signature of Student over Printed name)/ Date

Appendix A. Capstone I Oath of ConfirmationDate March 10, 2021**OATH OF CONFIRMATION**

This is to confirm that I, Rosvie R. Pepito, a BSIT-3 student, currently enrolled in the course of Capstone Project and Research I, have aptly received a copy, religiously read and understood its contents, and openly submit to the terms, rules, conditions and regulations stated in the Capstone Project Manual 2021 document implemented by the Subject Teacher. This is also to affirm that said guidelines were judiciously discussed and explicitly elaborated in a forum conducted by the Subject Teacher.

CONFORME _____
Rosvie R. Pepito _____
_____3/10/2021_____

(Signature of Student over Printed name)/ Date

Date: March 10, 2021**OATH OF CONFIRMATION**

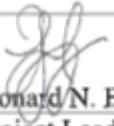
This is to confirm that I, Rosvie R. Pepito, a BSIT-3 student, currently enrolled in the course of Capstone Project and Research I, have aptly received a copy; religiously read and understood its contents; and openly submit to the terms, rules, conditions and regulations stated in the Capstone Project Manual 2021 document implemented by the Subject Teacher. This is also to affirm that said guidelines were judiciously discussed and explicitly elaborated in a forum conducted by the Subject Teacher.

CONFORME: _____
Rosvie R. Pepito _____
_____3/10/2021_____

(Signature of Student over Printed name)/ Date

Appendix B. Research Working Title Form

Appendix E: Research Working Title Form

Name of the Proponents	
1. Rosvie R. Pepito	
2. Craige Jonard N. Baring	
3. Sajid Cadavero	
4.	
Proposed Research Title:	
eBarangay: Application management system with Purok integration and flow of workload	
Date: April 10, 2021	Date: April 10, 2021
Submitted by: Team RJS	Noted and Approved by: Narcisan Galamiton
 Craige Jonard N. Baring (Signature of Project Leader over Printed Name)	 Narcisan Galamiton (Signature of Adviser over Printed Name)

Appendix C. Capstone 1 Consultation Logs Form

Research/Capstone Project Title

EBARANGAY: AN APPLICATION MANAGEMENT SYSTEM
WITH PUROK INTEGRATION AND FLOW OF WORKLOAD

Name of the Proponents

Craig Jonard N. Baring Rosvie R. Pepito

Sajid Cadavero

Name of the Group

RJS Team

1st Consultation : CHAPTER 1 must be completely delivered for adviser's evaluation

Rationale needs more details, like benefits of barangays/towns
on other countries.

04/24/2021

Date

PM's Signature

Adviser's Signature

2nd Consultation : CHAPTER 1 and 2 must be completely delivered for adviser's evaluation

Rationale is now looking better, just need to avoid the usage
of first person words like I, we, me, etc. Opt to use third person
pronouns

04/30/2021

Date

PM's Signature

Adviser's Signature

3rd Consultation : CHAPTER 1, 2 and 3 must be completely delivered for adviser's evaluation

Review FDD, use case, and ERD

05/15/2021
Date



PM's Signature


Adviser's Signature

Adviser's Signature

4th Consultation : CHAPTER 1, 2, 3 and including initial and finals pages must be completely delivered for advisers' evaluation

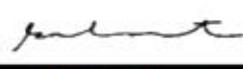
Improve ERD

Improve list of modules (use-case as a guide)

05/22/2021
Date



PM's Signature


Adviser's Signature

Adviser's Signature

This is to certify that I have been regularly consulted by my advisees; have reviewed their manuscript of the above-stated study. As their adviser, I therefore submit them ready for Proposal Hearing as the Chapters 1, 2, and 3 and the pertinent parts of their manuscript are complete


Narcisan Galamiton

(Signature of Adviser over printed name)

CURRICULUM VITAE

Name : CRAIGE JONARD N. BARING
 Address : KAMANGGAHAN 1, PAJO, LAPU-LAPU CITY, CEBU
 E-Mail Address : craigejonard@gamil.com



PERSONAL DATA:

Gender : MALE
 Age : 21
 Religion : ROMAN CATHOLIC
 Civil Status : SINGLE
 Citizenship : FILIPINO
 Date of Birth : JANUARY 7, 2000
 Place of Birth : LAPU-LAPU CITY

EDUCATIONAL BACKGROUND

SENIOR HIGH SCHOOL

School : UNIVERSITY OF CEBU - LAPU-LAPU AND MANDAUE
 Address : A.C. CORTES AVE, MANDAUE CITY, 6014 CEBU
 Year Graduated : 2017-2018

JUNIOR HIGH SCHOOL

School : UNIVERSITY OF CEBU - LAPU-LAPU AND MANDAUE
 Address : A.C. CORTES AVE, MANDAUE CITY, 6014 CEBU

Year Graduated : 2015-2016

ELEMENTARY

School : UNIVERSITY OF CEBU - LAPU-LAPU AND MANDAUE

Address : A.C. CORTES AVE, MANDAUE CITY, 6014 CEBU

Year Graduated : 2011-2012

Name : SAJID O. CADAVERO
 Address : M6 SITIO KAMANGGAHAN,
 LABOGON, MANDAUE CITY, CEBU
 E-Mail Address : sajidcadavero@gmail.com



PERSONAL DATA:

Gender : MALE
 Age : 21
 Religion : ROMAN CATHOLIC
 Civil Status : SINGLE
 Citizenship : FILIPINO
 Date of Birth : JUNE 28, 1999
 Place of Birth : CEBU CITY

EDUCATIONAL BACKGROUND

SENIOR HIGH SCHOOL

School : ST. JOSEPH'S ACADEMY
 Address : MANDAUE CITY, CEBU
 Year Graduated : 2017-2018

JUNIOR HIGH SCHOOL

School : ST. JOSEPH'S ACADEMY
 Address : MANDAUE CITY, CEBU
 Year Graduated : 2015-2016

ELEMENTARY

School : ST. JOSEPH'S ACADEMY
Address : MANDAUE CITY, CEBU
Year Graduated : 2011-2012

Name : ROSVIE R. PEPITO
 Address : ZONE SIBUYAS, PAKNAAN,
 MANDAUE CITY, CEBU
 E-Mail Address : pepitorosvie@gmail.com



PERSONAL DATA:

Gender : FEMALE
 Age : 21
 Religion : ROMAN CATHOLIC
 Civil Status : SINGLE
 Citizenship : FILIPINO
 Date of Birth : AUGUST 23, 1999
 Place of Birth : BORBON, CEBU

EDUCATIONAL BACKGROUND

SENIOR HIGH SCHOOL

School : UNIVERSITY OF CEBU - LAPU-LAPU AND MANDAUE
 CAMPUS
 Address : A.C. CORTES AVE, MANDAUE CITY, 6014 CEBU
 Year Graduated : 2017-2018

JUNIOR HIGH SCHOOL

School : DON EMILIO OSMENA MEMORIAL HIGH SCHOOL
 Address : SAGAY, BORBON, CEBU
 Year Graduated : 2015-2016

ELEMENTARY

School : LAAW ELEMENTARY SCHOOL

Address : LAAW, BORBON, CEBU

Year Graduated : 2011-2012