

GARBAGE COLLECTION APPLICATION

A PROJECT SUBMITTED TO:

THE DEPARTMENT OF

STATISTICS AND COMPUTER SCIENCE

MOI UNIVERSITY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

BY:

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DATE: 11TH APRIL 2019.

DECLARATION:

I declare that this report is my original work and has not been presented for a degree award in any other university. No part of this work may be reproduced without prior written permission of the authors and moi university.

**Approval page**

**Supervisor’s Declaration**

This project has been submitted for reviews with my approval as the university supervisor.

Signature…………………………………… Date………………………………………..

Name……………………………………………………………………………………….

DEPARTMENT OF STATISTICS AND COMPUTER SCIENCE

MOI UNIVERSITY.

DEDICATION:

I dedicate this project to the entire Moi fraternity, my fellow comrades and my family at large.

Thanks for your support through out the development process.

**ABSTRACT**

This project addresses the study and development of a Garbage collection Application on

County Garbage Management System to enable residents, both the county administrators and the citizens to make use of the application. Traditionally, garbage management from the authorized bodies has been manually where county administrators has just been seen it then collecting it unlike in most interior parts of the county where county administrators has not been accessing the issue of garbage management has not possible.

The Garbage collector App will cater for garbage collection in every part of the county more so in major county towns like Nairobi where the issue seems to be dominating. This Mobile project addresses the problems faced by the residents from different parts where garbage is not collected and also where it takes time for it be collected because of manual collection of garbage. The project studies some issues on implementation and also recommendations on how Garbage collection Application can take place effectively.

This project recommends on a record keeping system based on individual app usage rate system. This project also recommends a Decision Support System to deal with Administrators requirement whereby it provides reliable choices to administrator to make decision. This project includes the development of a Garbage collection mobile App to support the

project objective. This Mobile Application will assist in future development that would support a

fully integrated system that links county’s cleanliness monitoring and the entire country. Borrowing from other counties measures of cleanliness will be taken into consideration.

ACKNOWLEDGEMENT.

This documentation of my project had been successfully completed. A lot of time and effort was spent to ensure that this project meets the objectives that were stated. I wish to express my sincere gratitude to Mr. Kiprop for his guidance and patience in supervising

the writing of this documentation of my project. His advice and valuable suggestions are the source of encouragement throughout the completion of my project.

Last, but not least, I wish to thank my beloved friends who have been

supportive during the writing of my project. Am very grateful for their encouragement and moral support during the progress of the project.

**Table of Contents**

**1. Introduction and Background**

1.1 Statement of Problem Area

1.2 Background

1.3 Brief Project Description

1.4 Purpose/Objectives/justification of Project

**2. Literature Review**

2.1 Previous and Current Work, Methods and Procedures

**3. System Functional Specification**

3.1 Functions Performed

3.2 User Interface Design

3.3 System Data Base/File Structure Preview

3.4 External and Internal Limitations and Restrictions

3.5 User Interface Specification

3.5.1 User Screens/Dialog

3.5.2 Report Formats/Sample Data

3.5.3 On­line Help Material (if applicable)

3.5.4 Error Conditions and System Messages

3.5.6 Control Functions

**4. System Performance Requirements**

4.1 Efficiency

* 1. Reliability

4.3 Security

4.3.1 Hardware Security

4.3.2 Software Security

4.3.3 Data Security

4.4 Maintainability

4.5 Modifiability

4.6 Portability

**5. System Design Overview**

5.1 System Data Flow Diagrams

5.2 System Architecture and Structure

5.3 System Data Dictionary

5.4 Description of System Operation

5.5 Equipment Configuration

5.6 Implementation Languages

5.7 Required Support Software

**6. System Data Structure Specifications**

6.1 User Input Specification

6.1.1 Identification of Input Data

6.1.2 Source of Input Data

6.1.3 Input Medium and/or Device

6.1.4 Data Format/Syntax

6.2 User Output Specification

6.2.1 Identification of Output Data

6.2.2 Output Medium and/or Device

6.2.3 Output Format/Syntax

6.2.4 Output Interpretation

6.3 System Data Base/File Structure Specification

6.3.1 Identification of Data Base/Files

6.3.2 (Sub)systems Accessing the Data Base

6.3.3 Logical File Structure

6.3.4 Physical File Structure

6.3.5 Data Base Management Subsystems Used

7. **Module Design specifications**

7.1

7.1.1 Module Functional specification

* + - * + Functions Performed
        + Module Interface Specifications
        + Module Limitations and Restrictions

7.1.2 Module operational Specification

* + Locally Declared Data Specifications
  + Algorithm Specification
  + Description of Module Operation

**8. System Verification**

8.1 Items/Functions to be Tested

8.2 Description of Test Cases

8.3 Justification of Test Cases

8.4 Test Run Procedures and Results

8.5 Discussion of Test Results

**9. Conclusions**

9.1 Summary

9.2 Problems Encountered and Solved

9.3 Suggestions for Better Approaches Problem /Future Extensions to Project

**10. Bibliography**

**11. Appendices**

**12. Program Listings**

1. **User Manual**

**INTRODUCTION AND BACKGROUND.**

**1.1 Statement of problem area**

At present, the public can only know about the importance of having and maintaining cleanliness through conventional media means such as radio, newspaper or television advertisements. There is no information regarding the garbage collection programs available on any of the portal.

The current system that is using by the garbage collection is manual system. With the manual system, there are problems in managing garbage. The garbage might management information might not be safely kept and might be missing collection records due to human error. Beside that, errors might occur when the administrator more than one record for same collection place.

There is no centralized database of garbage collection in our counties. So, it becomes really tedious for a person to search and find concerned authority in case of need of garbage collection. The only option is to manually search and wait if the county will come and collect. If a county makes collection in different places, no previous records can be traced except if the administrator brings along the collection information. Hence, the collection is considered to be a first-timer if they make collection in a new place or when new administrator is in the office it become tedious for him or her to trace collection grounds.

Without an automated garbage management system, there are also problems in keeping track of the actual amount of each and every collection made in the entire county. In addition, there is also no alert available when the quantity of garbage increases in mostly affected areas is above its par level of collection.

**1.2 Background**

The percentage of people disposing garbage is increasing day by day due to awareness to garbage collection sites for counties. The garbage disposed in different places to be managed thoroughly so that there will be no negative effect to the residents in the area of disposal site. The current system of garbage collection is mostly manual. In order to arrange for collection the information, have to follow the record as it is arranged by county’s management office and allocate collection arrangement as per the information sent by user of the system in different places of the entire county. Since there are different collection areas, the collection criteria method causes problems like sending collectors in wrong places. This is not only time wasting but also causes mix ups information .Which is why there is need for an automated system that minimize if not eliminate most of the problems of the manual system.

**1.3 Brief project description**

This is a Garbage application system that is used as a means of curbing issues of uncollected garbage in different parts of the county. Each place has its own collection period which runs every time a person from a certain county takes a garbage photo and provides required information for collection.

The system keeps the record of all the users, administrator, collection status, collection area and collected . This project intends to computerize the garbage management system in a county in order to improve the information management efficiency due to the grown size of records of data for garbage.

**1.4 Purpose/objectives/justification of the project**

The purpose of the garbage management project is to simplify and automate the process of searching for uncollected garbage in the county for maintaining cleanliness and also ensure there is reduced contamination of airborne diseases like cholera which is very dangerous to humans living in certain highly populated places and maintain the records of collection places, users and system administrators**.**

**The goals and objectives of the Garbage Collection Application project are as follows:**

1. To provide a means for collection of uncollected garbage.

2. To allow any county citizens to be able to use report a garbage only if he/she has smart phone.

3. To provide an efficient information keeping for garbage after collection.

4. To improve the cleanliness in the county for instance the air pollution.

5. To provide synchronized and centralized garbage collection database.

6. To provide immediate storage and retrieval of data and information about garbage in different areas.

**2. Literature Review**

**2.1 previous and current work, methods and procedures**

There is one system that has been selected as benchmark for the development of Garbage Collection Application. The Smart Garbage Monitoring System for Waste Management.

The website for The Smart Garbage Monitoring System for Waste Management is a website that provides the facility for the citizen to register himself or herself as a system user. Only citizens in Malaysia can register to the system. Piles of rubbish are one of the major problems faced by most people in Malaysia especially those living in flats. The Smart Garbage Monitoring System for Waste Management measures waste level in garbage bin real-time and to alert the municipality, in particular cases, via SMS. It supposes to generate and send the warning messages to the municipality via SMS when the waste bin is full or almost full, so the garbage can be collected immediately.

However, this Smart Garbage Monitoring System for Waste Management does not provide any easy usage of the system. Therefore, they cannot know how is collection statuses in case of any fault. As for residents, they cannot know what’s happening in case a fault occurs. Without having this function to access administrator in case of fault in the system, the resident cannot monitor his or her health condition in term of garbage collection . This will make the citizens(users) become unaware of why the garbage is still pending uncollected.

**3. System Functional Specification**

**3.1 Functions Performed**

Citizens(users) registration-The system allows county residents to register as the users and saves the information in county database.

* Home Page- has some guidelines on the work of the county responsibilities and how the county does it .
* Accounts- User can update their profile by updating their phone numbers, email and full names in case there was an error in the names during registration. In the account, one can send a place of garbage requesting its collection.
* Report garbage- this is the activity where the a logged in user can open a camera and take a photo of the garbage and save it in the gallery for upload to county databases also the user can view whether the photo is saved in the gallery.
* Choose image- this activity gives for user to upload a garbage photo taken in the database
* Administrator Module- The admin has a lot of roles in our Garbage Collection Application. The admin manages the requests by approving them so the garbage can be collected. The admin is responsible for deleting collected garbage photo after collection has been done. The admin can see the information posted by the user of the system.

**3.2 User Interface Design**

Being a Garbage Collection System, I choose my primary color to be green as a symbolic representation of environment due to vegetation. The user interface is easy to use for users and administrators. The following are the User interface components of my system:

* Welcome Activity- this is a xml provision which contains the buttons which on pressed open the pages as per the name of the button. Its offers quick and easy to use navigation through the various sections of my mobile application. The welcome activity appears when the app icon is clicked. The button in the welcome activity is labeled according to the modules they are linked to so it makes it more easier to navigate through my mobile application .The following are the navigation buttons in my system;
* Proceed- on click it opens the Report garbage activity where there is camera.
* Sign-up Activity – it registers the user.
* Choose image – on click it opens the images then you the image for garbage to be uploaded.
* Upload – on click it upload the selected image in the database .
* Big star- it displays selected.
* Camera-on click it opens the phone camera so that photo can be taken
* Gallery – on click it opens the gallery to confirm the image.
* Report Garbage- contains/holds the contents of the Camera, gallery, big star and proceed button.
* Main2Activity*-* it is constant in all the buttons of the mobile application such buttons includes upload, choose image and admin.
* Admin – on click it registers administrator of the system.

**3.3 System Database/File Structure Preview**

Am using Fire-base Database for my system. The database has the following key tables:

* Administrator- contains administrator details like email and his log in password.
* User Register- contains all details of the user, which he/she enters during the registration process. These details are; full names, email, phone number, place of garbage and password.
* Uploads- stores the uploaded image and the image name.

File Structure Preview- i have structured the system files in the following manner.

* Administrator- contains some of java the files that represents actions that the administrator can perform. These actions are; managing users, managing uploaded images(collection status either collected or uncollected) and managing the collections in different places.
* Users- has the java file for the users actions, the user is responsible for uploading garbage to the system.
* Welcome page- it is an include folder which contains xml and java files necessary user actions from proceed button there is user registration.
* Report Garbage Activity - contains the java files necessary for the user actions. The actions performed by a user include; taking photo with a camera, view taken from the gallery.

**3.4 External and Internal Limitations and Restrictions**

* It is difficult to know whether information given by the users on registration is correct.
* Power blackouts system out of use.
* Low Internet connectivity also slows down the working of the my Garbage collection Application

**3.5 User Interface Specification.**

In this system i communicate with the users using the user interfaces. Some of the interfaces are:

* Welcome Page- displays the general information of the Garbage collection system
* Sign-up Activity Page- displays registration form to users
* Report garbage page- where the user can take photo and view taken photo in gallery.
* Main Activity2 page- displays buttons for upload and image selection for the user.

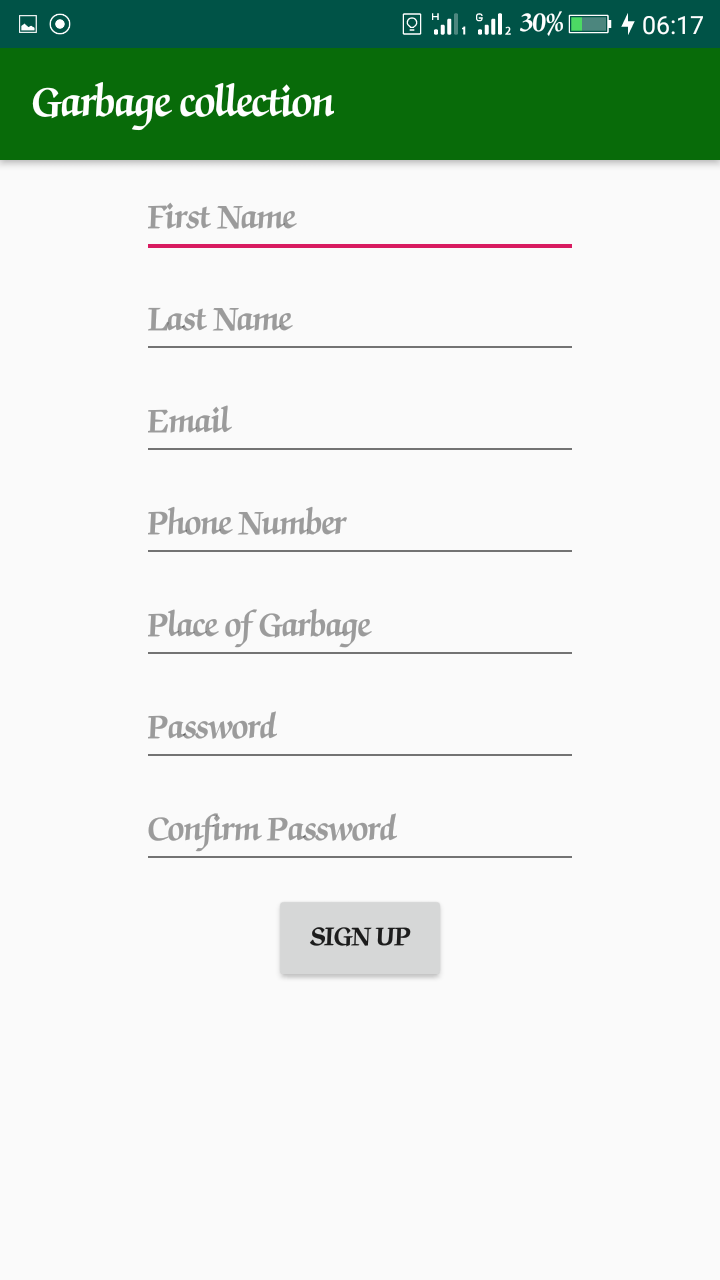
**3.5.1 User Screens/Dialog**

The following are the user screens for the Garbage collection System

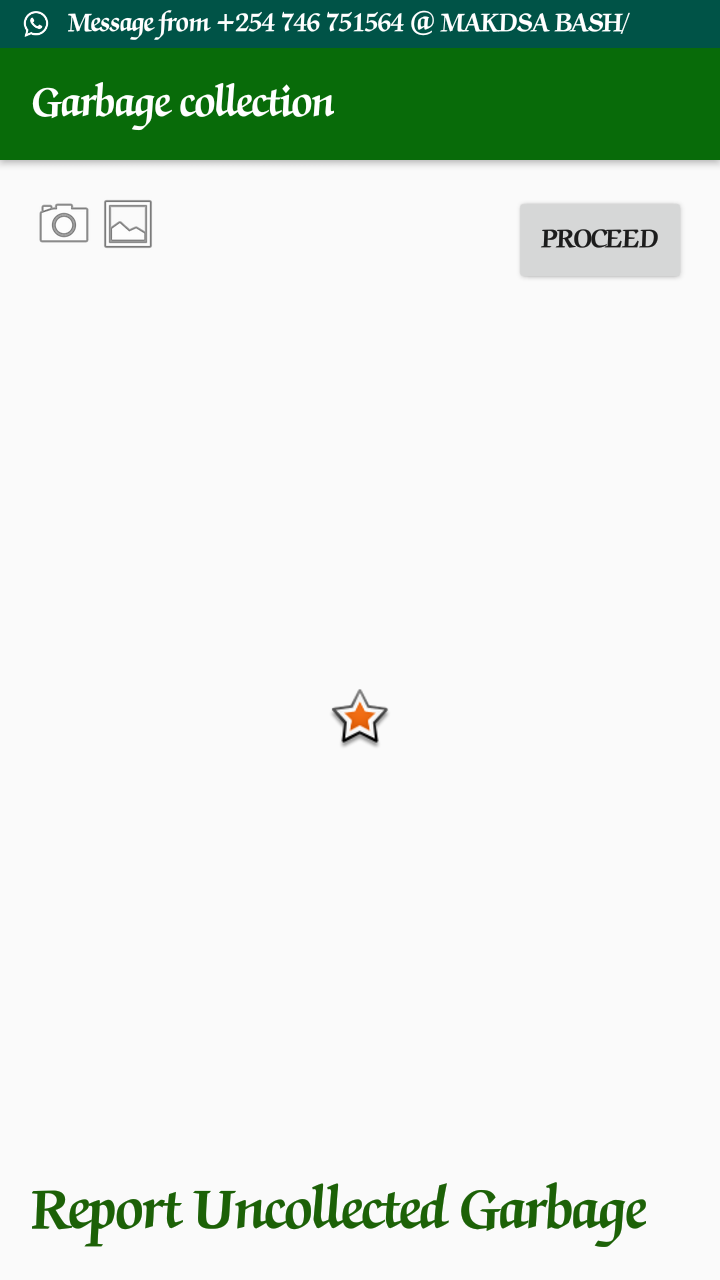
1. **Garbage Collection Welcome Page**

****

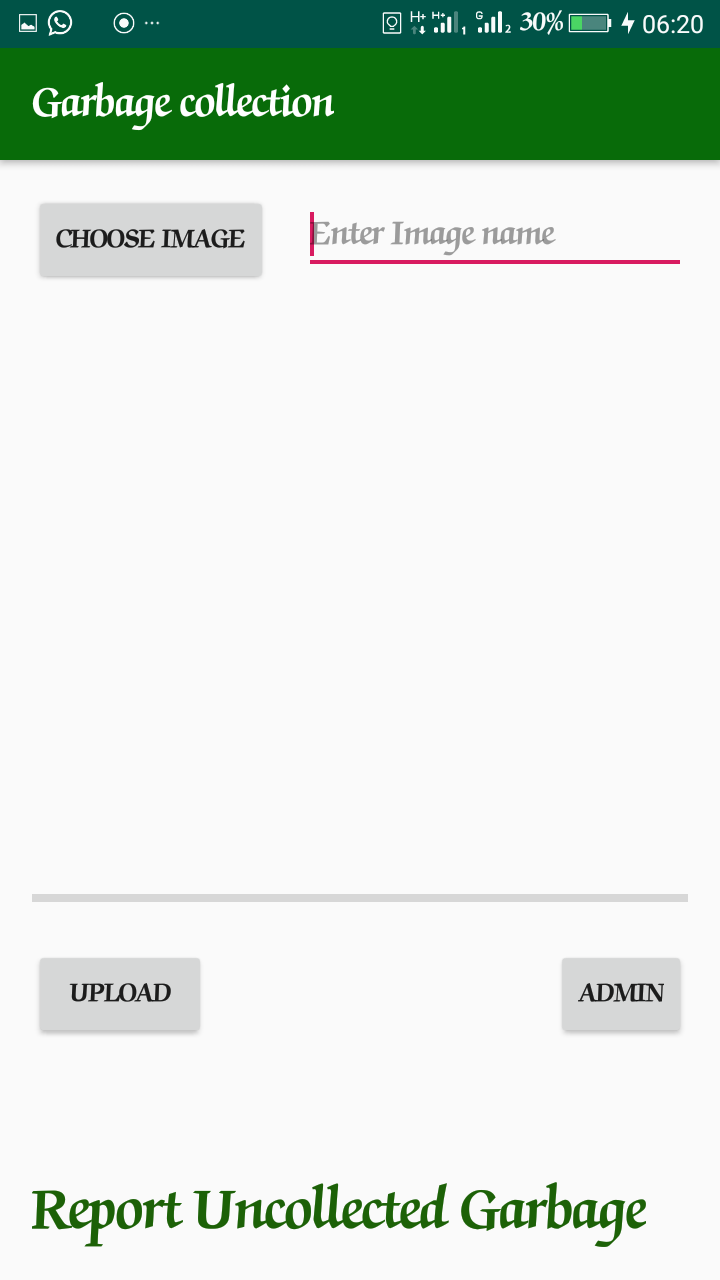
**b) Garbage Collection User Register Page**

****

**c) Garbage Collection Report Garbage Page**

****

**d) Garbage Collection Main2Activity Page**

****

**3.5.2 Report Formats/Sample Data**

My system just like any other systems generates reports. The reports include: garbage photos, number of garbage photos and collection reports. The amount of photos is displayed in admin page. If garbage is reported from a certain area, the photo is immediately uploaded. The number of uploaded photos is a report which is visible to the garbage collection administrator. It shows all garbage photo requests, the person requesting for collection, phone number, email, place of garbage and the required date. From this the administrator can confirm the request of collection. The administrator can prove the requests and the garbage can be collected as first as possible if all the conditions are taken in measure.

**3.5.3 Online Help Material**

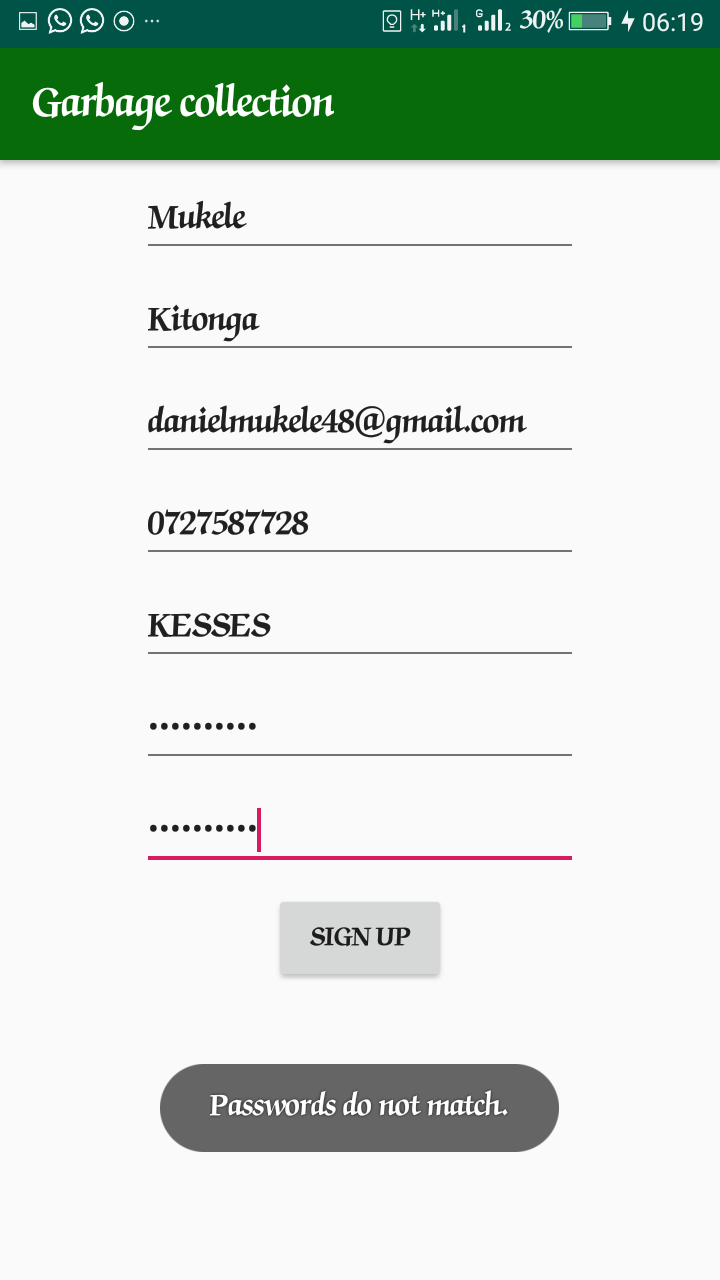
For my Garbage Collection System i have designed it in such a way that it is easy to use. Any person who has the idea of smart phone usage can use the mobile application very easily without any complication if there is sufficient or fast internet connectivity.

**3.5.4 Error Conditions and System Messages**

The following are the examples of the error conditions in my system:

|  |  |
| --- | --- |
| Condition | Message |
| Wrong user registration details | Error while registering |
| Email and mobile already in the database | Email or Mobile Number already exists. Please Try another one |
| Firebase app is not initialized | After using different types of dependencies in android studio |
| Wrong email and password | Email or Password does not exists |
| Passwords didn’t match | Passwords does not Match. Please Try Again |

The following is a screenshot for the error condition



following are the examples of the system messages

|  |  |
| --- | --- |
| Condition | Message |
| User creates a new account | Successful registered |
| User upload photo | Photo uploaded successfully |

**3.5.5 Control Functions**

The main control functions in my mobile application are performed by the user and the admin

* Admin Control Functions

1. approving collected garbage
2. approving uncollected garbage
3. Managing users

* User Control Function
* Report garbage
* Register for system’s usage
* Resend collection information if it wasn’t collected

**4. System Performance Requirements**

**4.1 Efficiency**

Compared to the manual garbage collection system where all the files are kept at one place and the records are taken manually my system is more efficient given that I am keeping my records electronically and are at one database.

My system reduces a lot of paper work in the garbage collection exercise since the user has to input the details in my system.

Immediate response for garbage collection requests is very possible given that the requests go directly to the garbage collection admin and he approves the requests within no time. The manual one takes time to approve the requests.

**4.2 Reliability**

Our Garbage Collection system is reliable, that is it can be online for a long time without needing any additional maintenance. However the app’s maintenance needs to be done manually.

**4.2.1 Description of Reliability Measures**

In order to achieve full reliability of my system, i have taken the following measures:

**Consistency**- The mobile application has consistency in the user interface and user inputs. This consistency ensures users develop quick familiarity with the application so as to solve their problems more efficiently.

**Accuracy** – The Garbage Collection System ensures that correct user information is taken during the user registration process.

**Availability** – My Garbage Collection System is online for 24 hours therefore making it reliable for all the times even at the late night hours

**4.3 Security**

**4.3.1 Hardware Security**

For hardware security i have the following measures in place for my system

* Secure server place-my server for all the Garbage sites in the county will be at secure locked place where only limited persons have the key to the server room

**4.3.2 Software Security**

I have put measures to ensure the security of my Garbage collection System. These include

* Authentication -Users have to enter their email addresses and password in order to access their accounts. This controls the number of malicious users of the system.
* Password hashing- This ensures that even the database administrator does not have access to user passwords so only the user knows his/her password.
* Administrator privileges- limits information access to malicious persons
* Anti-virus- we have anti-virus programmers to prevent virus and malware attacks

**4.3.3 Data Security**

The measures put in place to ensure the security of data in the system include:

* Data encryption- Only specific people can decrypt the data making it reach only the intended persons.
* Data access Control- specific information is only available to specific people. This limits the number of people who knows the system.
* Passwords- we are using passwords which are hard to guess to prevent unauthorized access to the system
* Keeping all my software up to date.

**4.4 Maintainability**

My Garbage Collection System is easy to maintain and the maintenance process takes one in a while.

**4.5 Modifiability**

My Garbage Collection System code base can be easily modified without breaking any of the core functionalities of the system.

The user interface styling is modular therefore components can be swapped without much overhead.For modules as they are independent i can easily modify the user’s module without affecting the admin module and vice versa.

**4.6 Portability**

The system can run only run any Android platform since it is a mobile based application. It can run on most modern Android versions like Android 8.1. Older Android versions are supported through fall back code.

**5. System Design Overview**

**5.1 System Data Flow Diagrams**

This is the System Data Flow for our Blood Bank System.

1. User Data Flow Diagrams

Users

Account

b) Admin Data Flow Diagram

Admin

Account

**5.2 System Architecture and Structure**

The software system is designed around simplicity. The system core functions are to take photo, view in gallery, upload photo and create records. But these functions are accessible depending on the type of the user of the system. Normal users can only create accounts, take photo, view photo and upload the photo. The administrator can delete other administrators, delete photos, delete users and administer for collection.. The system also has a front end that serves to present organized data to users and administrators.

The structure of the application system is such that it include:

* Authentication subsystem
* Report Garbage subsystem
* Garbage subsystem
* Admin panel Subsystem

**5.3 System Data Dictionary**

Admin

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column** | **Type** | **Null** | **Default** | **Links to** | **Comments** | **MIME** |
| admin\_id | int(10) | No |  |  |  |  |
| Email | varchar(20) | Yes | *NULL* |  |  |  |
| Password | varchar(20) | Yes | *NULL* |  |  |  |

* 1. Users

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column** | **Type** | **Null** | **Default** | **Links to** | **Comments** | **MIME** |
| First name | varchar(30) | No |  |  |  |  |
| Last name | varchar(30) | No |  |  |  |  |
| Email | varchar(10) | No |  |  |  |  |
| Phone number | int(10) | No |  |  |  |  |
| Password | Varchar (6) | No |  |  |  |  |
| Mobile | int(15) | No |  |  |  |  |
| Email | varchar(100) | No |  |  |  |  |
| Password | varchar(500) | No |  |  |  |  |

* 1. Uploads

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column** | **Type** | **Null** | **Default** | **Links to** | **Comments** | **MIME** |
| Image name | varchar(10) | No |  |  |  |  |
| Image url | varchar(10) | No |  |  |  |  |
| Image | picture | No |  |  |  |  |
| Date/time | Date | No |  |  |  |  |

This screenshot for the data dictionary

**5.4 Description of System Operation**

My Garbage Collect system operates in the following manner. Normally the user registers with the system by giving the following details: First Name, Second Name, Email, Mobile Number, Place of garbage, Password and password confirmation. This information is stored in my database. The users cannot access their accounts once they have uploaded garbage photo to be collected. Once the user wants to use the application again he/she will be prompted to register the garbage again. After uploading the garbage photo for collection, the garbage collector Administrator goes ahead to approve this requests by going to collect the garbage as per the request details. The administrator also can send emails or sms messages to users to request for more information. For every collection, there must be the administrator prove which prevents users from requesting for collection of garbage which is not there.

**5.5 Equipment Configuration**

In order for my system to work properly, the only equipment configuration that needs to be done is to have internet access in the mobile phones,laptops and desktop computers since our system cannot work off line. This configuration is very easy to achieve and anyone can be able to configuration his/her device to access internet.

**5.6 Implementation Languages**

I have used the following programming languages to come up with the Garbage Collection Mobile Application the front end and back end of my system;

**Front End**

* XML – Defines the structure of the App and how it will appear on android phone.

**Back End**

* JAVA - it is a functionalities based and server side language that is supported by most web hosting companies it is also easy to learn and implement.
* Json- for validations
* Fire base - Am using fire-base database to store user and administrator data and garbage data. Fire-base is a very secure database and that’s why I preferred to use it. Its also real-time database.

**5.7 Required Support Software**

* Android Phone – for enabling the user to access the software where one can click the icon to access my mobile application.
* Browser- this is to enable the administrator access my real-time database.

**6. System Data Structure Specifications**

**6.1 User Input Specification**

**6.1.1 Identification of Input Data**

Input data for the system in sub-classes is in different categories;

* Registration input data for Users-it is a form and also has place holders
* Photo input data - This is data about important information that is input to be viewed on the admin page.

**6.1.2 Source of Input Data (NOT input device)**

Sources of the input data are 3; the admin(s) and the user(s) .

* Admin

Login Input Data

- An admin provides login credentials at the admin login portal.

* User

Login Input Data

- A user provides login credentials at the user’s login portal.

Photo Input Data

-A user provides photo input data of the garbage to be collected.

**6.1.3 Input Medium and/or Device**

- The primary input medium is a keyboard and the device can be any device which is android.

**6.1.4 Data Format/Syntax**

* Registration input data

User Registration

Any user can register through the user registration form available in the app by clicking signupActivity.

- The form has seven form input fields which must be filled, First Name (characters for the first name), Last Name (characters for the last name), E-mail (valid email address), Phone Number(integers),Place of Garbage(characters for the place of garbage) Password (alphanumeric characters) and Confirm Password (the same as input to Password).

Admin Registration

- Admin can register through the admin registration form available by clicking Admin button.

- The form has five form input fields which must be filled, First Name (characters for the first name), Last Name (characters for the last name), E-mail (valid email address), Password (alphanumeric characters) and Confirm Password. (The same as input to Password)