ARBA MINCH UNIVERSITY

ARBAMINCH INSTITUTE OF TECHNOLOGY (AMIT)
FACULTY OF COMPUTING AND SOFTWARE ENGINEERING

"National ID system for citizen identification, the case for Ethiopia"

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A senior project analysis document

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Approval sheet

This to certify that I have read this project and that in my opinion it is fully adequate, in scope and quality, as a project for the degree of Bachelor of Science.

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Advisor name	sign	date
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Examiner name	sign	date
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Acknowledgment

Frist of all we want to give thanks for almighty God helping us in all our way. Next great thanks to our lovely family and Teachers who were teaching us in every academic level. And also great thanks for our advisor getahun tigistu for his guidance during our project work.

Finally, Arbaminch University institute of technology faculty of computing and software engineering is special for us where we get favorite study mater and we are happy by joining and being student of AMIT. So, we have special thanks.

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Abbreviations

SRS: System requirement specification

PHP: Hypertext preprocessor

USC: Use case

ID: Identity definition

DBMS: Database management system

JS: Java script

HTML: Hypertext markup language

CSS: Cascading style sheet

SQL: Structured query language

OOSAD: Object oriented system analysis and design

UML: Unified modeling language

MS: Microsoft

Abstract

In the face of advancement in technology like smart card and biometrics, Citizen Identification System is getting the attention of many countries of the world. Most of the developed countries are in the process of implementing robust ID card system. However, Ethiopia uses the manual ID cards issued at kebele level for citizen Identification. So that this system helps to uniquely identify citizens and also it helps to manage citizens information in central repository.in addition to this the system helps to generate resident's id and notify residents about the status of the resident id generation. The system also contains portal to collect user information for resident identification and id generation. On the other hand, many government and private organizations are automating their day-to-day operations. Among them lie organizations that keep citizen information for one or other purpose. Exchange and Integration of citizen information among these organizations is very important. However, there is no much effort done in this respect. It is therefore important to anticipate and prepare a mean for integration before more automation is done and the data repository in many organizations grew In this project, we studied a system that keeps citizens' identification information and generates unique national ID number, which can assist in the integration of citizen information and also notifies users about the status of id generation. We also analyzed the Requirements for citizen identification system and proposed a working Architecture for Ethiopian condition. Finally, we will develop the system which can manage citizen's information and generate citizen's ID card and web portal prototype for the Citizen Identification System of Ethiopia using software development tools i.e. sublime, apache MySQL.

Key words: national id, citizen identification, identity card, unique.

Chapter one: Introduction

1. Introduction

Citizen identification system for National ID with resident's service is portal system which can collect resident's information and manages resident's information and also it generates national id for legal citizens of the country.

A national identity card is a portable document, typically a plasticized card with digitally-embedded information, that someone is required or encouraged to carry as a means of confirming their identity.

This system helps to uniquely identify residents of Ethiopia and also the system manages the resident's information and helps legal government bodies to view resident's information while they are needed. This system also helps residents to collect their national id cards being notified by the system and they can view how much the status of ID card generation is in process.

The system digitizes the identification of residents across the country.

1.1 Background of organization

National id agency is a governmental organization which focuses on integration of citizen's data and also generating unique identification number for effective management of residents.

1.1.1 Mission

To modernize and integrate both civil registration of vital events and national population registry through digital and secure identity information system for legal identity and right for all with an accurate authentication of data responding to the needs of all stakeholders.

1.1.2 Vision

- "Legal and Unique Identity for all, at anytime, anywhere".
- "Smart identification to development".

1.2 Background of the project

The ability to uniquely identify citizens in any country is very important to facilitate various activities of the government such as Public Administration Services, Social Security Services, Medical Services, Tax Collection Services, Vital Registration Services, and much more. It can also enable government agencies to provide these services with better integrity and control. Currently, developing such capabilities is possible because of the information technology revolution that allows sharing of large amount of information among computer networks. However, some Human Rights Activists reject the idea of having Identification systems mainly due to its potential for "functionality creep", which means serving purposes other than its original intent. In addition, they argue that such systems give more power to the government over its citizens and can also cause more identity frauds and other privacy issues Implementing such systems requires study on its impact in this regard and particularly the information to be kept in the database and the ID cards should be carefully approached. Depending on the purpose for which the ID system was built, some countries include not only their citizens but also foreign nationals who have become permanent residents. Ethiopia as a country can greatly benefit from an integrated Citizen Identification System if it can implement it for the purpose of identifying its citizens at a country level.

1.3 Team composition

Project Title	**National id system with residents service, case for Ethiopia**				
Prepared by	**no**	**Name**	**id**	**responsibility**	**Email/phone**
	1.	**Yakobe shewa**	**Ramit/1622/09**	**system programer**	
	2.	**Yehenew mengist**	**Ramit/1654/09**	**system programer**	
	3.	**Dawit h/Mariam**	**Ramit/475/09**	**System designer**	
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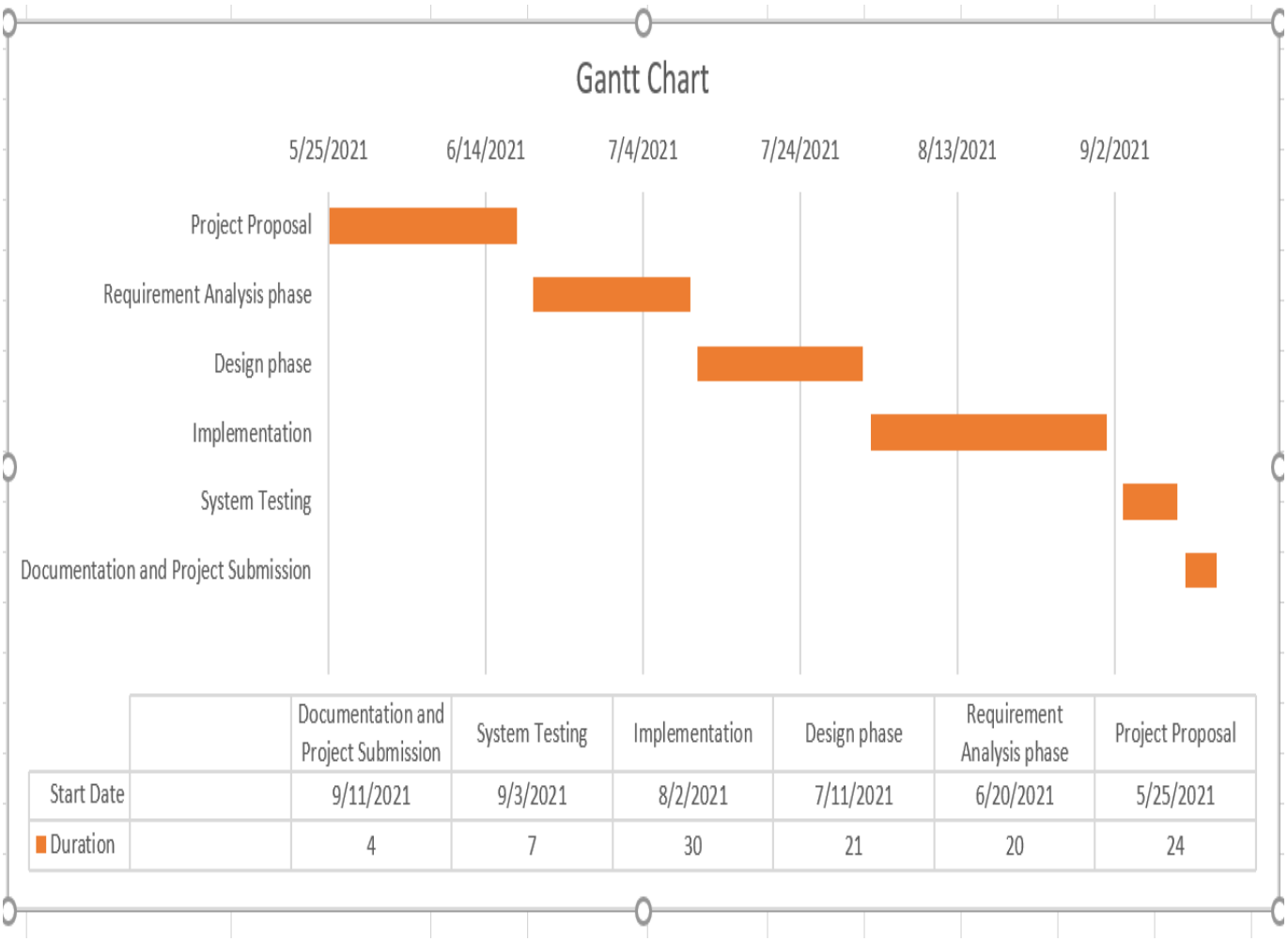
Date	30/7/2021				
Advisor	**Name**		**email**		
	Getahun Tigistu (assi professor)				

Table 1: team composition

1.4 Tasks and schedule



		Documentation and Project Submission	System Testing	Implementation	Design phase	Requirement Analysis phase	Project Proposal
Start Date		9/11/2021	9/3/2021	8/2/2021	7/11/2021	6/20/2021	5/25/2021
Duration		4	7	30	21	20	24

1.5 Problem statement

Citizen identification in Ethiopia is done using kebele id which is a highly developed and pervasive paper-based system for the personal identification of adult Ethiopians, defined as individuals aged 18 years and above.

This system is administered on a decentralized basis by Ethiopia's 16,475 kebeles, the lowest-level units of the administration. The kebele card is accepted and required for virtually all identification purposes to register a SIM, open a financial account, travel internally, stay in a hotel, obtain a passport, and to enroll to vote. These forms of identification apply only to Ethiopian citizens. Foreigners and refugees are registered separately and have separate forms of identification. In some border areas, especially with pastoral populations, there have been disagreements over who should be entitled to an Ethiopian ID [3].

And this system is not well organized and the user's data will not be accessed all over Ethiopia during the time that user's data is required by concerned bodies.

And to uniquely identify citizen it is so hard because citizens may have the same information and they have no unique id.

1.6 Objective

1.6.1 General Objective

The general objective of this project is to study the need for Citizen Identification System in Ethiopia, assess the issues that can arise in implementing such system and develop its prototype and also make effective portal for user data collection for id generation.

1.6.2 Specific Objectives

The specific objectives of the project are:

- Making secure and fast system.
-
- Propose architecture for the Citizen Identification System and assess its security requirements.

- Study how the system can be implemented based on the current ICT infrastructure of the country.

1.7 Feasibility Analysis

1.7.1 Operational feasibility

t is a standard that ensures interoperability without stifling competition and innovation among users, to the benefit of the public both in terms of cost and service quality. The proposed system is acceptable to users. So, the proposed system is operationally feasible

1.7.2 Technical feasibility

Our system is technically feasible; we use internet programing (i.e., HTML, CSS, JS for front end the back End with PHP and MYSQL Server database), Microsoft word 2016 for writing documents hopefully we will develop successfully by using our academic knowledge in this case this project is feasible according to the above reasons.

1.7.3 Schedule feasibility

1. Cost of the project

Hardware requirements cost

No	Materials Required	Amount	Price per Unit	Total Cost(birr)
1	Toshiba computer	2	10,000	20,000
2	Pen	5	10	50
3	A4 size paper	110	0.5	55
4	Print	100	1.00	100
5	Flash disk	2	150	300
Total	20505			

Table 2: hardware requirement cost

1.8 Scope and limitation of the project

1.8.1 Scope of the project.

The basic purpose of this project is to develop a web-based portal system for national id management. The system to be developed covers citizen's registration to national id by their name age birth date birth place nationality marital status, etc. It also notifies registered citizens about the status of the national id generation.

The system scope of the web-based resident's national id portal system is to collect user's data, generate a unique id for each registered citizen, renew id, and issue national id for approved citizens. This system works all over Ethiopia to generate a national id for a legal person.

1.8.2 Limitation of the project

- System works online because it contains central remote repository.
- System works for only residents of the country.
- Time constraint.

1.9 Methodology for the project

This is the method, rule or ways of collecting data for research/project. This project carried out by simulating a manual system with automates system. Electing all necessary information collected by interviewing some staffs.

1.9.1 Data sources

We used interview and observation to collect data that are necessary to develop the designed system.

Direct Observation: we observed the current system and we identify the problems regarding to the id system in managing the citizen's information. So, it helped us easy way to understand the

system and to develop the project. By observing their system structure, we designed a project to solve their problems.

Interview technique: During interview we got the necessary information from the employees. We communicate with kebele administrators, citizens, polices, and another co-worker.

1.10 Systems Analysis and Design methodology

1.10.1 System Analysis

Is the process of breakdown an entire system into module, analyzing each module separately, and determining the relationship between n system development process we used system modeling i.e., creating model of the system. System modeling is the process of creating a model of system by analyzing and organizing the system elements. This is the phase where deeply understanding of the existing system problems and finding alternative solution.

1.10.2 System Design

To design the system, we choose the concept of Object-oriented system analysis and design (OOSAD); Object-oriented modeling techniques and Unified modeling language (UML) tools. object oriented modeling technique is advantageous for the following reasons why we use it:

- It enables us to comprehensively model a system before we develop it.
- Modification of the object implementation is easy because objects are loosely coupled.
- Understanding of the structure is easy because object oriented modeling and tools used to represent real world entities.
- Direct manipulation of architectural components is possible because several object oriented programming languages exist.
- UML is also the main tool we used for necessary software design and analysis.
- To develop diagrams and provide users with ready-to-use expressive modelling examples.
- It can be used for modelling a system independent of a platform language
- To design the blue print artifact of the system
- To present proposed designs and communicate with stakeholders.

- To understand requirements.

1.10.3 Overview of Project Phases

Phase of this project is summarized as following in table bellow

Phases	Task	Description
Phase1	Data collection and Project proposal preparation	Collection of data for project proposal and preparation
Phase2	System analysis and design	Analysis of problem and findings to come up with requirement and designing based on those requirements
Phase 3	Implementation, Testing and Documentation	Implementing for the specified requirements and testing if the requirements are very well satisfied and preparing documentation from the findings on the problem domain and solution domain. Where solution domain contains System analysis and design.

Table 3 over view of the project phases

1.11 Artifacts to Produce

1.11.1 Inception

This is the early stage to describe the initial requirements

- To develop and justify the business case for the system
- To determine the scope of the system
- To identify the people, organizations, and external systems that will interact with our system
- To develop an initial risk assessment, schedule, and estimate for our system
- To develop an initial tailoring of the Unified Process to meet our exact needs

On this stage we have developed proposal of the system from the above outputs. Generally, we have been able to get the project proposal as an output.

1.11.2 Elaboration

This phase has several goals:

- To produce a proven, architectural baseline for our system
- To evolve our requirements model to the "75% completion point"
- To develop a coarse-grained project plan for the entire Construction phase
- To ensure that the critical tools, processes, standards, and guidelines have been put in place for the Construction phase
- To understand and eliminate the high-priority risks of your project

Generally, SRS (system requirement specification) will be the output of this stage

1.11.3 Construction Phase

- To describe the remaining requirements
- To flesh out the design of our system
- To ensure that our system meets the needs of its users and fits into our organization's overall system portfolio
- To complete component development and testing, including both the software product and its documentation
- To minimize development costs by optimizing resources
- To achieve adequate quality as rapidly as possible
- To develop useful versions of your system

Generally, analysis, system design, first prototype will be the output of this phase.

1.11.4 Transition Phase

- The transition phase encompasses the latter stages of the generic construction activity and the first part of the generic deployment (delivery and feedback) activity.
- Software is given to end users for beta testing and user feedback reports both defects and necessary changes.
- At the conclusion of the transition phase, the software increment becomes a usable software release.
- Generally, fully tested implemented system will be the output of this stage. Documentation also will be developed on this stage.

1.12 Development Tools

For project development different tools are required these tools are both hard ware and software tools.

1.12.1 Hardware requirement

Hardware needed in this project are listed below in table.

NO	Hardware name	Description
1.	Computer	To do computing process, data input output.
2.	Internal/external hard disk	For data storage and backup
3.	Printer	For printing out design prototype and document in hardcopy
4.	Lcd projector	For presentation

Table 4: hardware requirements

1.12.2 Software requirements

There are many software tools in system development; among these some of these are listed below. Software requirements and programming language we used in our project are summarized in the following table.

N^{O}	Name	category	Description
1.	HTML, CSS, JS	Client-side programming	To design interactive user interface
2.	PHP	Server-side scripting	For server-side script competition
3.	MYSQL	Querry language	For database
4.	XAMPP	server	
5.	Microsoft word	Development environment/software	For project documentation
6.	MS Power point	tools	For presentation
7.	Edrawwmax	tools	To draw UML diagram
8.	Browser	tools	Google chrome, Mozilla fire fox
9.	ms windows	tools	A platform where this system implemented

Table 5 software tools

In addition to the above requirements, the project development requirements of our system are summarized as follow: -

- **Backend technology**

I. Server**:** Apache HTTP Server is used run the web server within Windows OS.

II. Database**:** MySQL is common database in creating dynamic websites it is a high-speed database.

III. Scripting Language**:** PHP (Hypertext preprocessor) is a scripting language that can be used to access data from the database.

Generally, Apache, MySQL, and PHP are open source components that can be installed individually, they are usually installed together.

- **Front end technology**

The Front end of this project used HTML, CSS and JavaScript: -

I. HTML: used for user interface design

II. CSS: used for styling HTML user interface.

III. JavaScript: used for validating user front end activities, calculation and etc.

In short, the most popular frame work in CSS and JavaScript are Bootstrap, jQuery and we will use them in our system to make it better interface and performance.

Chapter Two: Description of the Existing System

2.1 Introduction of Existing System

In Ethiopia mostly now the system used to identify citizen is by using kebele id card which contains name photo and other information's which can describe the person which owns the kebele id.

Kebele id is given for residents which live on certain kebele minimum of six months and it is used while you are living in that specific kebele.

If you change living location you must have to have kebele id for that specific location unless you will not get the benefits which it given from the location. It is manual system and there is no way to uniquely identify citizen.

To illustrate, in the current Kebele ID system, biographic data (name, age, address, etc.) and the biometric features visible from facial images make individual unique.

- the identities are stored on paper in Kebele offices.
- And new identities are added through applications at local Kebele offices.
- Citizens receive a Kebele ID card with a facial image as credential.
- And individuals and credentials are verified through visual inspection of the Kebele ID Cards.

None of these layers are currently digital. The important takeaway from this framework is that some of these layers could be digital while others are not.

2.2 Players in existing system

- Kebele adminstrators.
- Residents

2.3. Major functions/activities in the existing system like inputs, processes & outputs

2.3.1 Input Analysis

Input to the system is the form which is fulfilled by the legal residents of kebele. These forms are filled by residents and kebele administrators.

2.3.2 Process Analysis

The form is filling by the residents and then collected and signed by the offices of kebele administrator to certify that the resident is a legal member of the kebele. Kebele id issued to show that resident is a legal member of the kebele.

2.3.3 Output Analysis

The output from the system is the kebele id card to show that he/she is the legal member of the kebele.

2.4 Business Rules

- Unauthorized user cannot access the system for the reason of system security.
- Users must be registered to access the system to be authorized user by filling the necessary.
- Information online to the provided space in the registration form.
- Users must have username and password to login to the system.

2.5 Report generated in the existing system

The forms generated in the existing system are in the forms of forms and files.

Forms: - are the reports generated in the existing system that contains all information filled by the kebele adminstrators and the resident.

Files:-are the collection of information about the residents and and kebele officers who Involve in the clearance process.

These all reports kept in offices of the kebele to store information about the

Residents

2.6 Forms and Other Documents of the Existing System

Figure 1 Kebele ID Records

Figure 2: List of ID card Numbers Issued

Figure 3: kebele id

2.7 Bottleneck in existing system

2.7.1 Performance (Response time)

- Wait until kebele id is processed.
- It takes time to process id and generate kebele id manually.

2.7.2 Input (Inaccurate/ redundant/flexible) and Output (Inaccurate)

During filling out the form, the user may fill inaccurate information and may miss necessary information this shows the system is inaccurate. And the system is not flexible because if the user wants to erase the form he/she must only change another form.

2.7.3 Security and controls

- Illegal removal of forms by falsified staff leading to insecurity.
- Loss of vital documents as the filing system is manual.

2.7.4 Efficiency

Due to the manual operation, most of the activities are easy to wastage of resources like Stationary materials, manpower, time, etc. to produce the corresponding outputs. This makes the Current system is inefficient while utilizing resources.

- **Kebele Cards fail to achieve the desired functionalities of a foundational ID.** The basic roles of ID systems are to

1. Uniquely identify individuals (“Who are you?)
2. provide a method of authentication that an individual who claims an identity is the true owner of that identity (“Are you who you claim to be?”), and
3. Determine whether an individual is authorized for something (“Are you eligible for a service?”)

- **Individuals can lose their (legal) identities.**

Kebele Identity records are stored decentrally on paper with no aggregated backups in a centralized repository or database.

- **Identities are bound locally.** Individuals moving to a different Kebele are in principle required to return their ID card to the original Kebele in exchange for a reference letter that allows them to obtain a new Kebele ID Card at their new residence . Consequently, Kebele identities are not continuous over time which can create difficulties for third parties relying on them to trace individuals. The process of returning one’s old ID for obtaining a new one is also not user-friendly and adding a burden on citizens with increasing internal migration.
- **Identities are not unique.** The wide range of documents that are accepted for new registrations, the lack of a central registry, and the administrative burden of returning an old Kebele ID Card when moving, led to reportedly many Ethiopians having more than one Kebele ID card (i.e., Kebele ID cards are not deduplicated) . Individuals maintaining

several Kebele IDs identities pose problems for third parties that use Kebele IDs for authorizing the receipt of services or benefits. It also invites election fraud and prevents financial institutions from establishing a unique credit history, creating a barrier to financial inclusion.

- **Third parties cannot easily authenticate Kebele ID cards and individuals.** Kebele ID cards are easily forged or altered, and forgery of Kebele Card is one of the most common kinds of fraud in Ethiopia. This means that third parties (other government ministries, banks, etc.) cannot without doubt establish that a Kebele ID card
- (i). Is genuine and matches the information provided at registration —"does this identity exist?" (credential authentication), and

  (ii). An individual is the person they claim to be using the ID card —" is this identity?" (Individual authentication).

The limitations of the Kebele ID and the limited scope of functional IDs underpin the need for a robust centralized foundational ID system. The extent to which digital elements can address current limitations in an overhauled ID system will be discussed next.

2.8 Overview of the new proposed system

The Citizen Identification System is a system that has a purpose to assist in providing the service of identifying Ethiopian citizens at the national level having their own unique Citizen Identification number. This number can be used by different government organizations to integrate Individual Citizen Records in these organizations.

The system is required to assign each citizen a systematic unique number that will not be used by any other citizen. The system needs to have a facility for authorized personnel to review the individual citizen's personal information in order to check and approve the issuance of the Identity Card. The Identity Card should contain the unique Citizen Identification number in addition to other information of the citizen. The system has to provide the facility for printing the citizen information on the Identity Card that will be issued to the citizen. Moreover, the system should

provide an alternative method for verifying issued identity cards online from the repository by any government offices that want to verify if the ID card bearer is the legal owner of that identity.

The system has to allow and require the renewal of the Identity Card every few years for the purpose of updating the individual's current address and minimizing ID misuse. This can be achieved by marking Citizens with un renewed ID cards as illegal until their ID card is renewed. IDs that are not renewed can be identified by expiry date indicated on the card or by their online status from the repository, which can be seen during online verification. Next, we present the functional and non-functional requirements of the system.

2.9 Proposed solution for the new system that address problems of the existing system (As an alternative)

From the problem domain we studied; we designed the following solutions which are addressed by the proposed system.

The main solution is designing the computerized system that overcomes the manual system. This system has the following advantages.

- It is a web-based system, so that information is available anytime.
- High integrity and security.
- Ability to incorporate newly available data.
- It is user friendly.
- Speed and accuracy are increased.
- Security is associated with user authentication
- Duplication of information is avoided.

2.10 Requirements of the Proposed System

2.10.1 Functional requirements of Citizen Identification System

To identify the functional requirements of the Citizen Identification System, we considered to elicit the three aspects of the system, that is, the input to the system, the output from the system and the different functions that the system performs.

The following functional requirements are drawn from the general requirements of the proposed system described in the previous section.

1. Input to citizen Identification System

The citizen identification system accepts personal information about individual citizens as input data. The information includes the citizen's full name, gender, birth date, birthplace, photo, current residence address, profession, and citizenship information.

Citizen's contact person name in case of emergency and the address of the contact person are input to the system. Then later, it generates the unique citizen identification number, which will be used to identify the individual's information. This number is also stored in the database. The system also accepts administration information like authorized user information, approving user information, and system administrator information.

2. Output of citizen Identification System

The output of the citizen identification system can be information about individual citizen identity and any combination of the information stored in the database such as statistical summary. One such output is a report containing the individual bio data to be printed on Identity Card. The other is verification report to be seen online by authorized government offices.

3. Functions of citizen Identification System

The citizen identification system has different functions as shown below.

- **Issuing Citizen Identification Card**

Once the individual citizen is registered into the system, has fulfilled the formality and obtained approval he/she can get the Identification card, which is to be printed from the Citizen Identification System. As the Identification Card is issued, additional information, the name of authorized issuer, date of issue, and expiry date, will be printed on the ID card. The authorized person will also sign on it. However, the system will log or keep the registration personnel and the authorized issuer or the one that approved the issuance for future reference.

- **Online verification of the Citizen's Identification information**

The Citizen Identification System has to make sure that every citizen identification number generated and assigned to citizens is unique across the nation. Moreover, it has to provide a secured web interface for other government bodies that need to verify if the citizen's Identification information is correct when the citizen presents his/her Identification card. Each individual Citizen should renew his/her Identification card every three to five years, which can be basically decided by the citizen identification system administering government body. The renewal is required to keep track of the current address of each citizen and most importantly to further restrict the use of lost Identification cards beyond the service duration. During renewal of the Identification Card, the citizen's personal information that can change and has changed should be updated on the system. Such information is the citizen's current residence, work address, profession, contact person name and the address of the contact person. Moreover, the authorized issuing personnel can also change. The changes made have to be approved by authorized personnel (as shown above) before the Identification Card is renewed and issued to the citizen. Finally as it is issued, the issuing process has to be followed.

- **Changing the status of ID that is not renewed**

If the Identification Card is not renewed after its expiry date, then the citizen will not be legal to use it until renewed. Moreover, the status of his/her Identification card should be displayed as expired when interested government bodies try to verify it online. The system should also remove the "expired" mark after the individual ID is renewed.

- **System administration utility**

The system should also have a module for registering authorized users, approving officials and administrators. In this module, users are added to and removed from the system as necessary.

*2.10.*2 Non- Functional requirements of citizen Identification System

The non-functional requirement of a system describes the quality constraints of the system like Response time, Throughput, Resource usage, Reliability, Availability and others. For Citizen Identification System, the following quality requirements are remarkable.

- It is desirable to have an acceptable response time.
- Availability during government offices' working hours at the locations that the system will be used across the nation.
- It has to be a multi-user system i.e. a lot of ID issuance centers across the nation plus the various government offices that possibly try to verify the citizen Identification online from time to time can use it.
- The system has to be secured and reliable enough to minimize the different Identification Fraud that may be attempted.

Chapter 3: System Analysis

3.1 Introduction

The Citizen Identification System is a system that has a purpose to assist in providing the service of identifying Ethiopian citizens at the national level having their own unique Citizen Identification number. This number can be used by different government organizations for the purpose of integrating Individual Citizen Records in these organizations. The system is required to assign each citizen a systematic unique number that will not be used by any other citizen. The system needs to have a facility for authorized personnel to review the individual citizen's personal information in order to check and approve the issuance of the Identity Card. The Identity Card should contain the unique Citizen Identification number in addition to other information of the citizen. The system has to provide the facility for printing the citizen information on the Identity Card that will be issued to the citizen. Moreover, the system should provide an alternative method for verifying issued identity cards online from the repository by any government offices that want to verify if the ID card bearer is the legal owner of that identity.

3.2 System Requirement Specifications (SRS)

3.2.1 Use case diagrams

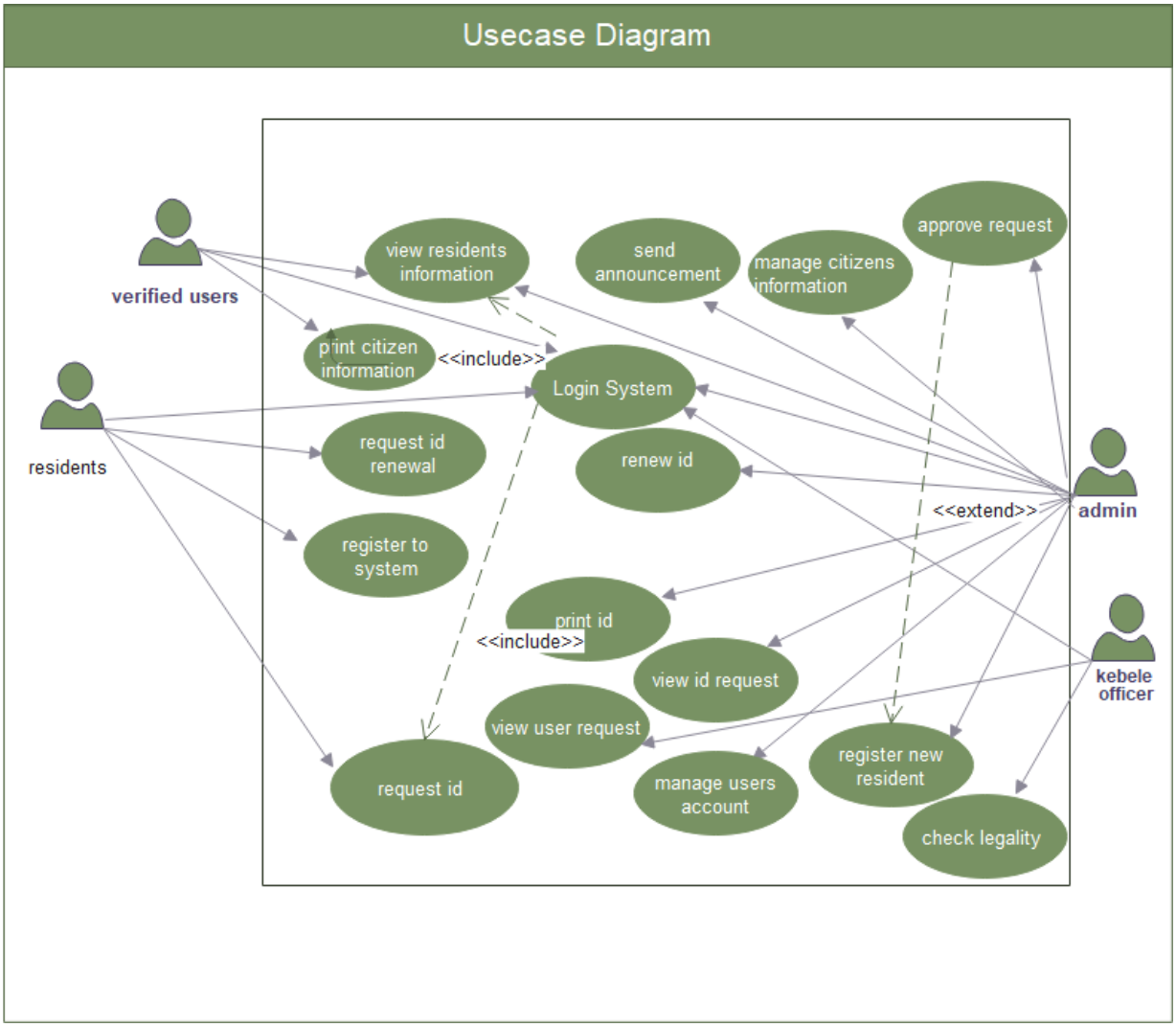


Figure 4: use case diagram

3.2.2 Use case documentation

Use case number	#USC1	
Use case name	View residents information	
Actors	System admin/verified users/kebele officer	
Description	All the actors must to login first before using the system.	
Precondition	The user who wants to login must have user name and password.	
Post condition	The user accesses the system.	
Basic course of action	User action	System response
	1. Open the browser 3. Click on login button 5. Enter user name and password 7. Click on login button 9. The user logged in to the system successfully. 10. Click on resident's information.	2.The system opens User's home page 4. The system displays login form. 6. The system validates username and password. 8. The system checks username and password in the database. 11. Residents information displayed.

Table 6: Use case documentation for View resident's information

Use case number	#USC2	
Use case name	Request id renewal.	
Actors	Residents	
Description	All the actors must to log in first before using the system.	
Precondition	The user who wants to renew Id must have an id card.	
Post condition	The user accesses the system and requests renewal of id.	
Basic course of action	User action	System response
	1. residents login to the system 3. Click on renew request.	2.The system opens the User's home page 4. The system displays form to request renews. 5. Renew request successfully sent.

Table 7: Use case documentation for request id renewal

Use case number	#USC3	
Use case name	Register to system.	
Actors	Residents	
Description	All the actors must to log in first before using the system.	
Precondition	The user accesses the home page	
Postcondition	User access the system and registered as a user	
Basic course of action	User action	System response
	1. Open the browser 3. Click on create a user account. 5. Type user name password, email phone number, and other information. 7. Click on create an account button.	2.The system opens the User's home page 4. The system displays a login form with create account button. 6. The system validates username and password for minimum requirements. 8. the user account created successfully

Table 8: Use case documentation for register to system

Use case number	#USC4	
Use case name	Login	
Actors	System admin, residents, verified users ,kebele officer	
Description	All the actors must to login first before using the system.	
Precondition	The user who wants to login must have user name and password.	
Post condition	The user accesses the system.	
Basic course of action	User action	System response
	1. Open the browser 3. Click on login button 5. Enter user name and password 7. Click on login button	2.The system opens User's home page 4. The system displays login form. 6. The system validates username and password. 8. The system checks username and password in the database. 9. The user logged in to the system successfully.

Table 9: use case for login

Use case number	#USC6	
Use case name	Renew id.	
Actors	System admin.	
Description	All the actors must to login first before using the system.	
Precondition	The resident must be inside country	
Post condition	Residents' id renewed.	
Basic course of action	User action	System response
	1. Open the browser 3. Click on login button. 5. Type user name password. 7. Renew residents' id. 9. Click renew id button.	2.The system opens User's home page 4. System opens login page. 6. The system validates username and password. 8. system opens form to fill user information 10.residents id renewed

Table 10: Use case documentation for renew id

Use case number	#USC 8	
Use case name	Request id.	
Actors	Residents	
Description	Residents request national id from the system admin.	
Precondition	The resident must have to register first.	
Post condition	Residents requests id successfully.	
Basic course of action	User action	System response
	1. Residents login to system. 3. Click on request id. 5. Click on submit information.	2. System displays home page. 4. System displays form to request id. 6. System displays id request successfully sent.

Table 11: Use case documentation for request id

Use case number	#USC 9	
Use case name	Manage users	
Actors	System admin.	
Description	Admin deletes updates and inserts user's information.	
Precondition	admin must have to log into the system	
Post condition	Admin manages the users	
Basic course of action	User action	System response
	1. Admin login to the system. 3 Click view users button. 5 Click on manage users.	2. The system opens admin home page home page. 4. The system displays list of users and add users menu. 6. The system adds new user/deletes user/updates user.

Table 12: Use case documentation for manage users

Use case number	#USC 10	
Use case name	View id request	
Actors	System admin.	
Description	Here, admin view the entire residents request for id.	
Precondition	admin must have to log into the system	
Post condition	Admin views id requests	
Basic course of action	User action	System response
	1. Admin login to the system. 3 Click view request button.	2. system displays login form 4. The system displays list of requests

Table 13: use case documentation for view id request.

Use case number	#USC 11	
Use case name	View resident info	
Actors	Verified user, admin and kebele officer	
Description	Here, verified/admin user views user information.	
Precondition	Verified/admin user must have to log into the system.	
Post condition	Verified user/admin views id requests	
Basic course of action	User action	System response
	1. User/admin log into the system. 3. type residents id	2. system displays search form 4. system displays residents information

Table 14: Use case documentation for view resident info

Use case number	#USC 12	
Use case name	Check legality of Residents requests	
Actors	Kebele Officer.	
Description	Kebele Officer approve the resident's	
Precondition	Kebele officer must have to log into the system	
Post condition	Kebele officer Approve the Resident's request	
Basic course of action	User action	System response
	1. Kebele officer login to the system. 3 Click view Resident button. 5. Click on Approve Resident's.	2. The system opens Kebele Officer's home page. 4. The system displays list of Resident's 6. the system send the approved residents list to the admin

Table 15: Use case documentation for Approving resident request

3.2.3 Sequence diagram

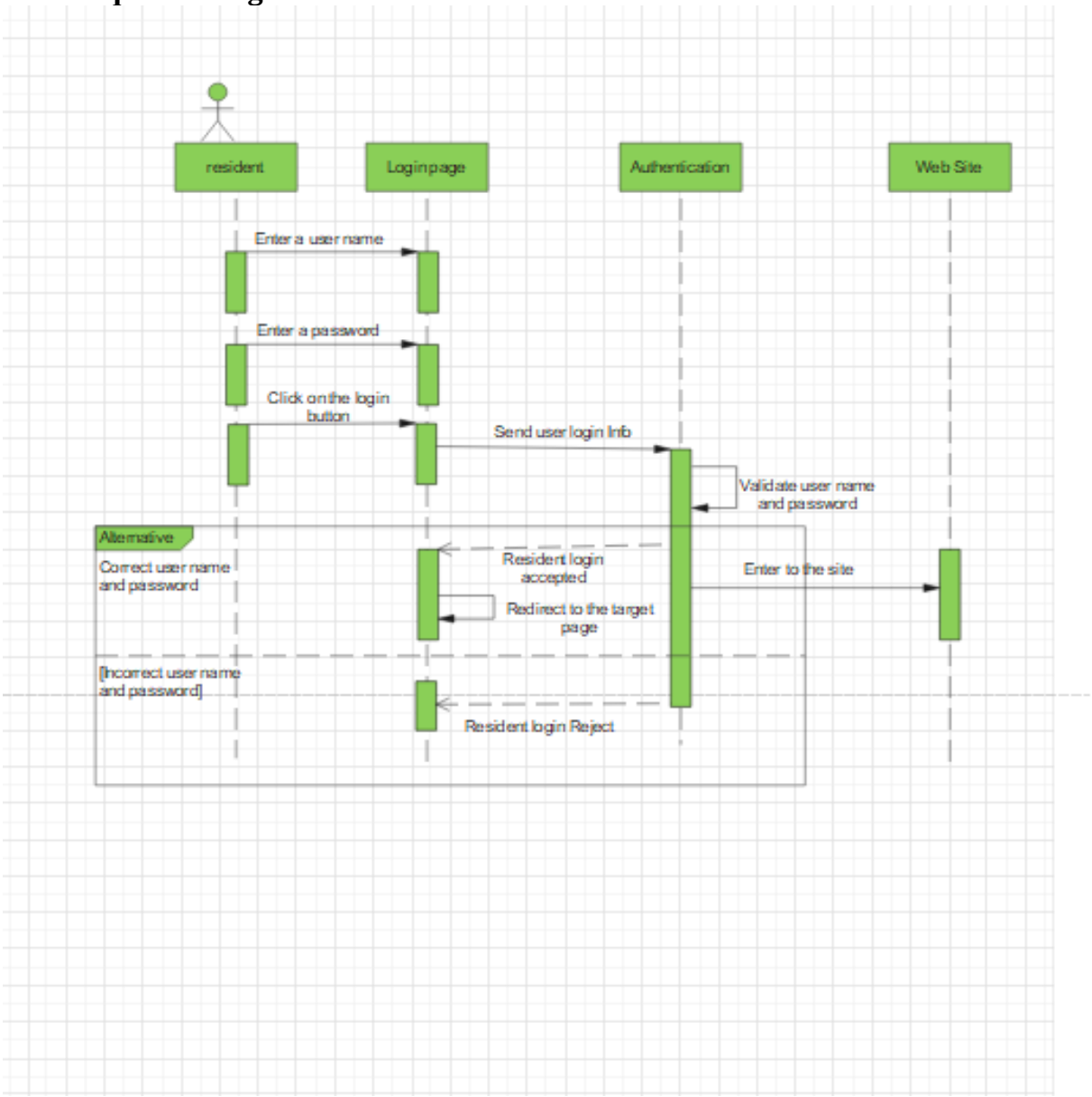


Figure 5: sequence diagram for resident login

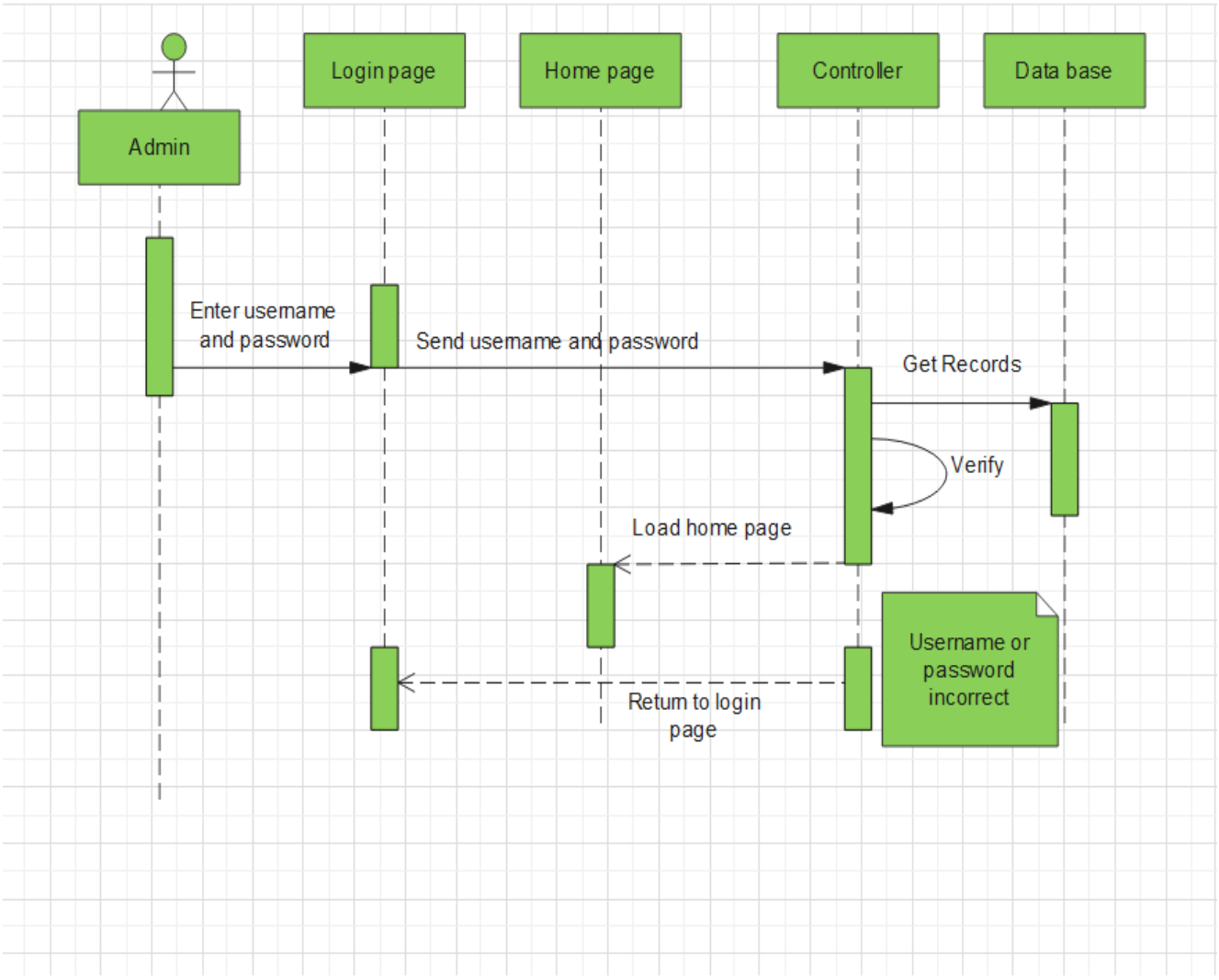


Figure 6: Sequence Diagram for admin login.

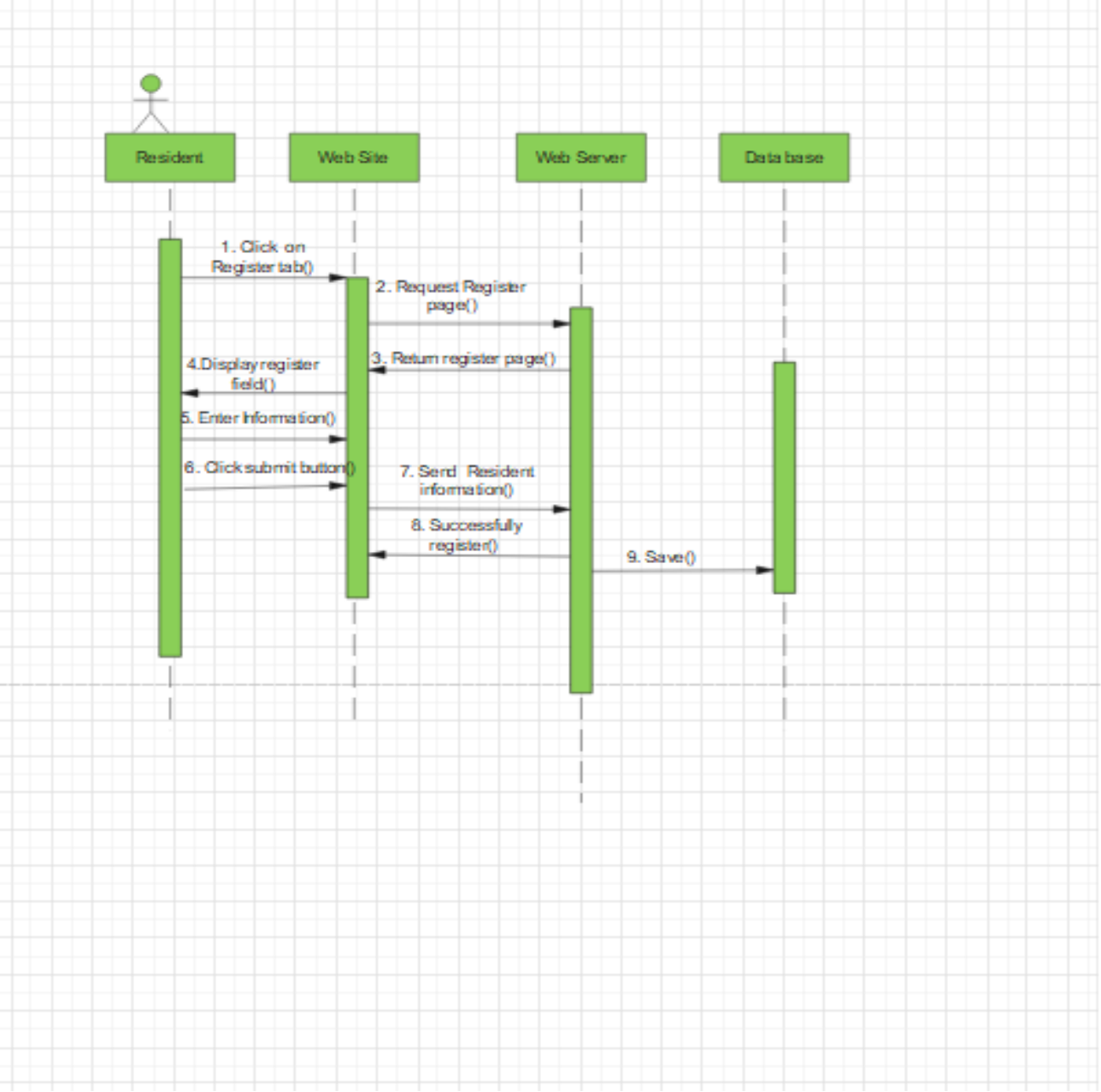


Figure 7: Sequence Diagram for request id

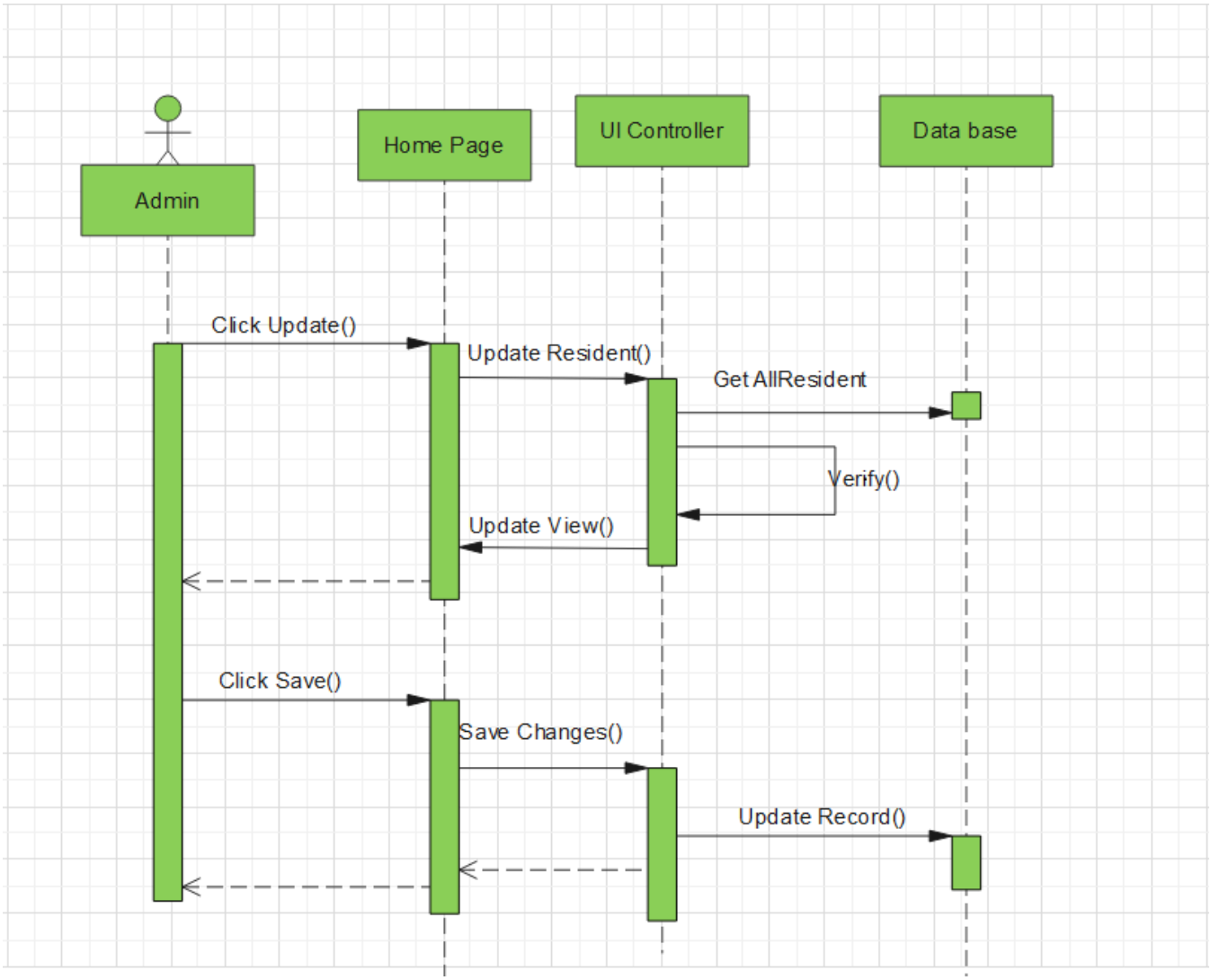


Figure 8: Sequence Diagram for updating resident informat

3.2.4 Activity Diagram

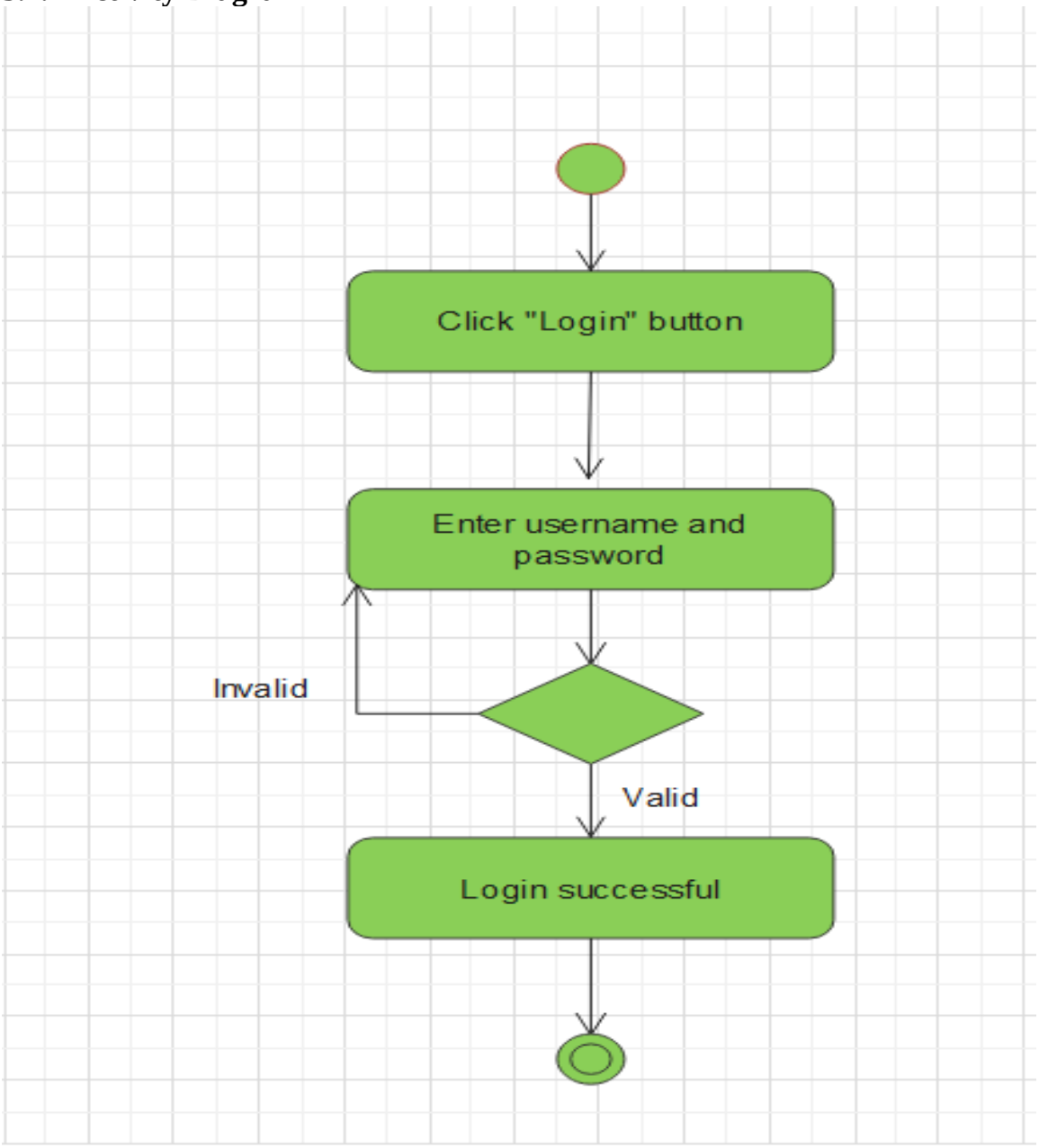


Figure 9: Activity Diagram for login

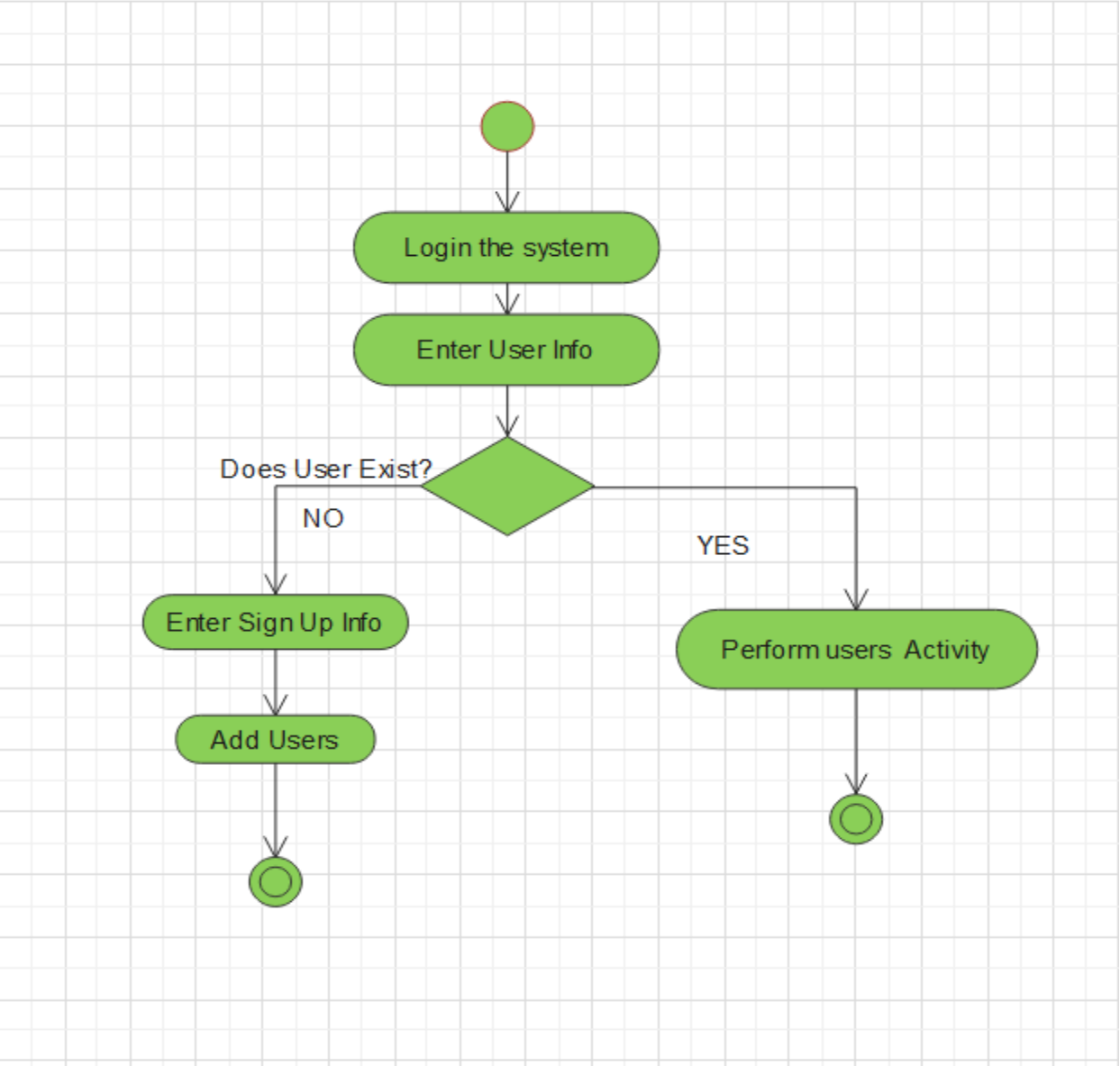


Figure 10: Activity Diagram for adding user

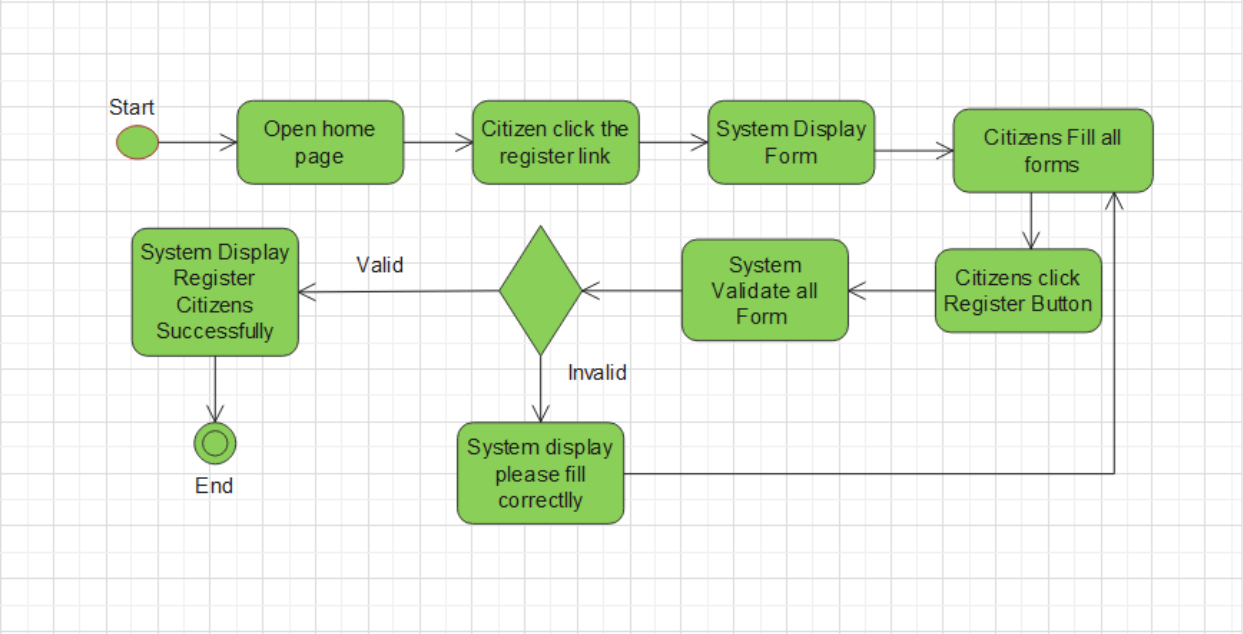


Figure 11: Activity Diagram for registering user information

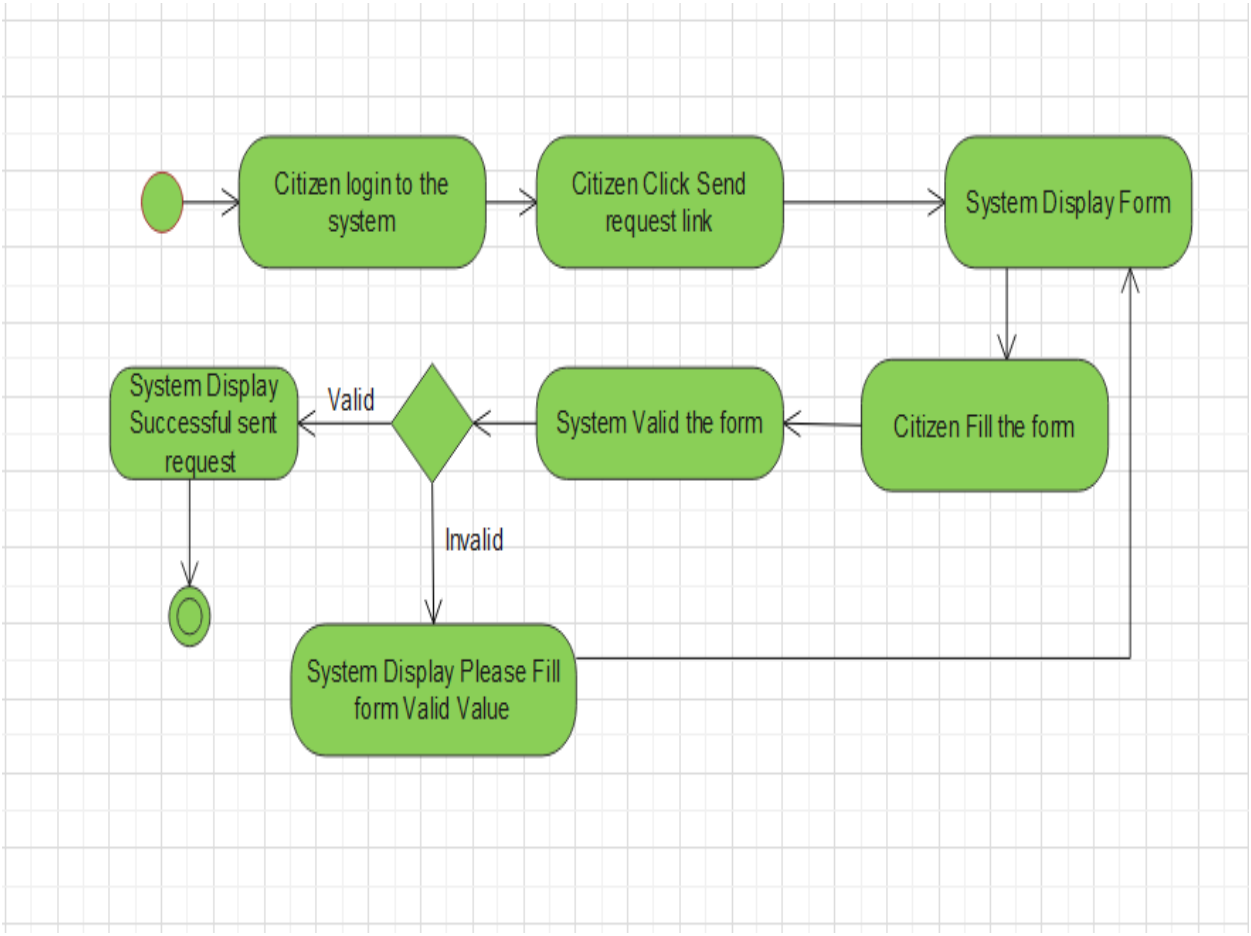


Figure 12: Activity Diagram for sending id request

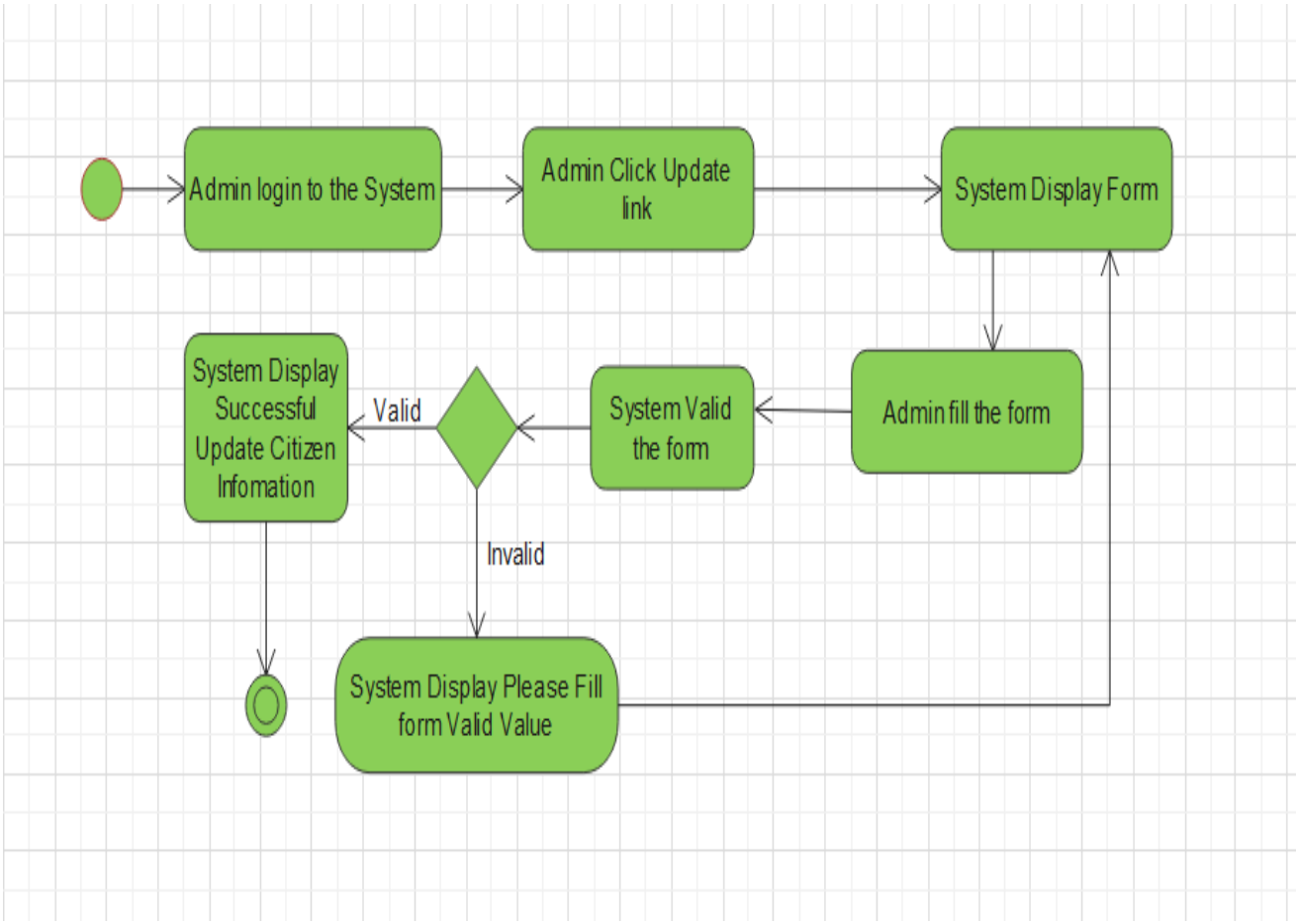


Figure 13: Activity Diagram for updating user information

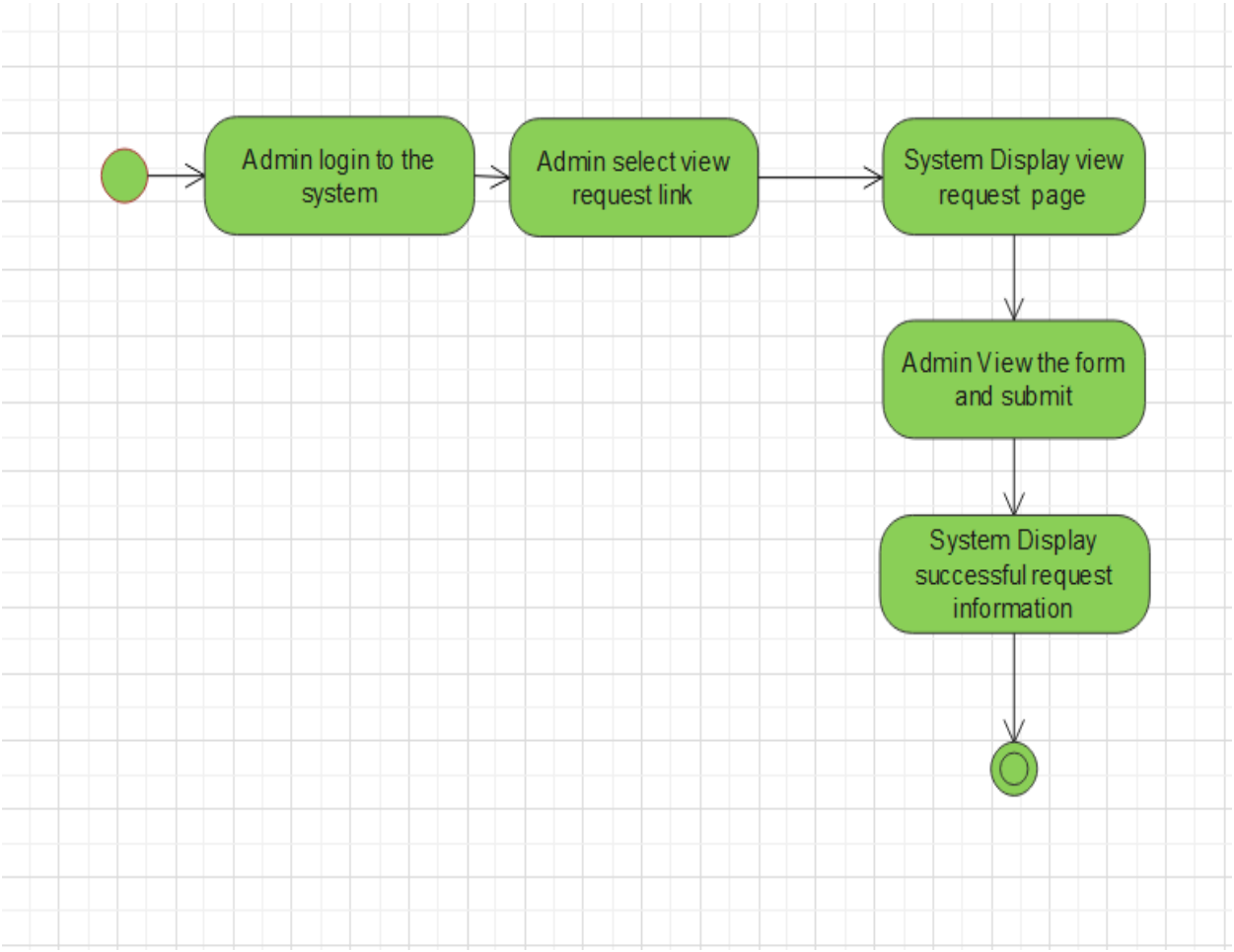


Figure 14: Activity Diagram for view request

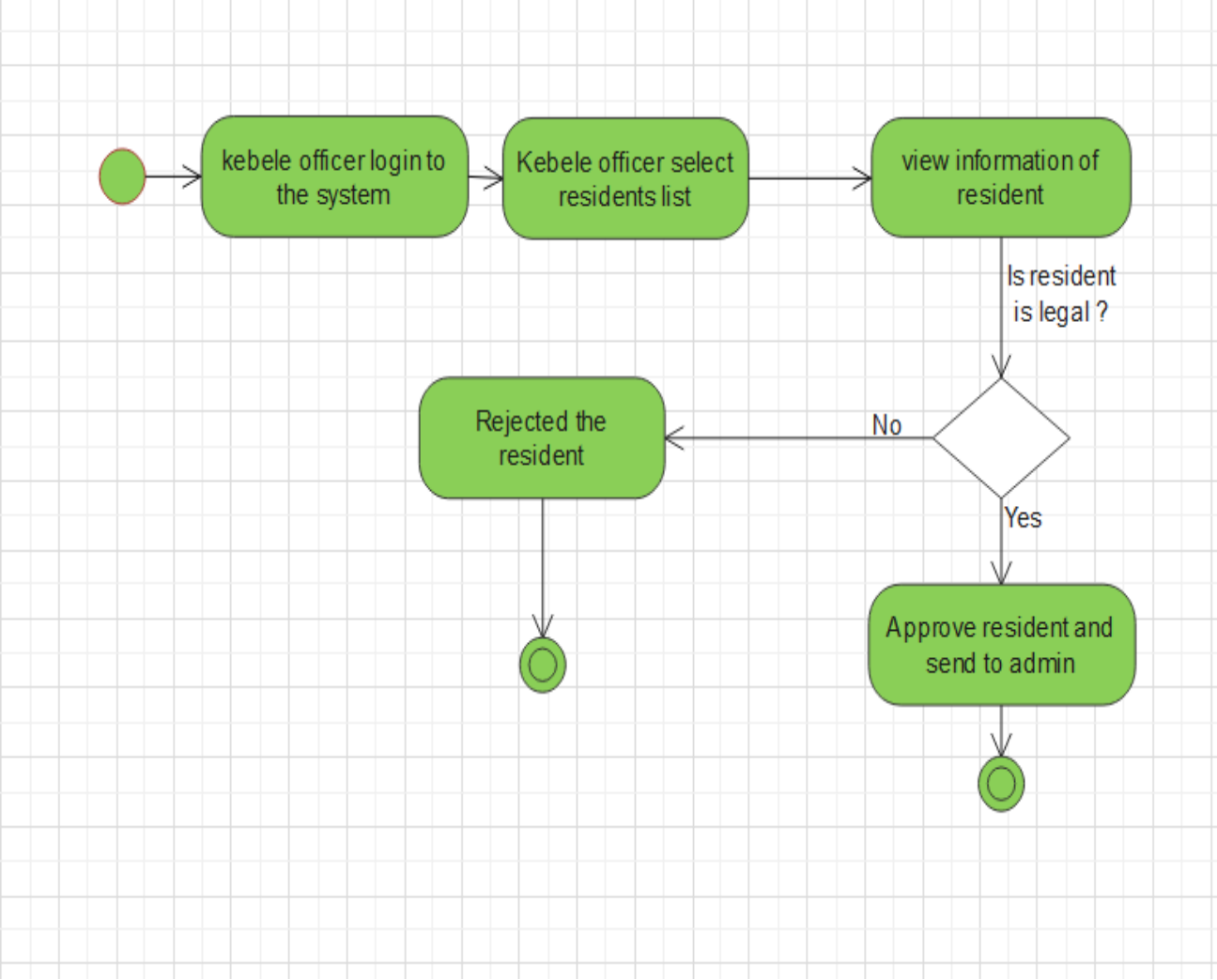


Figure 15: Activity Diagram for Approval Resident

3.2.5 User Interface Prototyping

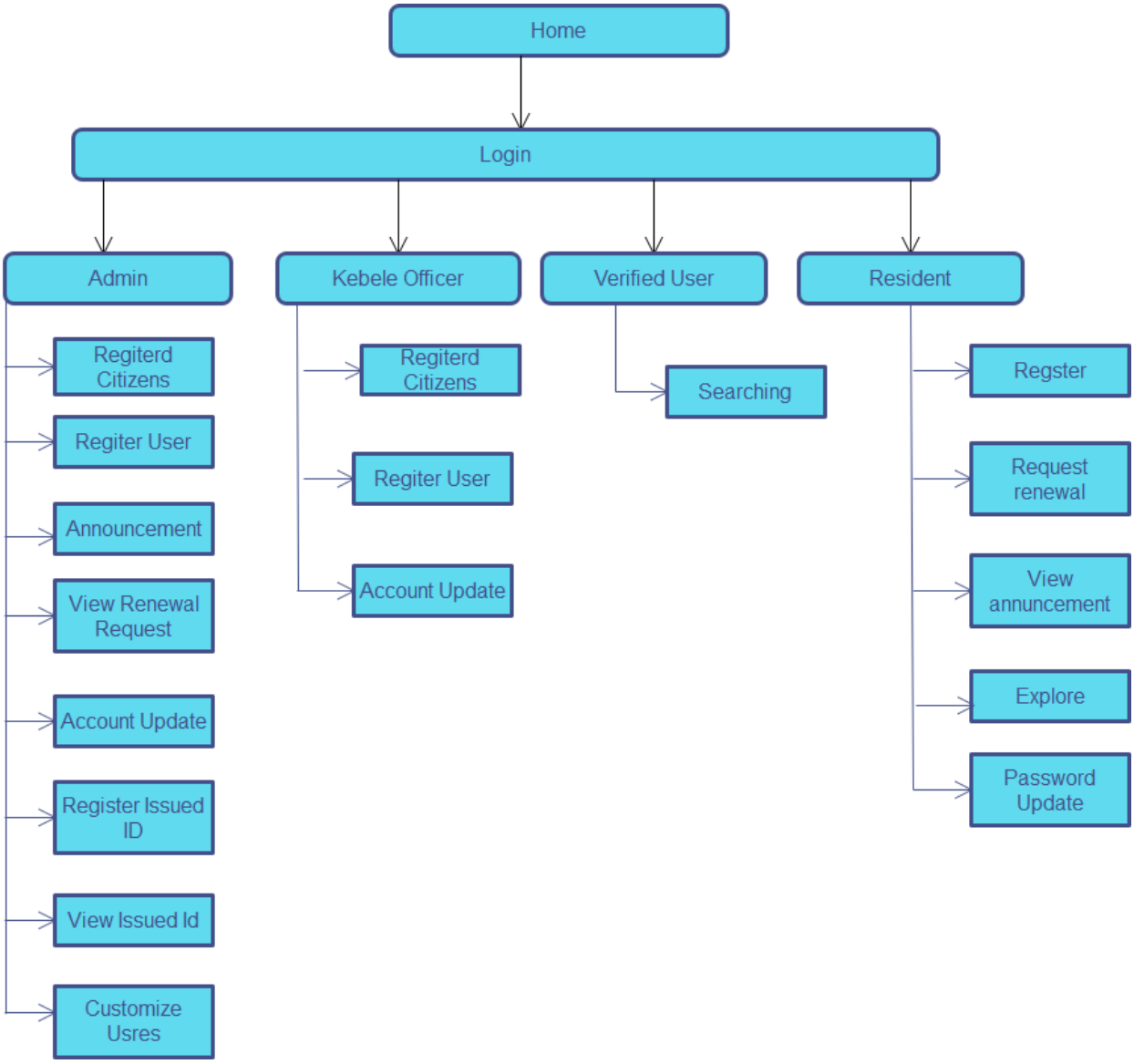


Figure 16: user interface prototype

Chapter four: Design deliverables of the new system

4.1 Introduction

System design is the transformation of the analysis model into a system design model. Up to now we were in the problem domain. System design is the first part to get into the solution domain in a software development. This chapter focuses on transforming the analysis model into the design model that takes into account the non-functional requirements and constraints described in the problem statement and requirement analysis sections discussed earlier.

In this chapter we have designed class diagram component diagram and different design level diagrams to model the blueprint of national id system.

The purpose of designing is to show the direction how the system is built and to obtain clear and enough information needed to drive the actual implementation of the system. It is based on understanding of the model the software built on. The objectives of design are to model the system with high quality. Implementing of high quality system depend on the nature of design created by the designer. If one wants to change to the system after it has been put in to operation depends on the quality of the system design. So if the system is design effetely, it will be easy to make changes to it. And also at the last we have implemented the system using different web designing languages like php, css and html.

1.1 Design goals and objectives

The objectives of design are to model the system with high quality. The design goals are derived from non-functional requirements that means non-functional requirement is the description of the feature characteristics and attribute of the system as well as any constraints that may limit the boundary of the proposed solution.

Design goals describe the qualities of the system that the developers should consider.

Reliability: our system should be reliable.

Fault Tolerance: our system should be fault tolerant to loss of connectivity with the service.

Security: out system should be secured, i.e., not allow other users or unauthorized users to access data that has no the right to access it.

Modifiability: our system should be modifiable for further modification and enhancement of the application

Performance: - The system should respond fast with high throughput.

Cost: The system should be developed with minimum cost possible. In reality there is always trade-offs or disadvantages and therefore from its previous experience the

End User Criteria: - The system should have simple and understandable graphical user Interface such as forms and buttons, which have descriptive names. It should give reliable response for each user request at least before the session expires. All the interfaces, forms and buttons are written or designed in a simple language or common language so that the user can access it without any difficult.

4.2. UML Design models

4.2.1. Class modeling

Class model is class diagram and associated documentation. The class model shows static class objects in a system and the relationships between them. Each class object on the diagram often shows the class name, its attributes and operations

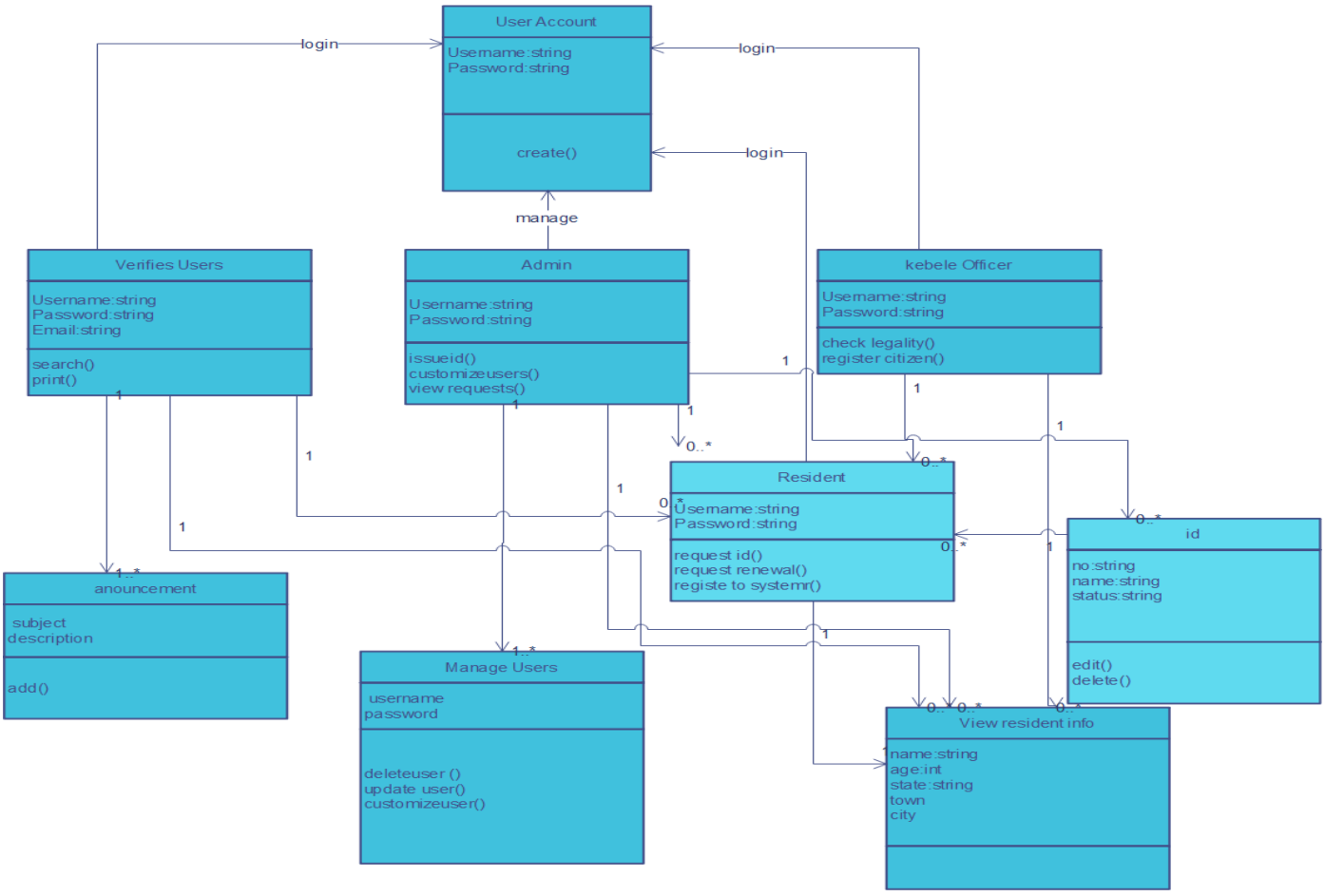


Figure 17: Class Modeling

4.2.2. State chart diagram

A state chart diagram is a view of a state machine that models the changing behavior of a state. State chart diagrams show the various states that an object goes through, as well as the events that cause a transition from one state to another.

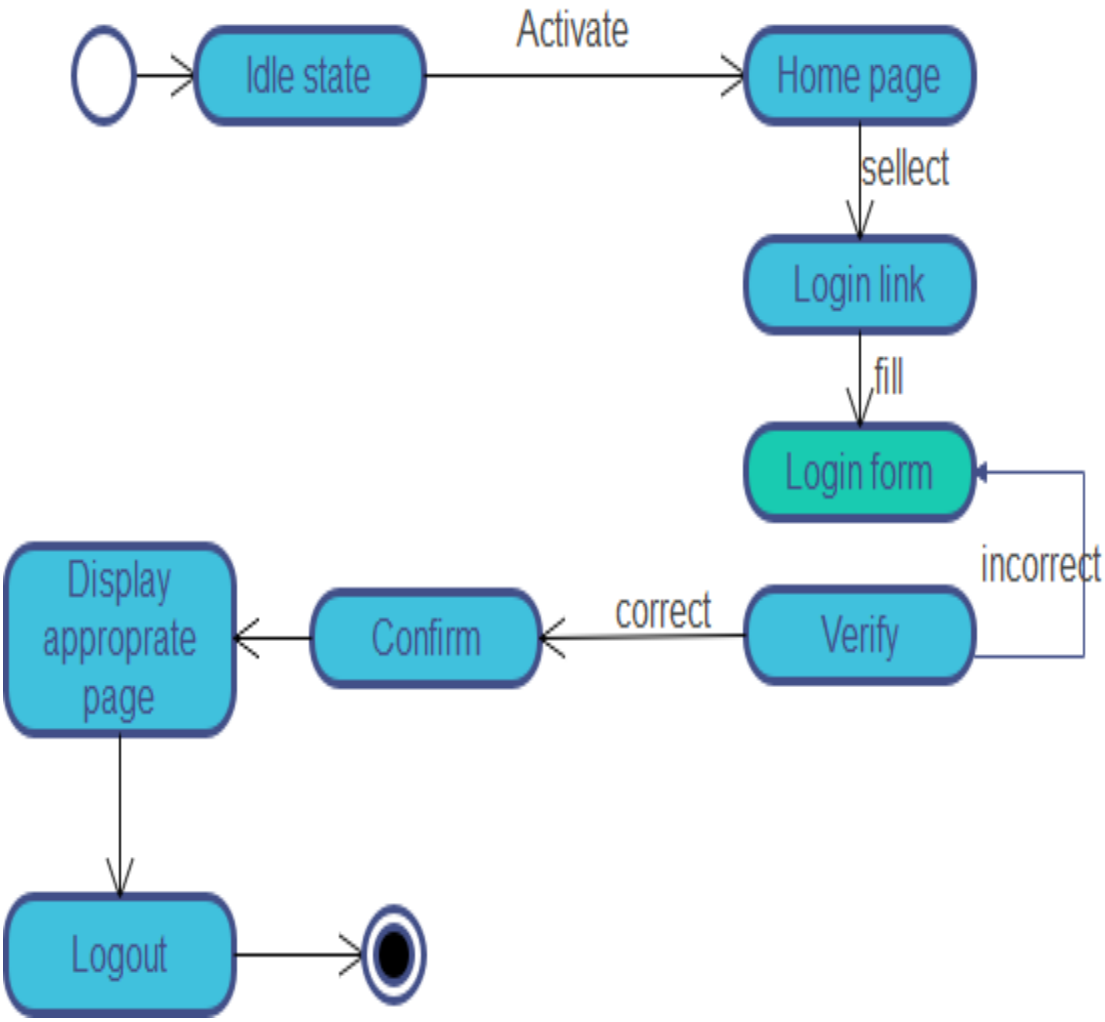


Figure 18:Login State chart diagram

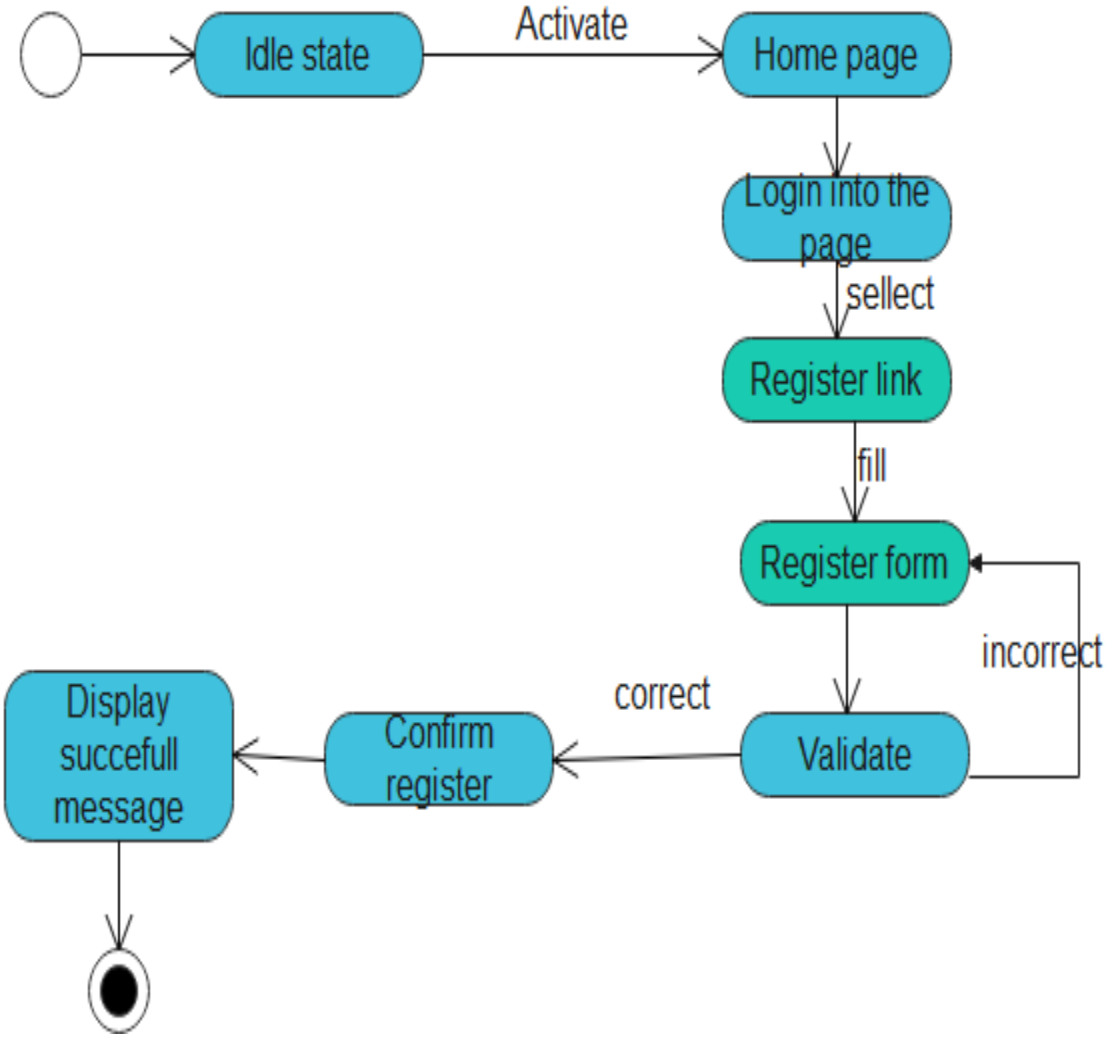


Figure 19: Registration state chart diagram

4.2.3. Component diagram

In the Unified Modeling Language, a component diagram show how Components are wired together to form larger components and or software system they are used to illustrate the structure of systems.So from that point component diagrams are used to visualize the physical components in system.

Component diagrams can also be described as a static implementation view of a system. Static implementation represents the organization of the components at a particular moment.

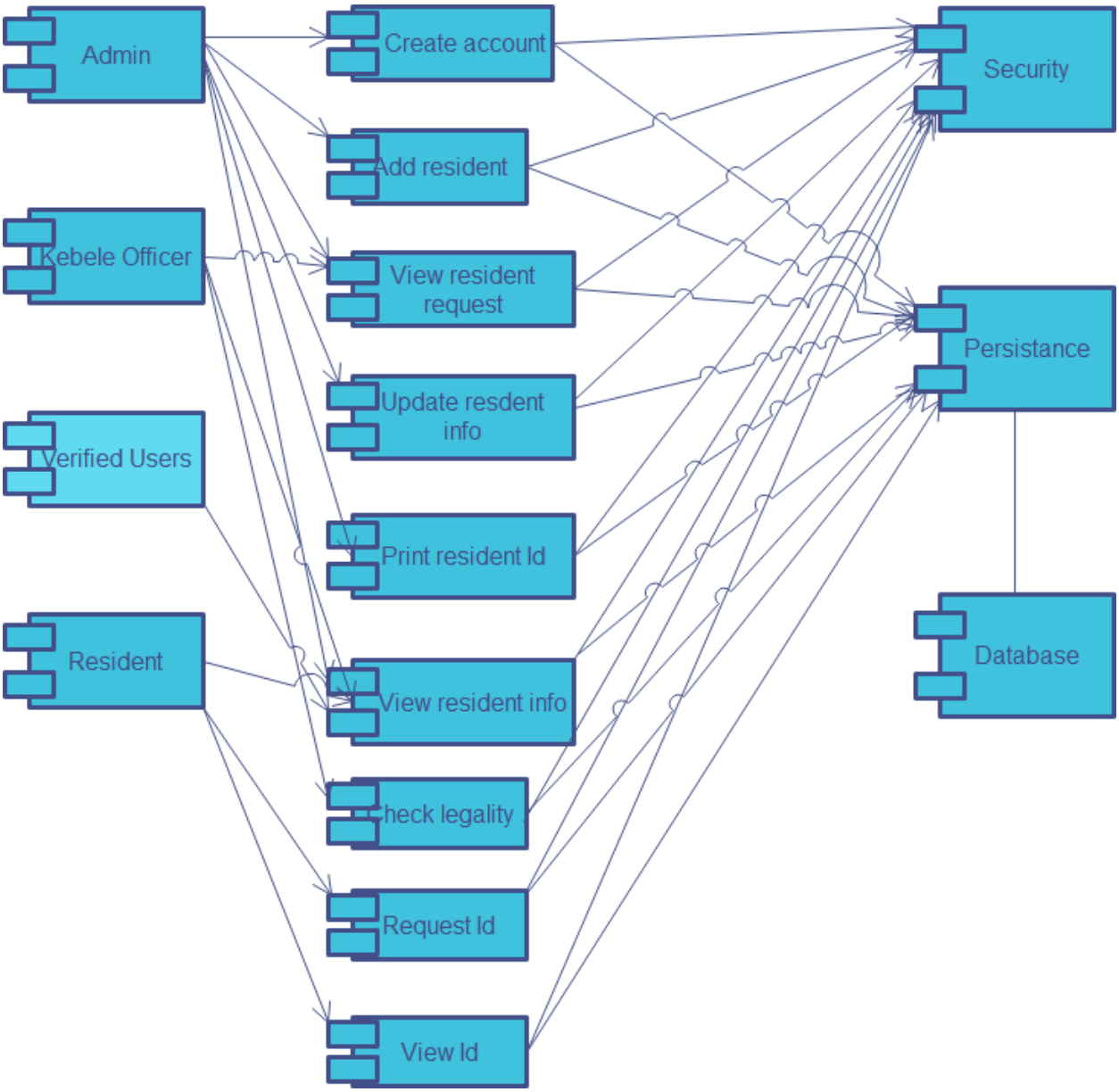


Figure 20: Component diagram

4.2.4. Deployment diagram

Unified Modeling Language models the physical deployment of artifacts on nodes. To describe a web site, for example, a deployment diagram would show what hardware components ("nodes") exist (e.g., a web server, an application server, and a database server), what software components ("artifacts") run on each node (e.g., web application, database), and how the different pieces are connected.Nodes appear as boxes, and the artifacts allocated to each node appear as rectangles within the boxes. Nodes may have sub nodes, which appear as nested boxes. A single node in a deployment diagram may conceptually represent multiple physical nodes, such as a cluster of database servers

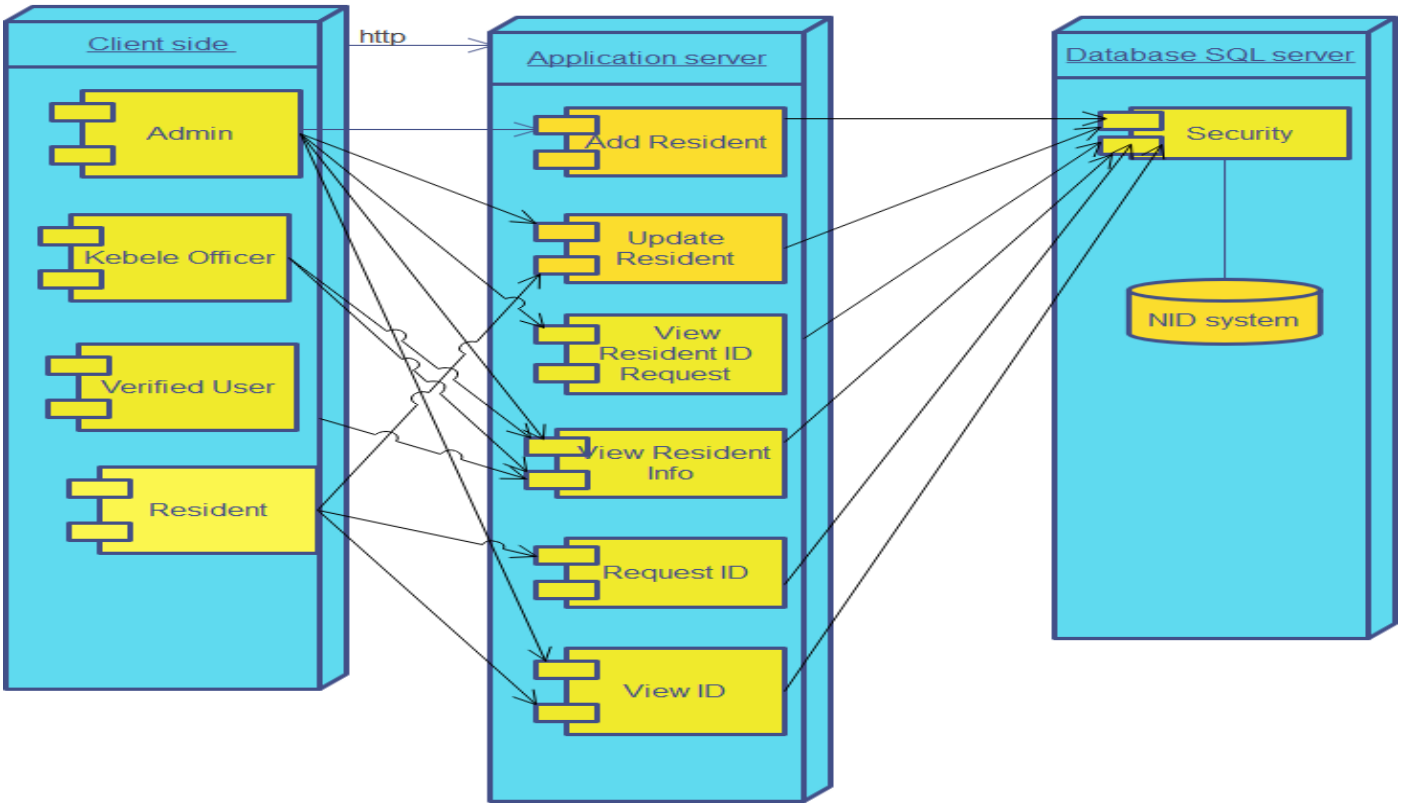


Figure 21: Deployment diagram

4.2.5. Collaboration Diagram

A collaboration diagram describes interactions among objects in terms of sequenced messages. Collaboration diagrams represent a combination of information taken from class, sequence, and use case diagrams describing both the static structure and dynamic behavior of a system.

The UML Collaboration diagram is used to model how objects involved in a scenario interact, with each object instantiating a particular class in the system. Objects are connected by links, each link representing an instance of an association between the respective classes involved. The link shows messages sent between the objects, and the type of message passed.

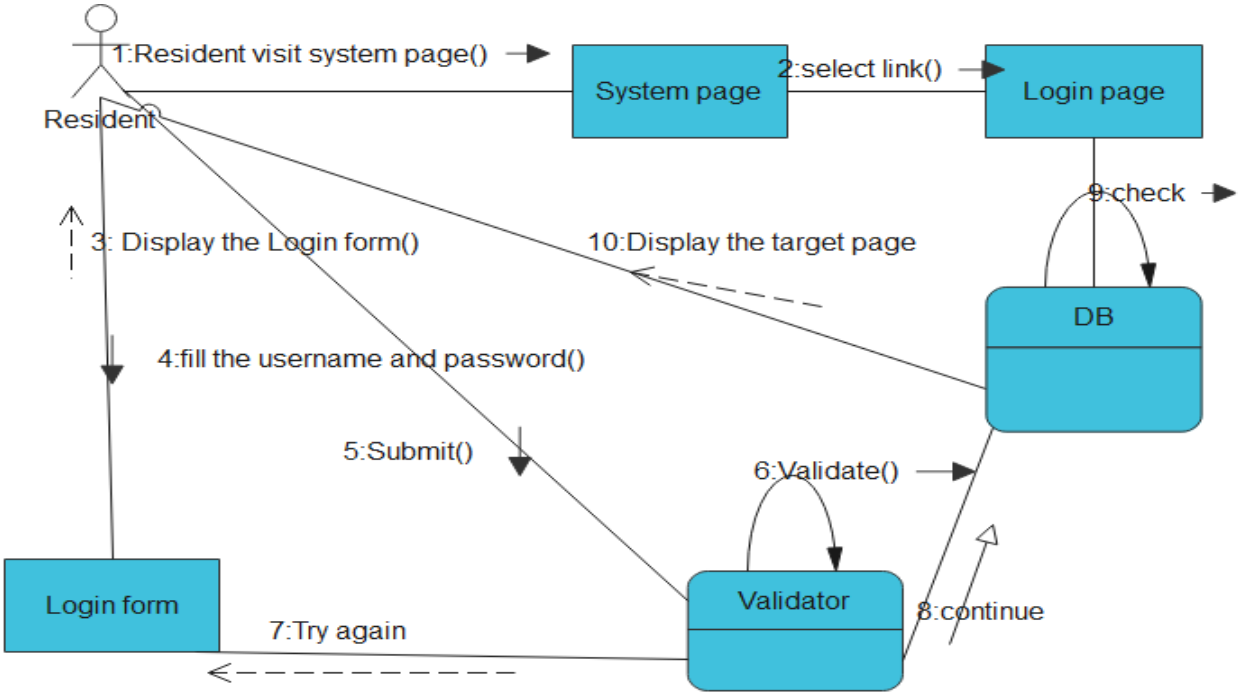


Figure 22: Login collaboration diagram

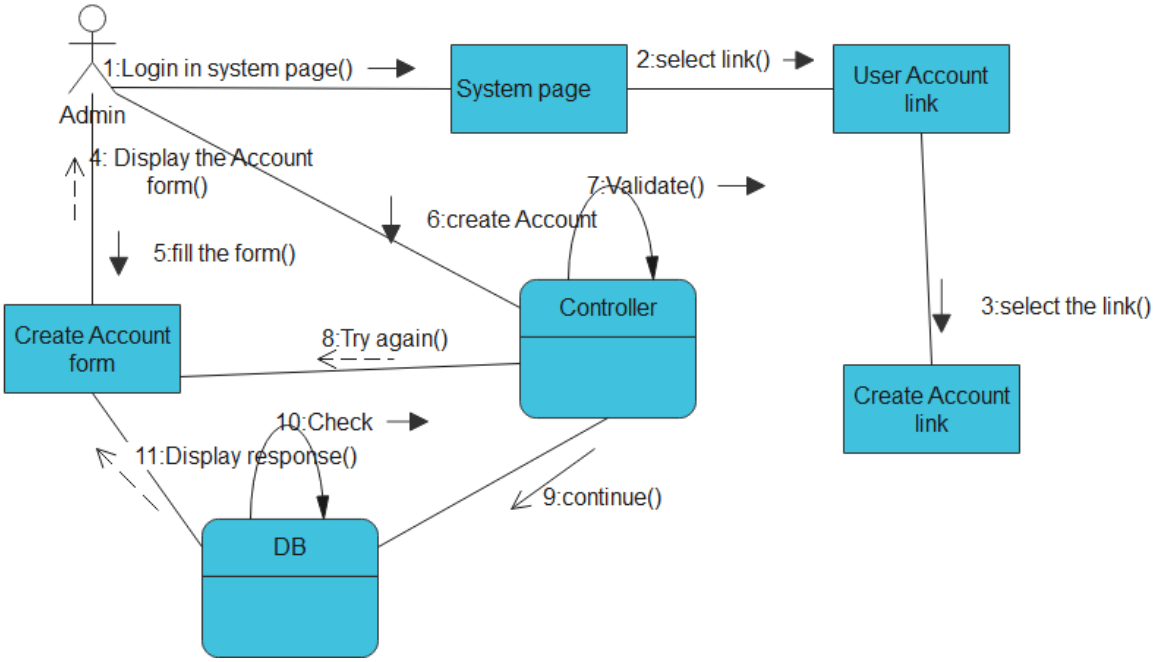


Figure 23: Create Account collaboration diagram

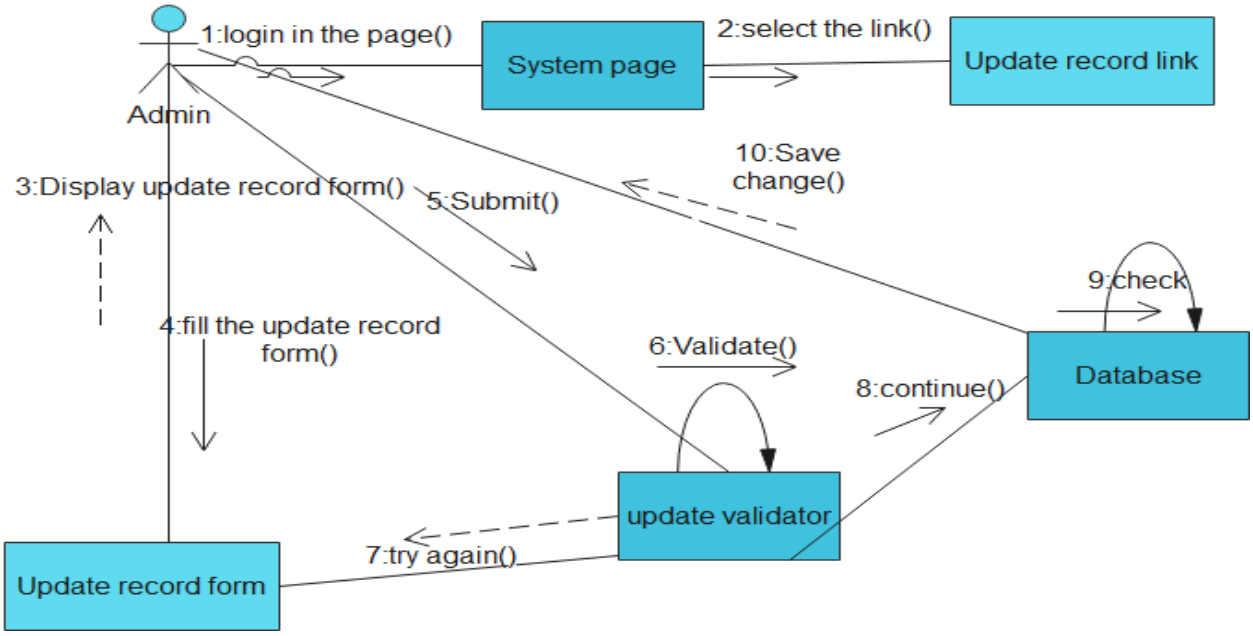


Figure 24: Update resident info collaboration diagram

4.2.6. Database and User interface design

4.2.6.1. Database

MySQL database is used to store application data for this project. MySQL Database is used to create database, tables for the project. MySQL is a relational database management system. It is free and open source. As this project involved a lot of data, it is good to use database so that the whole data management be easy. All the data are stored in a specific table, and each table has specific number columns and rows.

The database name for our project is “nids”. It has 5 tables

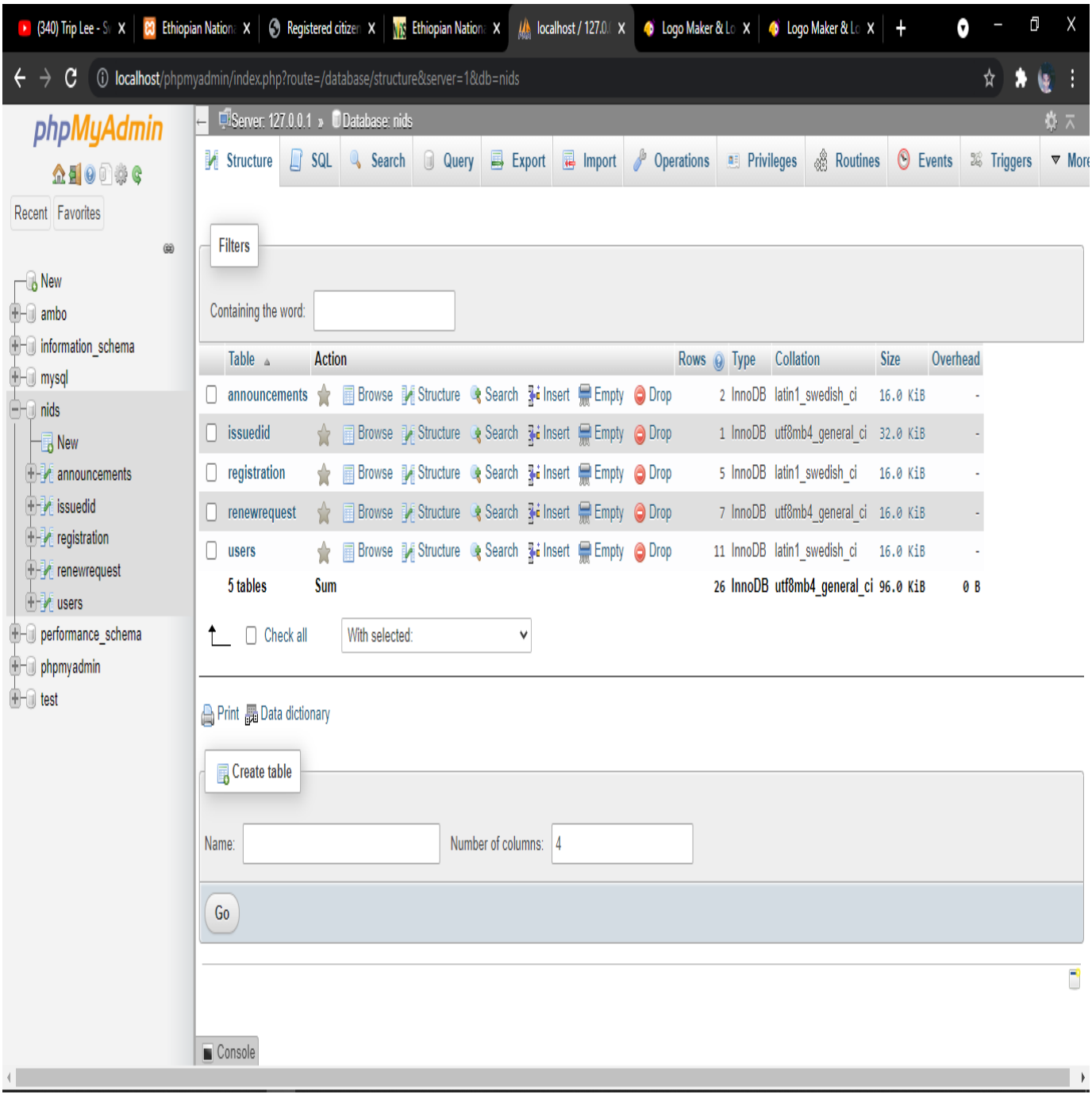


Figure 25:tables in our database

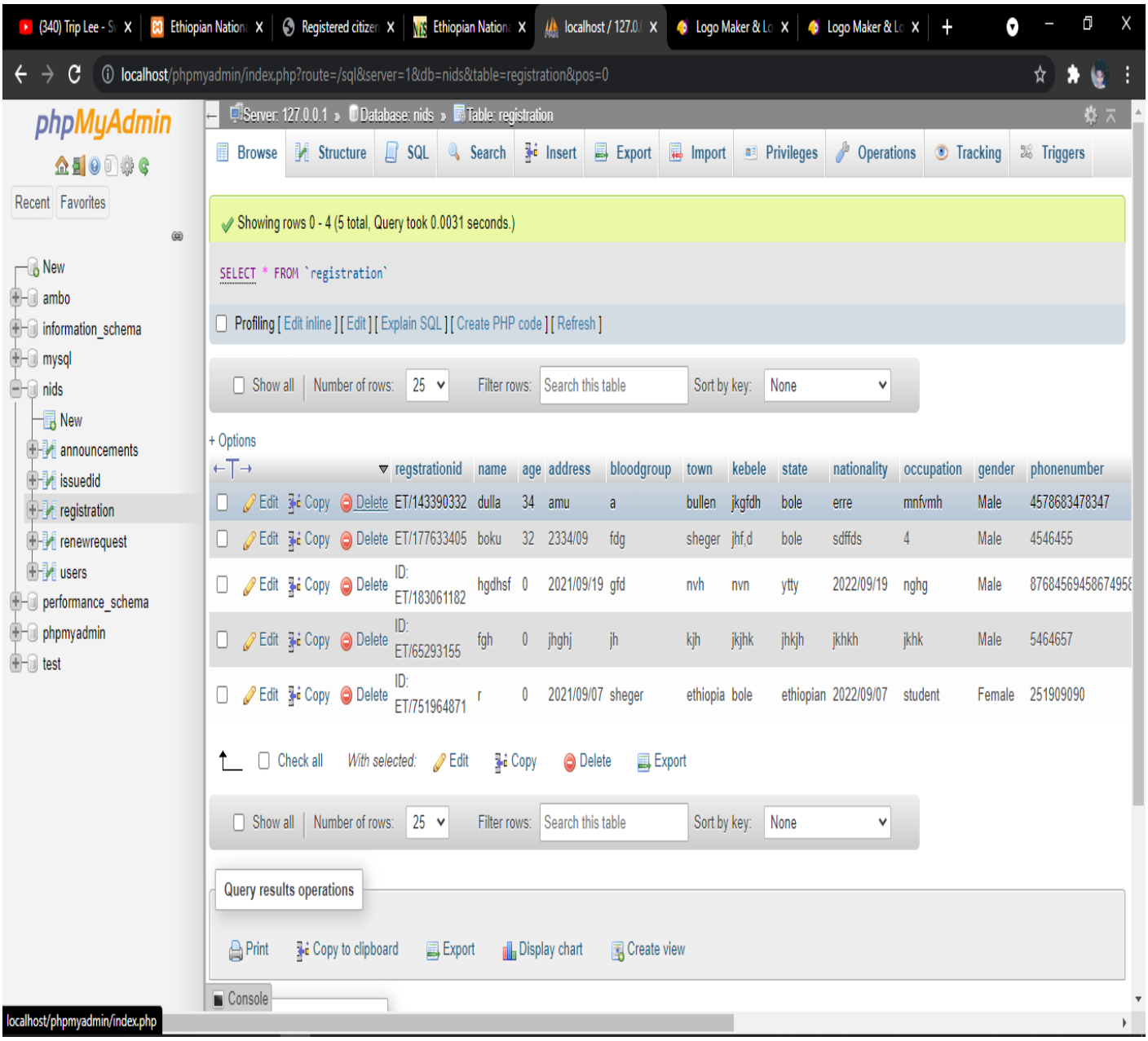


Figure 26:registration table stored in our database

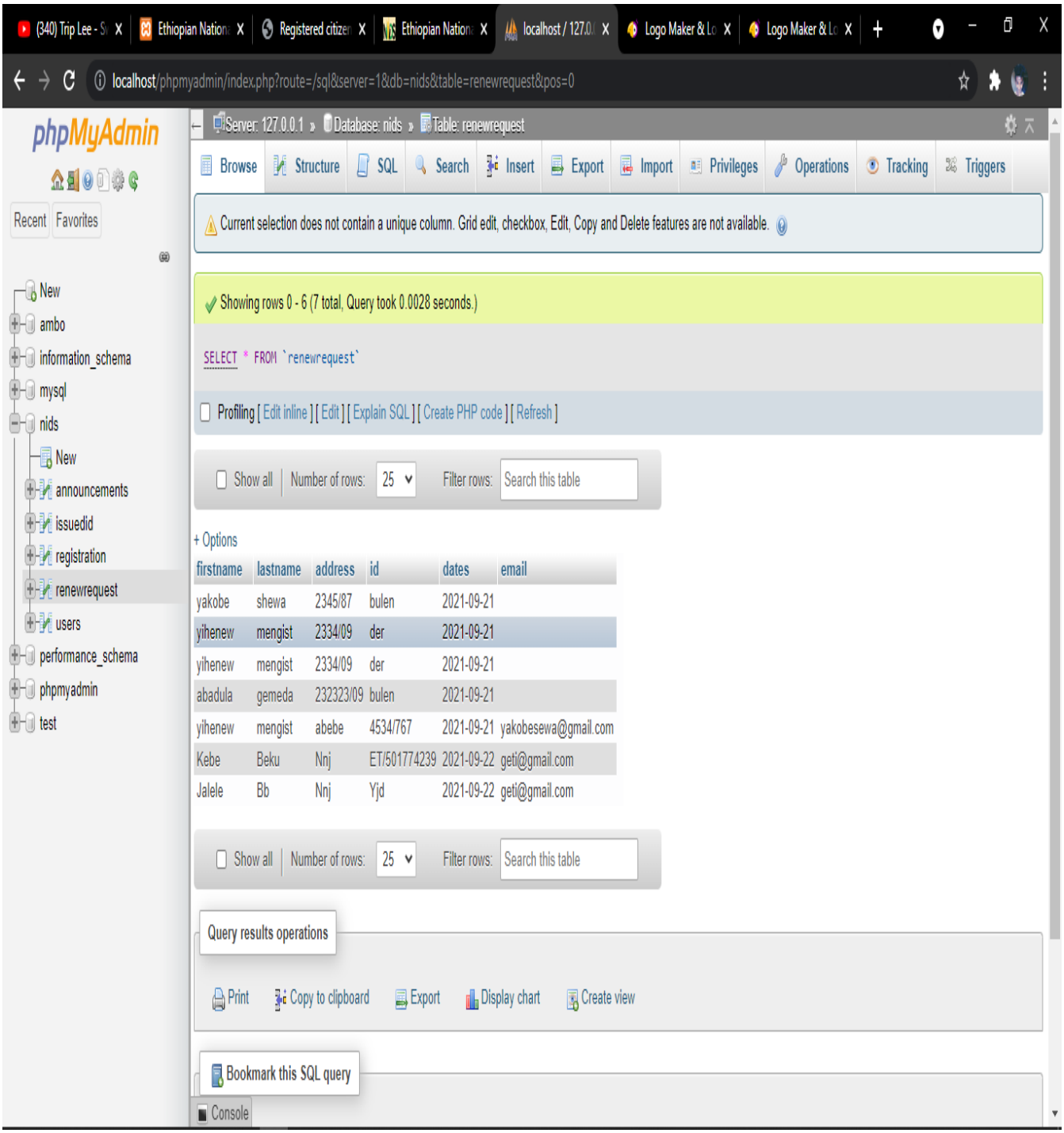


Figure 27:renewal request stored table in our database

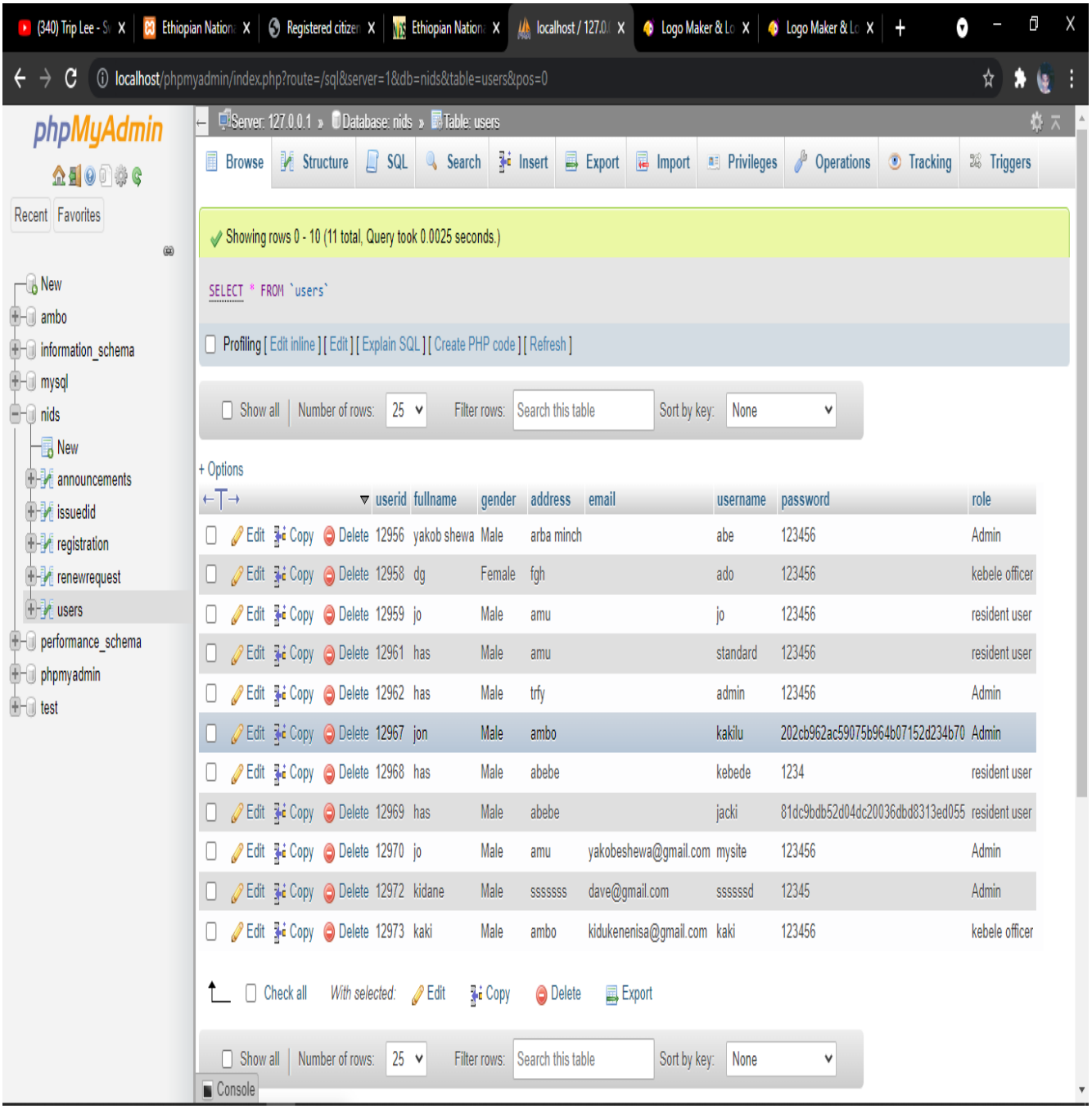


Figure 28:users and their role in our database

4.2.6.2. User interface design

We have designed the user interface for national id system using Html ,CSS and java script.

The design of user interfaces for this system for the purpose of designing how the interface seems like with the focus on maximizing the user experience. The goal of user interface design is to make the user's interaction as simple and efficient as possible, in terms of accomplishing user goals what is often called user centered design.

- Admin page and their functionality
- login page

Login page

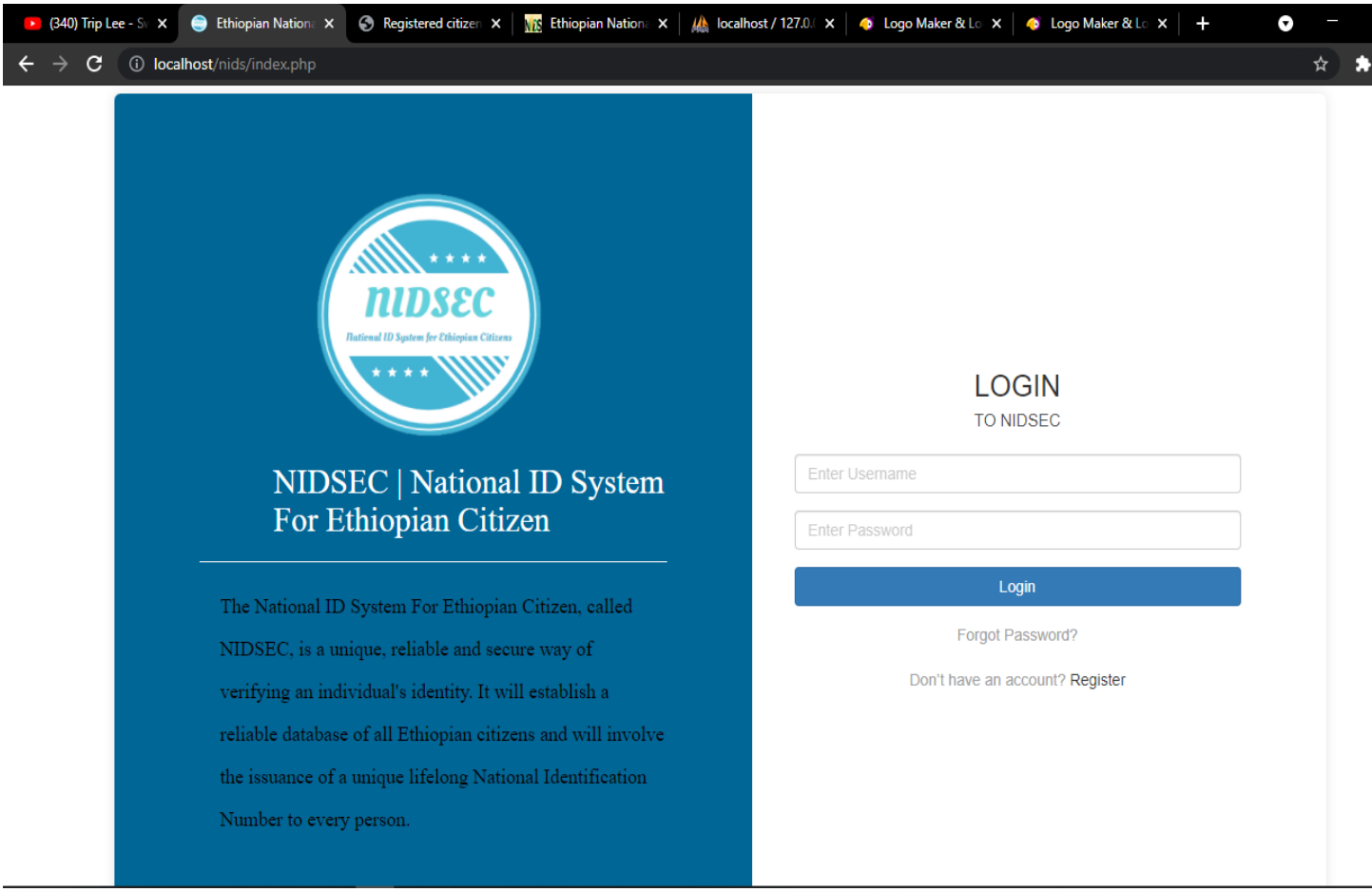


Figure 29:Admin login page

Home page

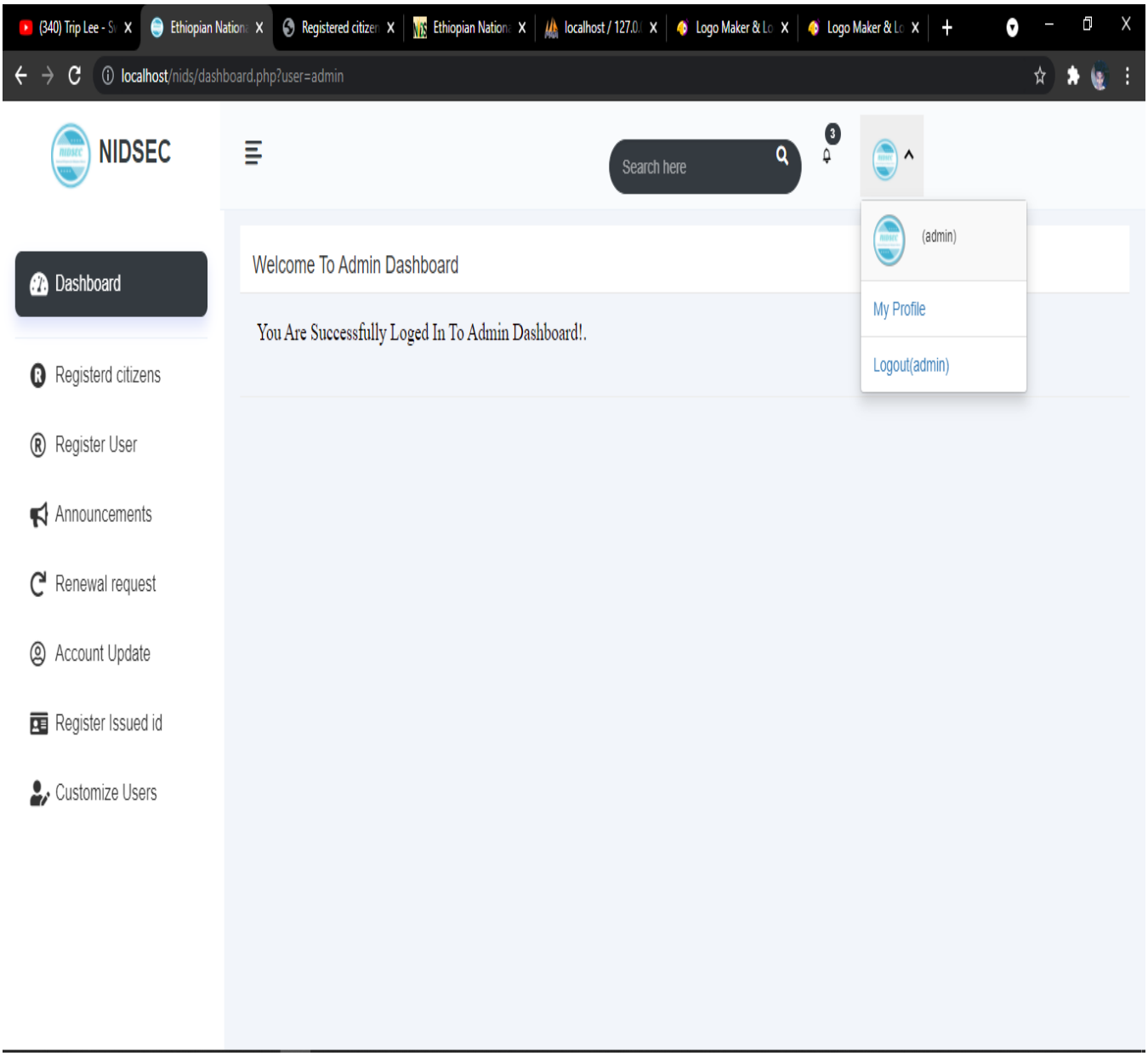


Figure 30:Admin home page

View registered citizens

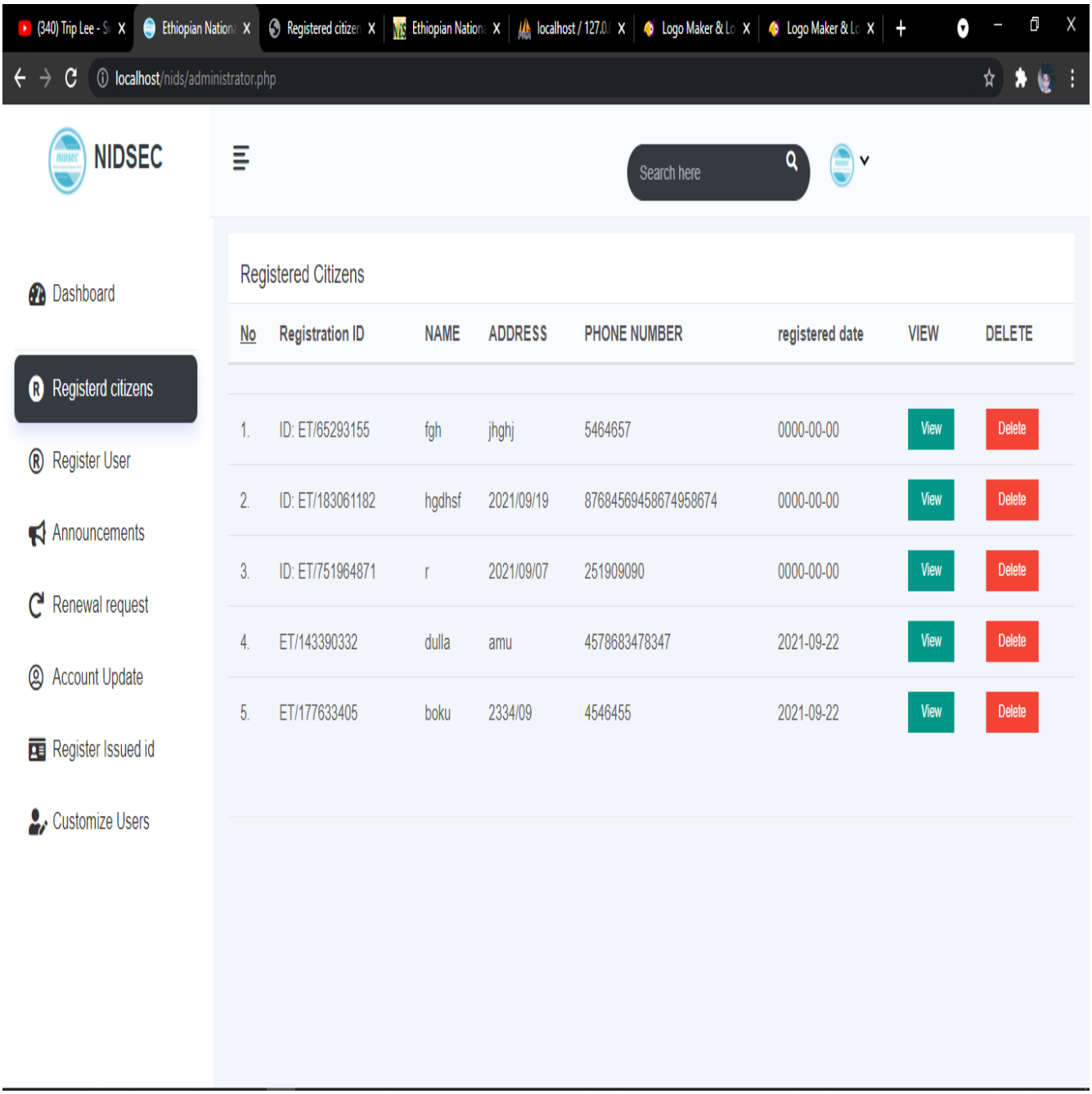


Figure 31: Admin views registered citizens

Register citizens

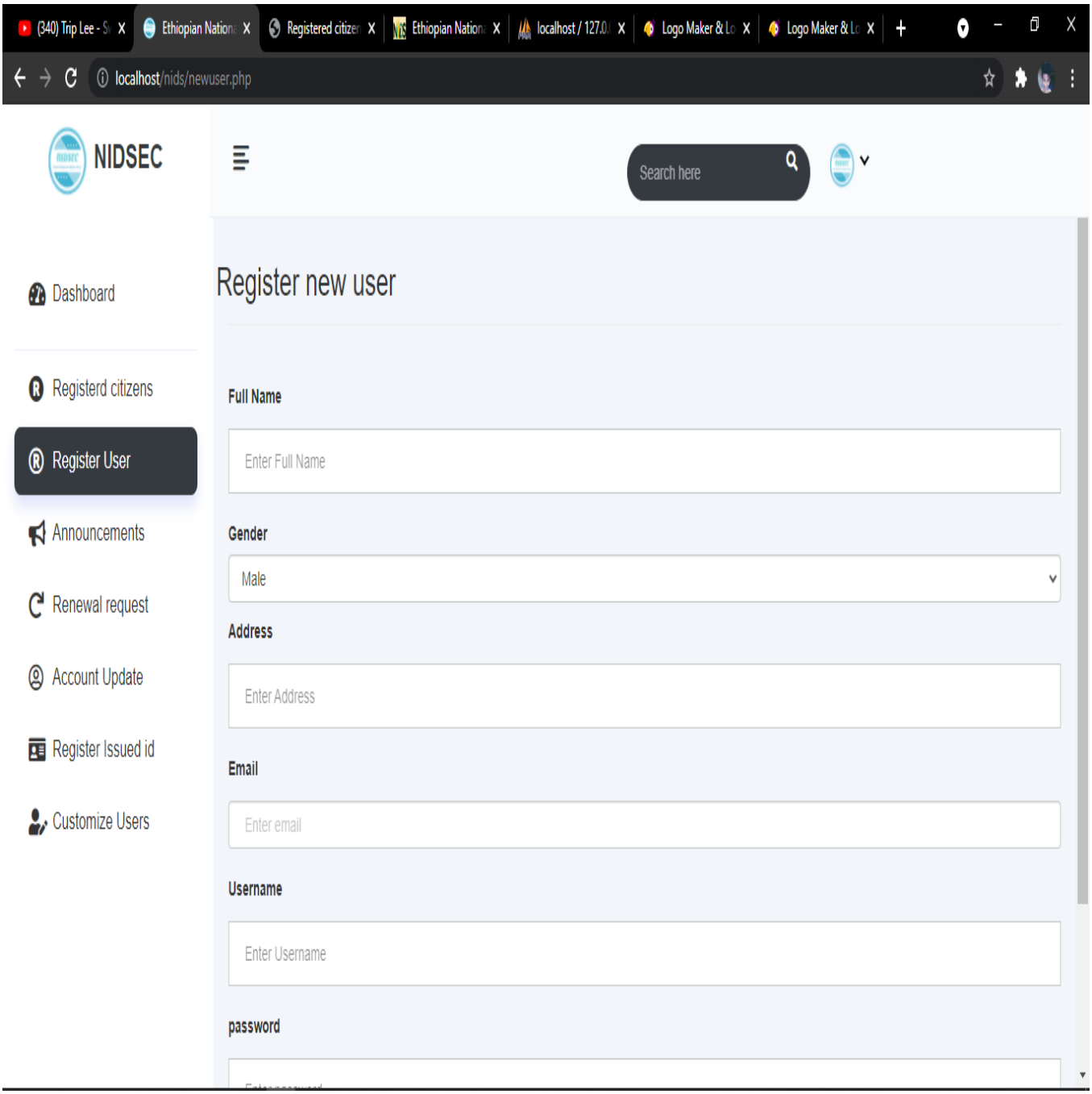


Figure 32:Admin register new citizens

View renewal request

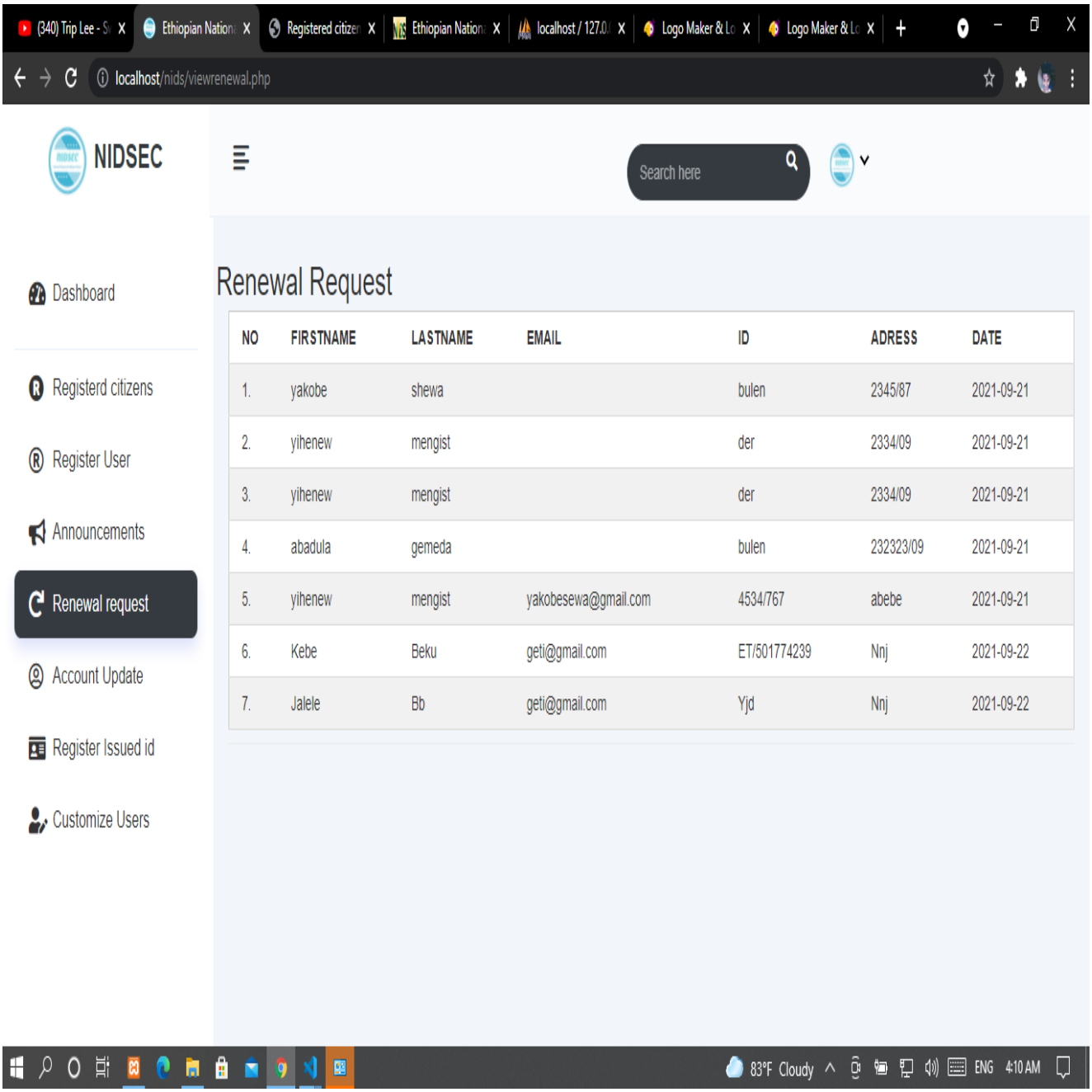


Figure 33:Admin views renewal request

Update account

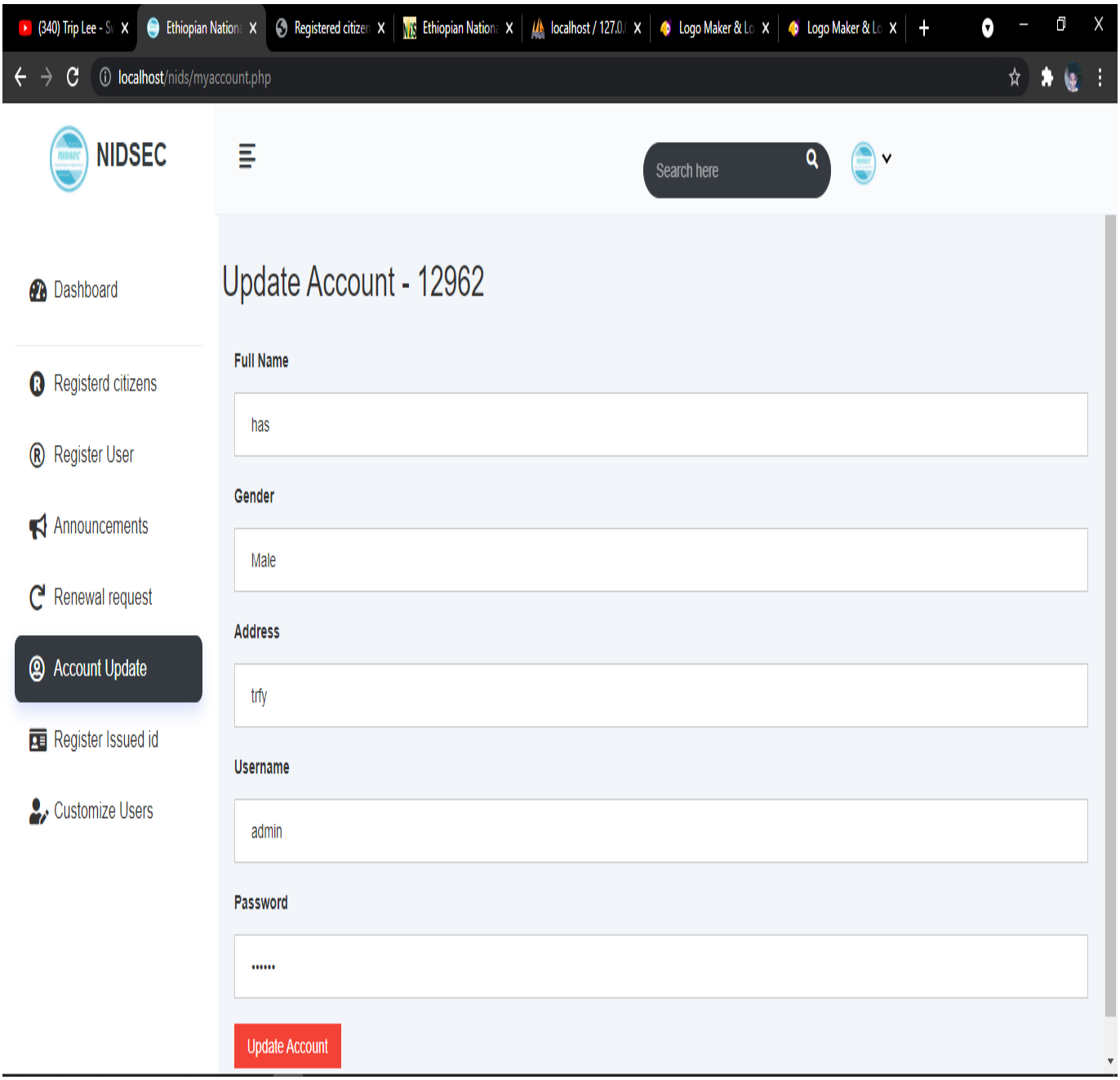


Figure 34:Admin update users account

Customize Users

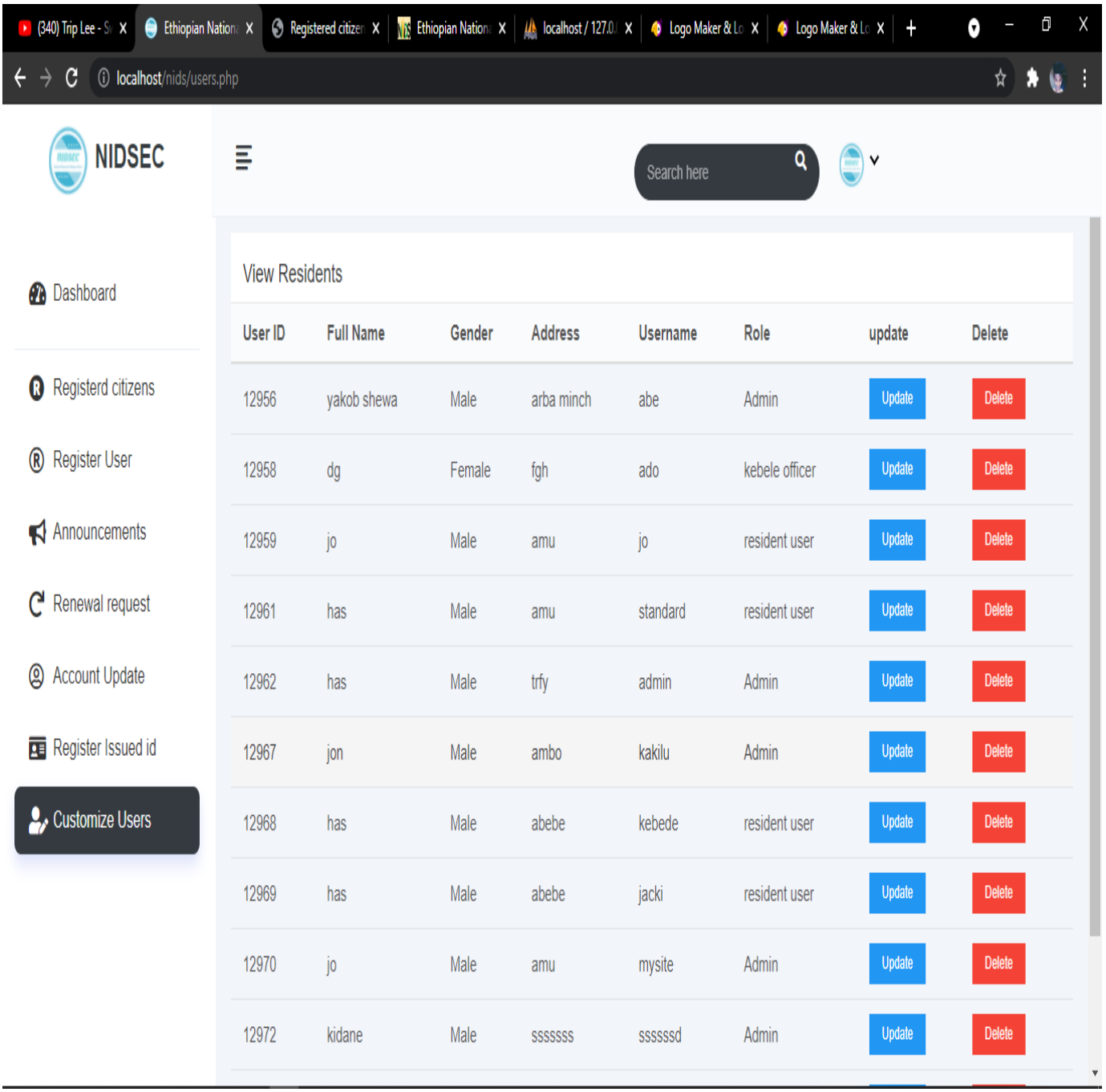


Figure 35:Admin views residents info

Kebele officer page

Login page

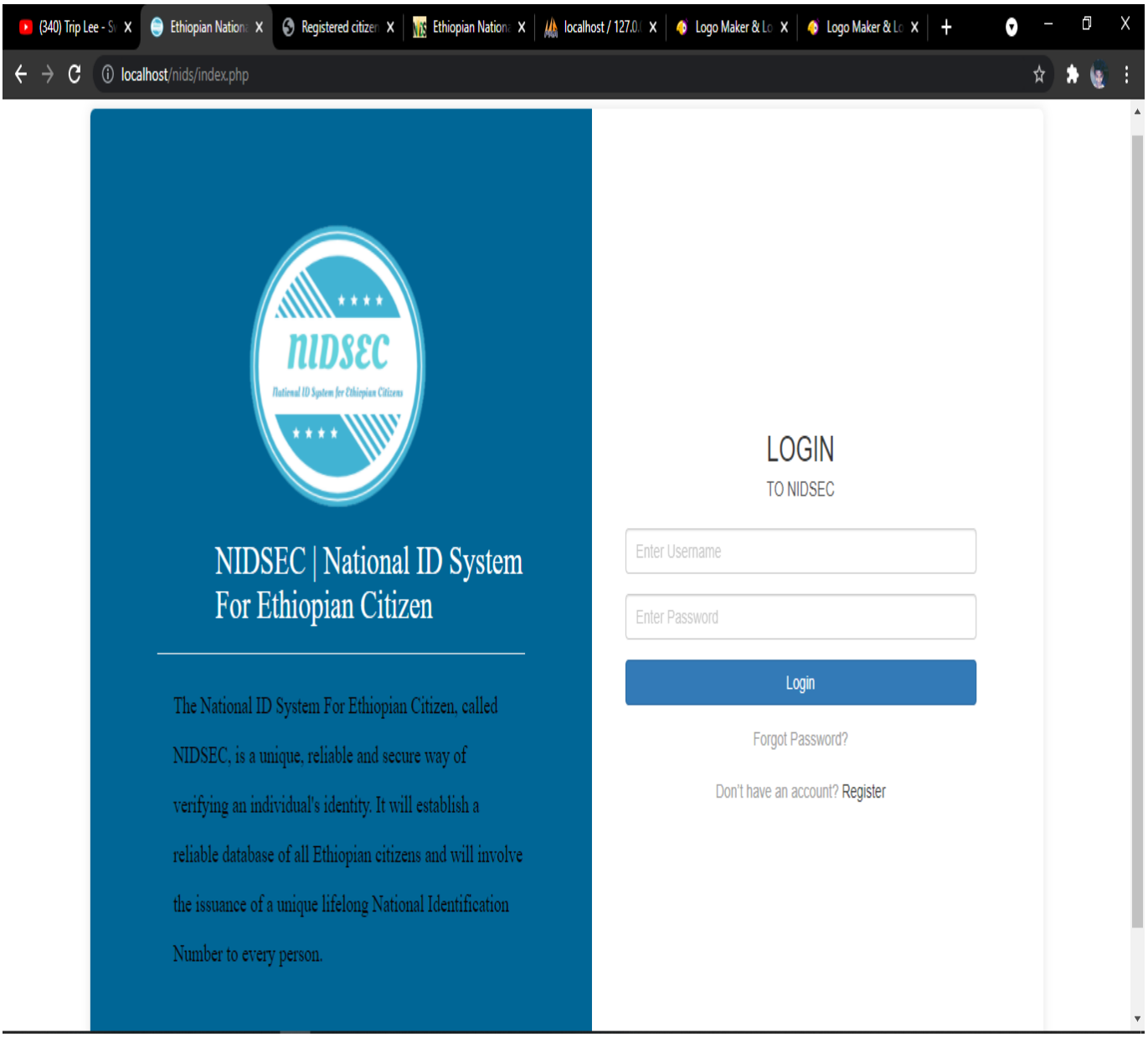


Figure 36:kebele officer login pages

Home page

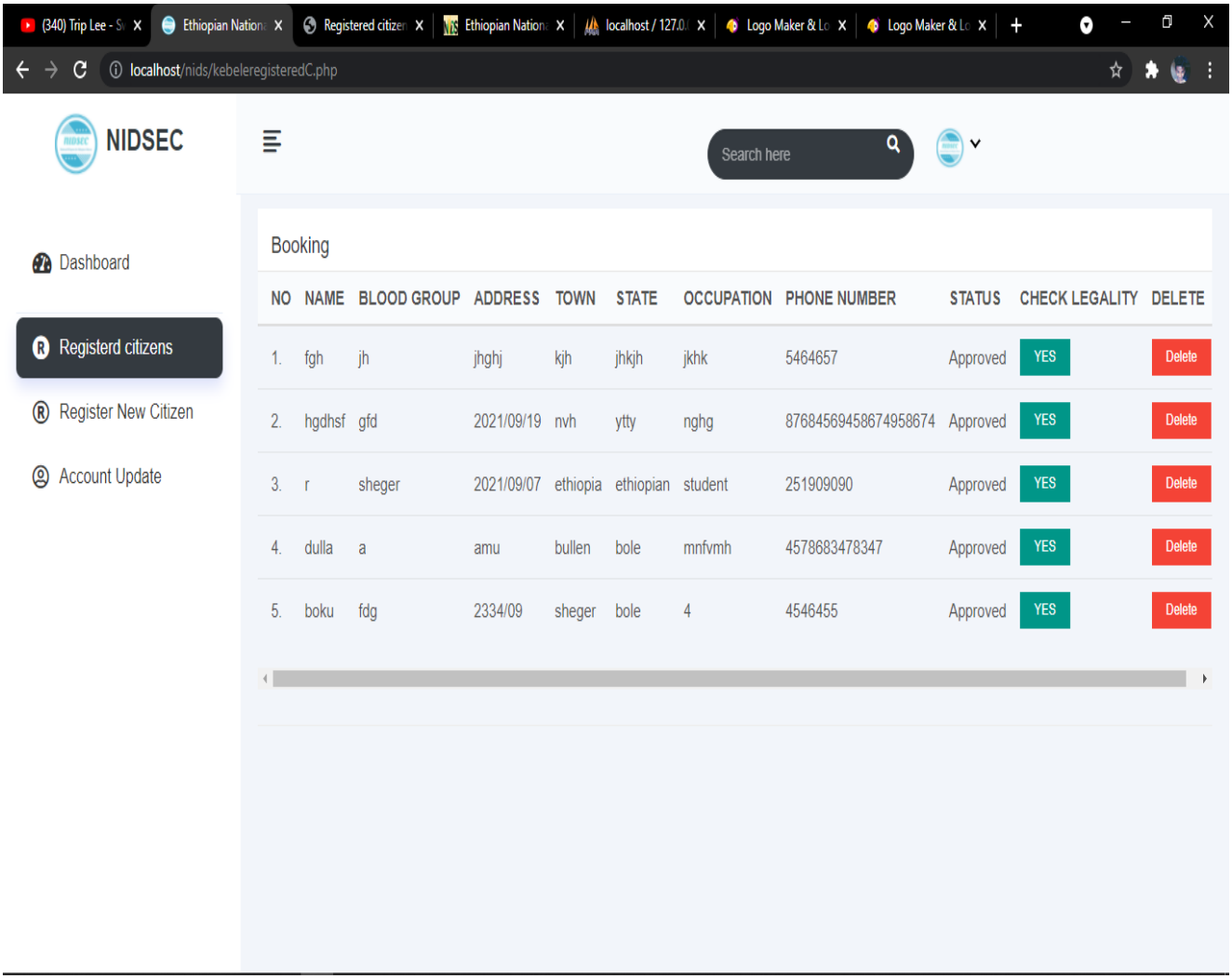


Figure 37:kebele officer home page

Register new Citizen

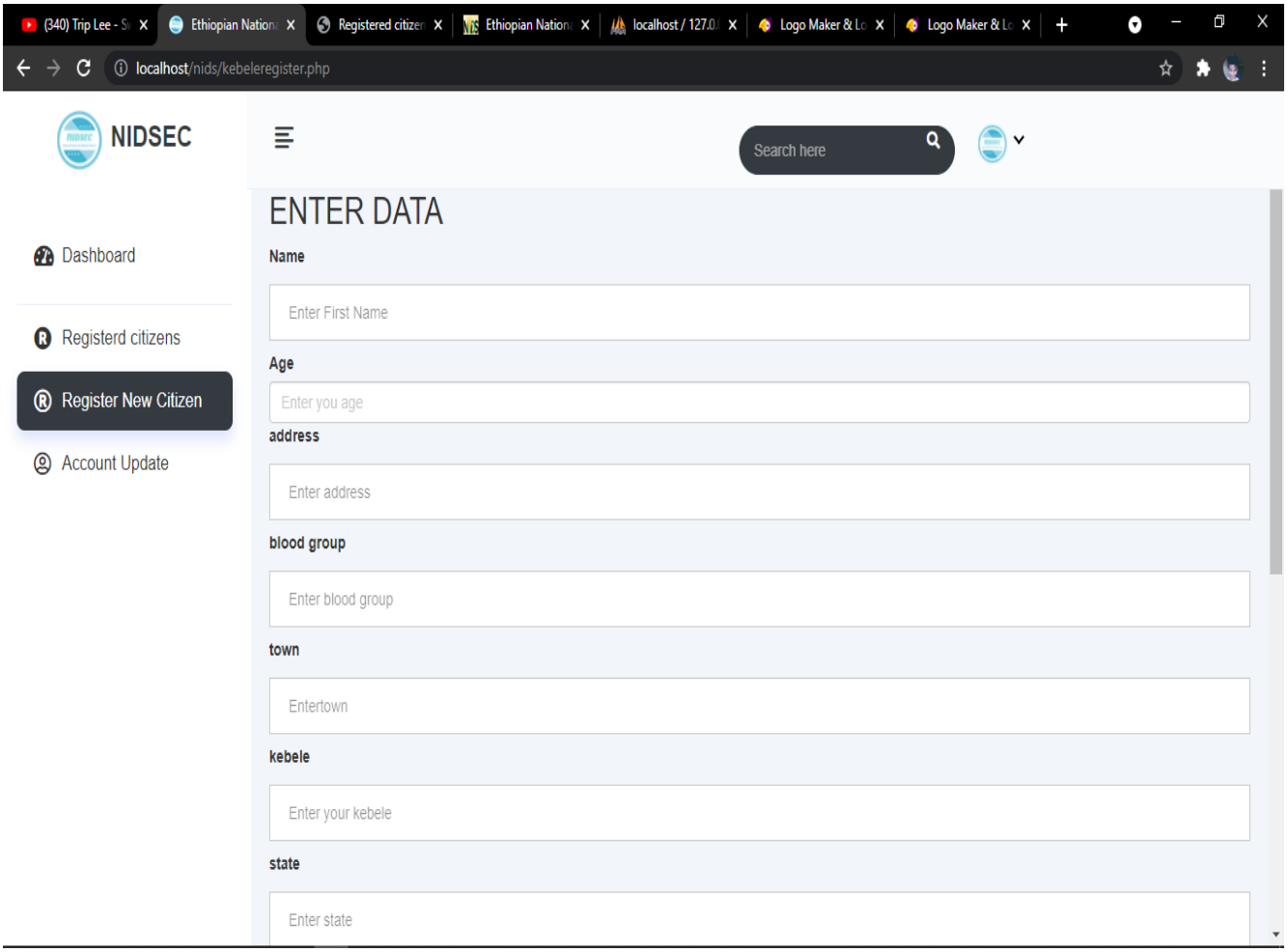


Figure 38:kebele officer register new citizens

Chapter Five: Implementation and Testing

5.1 Introduction

Implementation is one of parts of the project development phase where project inputs are converted to project outputs. In implementation phase, main task is coding. In implementation; we tried to put into practice what was proposed in the project document i.e., transforming the project proposal into the actual project. Then the developed system is implemented or hosted on the server for the users to get the purpose or benefit of the system. All the functionalities need to be done in an orderly. The user interfaces are important as the administrator interface.

As the whole project is based on HTML5, CSS3, PHP,JS and MySQL technologies, which were focused for the implementation of the project. All the codes are explained below.

5.2. Implementation of Functions

The implementation can be divided into two mains blocks: user interface and backend The user interface is implemented with HTML5 and for styling we used CSS3 ,and backend with PHP and SQL code. In this part, we will mainly explain the code for the implementation of the pages, of the functions used in the whole project.

5.3. Configuration of PHP Development Environment

The first and most convenient way is to install and configure an AMP (Apache, MySQL, and PHP) package.

A PHP engine	Version 5. Included in XAMPP-Windows.
A web server	Apache HTTP Server 2.2 is recommended. Included in XAMPP Windows.

A database server	MySQL Server 5.0 is recommended. Included in XAMPP Windows.

Table 16:php development environment

❖ Required Software

In order to create, run, and debug our PHP projects we used the following software:

➢ A web server

➢ The PHP engine

➢ A database server

❖ Installing and Configuring the XAMPP Package

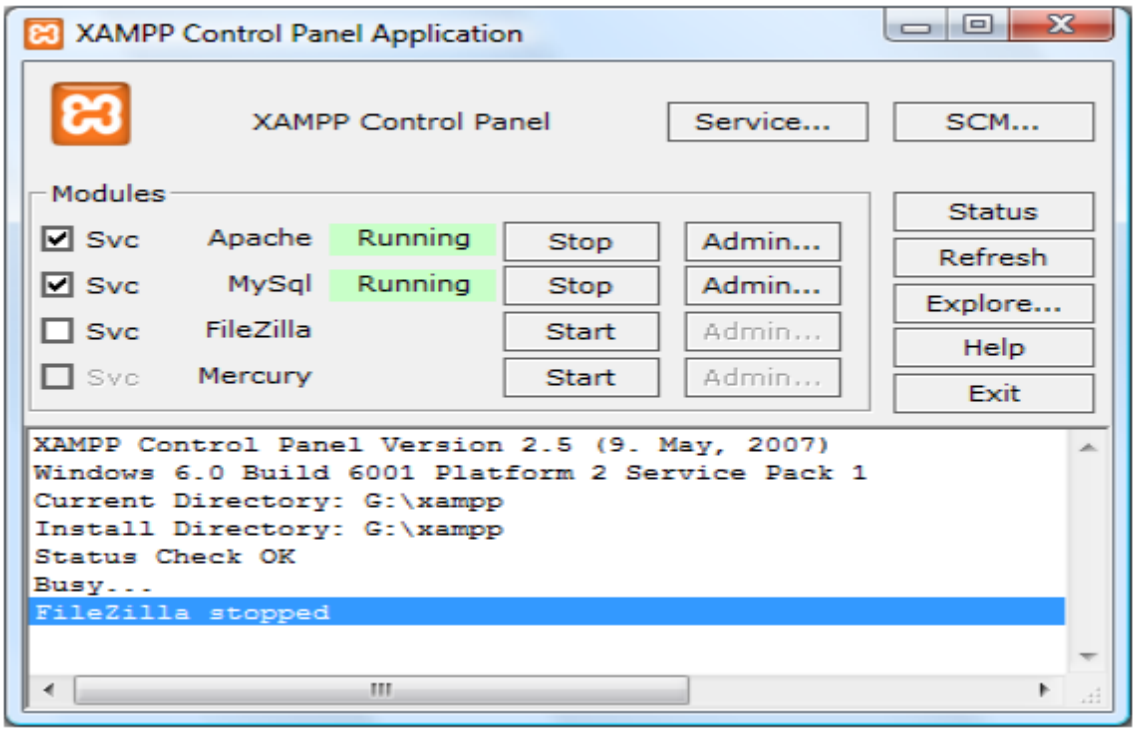


Figure 39:instalation and configuration xampp package

5.4. Testing of the system

We will perform the following testing techniques for checking functionality of our proposed system.

5.5.1. Unit testing

First we will test each unit at each system. Each module of the system can be tested check the working of each class, methods and attributes of the system. For immediately maintain at which the problem is occurred.

Test Case1 - User authentication

Notice:- we used username=”admin” and Password=”123*” as correct username and password to test the system.**

Test Case ID	Test Scenario	Test Steps	Test Data	Expected Results	Actual Results
TC1	Start the system	Open web browser and Type this url **https://localhost/nids/index.php**	……	system page	system page
TC2	Check Customer Login with correct username and correct password	1. Open web browser and Type this url **https:// localhost/nids/index.php** 2. Enter username 3. Enter Password 4. Click Login	Username = admin Password = 123***	User should Login into the system	As Expected

TC3	Check user Login with incorrect username and correct password	1. Open web browser and Type this url **https:// localhost/nids/index.php** 2. Enter username 3. Enter Password 4. Click Login	Username = rra/111/99 Password = 123***	User should not Login into the system	As Expected
TC4	Check user Login with incorrect username and incorrect password	1. Open web browser and Type this url **https:// localhost/nids/index.php** 2. Enter username 3. Enter Password 4. Click Login	Username = rra/111/99 Password = ja***	User should not Login into the system	As Expected
TC5	Check user Login with correct username and incorrect password	1. Open web browser and Type this url **https:// localhost/nids/index.php** 2. Enter username 3. Enter Password 4. Click Login	Username =admin Password = jagf***	User should not Login into the system	As Expected

Table 17: Unit testing in user authentication

Test Case ID = Test Case 02	
Unit to Test = Register citizens	
Assumptions = register citizen page	
Name	**(Invalid Name, Valid Full Name, empty)**
Address	**(invalid Address, valid Address, empty)**
Town	**(invalid town, valid town, empty)**
Occupation	**(invalid Occupation, valid Occupation, empty)**
Phone number	**(invalid Phone number, valid Phone number, empty)**

Steps to be Executed	Data	Expected Results
Name and Click register button	Name =xyz	"Correctelly entered Name "
Enter invalid Name and click register button	Name = 123	"Name field required only alphabet characters"
Empty Name and click register button	Name =" "	"Please enter Name"
Enter valid Phone number and click register button	Phone number =0461544425	"Correctelly entered Phone number "
Enter empty Phone number and click register button	Phone number = " "	" Entered Phone number"
Enter invalid Phone number and click register button	Phone number ="ABgDE"	Invalid mobile number. Mobile number required only numeric data
Enter invalid Phone number and click register	Phone number ="09101112"	Invalid mobile number. Required 10 digit
Enter valid Address and register button	Address = "sikala"	"Correctelly entered Address "
Enter invalid Address and register button	Address = " 123321"	"Please enter the Correcte Address in words "

Enter empty Address and register button	**Address=””**	**“Please enter the Correcte Address “**
Enter valid town and click register button	**town = “arba minch ”**	**“Correctelly entered town”**
Enter invalid town and click register button	town = **“12”**	**“Please enter the Correcte town in words ”**
Enter empty Address and register button	**town = “ ”**	**“Please enter the Correcte town**
Enter valid occupation and click register button	Occupation=**”student”**	**“Correctelly entered ”**
Enter empty occupation and click register button	Occupation = “12222”	**“Please enter the Correcte Occupation in words ”**
Enter empty Occupation and register button	**Occupation = “”**	**“Please enter the Correcte Occupation ”**

Table 18:Register new citizens

CHAPTER 6: Conclusion and Recommendation

6.1. Conclusion

In this project, firstly we have done the analysis and design for national id system and built web portal for the system and also we have identified that national ID card is crucial for countries like Ethiopia in order to uniquely identify citizens for different purposes.

Many countries including the developed nations of the world such as the UK and U.S.A are going for the system despite the opposition from some human rights activists. The system primarily assists in assigning each citizen a unique identification Number. The number can then be used in every other database so that the citizens' information is stored for later retrieving of integrated information about each citizen as required. As most countries are going for more robust type of identification system that incorporate biometrics feature and interacts with other databases of the government, Ethiopia is still using the manual ID card system with no nationwide citizen identification number.

In this project we have built a web portal for collecting resident's information for national id car and system which can help admins to make prototype for national ID card. Generally this project is helpful for Ethiopian government and for citizens in order to facilitate services provided by government and make efficient management of residents within Ethiopia.

As general conclusion the aim of project that we have done is to uniquely identify Ethiopian citizens by giving them unique id for purposes that we have listed before.

6.2. Recommendation

Many European countries and several countries in Asia like Philippines have implemented national ID card. The fact that other countries have implemented an identification system is not necessarily a helpful argument in considering whether such a card is appropriate in Ethiopia.

But in order to uniquely identify each citizen within the country for effective management of citizens and effectiveness of services, it is necessary to have national id system.

In Ethiopia now a days there is no national identity card which can uniquely identify residents so that crime investigation, vital registration and different governmental processes are not as fast as possible and are not efficient.

And also kebele identity cards contain unnecessary information's like ethnicity and local information's which can make a card holder to be vulnerable to identity attacks.

Appendix

Code handles login page for admin (web)

```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0, user-scalable=0">
    <title>Ethiopian National Citizen Identification System</title>
    <link rel="shortcut icon" type="image/x-icon" href="assets/img/logok.PNG">
    <link rel="stylesheet" href="assets/css/bootstrap.min.css">
    <link rel="stylesheet" href="assets/plugins/fontawesome/css/fontawesome.min.css">
    <link rel="stylesheet" type="text/css" href="assets/plugins/fontawesome/css/all.min.css">
    <link rel="stylesheet" href="assets/css/feathericon.min.css">
    <link rel="stylesheet" href="assets/plugins/morris/morris.css">
    <link rel="stylesheet" href="assets/css/style.css"> </head>
    <link rel="stylesheet" href="assets/plugins/fontawesome/css/all.min.css">

    <link rel="stylehseet" href="https://cdn.oesmith.co.uk/morris-0.5.1.css">


    <link rel="stylesheet" href="style/w3.css">
    <link rel="stylesheet" href="style/bootstrap.min.css">
```

```
        <link rel="icon" href="images/icon.png">

<body>
        <div class="main-wrapper login-body">
                <div class="login-wrapper">
                <div class="container">
                <div class="loginbox">
                                        <div class="login-left" ><img class="img-fluid"
float="left" left="10px" width="50%" height="70%" ;
                                                src="assets/img/logok.PNG"
alt="Logo">

                                        <div class="large-6 medium-6 columns">


                                                <h2 class="color-white heading"
style=" padding-left: 70px; color: #fff; font-family: 'Open Sans', 'sans-serif';">NCIDS |
National Citizen Identification System</h2>
                                                <hr>
                                                <h4 class="color-white " style="
padding-left: 20px; line-height: 37px; color: rgb(10, 0, 0); font-family: 'Open Sans', 'sans-
serif';"> The National Citizen Identification System, called NIDS, is a unique, reliable
and secure way of verifying an individual's identity. It will establish a reliable database of
all Ethiopian citizens and will involve the issuance of a unique lifelong National
Identification Number to every person.
                                                </h4>
                                        </div>
```

```
                                    </div>
                                    <div class="login-right">
                                        <div class="login-right-wrap">
                                            <h1>LOGIN</h1>
                                            <p class="account-subtitle">TO
NCIDS</p>

                        <form action="index.php" method="POST">

                                                <div class="form-group">
                                                    <input type="text"
placeholder="Enter Username" name="username" class="form-control" required> </div>
                                                <div class="form-group">
                                                    <input
type="password" placeholder="Enter Password" name="password" class="form-control"
required> </div>
                                                <div class="form-group">
                                <button type="submit" name="submit" class="btn btn-primary btn-
block">Login</button>
                                                </div>
                                            </form>

                                            <div class="text-center
forgotpass"><a href="forgot-password.html">Forgot Password?</a> </div>

                                            <div class="text-center dont-
have">Don’t have an account? <a href="register.html">Register</a></div>
```

```
                                        </div>
                                    </div>
                                </div>
                            </div>
                        </div>
                    </div>

                    <script src="assets/js/jquery-3.5.1.min.js"></script>
                    <script src="assets/js/popper.min.js"></script>
                    <script src="assets/js/bootstrap.min.js"></script>
                    <script src="assets/plugins/slimscroll/jquery.slimscroll.min.js"></script>
                    <script src="assets/js/script.js"></script>
                    <?php
  error_reporting(E_ALL ^ E_DEPRECATED);
if(isset($_POST['submit'])) {
include 'database_configuration.php';

$myuser = $_POST['username'];
$mypass = $_POST['password'];
//$mypass = crypt($mypass);
$sql = "SELECT * FROM users where username='$myuser' and password='$mypass'";
$result = $conn->query($sql);

if ($result->num_rows > 0) {
    while($row = $result->fetch_assoc()) {
      $role = $row['role'];
```

```
if ($role == "Admin") {
session_start();
$_SESSION['username'] = $myuser;
header("location:dashboard.php?user=$myuser");
}
else if ($role == "kebele officer") {
session_start();
$_SESSION['username'] = $myuser;
header("location:dashboardk.php?user=$myuser");
}
else if ($role == "resident user") {
session_start();
$_SESSION['username'] = $myuser;
header("location:dashboardr.php?user=$myuser");
}
else  {
session_start();
$_SESSION['username'] = $myuser;
header("location:dashboardv.php?user=$myuser");
}
   }}
   else {
     echo "<script type = \"text/javascript\">
     alert(\"your username or password is incorrect \");
     window.location = (\"index.php\")
     </script>";
}
```

```
$conn->close();


}
?>
</body></html>
```

Reference

1. https://www.ena.et/en/?p=15393
2. https://www.wikiprocedure.com/index.php/Ethiopia_-_Obtain_a_Kebele_Identity_Card
3. https://documents1.worldbank.org/curated/en/822621524689442102/ID4D-Country-Diagnostic-Ethiopia.pdf
4. https://www.ena.et/en/?p=15393
5. http://www.privacy.org/pi/activities/idcard/idcard_faq.html