Faculty of Engineering
Computer Department

“Serums and Vaccines distribution in Alexandria Government”

Presented to:

Dr. Mohamed EL Khouly
Eng. Nada EL Rakiby

Presented by:

Veronia Osama Ragaei	5316219
Yasmine Ahmed Mohamed	5316381
Aya Wael Mohamed	5316084
Omnia Maher	5316069

Content

Abstract

Serums and Vaccines distribution in Alexandria Government , This application allows employees to add and reserve serums and vaccines for patients , and view their medical history . Hospitals and Districts can reserve item from the main inventory . Admins can add employees.

The advantages of this application are :

- It will be easier to reserve Serums and Vaccines for patients .
- Everything will be done on computer , instead of papers , so it will save time .
- Everything will be stored in database , so that they will not be lost or destroyed

Everything will be done on computers , so there's little chance of it being destroyed or lost , it will be easier for employees to store and find items .

Acknowledgment

We would like to show our gratitude to the manager of Serums and vaccines district in west Alexandria for sharing her pearls of wisdom with us during the course of this research , and showing us how the old system works , which helped us understand what we should avoid and change , and DR . Mohamed El-Khouly for providing insight and expertise that greatly assisted the research .

List of Figures

Introduction

This application will make it easy for employees to store and find items , without having to do it on papers and risking that they might get lost or destroyed . it will all be done on computers , so there’s little chance of it being destroyed or lost or repeated .

Drawbacks of existing manual work:

- Everything is on paper.
- High chance of being lost.
- High chance of being destroyed.
- High chance of repetition.

In this application we used Agile Process Model, because it gives teams an opportunity to learn with each new iteration and change it according to the client needs, its fast and flexible and can change in previous steps without losing all their work.

In Serums and vaccines Diagram we used Component Diagram, because it handles every component as a separate block or as a subsystem. In log in System Diagram, Patients Diagram and Hospitals Diagram we used Sequence Diagram, Because it shows the interaction logic between the objects in the system in the time order that the interactions take place. In Expiration Diagram we used interaction overview diagram, because it provides a high level of abstraction an interaction model. In Delivery System and Reservation Diagram we used Use Case Diagram, because it focuses mainly on cases. In Alert System Diagram we used Activity Diagram, Because activities can be sequential and concurrent.

Analyses and Requirements

Requirement Collection:

- We had a meeting with the manager of Serums and Vaccines district in west Alexandria
- We went to west district and looked for the old system as to recognize.

Feasibility Study:

- What if the system wasn't implemented?

The organization will remain as it is as it will remain working with papers and this are an old-fashioned way plus it has a lot of disadvantages.

Functional Requirements

- A system of serums and vaccines inventory is needed to replace paper documentation.
- The system should:
    - Document the serums and vaccines found in the district inventory.
    - If any product is not found in one of the districts or in emergency case:

District should look in the main inventory.

If not, district should look in the database in nearest districts.

When the serum is found in a nearest district:

- Reserve the serum by the name of the patient.
- If it is an emergency case it must be delivered to the district soon as possible.

- Alert is shown in the system. Send an email for the main district to tell them that this product reach to minimum level.
- Expiration Date:

When the product reaches three months before its expiration date, the system should alert the district to be distribute them first.

If no one need this product one month before its expiration date, the district must return it to the main inventory and to be removed from the district storage.

- Hospitals:

Each district is connected to a number of health offices and hospitals in its region that distribute to the them the serums and vaccines. The system should reserve by a month prior to the date it should be delivered to the hospitals the number of serums and vaccines the hospital needs. It should decrement that number from the total in the district and alert the system a week prior of the date of delivery.

The hospital has the medical history of their patients. For any increase of the number of needed serums/vaccines, the system should be informed.

- Patients:

The system has the medical history of the district's patients.

The system can decline the giveaway of a certain serum/vaccine if it might leave any side effects on the patient.

It only approves if the patient's health is not affected by the serum/vaccine or with the doctor's approval.

- The system should check if the patient or the hospital giving the patient the prescription is found in the said district. The system approves the serum/vaccine giveaway if and only if either the patient or hospital is found the district system's database.
- Each year, there is a rate of births and deaths that are known in the government. The distribution of the products from the government inventory to the districts is based on this rate. If the hospital shows higher rate of births or deaths, the district should inform the inventory for the number of changed rates either by increasing the number of sent products or decreasing respectively.

Non-Functional Requirements

- Accessibility
    - Accessibility is the practice of making your websites usable by as many people as possible.
    - How?
        - Semantic HTML, which improves accessibility, also improves SEO, making your site more findable.
        - Caring about accessibility demonstrates good ethics and morals, which improves your public image.
        - Other good practices that improve accessibility also make your site more usable by other groups.
- Usability
    - The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use. (ease-of-use)
    - How?
        - Easy for the user to become familiar with and competent in.
        - Easy for users to achieve their objective
        - Easy to recall the user interface and how to use it on subsequent visits
- Stability
    - The quality or attribute of being firm and steadfast
    - How?
        - Software stability can be obtained by testing and emphasizing simplicity.
        - Testing and simplicity extend the life span of software by allowing it be changed to meet the customers' requirements. Not being able to meet a

customer requirement, or be able to make changes to the software without causing defects, is one way to end the life of a program.

- Privacy
  - Privacy is the ability of an individual or group to seclude themselves or information about themselves, and thereby express themselves selectively.
  - How?

Each client has a user name, password and data for job assignments.

- Integrability
  - System integration is defined in engineering as the process of bringing together the component sub-systems into one system (an aggregation of subsystems cooperating so that the system is able to deliver the overarching functionality) and ensuring that the subsystems function together as a system, and in information technology as the process of linking together different computing systems and software applications physically or functionally, to act as a coordinated whole.
  - How?

Process of bringing together the component sub-systems into one system

Design

<u>Context Design</u>

In This Diagram we will deal with four organizations.

- Hospitals
  - The System will send to the Hospitals Serums and Vaccines in specific quantity .
  - If there's an increase rate of a disease, the System will increase the Serums and Vaccines sent to the hospital.
  - The Hospitals will send patient's data to.
- Civil Registry
  - Will inform the System of all the Citizens living in the district.
  - Will inform the System with the birth and death rate.
- Government Inventory
  - Will send information about the Serums and Vaccines delivered to the district.
- Ministry of Health and Population
  - Will send information about the Serums and Vaccines stored.

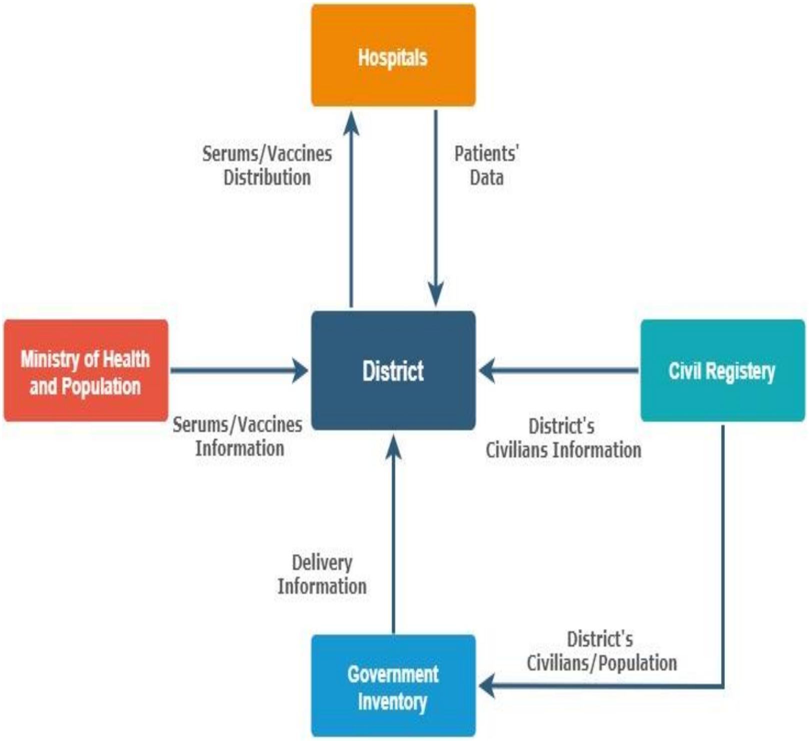

Hospitals
Serums/Vaccines Distribution
Patients' Data
Ministry of Health and Population
District
Civil Registery
Serums/Vaccines Information
District's Civilians Information
Delivery Information
District's Civilians/Population
Government Inventory

Figure 1 . Context Design

Architecture Design

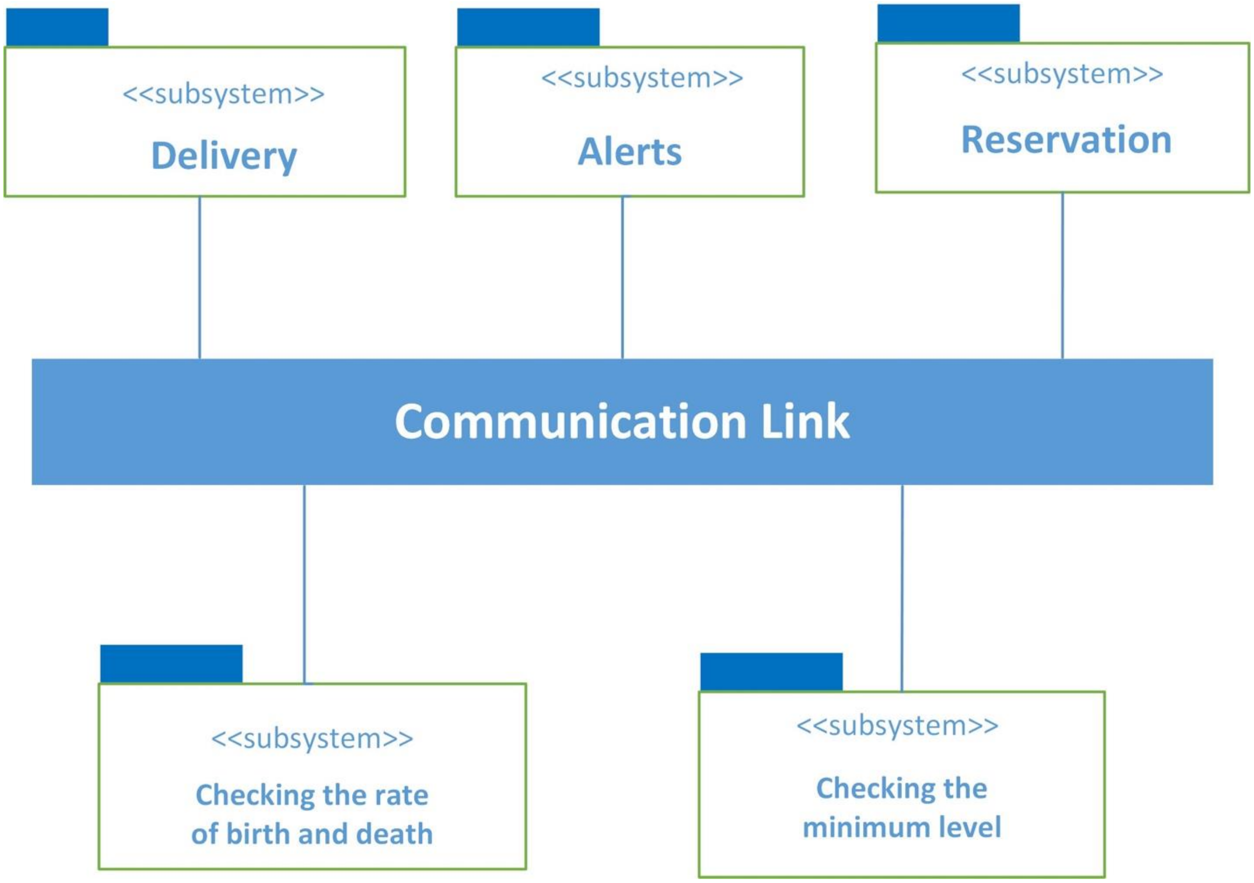


Figure 2 . Architecture Design

In Architecture Design, we Have five Subsystems connected to a communication link . The communication link helps them communicate with each other

Serums and Vaccines Inventory System (Component Diagram)

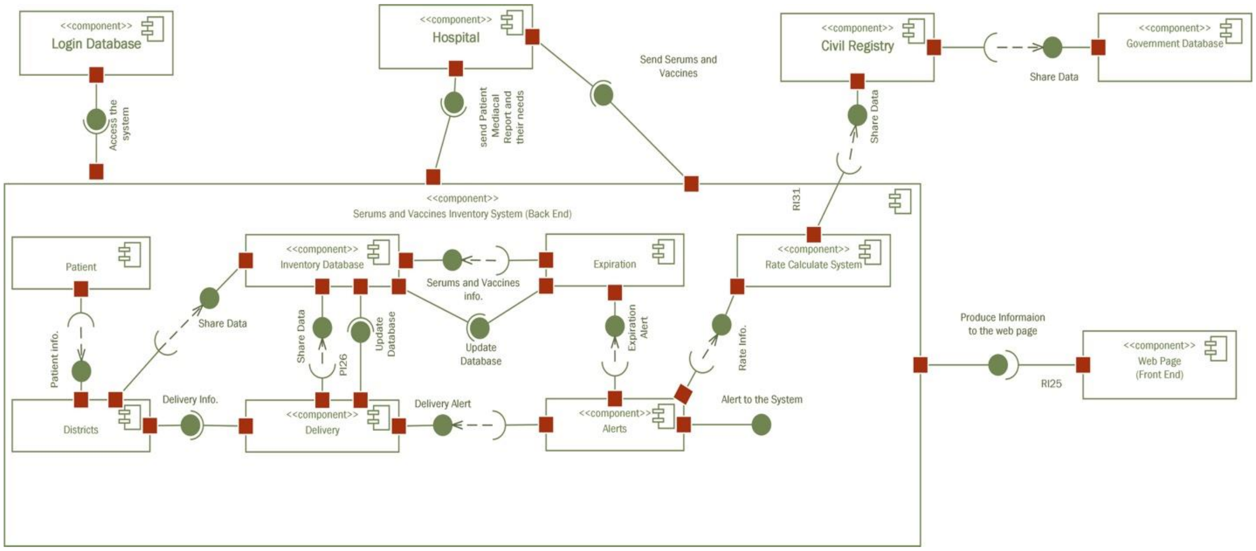


Figure 3 . Serums and Vaccines Inventory System

The component diagram it is a static diagram that represent the whole system why it is called component diagram as it works on components or subsystem as it represents in architecture diagram subsystems work with each other through communication link.
Firstly, any rectangle written on its component that's means that it can act freely in any other system but any rectangle which is not written on its component means that it is a part of the system and can't be present individual.
Secondly, the lollipop line resembles giving information to another component and the arc line resemble gaining the information from another component.
Briefly we will write how this UML diagram works, at the beginning the registration gives the system information as to access it, the whole system can act as a component can be integrated in another systems, the district gain information from database and also dependent on it as it can't take the decisions without database, the patient also gain information from district and dependent to it's own district, the whole system can deal with outside components as we mentioned in architecture design like Hospital to take from it medical reports and give it monthly quota from the inventory, also civil registry as to take from it the number of birth and death people which these information are taken from the government database.
Completing the system the delivery system gain information from database and update in it if any amount decrease, the alert system which has multi jobs it takes the information from expiration system an gives alert and also alert for delivery notifications, finaly the whole system deal with the front end which the user deals with.

Login System

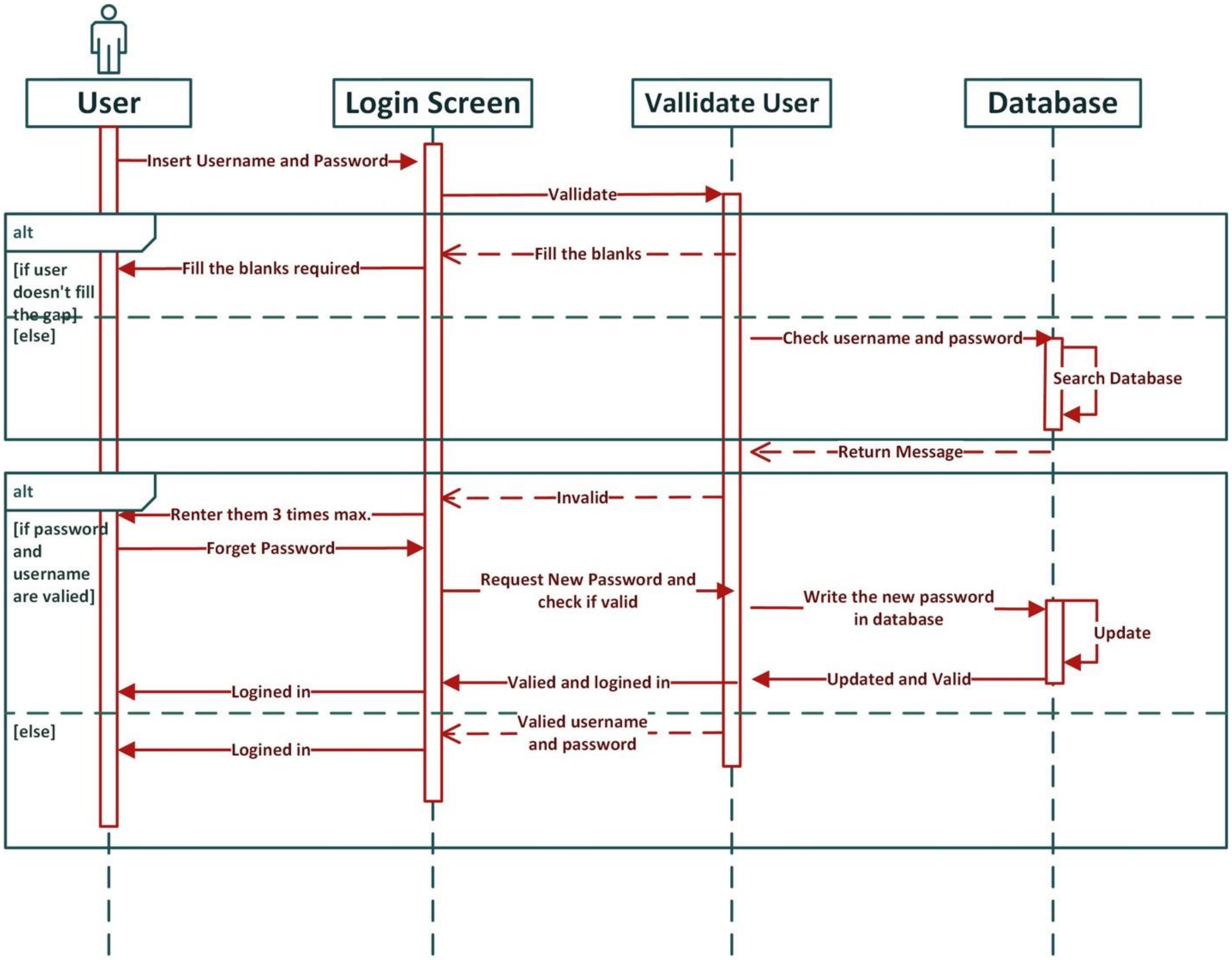


Figure 4 . Login System

- In this Diagram, it shows that the user has to enter his username and password if it is correct it will search in the database for the user, if the user is found, he will be logged in .
- If the user leaves the username and password blank, he will get a message to fill them.
- If the username or password is incorrect, he will get a message to renter them 3 times max.
- If the user forgets his password, he will request a new password and then the new password will be updated in the database, and he will be logged in .

Patients

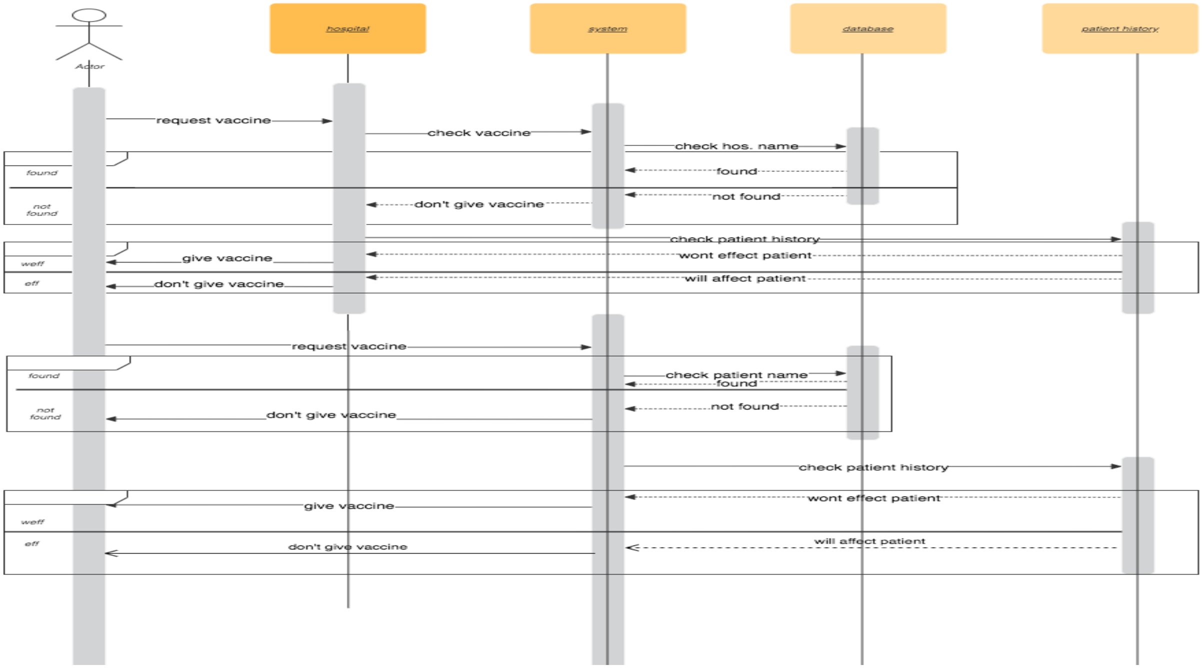


Figure 5 . Patients

- Patients can request a vaccine from a hospital, the hospital will check for the vaccine in the System, then the system will check the hospital name in the database, if it exists the system will give the vaccine to the hospital.
- If the hospital name doesn't exist in the database, the system will not give the hospital the vaccine.
- After receiving the Vaccine, the hospital will check the patient's medical history in the database, if the Vaccine will affect the patient's health negatively, the hospital will not give the patient the vaccine.
- If the Vaccine doesn't affect the patient, the hospital will give the patient the vaccine.
- The patient can request the Vaccine form the System; the system will check the patient's name in database.
- If the patient's name doesn't exist in the database, the System will not the patient the Vaccine.
- If the patient name exists, the System will check the patient's medical history in the database, if the vaccine will affect the patient's health negatively, the System will not give the patient the Vaccine .
- If the Vaccine doesn't affect the patient, the System will give the patient the vaccine.

Hospitals

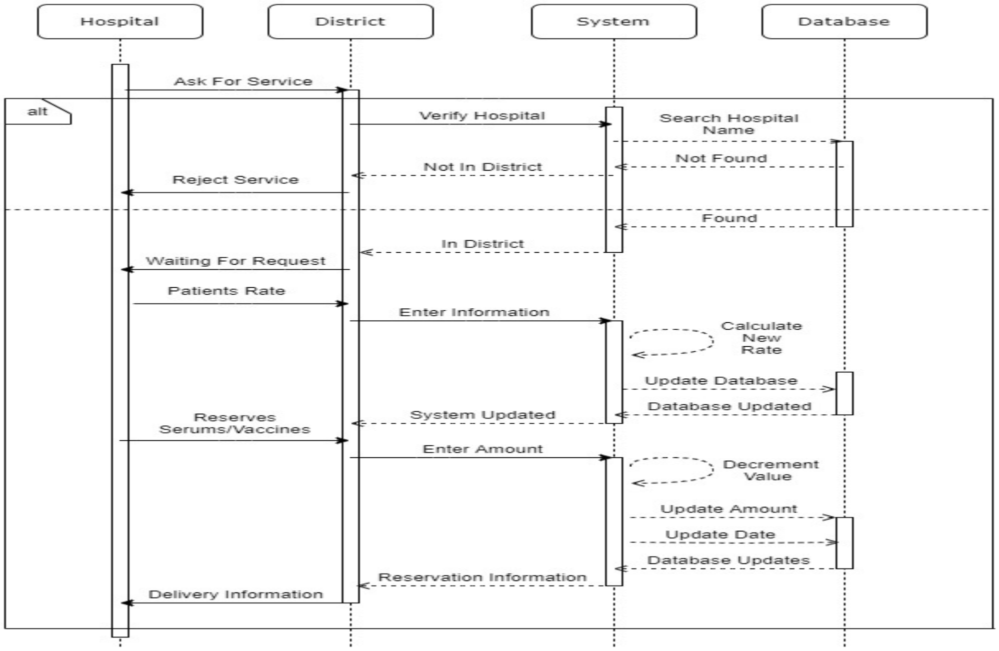


Figure 6 . Hospitals

- Hospital will ask for service from District , the District will verify the hospital in the system , then the system will check for the hospital name in the database .
- if the hospital name doesn't exist , the system will inform the district and the district will ignore the service .
- If the hospital name exist , the District will wait for the hospital's request .
- The hospital will send the patient's rate to the district , the system will calcualte the new rate , then will update the database .
- The database will send a message to the system , that the database is updated .
- Hospital will request from the district the monthly amount of serums and vaccines deliverd .
- The database will decrement from the district the amount of serums and vaccines requested by the hospital , then the database will update the current amount of vaccines and serums and update the date of the delivery to the hospital .
- The database will send a message to the district , that the database has been updated .
- Then the system will send a message to the district about the reservation information .
- The district will then send a message to the hospital about the delivery information .

Expiration

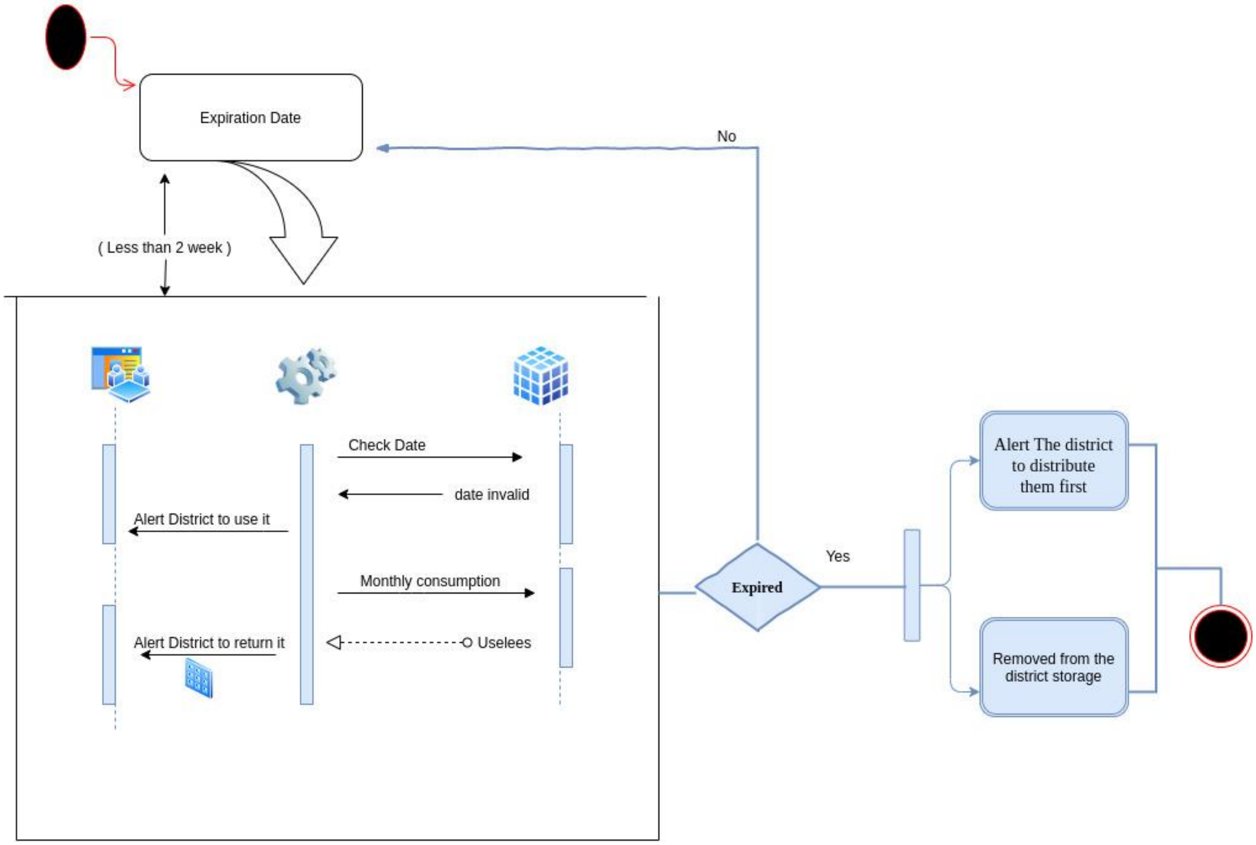


Figure 7 . Expiration

- The system will check the date of the serum in the database .
- If the date of serum is going to expire after three months , the system will alert the district to use this serum first .
- The system will check the monthly consumption the serum .
- If the serum consumption is insignificant , it will alert the system to take it and give to another district where it's needed .
- If the serums is not expired , the system will repeat these two conditions every two weeks .
- If the serum is expired , the system will alert the district to remove it .

Delievery System

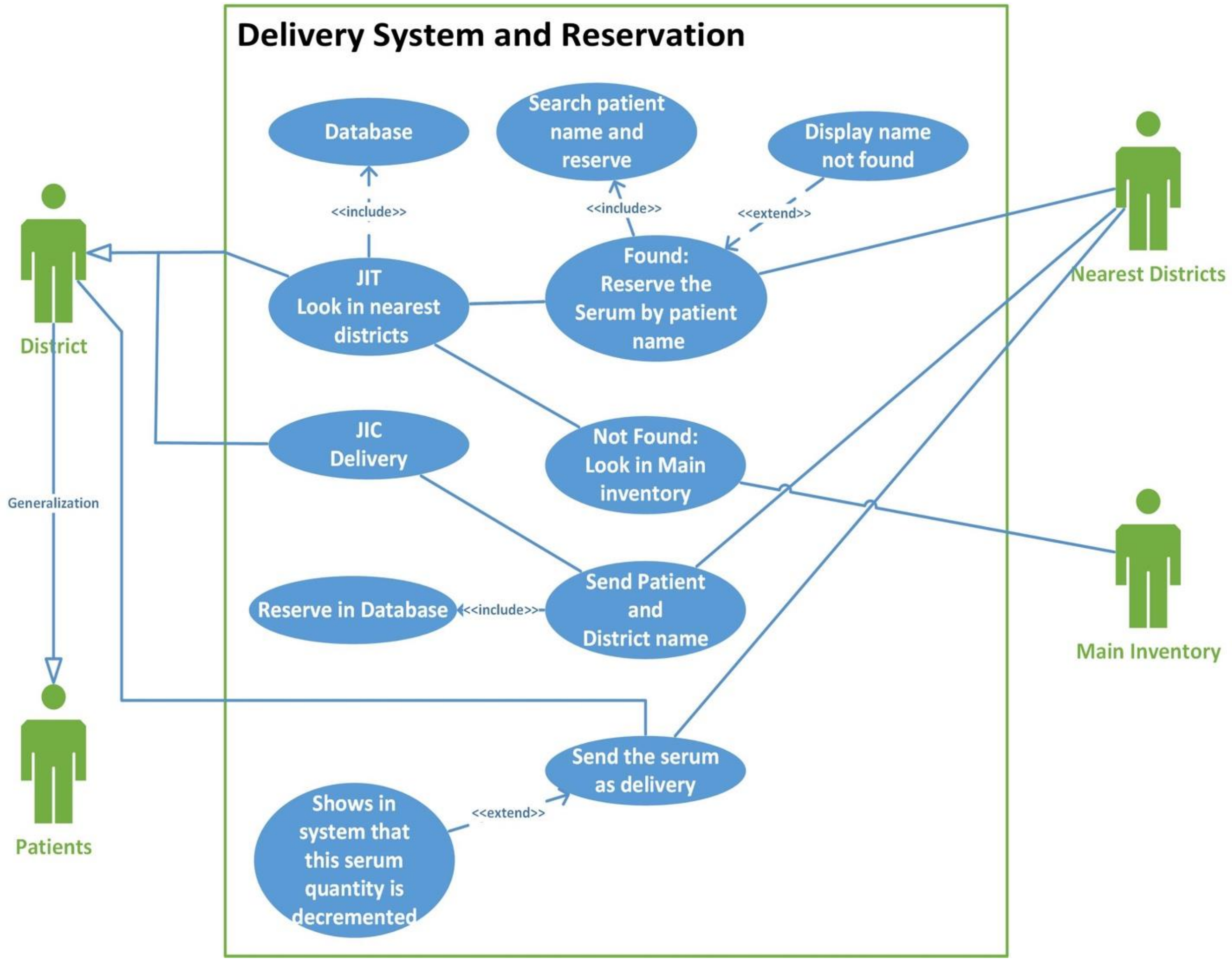

Delivery System and Reservation
Database
Search patient name and reserve
Display name not found
<<include>>
<<include>>
<<extend>>
JIT Look in nearest districts
Found: Reserve the Serum by patient name
District
Nearest Districts
JIC Delivery
Not Found: Look in Main inventory
Generalization
Main Inventory
Reserve in Database
<<include>>
Send Patient and District name
Patients
Send the serum as delivery
<<extend>>
Shows in system that this serum quantity is decremented

Figure 8 . Delivery System

- There’s two primary actors , district and patients .
- There’s two secondary actors , nearest districts and main inventory .
- In JIT (Just In Time) if the patient needs a serum/vaccine but not urgently the district looks for the serum/vaccine in the nearest district database .
- If the patient name is found in database and the serum/vaccine is found , reserve the serum by the patient name .
- If the patient’s name is not found , display a message that the name not found.
- If the serum/vaccine is not found inn the nearest district , look for it in the main inventory database.
- JIN (Just In Case) if the patient needs a serum/vaccine urgently .
- Send the patient and district name to the nearest district , and reserve it in database .
- The nearest district sends the serum/vaccine as delievery , and shows in the system that this serum/vaccime quantity is decremented .

Alert System

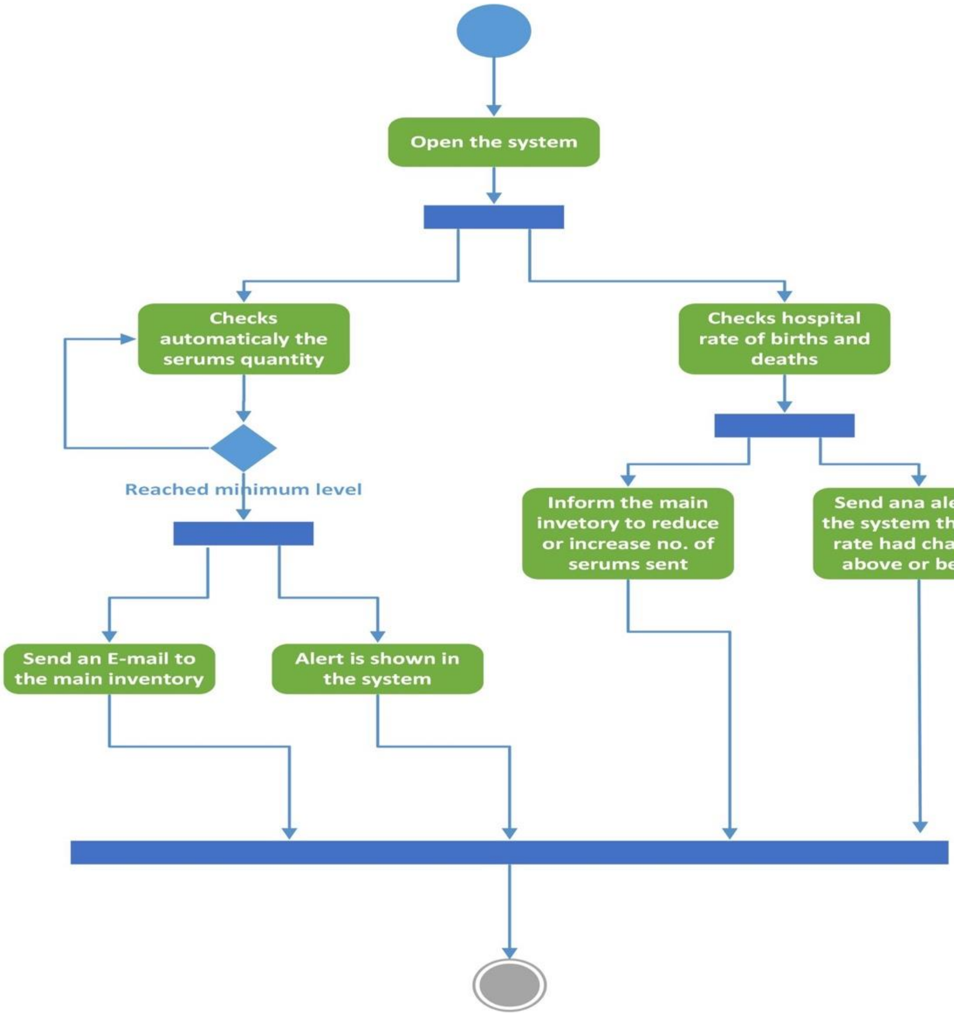

Open the system
Checks automaticaly the serums quantity
Checks hospital rate of births and deaths
Reached minimum level
Inform the main invetory to reduce or increase no. of serums sent
Send ana alert to the system that the rate had changed above or below
Send an E-mail to the main inventory
Alert is shown in the system

Figure 9 . Alert System

- The system will check automaticaly the Serums quantity in databsase and check the hospital rate of birth and death , they both are working concurrently .
- If it did not reach minimum level , it will keep on checking .
- If it did reach minimum level .
  - The system will recieve an alert .
  - The system will send an email to the main inventory .
- The system will receive an alert when the rate of birth and death cannge .
- The system will inform the main inventory to reduce or increase the number of Serums .

Erd System

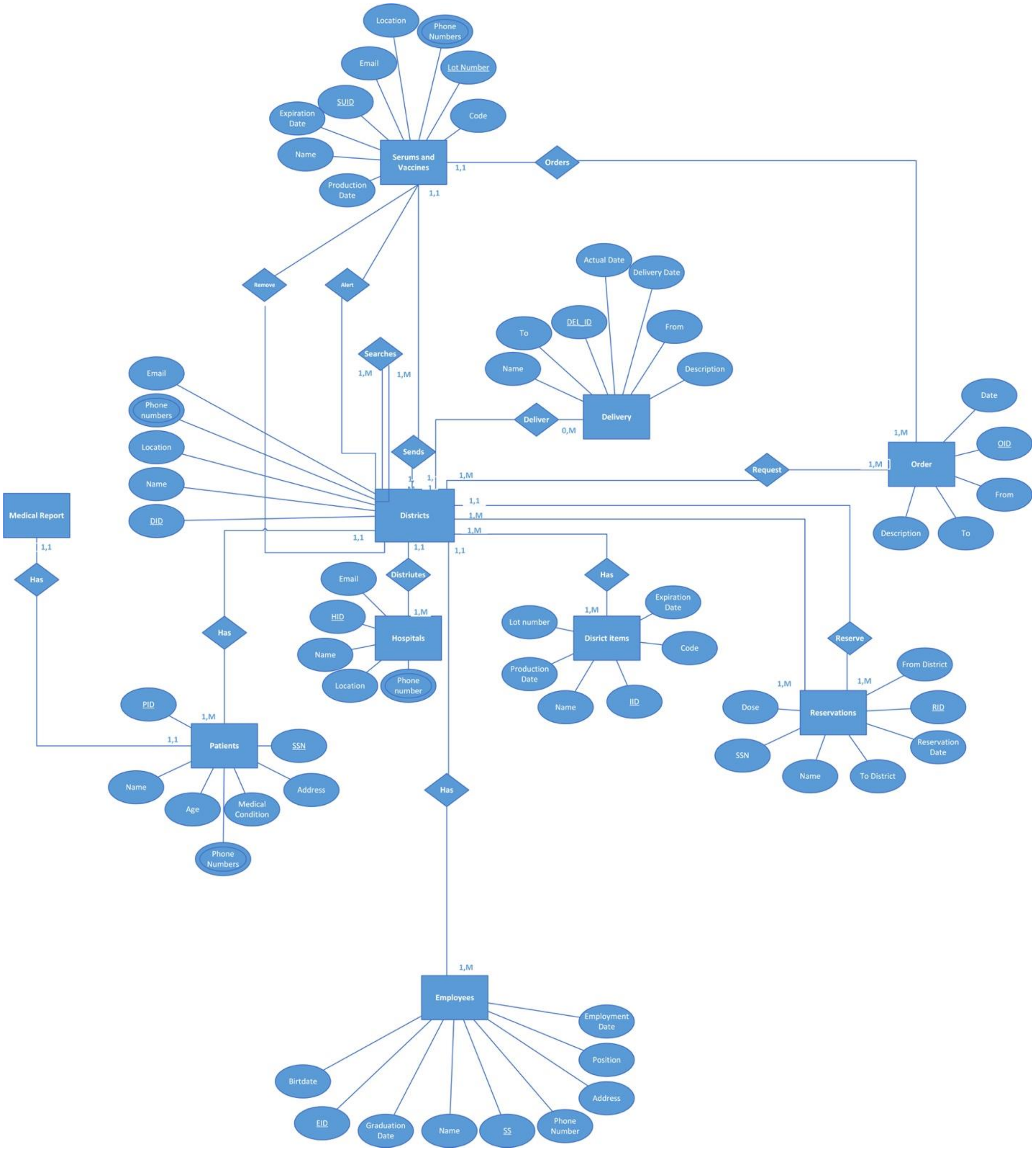


Figure 10 . ERD System

Implemenntation

In this application we used Codeigniter as our Framework , for many reasons such as :

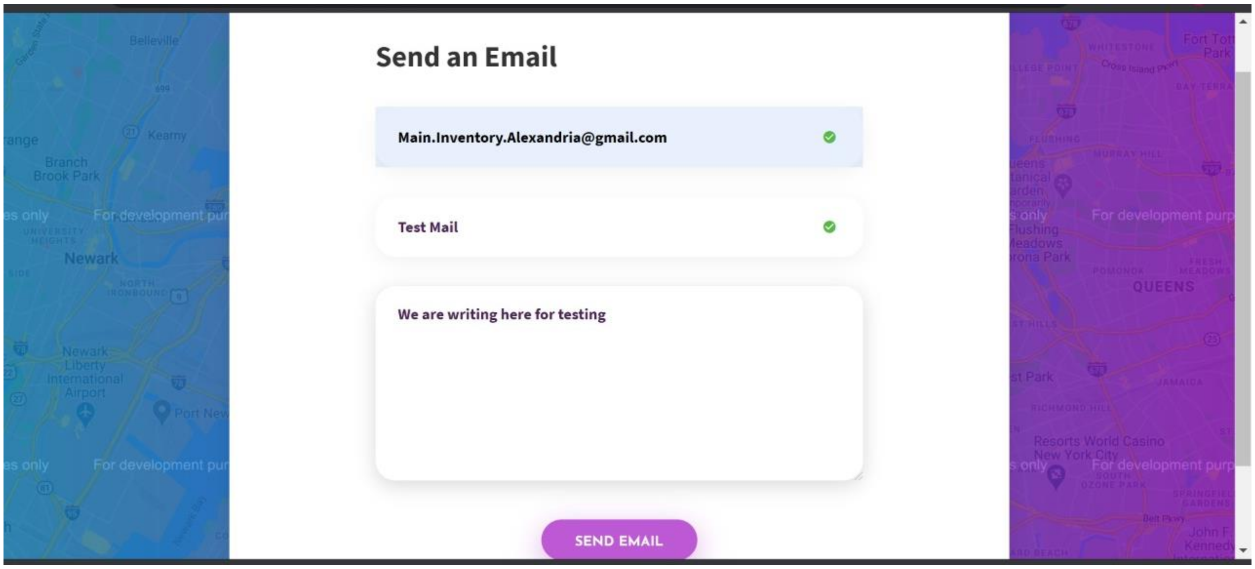
- The entire source code for CodeIgniter framework is close to 2MB.
- This makes it easy to master CodeIgniter and how it works.
- It also simplifies deploying and updating it.
- CodeIgniter takes less than one second to load just after installation.
- You can load on average around less than 50ms.
- The extra time spent optimizing like is the case in another framework is freed up when you are working with CodeIgniter.
- The built-in features are designed to work independently without relying too much on other components.
- This makes it easy to maintain and make upgrades
- The framework is well documented, and there are good books, tutorials and answered forum questions on CodeIgniter.
- The framework uses the Model-View-Controller architectural design.
- MVC separates the data, business logic, and presentation

In this application we used XAMPP , for many reasons such as :

- It has over any other web server is that it is easy to configure and use.
- It is cross-platform software available for all kinds of operating systems such as Linux , Mac and Windows
- It possesses many other essential modules such as phpMyAdmin, OpenSSL, MediaWiki, WordPress, Joomla and more
- the user is able to initiate and end the whole webserver+database stack with just one command

In this application we used Web Services API Google Maps .

Send an email



Send an Email

Main.Inventory.Alexandria@gmail.com

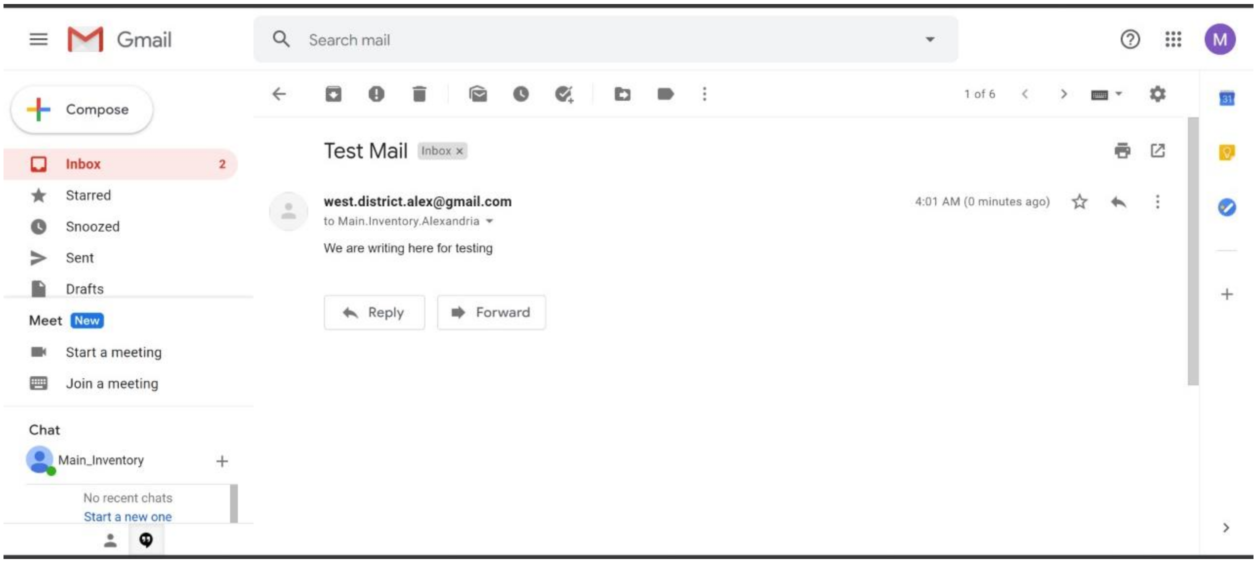
Test Mail

We are writing here for testing

SEND EMAIL
Belleville
Kearny
Branch Brook Park
Newark
Newark Liberty International Airport
Port Newark
For development purposes only
QUEENS
Flushing Meadows Corona Park
Resorts World Casino New York City
Fort Totten Park

Figure 11 . Screenshot sending mail

Here we can send an email to other districts and in the background we have google maps , which is made by using web services API .



Test Mail

west.district.alex@gmail.com

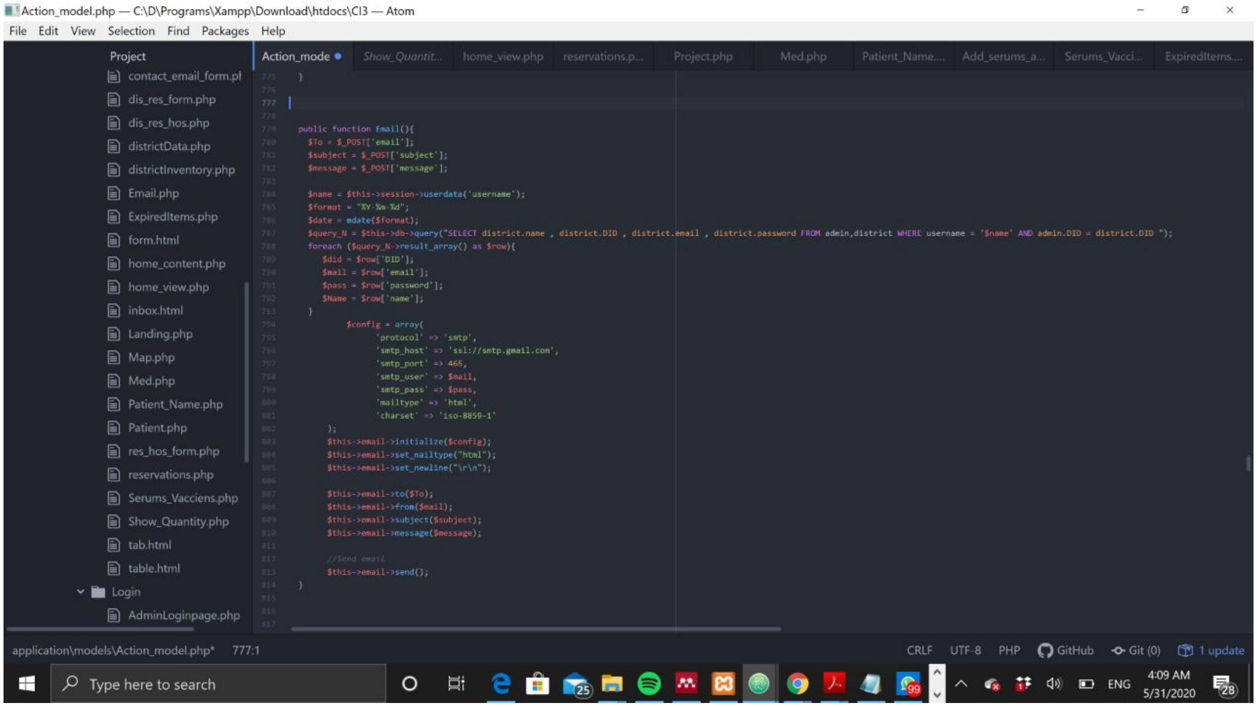
to Main.Inventory.Alexandria

4:01 AM (0 minutes ago)

We are writing here for testing

Figure 12 . Gmail account

We created an email to receive mails sent from another districts .

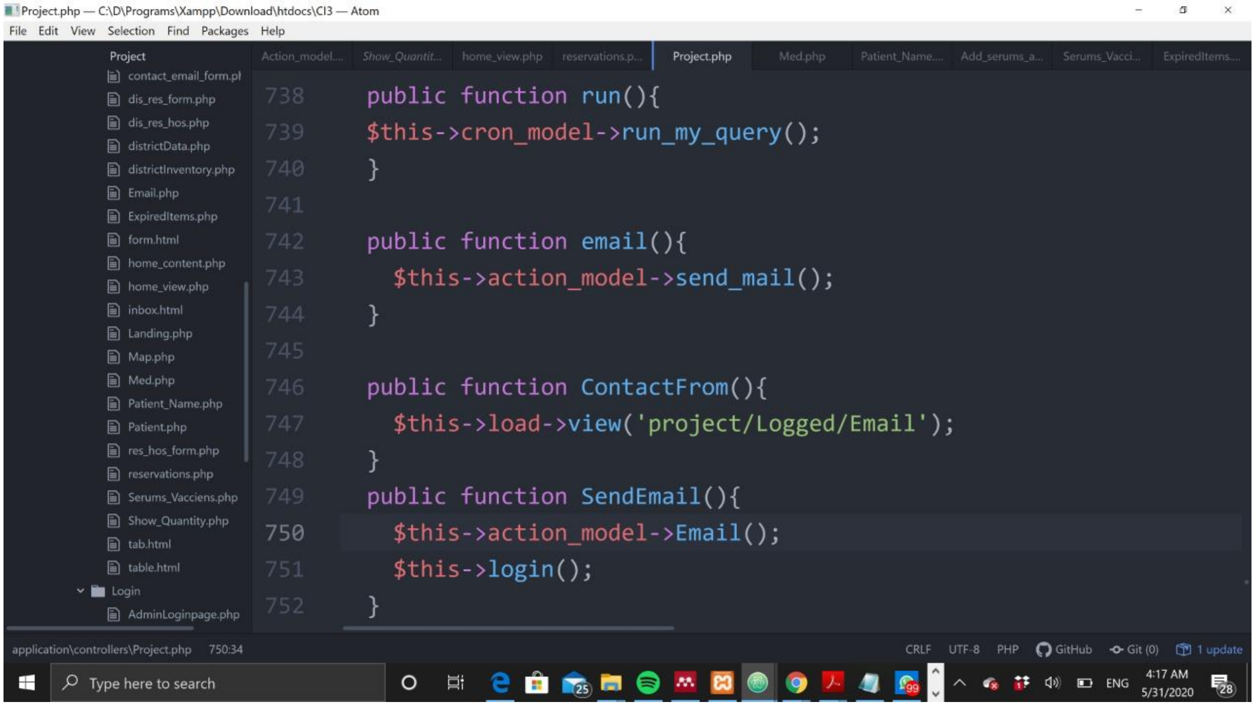

Action_model.php — C:\D\Programs\Xampp\Download\htdocs\CI3 — Atom
File Edit View Selection Find Packages Help
application\models\Action_model.php* 777:1

```php
  }


  public function Email(){
    $To = $_POST['email'];
    $subject = $_POST['subject'];
    $message = $_POST['message'];

    $name = $this->session->userdata('username');
    $format = "%Y-%m-%d";
    $date = mdate($format);
    $query_N = $this->db->query("SELECT district.name , district.DID , district.email , district.password FROM admin,district WHERE username = '$name' AND admin.DID = district.DID ");
    foreach ($query_N->result_array() as $row){
      $did = $row['DID'];
      $mail = $row['email'];
      $pass = $row['password'];
      $Name = $row['name'];
    }
          $config = array(
                'protocol' => 'smtp',
                'smtp_host' => 'ssl://smtp.gmail.com',
                'smtp_port' => 465,
                'smtp_user' => $mail,
                'smtp_pass' => $pass,
                'mailtype' => 'html',
                'charset' => 'iso-8859-1'
        );
        $this->email->initialize($config);
        $this->email->set_mailtype("html");
        $this->email->set_newline("\r\n");

        $this->email->to($To);
        $this->email->from($mail);
        $this->email->subject($subject);
        $this->email->message($message);

        //Send email
        $this->email->send();
  }
```

Figure 13 . Model of Email

we dealt with third parties , to send emails from localhost mails by using smtp ("ssl://smpt.gmail.com") protocols to Gmail .

Model of Email .

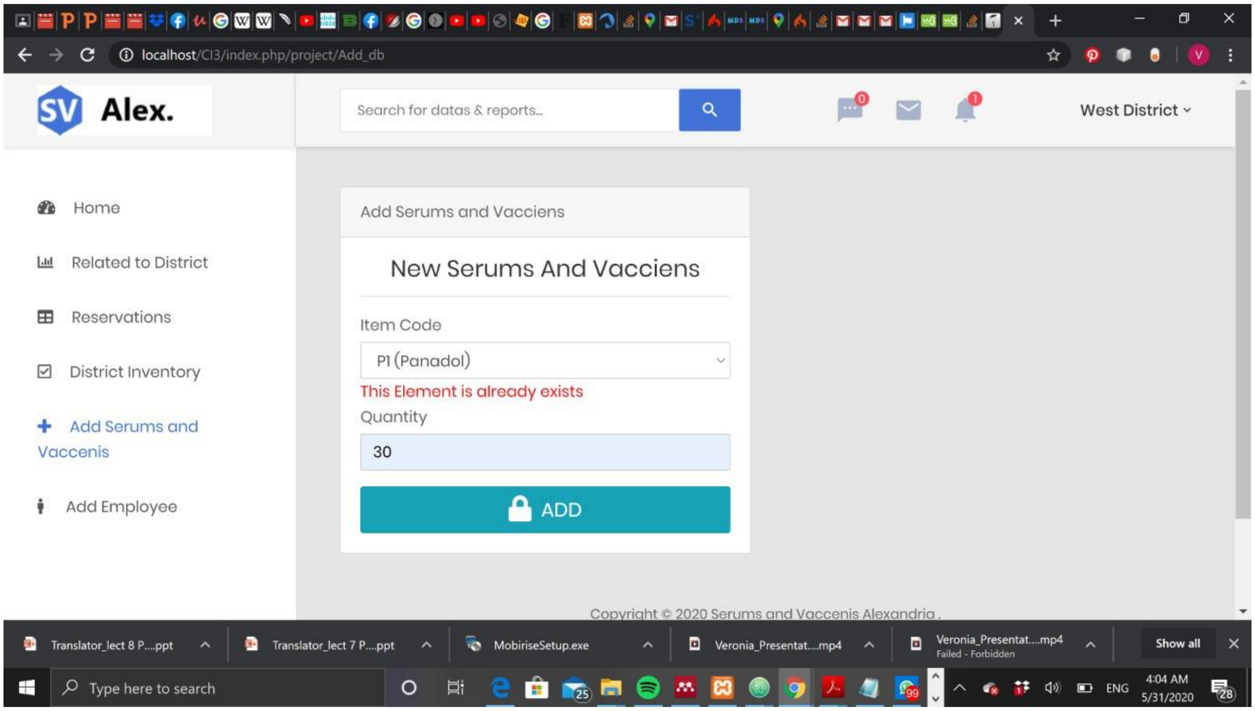

Project.php — C:\D\Programs\Xampp\Download\htdocs\CI3 — Atom
File Edit View Selection Find Packages Help
application\controllers\Project.php 750:34

```php
    public function run(){
    $this->cron_model->run_my_query();
    }

    public function email(){
      $this->action_model->send_mail();
    }

    public function ContactFrom(){
      $this->load->view('project/Logged/Email');
    }
    public function SendEmail(){
      $this->action_model->Email();
      $this->login();
    }
```

Figure 14 . Controller of Email

Controller of Email .

Add Items



Add Serums and Vacciens

New Serums And Vacciens

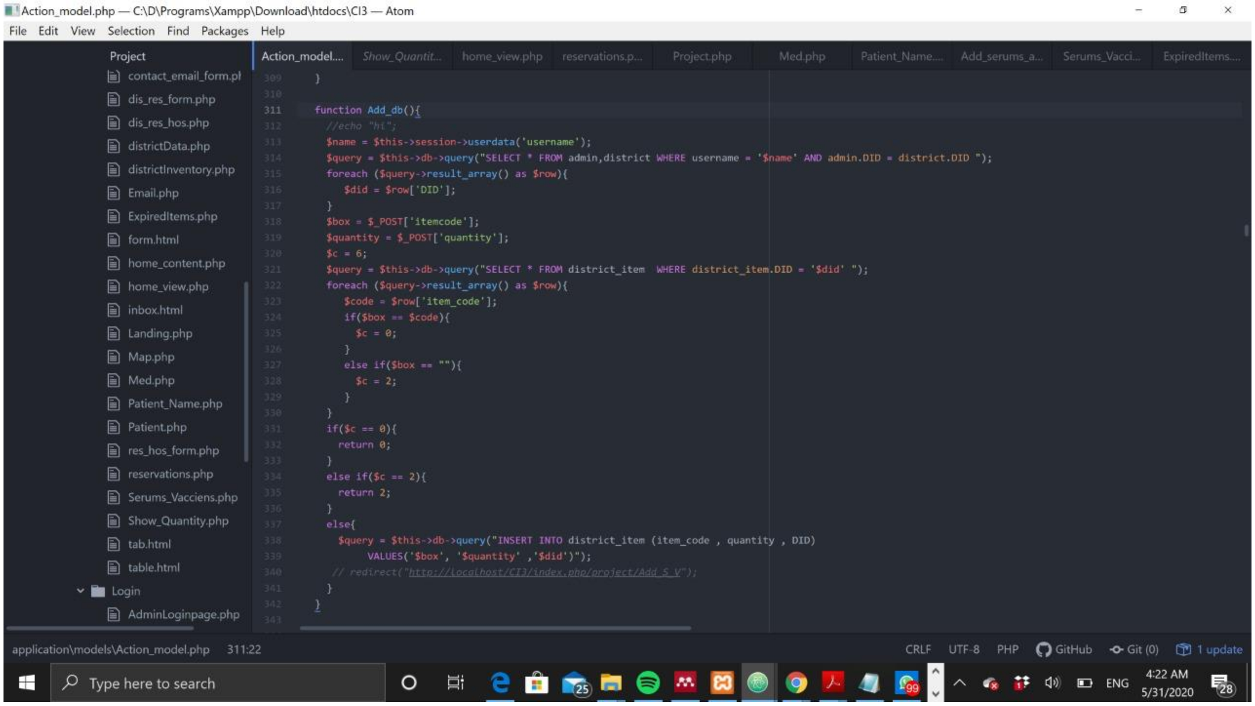
Item Code: P1 (Panadol)

This Element is already exists

Quantity: 30

Figure 15 . Add Items

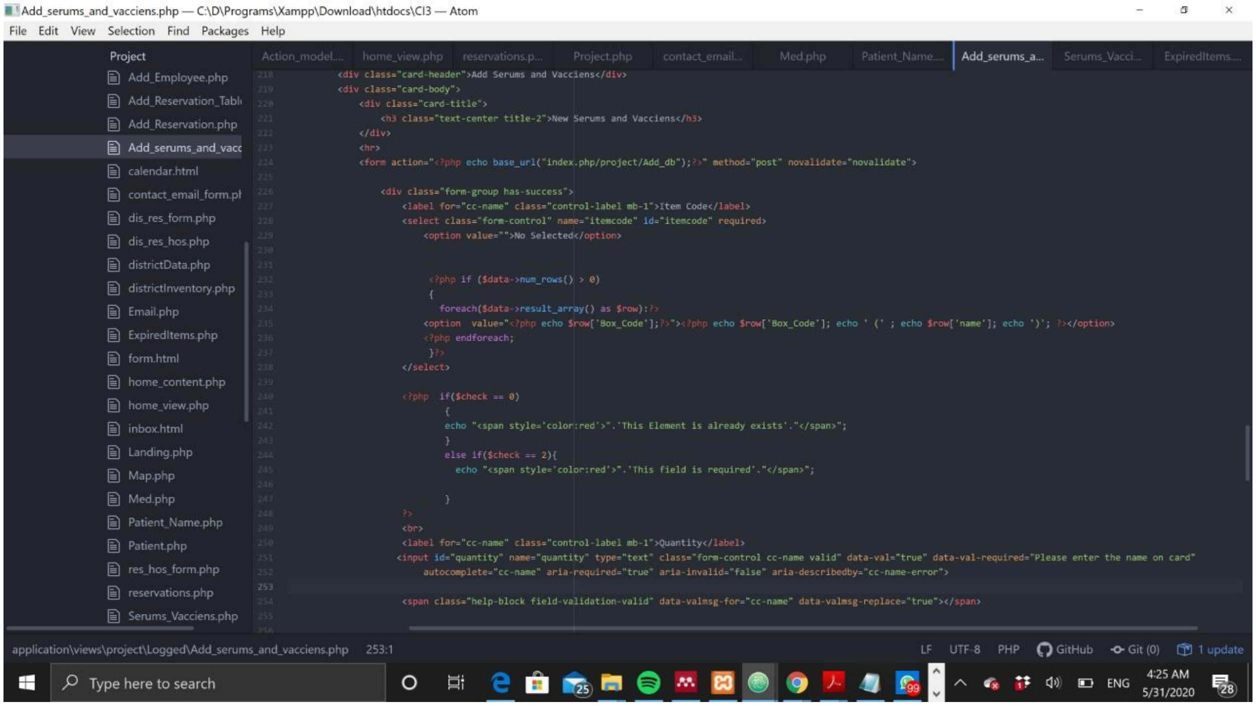
employee/admin add serum/vaccine to the system and the quantity wanted of that serum/vaccine



```php
  }

  function Add_db(){
    //echo "hi";
    $name = $this->session->userdata('username');
    $query = $this->db->query("SELECT * FROM admin,district WHERE username = '$name' AND admin.DID = district.DID ");
    foreach ($query->result_array() as $row){
       $did = $row['DID'];
    }
    $box = $_POST['itemcode'];
    $quantity = $_POST['quantity'];
    $c = 6;
    $query = $this->db->query("SELECT * FROM district_item  WHERE district_item.DID = '$did' ");
    foreach ($query->result_array() as $row){
       $code = $row['item_code'];
       if($box == $code){
         $c = 0;
       }
       else if($box == ""){
         $c = 2;
       }
    }
    if($c == 0){
      return 0;
    }
    else if($c == 2){
      return 2;
    }
    else{
      $query = $this->db->query("INSERT INTO district_item (item_code , quantity , DID)
           VALUES('$box', '$quantity' ,'$did')");
     // redirect("http://localhost/CI3/index.php/project/Add_S_V");
    }
  }
```

.Figure 16 . Model of Add Items

the system checks the district, and display the serums/vaccines available in that district , and check if the quantity requested is available and update it in the database .

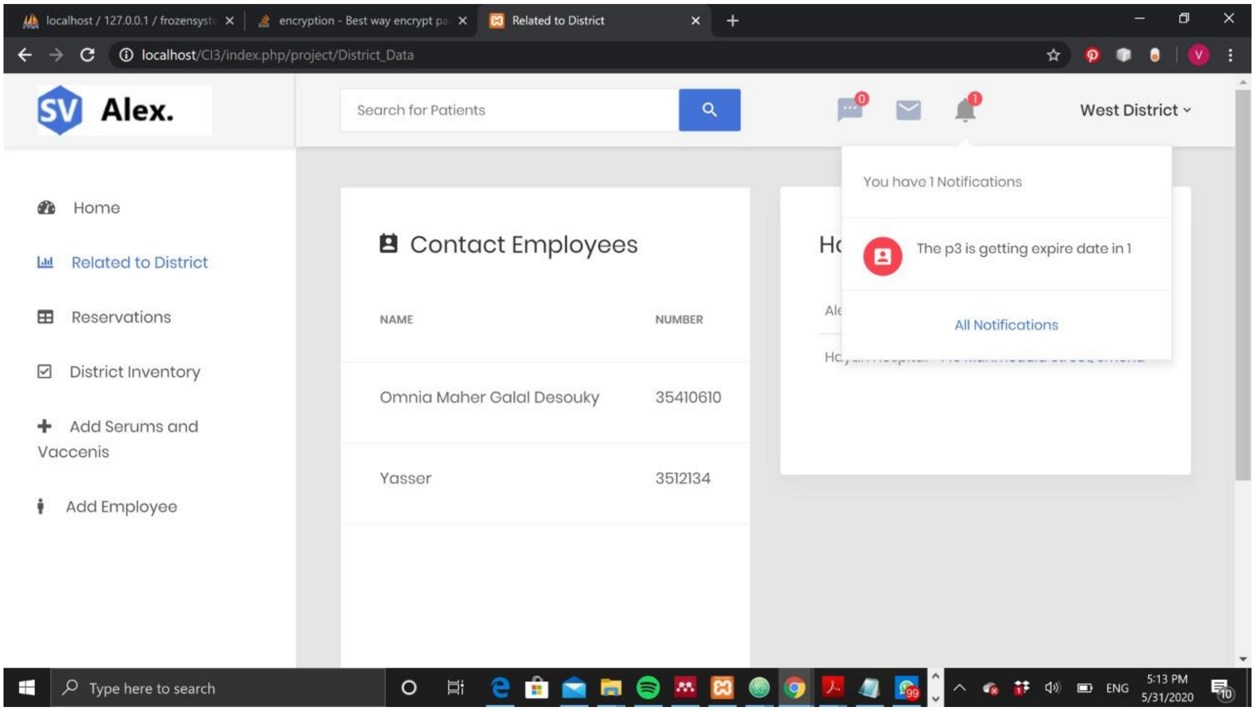


```
<div class="card-header">Add Serums and Vacciens</div>
<div class="card-body">
    <div class="card-title">
        <h3 class="text-center title-2">New Serums and Vacciens</h3>
    </div>
    <hr>
    <form action="<?php echo base_url("index.php/project/Add_db");?>" method="post" novalidate="novalidate">

        <div class="form-group has-success">
            <label for="cc-name" class="control-label mb-1">Item Code</label>
            <select class="form-control" name="itemcode" id="itemcode" required>
                <option value="">No Selected</option>


                 <?php if ($data->num_rows() > 0)
                 {
                   foreach($data->result_array() as $row):?>
                <option  value="<?php echo $row['Box_Code'];?>"><?php echo $row['Box_Code']; echo ' (' ; echo $row['name']; echo ')'; ?></option>
                <?php endforeach;
                 }?>
            </select>

            <?php  if($check == 0)
                    {
                    echo "<span style='color:red'>".'This Element is already exists'."</span>";
                    }
                    else if($check == 2){
                      echo "<span style='color:red'>".'This field is required'."</span>";

                    }
            ?>
            <br>
            <label for="cc-name" class="control-label mb-1">Quantity</label>
           <input id="quantity" name="quantity" type="text" class="form-control cc-name valid" data-val="true" data-val-required="Please enter the name on card"
                autocomplete="cc-name" aria-required="true" aria-invalid="false" aria-describedby="cc-name-error">

            <span class="help-block field-validation-valid" data-valmsg-for="cc-name" data-valmsg-replace="true"></span>
```

Figure 17 . View Code of Add Items

View code of Add Items

Notification Alert



You have 1 Notifications

The p3 is getting expire date in 1

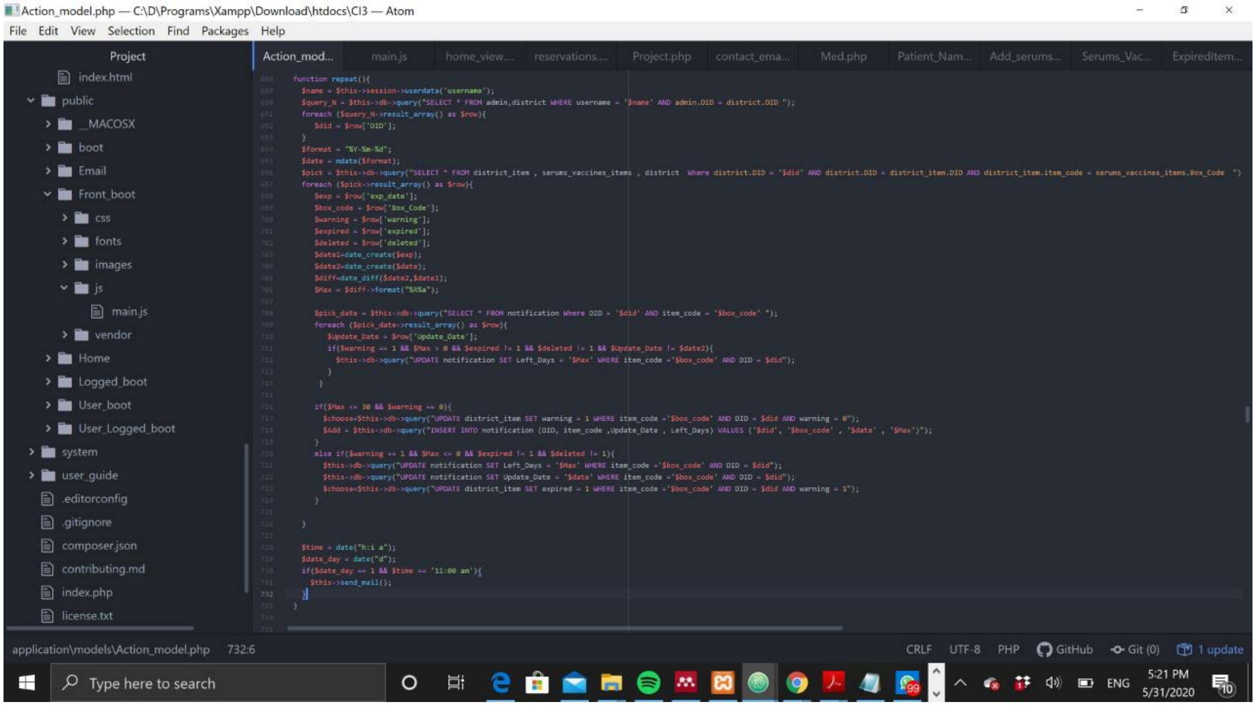
All Notifications

Contact Employees

NAME	NUMBER
Omnia Maher Galal Desouky	35410610
Yasser	3512134

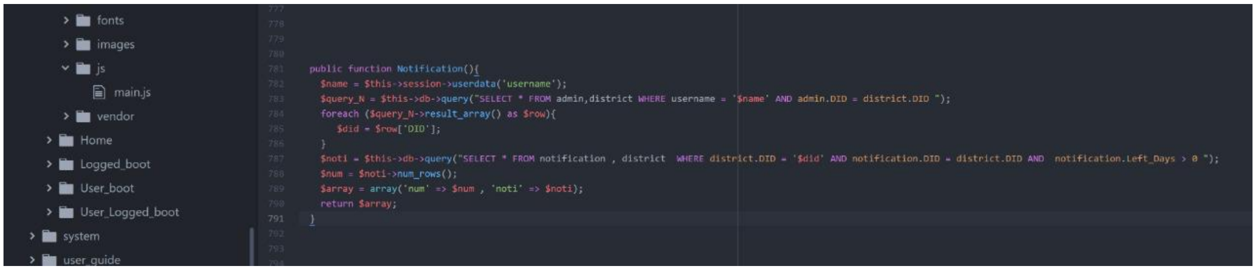
Figure 18 . Notification Alert

the system sends notifications to alert the districts if the serum/vaccine expire date is close .



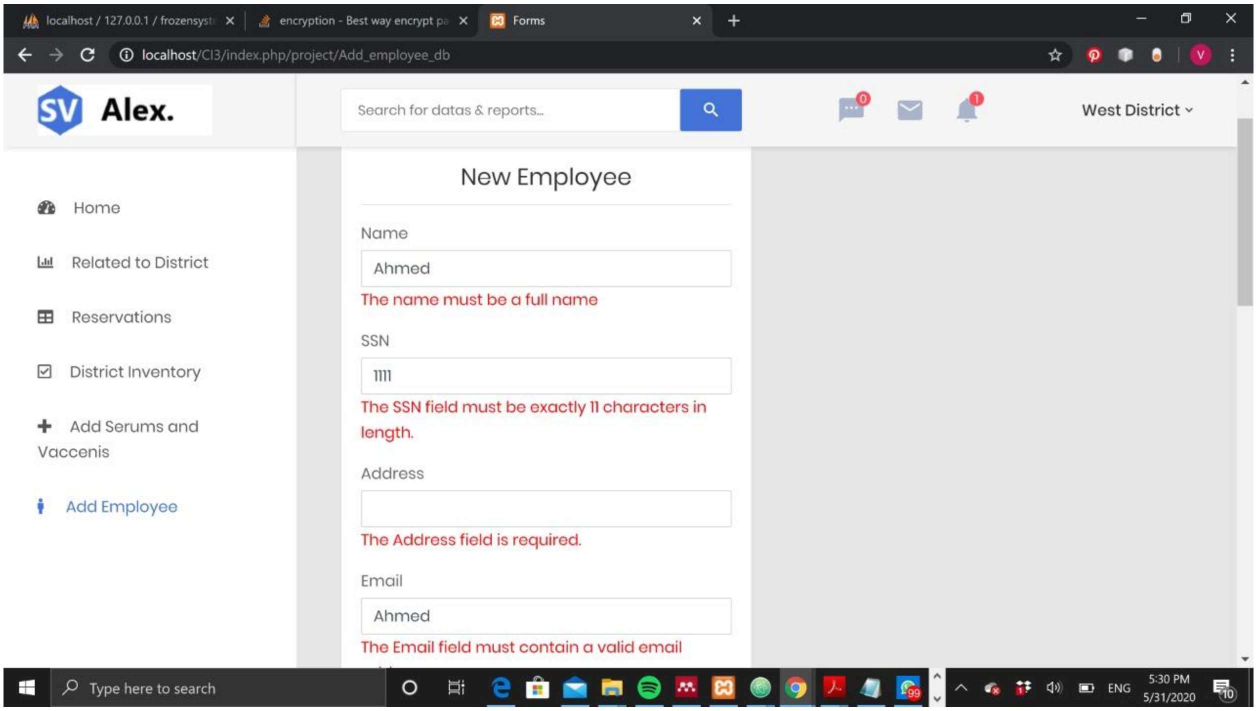
```
function repeat(){
  $name = $this->session->userdata('username');
  $query_N = $this->db->query("SELECT * FROM admin,district WHERE username = '$name' AND admin.DID = district.DID ");
  foreach ($query_N->result_array() as $row){
     $did = $row['DID'];
  }
  $format = "%Y-%m-%d";
  $date = mdate($format);
  $pick = $this->db->query("SELECT * FROM district_item , serums_vaccines_items , district  Where district.DID = '$did' AND district.DID = district_item.DID AND district_item.item_code = serums_vaccines_items.Box_Code  ")
  foreach ($pick->result_array() as $row){
     $exp = $row['exp_date'];
     $box_code = $row['Box_Code'];
     $warning = $row['warning'];
     $expired = $row['expired'];
     $deleted = $row['deleted'];
     $date1=date_create($exp);
     $date2=date_create($date);
     $diff=date_diff($date2,$date1);
     $Max = $diff->format("%R%a");

     $pick_date = $this->db->query("SELECT * FROM notification Where DID = '$did' AND item_code = '$box_code' ");
     foreach ($pick_date->result_array() as $row){
        $Update_Date = $row['Update_Date'];
        if($warning == 1 && $Max > 0 && $expired != 1 && $deleted != 1 && $Update_Date != $date2){
          $this->db->query("UPDATE notification SET Left_Days = '$Max' WHERE item_code ='$box_code' AND DID = $did");
        }
      }

     if($Max <= 30 && $warning == 0){
       $choose=$this->db->query("UPDATE district_item SET warning = 1 WHERE item_code ='$box_code' AND DID = $did AND warning = 0");
       $Add = $this->db->query("INSERT INTO notification (DID, item_code ,Update_Date , Left_Days) VALUES ('$did', '$box_code' , '$date' , '$Max')");
     }
     else if($warning == 1 && $Max <= 0 && $expired != 1 && $deleted != 1){
       $this->db->query("UPDATE notification SET Left_Days = '$Max' WHERE item_code ='$box_code' AND DID = $did");
       $this->db->query("UPDATE notification SET Update_Date = '$date' WHERE item_code ='$box_code' AND DID = $did");
       $choose=$this->db->query("UPDATE district_item SET expired = 1 WHERE item_code ='$box_code' AND DID = $did AND warning = 1");
     }

  }

  $time = date("h:i a");
  $date_day = date("d");
  if($date_day == 1 && $time == '11:00 am'){
    $this->send_mail();
  }
}
```

Figure 19 . Model of Notification Alert 1
the system check the serum/vaccine expire date and alert the district if the expire date is close .



```
public function Notification(){
  $name = $this->session->userdata('username');
  $query_N = $this->db->query("SELECT * FROM admin,district WHERE username = '$name' AND admin.DID = district.DID ");
  foreach ($query_N->result_array() as $row){
     $did = $row['DID'];
  }
  $noti = $this->db->query("SELECT * FROM notification , district  WHERE district.DID = '$did' AND notification.DID = district.DID AND  notification.Left_Days > 0 ");
  $num = $noti->num_rows();
  $array = array('num' => $num , 'noti' => $noti);
  return $array;
}
```

Figure 20 . Model of Notification Alert 2
The system checks the district and send alerts based on serums/vaccines avilable in that district . Model of Notification Alert .



New Employee

Name

Ahmed

The name must be a full name

SSN

1111

The SSN field must be exactly 11 characters in length.

Address

The Address field is required.

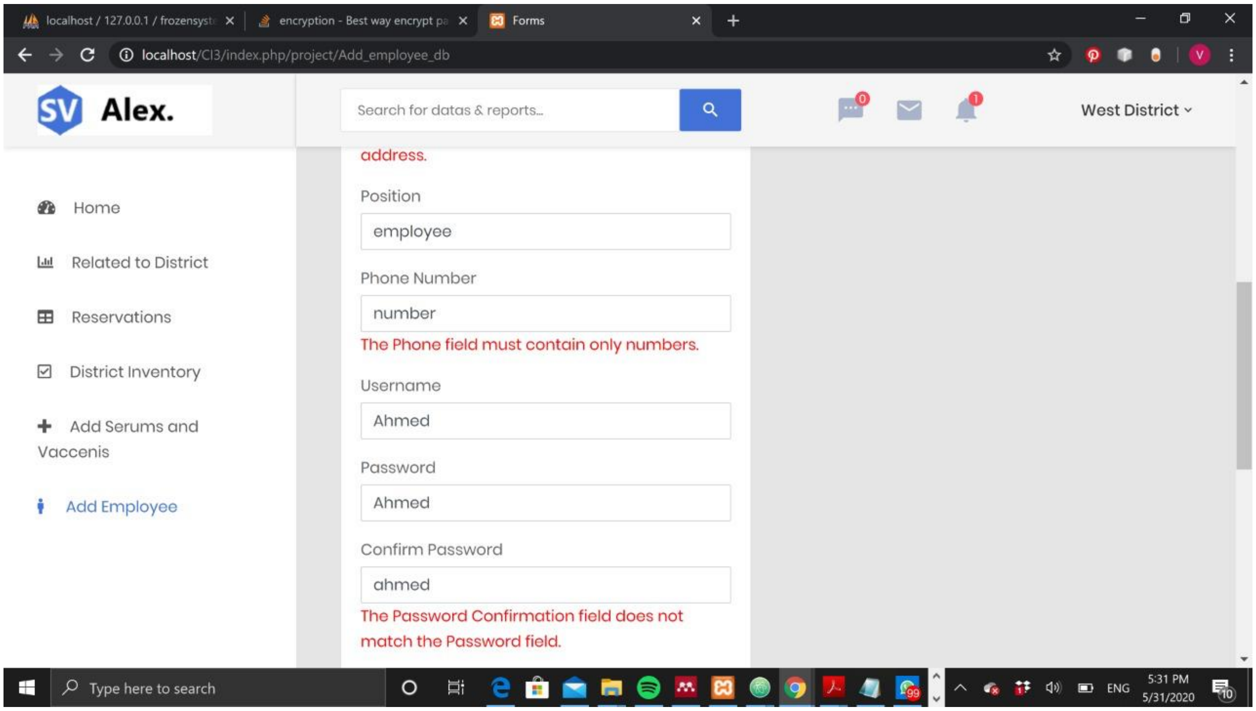
Email

Ahmed

The Email field must contain a valid email

Figure 21 . Add Employees 1

The system displays error if the entered data is not complete or wrong . like here the admin should enter the employee’s full name , Social Security Number lenght should be 11 numbers , the address is required and the email should be valid



address.

Position

employee

Phone Number

number

The Phone field must contain only numbers.

Username

Ahmed

Password

Ahmed

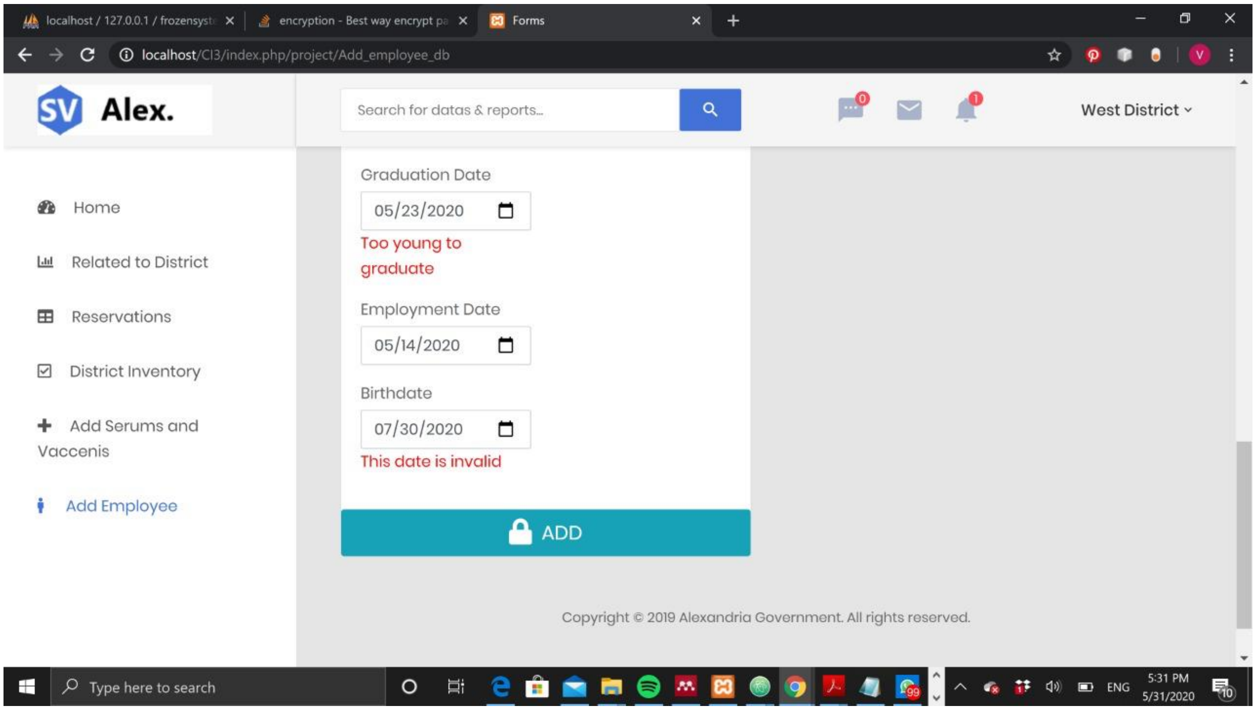
Confirm Password

ahmed

The Password Confirmation field does not match the Password field.

Figure 21 . Add Employees 2

The phone number should contatin numbers only , the user name is required , the two passwords have to match .



Graduation Date

05/23/2020

Too young to graduate

Employment Date

05/14/2020

Birthdate

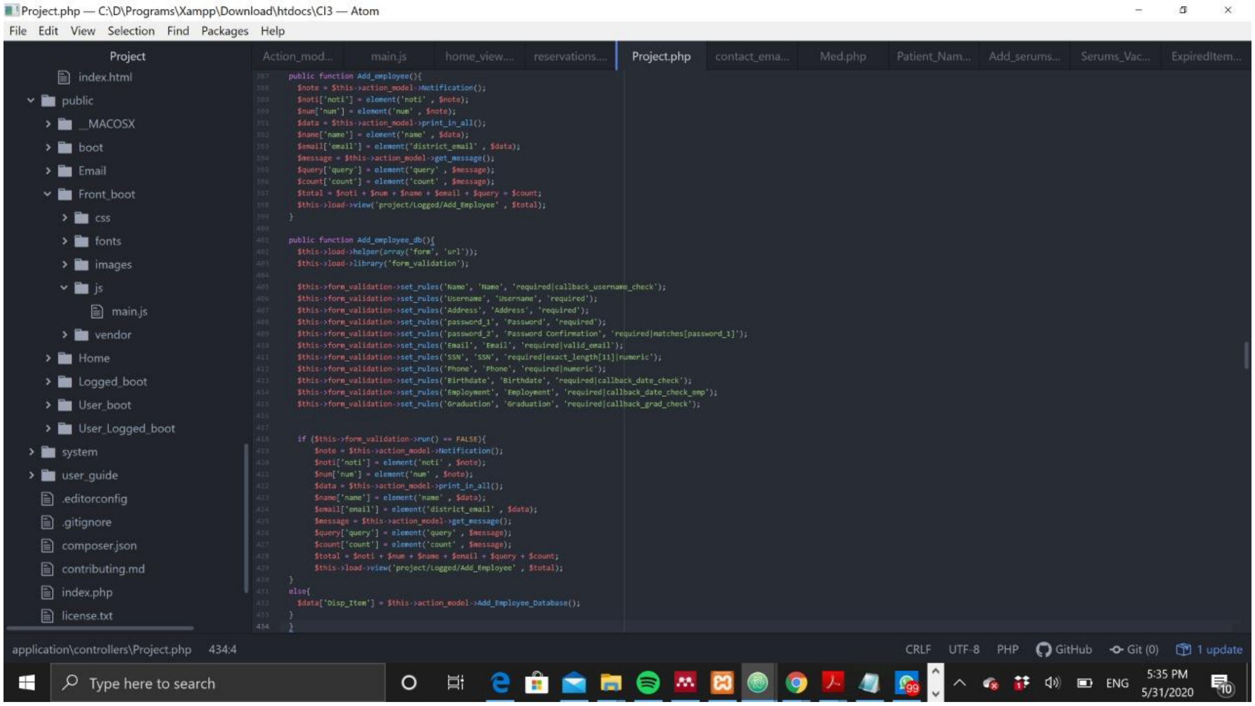
07/30/2020

This date is invalid

Copyright © 2019 Alexandria Government. All rights reserved.

Figure 21 . Add Employees 3

- The employee’s Birthdate should be between 24 and 60 , if the admin enters an invalid Birthdate , the system will display an error message .
- The system will alson check today’s date and subtract it from the Gradutation Date entered , if the output is negative , the system will display an error message .
- The system will check the Employment Date and compare it with the graduation date , if there’s an error , the system will display an error message .



```
public function Add_employee(){
  $note = $this->action_model->Notification();
  $noti['noti'] = element('noti' , $note);
  $num['num'] = element('num' , $note);
  $data = $this->action_model->print_in_all();
  $name['name'] = element('name' , $data);
  $email['email'] = element('district_email' , $data);
  $message = $this->action_model->get_message();
  $query['query'] = element('query' , $message);
  $count['count'] = element('count' , $message);
  $total = $noti + $num + $name + $email + $query + $count;
  $this->load->view('project/Logged/Add_Employee' , $total);
}

public function Add_employee_db(){
  $this->load->helper(array('form', 'url'));
  $this->load->library('form_validation');

  $this->form_validation->set_rules('Name', 'Name', 'required|callback_username_check');
  $this->form_validation->set_rules('Username', 'Username', 'required');
  $this->form_validation->set_rules('Address', 'Address', 'required');
  $this->form_validation->set_rules('password_1', 'Password', 'required');
  $this->form_validation->set_rules('password_2', 'Password Confirmation', 'required|matches[password_1]');
  $this->form_validation->set_rules('Email', 'Email', 'required|valid_email');
  $this->form_validation->set_rules('SSN', 'SSN', 'required|exact_length[11]|numeric');
  $this->form_validation->set_rules('Phone', 'Phone', 'required|numeric');
  $this->form_validation->set_rules('Birthdate', 'Birthdate', 'required|callback_date_check');
  $this->form_validation->set_rules('Employment', 'Employment', 'required|callback_date_check_emp');
  $this->form_validation->set_rules('Graduation', 'Graduation', 'required|callback_grad_check');


  if ($this->form_validation->run() == FALSE){
      $note = $this->action_model->Notification();
      $noti['noti'] = element('noti' , $note);
      $num['num'] = element('num' , $note);
      $data = $this->action_model->print_in_all();
      $name['name'] = element('name' , $data);
      $email['email'] = element('district_email' , $data);
      $message = $this->action_model->get_message();
      $query['query'] = element('query' , $message);
      $count['count'] = element('count' , $message);
      $total = $noti + $num + $name + $email + $query + $count;
      $this->load->view('project/Logged/Add_Employee' , $total);
}
else{
  $data['Disp_Item'] = $this->action_model->Add_Employee_Database();
}
}
```

Figure 24 . Controller of Add Employees

We used CodeIgniter built-in form validation library and made other error functions for Birthdate , graduation Date and employment Date .
Controller of Add Employees .

Testing

Unit testing

where individual program units or object classes are tested. Unit testing should focus on testing the functionality of objects or methods.

A- Dates checking:

At this point we focused on testing small components:

1- **Graduation Date:**
We make the check on the condition that today's date subtracting the employee's graduation date must not be in negative as that's means that the employee doesn't graduated, another case today's date subtract the employee's graduation date must not be bigger that 60 as this the age where the employees stops working as pharmacists.

2- **Birthdate:**
This check is so close to the graduation date check as we also compare the differences between today's date with the employee's birthdate as not to be less than or equal 21 or bigger and equal 60.

B- Name checking:

The system may have similar names so to make sure not to pick a wrong name every component that requests a name make an error if we typed a not full name so we make the system searches by the full name.

C- Quantity checking:

If the quantity for reservation is less than 10 so we can't reserve and message for quantity is not sufficient appears.

Component testing

Component testing should focus on testing component interfaces.

A- Login:

We tested the login page as the password are encrypted as no one can see the passwords from the database so no one can enter plus adding sessions to close the system if no one are working on the site for a while.

B- Patient Monthly Quota:

In this case we made for every patient medicine a monthly quota which is valid for the patient to take from them from the district until the monthly quota reach zero after that he can’t take extra unless the new month arrive.

C- Reservation for patient that had finished his monthly quota:

If this patient goes to git his reservation the system checks if he had taken all his monthly quota or not, if yes this reservation will be deleted from the reservations table.

System testing

where some or all of the components in a system are integrated and the system is tested as a whole.

A- Reservation System:

We tested the whole reservation system as to choose the district we will reserve from it and refuse to choose the same district that we are reserving from as this is an error then type the patient full name as not to get an error, then pick the medicine to reserve it an check in the quantity in the other district is more than 10 so we can reserve from it.

Reservation System:

Steps	Test Steps	Test Data	Excepted Result	Actual Result	Status (Pass/Fail)	Notes
1	Related to district page		Reach page	Reach page	Pass	
2	Enter the name	Yasmine	Find the patient	Found different person with the same name	Fail	Make system enter full name
3	Click page to reach patient medical report		Reach the patient page	Reach page	Pass	
4	Pick a serum/vaccine		Error is shown that the wanted item is empty in stock	Error appears	Pass	
5	Employee goes to reservation page.		As Expected	As Excepted	Pass	
6	Employee reaches for district in search bar	West	Show all items in west district	Show all items in west district	Pass	
7	Reserve certain item		Reservation appears in the district we reserved from.	Reservation appears in the district we reserved from.	Pass	

Expiration:

Steps	Test Steps	Test Data	Expected Result	Actual Result	Status (Pass/Fail)	Notes
1	Open Add Serums and Vaccines		Reach page	Reaches page	Pass	
2	Pick item code	Pick (“P9”)	Appear on dropdown list	Appears on dropdown list	Pass	
3	Enter quantity	20	Receive quantity	Quantity received	Pass	
4	Click on Add		Refresh page and appear “Success”	Refreshes page and “Item is already exists” appears	Fail	Check on return of variable $c
5	Repeat the pevious steps until click on Add		Refresh page and appear “Success”	Refreshes page and appears “Success”	Pass	

References

1. CodeIgniter. CodeIgniter User Guide — CodeIgniter 3.1.11 documentation. https://codeigniter.com/userguide3/index.html (2019).
2. Comtronics. System Integration Services wireless communications KY Comtronics Inc. https://www.comtronicsnow.com/integration.
3. Anderson, A. *What is software stability*. http://www.engr.sjsu.edu/fayad/SoftwareStability/Andrsnw2.html.
4. Morville, P. Usability: A part of the User Experience | Interaction Design Foundation. *Interaction Design Foundation* https://www.interaction-design.org/literature/article/usability-a-part-of-the-user-experience (2020).
5. Mozilla. What is accessibility? - Learn web development | MDN. https://developer.mozilla.org/en-US/docs/Learn/Accessibility/What_is_accessibility (2020).
6. El Khouly, M. Lecture Three. (2020) doi:10.3138/9781442652958-004.