

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY  
BELAGAVI-590018**



**A MINI PROJECT REPORT  
ON  
REAL ESTATE MANAGEMENT SYSTEM**

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*In the partial fulfillment of the requirement for 5th semester*

**DBMS LABORATORY WITH MINI PROJECT (18CSL58)**

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(Accredited by NBA)

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## CERTIFICATE

This is to certify that the mini project entitled “**REAL ESTATE MANAGEMENT SYSTEM**” is a bonafide work carried out by THILOTH B SHETTY (4MT19CS171) and THUSHAR S RAO (4MT19CS173) in partial fulfillment for the requirement of 5<sup>th</sup> semester DBMS Laboratory with mini project (18CSL58). It is certified that all the corrections / suggestions indicated for the Internal Assessment have been incorporated in the report. The mini project has been approved as it satisfies the academic requirement in respect of the 18CSL58 prescribed for the 5<sup>th</sup> Semester B.E in Computer Science & Engineering Program by the **Visvesvaraya Technological University, Belagavi**, for the academic year 2021 – 2022.

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## **ABSTRACT**

Real Estate Management System deals with the development, purchase, sale of properties like lands, houses and flats. The purpose of the project is to focus on providing real estate property management to users or to customers. Real Estate Management System is to automate the existing manual approach with the help of database systems. The website maintains lot of data of the properties, users and is safely stored in the database. The required software and hardware are easily available and is also user friendly. The customers will be able to buy or sell their property through this online website. Customers will provide their personal information while creating their account on the website. Here customers can create free account in the website and can buy or sell property. Real Estate Management System can lead to secure, reliable and fast management system. This system will provide to the user to search residential property, view property and helps the user to save time and get the right property. This system will also provide facility to the user to give the feedback.

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## Chapter 1

### INTRODUCTION

DBMS stands for database management system refers to the technology for creating and managing databases. DBMS is a software tool to organize (create, retrieve, update and manage) data in a database. The main aim of the DBMS is to supply a way to store up and retrieve database information that is both convenient and efficient. By data, we mean known facts that can be recorded and have embedded meaning. Database system are meant to handle a large collection of information and providing mechanisms that can do the manipulation that stored information. Moreover, the database system must ensure the safety of the information stored, despite system crashes or attempts at unauthorized access.

Everyone wants his/her property to be in the best location with all facilities. Due to competition in this industry, every real estate company wants to deliver the best service. So, we are here with Real Estate Management System website that takes care of everything that a real estate company wants to do. This Management System is developed for all the people trying to buy or sell the property with secure transaction. It is very strong and easy to use that makes quick booking and account handling process. The real estate management system is web-based site, and you can access it from anywhere. This ensures the service to the client 24\*7. Clients can view and book their favorite property online just after few clicks. All these can be done by creating an account on the website and all the data, transactions are stored securely and can be retrieved by the user any time.

#### 1.1 Problem Statement

With the increase in population in urban areas the population density also increases in order to overcome that, Real Estate Management System will provide plots to the customer. It will help in development of places other than cities. The proposed project comes in developing persistent system for Real Estate Management, in order to provide easy and fast facility for buying and selling the required properties.

#### 1.2 Objectives

- The main objective of the Real Estate Management System is to manage the details of sellers, approvals, property booking, property type and payment. It also manages all the information about sellers, buyers, property type and sellers



- The project is both administrative and user end. User can buy, sell and view properties, administrator is the one who verifies and list the properties.
- The purpose of the project is to build a website to reduce the manual work for managing the property, booking, customer, payment. It also stores the details about the customers and property.

### **1.3 HTML5**

HTML is the language for describing the structure of Web pages. HTML5 allows users to create and structure sections, headings, links, paragraphs, and more, on a website using various tags and elements. Almost everything you want to create on a web page can be done using a specific HTML code.

### **1.4 CSS3**

CSS stands for Cascading Style Sheet. It gives an additional style to the HTML document. A cascading style sheet is a language that is designed to define the document formatting and look written in a markup language. Generally, CSS is applied with HTML documents to change various styles of user interfaces and web pages. CSS is the language for describing the presentation of Web pages, including colors, layout, and fonts. It allows one to adapt the presentation to different types of devices, such as large screens, small screens, or printers. CSS is independent of HTML and can be used with any XML-based markup language.

### **1.5 PHP**

PHP is a general-purpose scripting language geared towards web development. PHP code is usually processed on a web server by a PHP interpreter implemented as a module, a daemon or as a Common Gateway Interface (CGI) executable. On a web server, the result of the interpreted and executed PHP code – which may be any type of data, such as generated HTML or binary image data – would form the whole or part of an HTTP response. Various web template systems, web content management systems, and web frameworks exist which can be employed to orchestrate or facilitate the generation of that response. Additionally, PHP can be used for many programming tasks outside the web context, such as standalone graphical applications and robotic drone control. PHP code can also be directly executed from the command line.

## **1.6 SQL**

SQL (Structured Query Language) is a standardized programming language that's used to manage relational databases and perform various operations on the data in them. The uses of SQL include modifying database table and index structures; adding, updating and deleting rows of data; and retrieving subsets of information from within a database for transaction processing and analytics applications. Queries and other SQL operations take the form of commands written as statements commonly used SQL statements include select, add, insert, update, delete, create, alter.

## **1.7 JavaScript**

JavaScript is a lightweight, interpreted, object-oriented language with first-class functions, and is best known as the scripting language for Web pages, but it's used in many non-browser environments as well. JavaScript can function as both a procedural and an object-oriented language. JavaScript is a flexible and powerful programming language that is implemented consistently by various web browsers. Along with HTML and CSS, it's a core component of web technology. While HTML is responsible for structure and CSS is responsible for style, JavaScript provides interactivity to web pages in the browser. The most important feature of JavaScript is that functions are objects. That's it. Understanding this will open up a whole new understanding of the JavaScript language. In JavaScript, functions are objects.

## Chapter 2

# REQUIREMENT ANALYSIS AND SPECIFICATION

## 2.1 Functional Requirements

These are statements of services the system should provide, how the system should react to particular inputs and how the system should behave in particular situations. In some cases, the functional requirements may also explicitly state what the system should not do. The functional requirements for a system describe what the system should do. These requirements depend on the type of software being developed, the expected users of the software and the general approach taken by the organization when writing requirements. When expressed as user requirements, the requirements are usually described in an abstract way. However, functional system requirements describe the system function in detail, its inputs and outputs, exceptions, and so on. Functional requirements for a software system may be expressed in several ways.

The function Requirements of Real Estate Management System is as follow:

### **Register Module:**

The user needs to provide their name, phone number, email and password while registering. These details will be stored in the database.

### **Login Module:**

For login user will input their email and password which will be compared with a database content.

### **Payment Module:**

For payment user will enter their card details.

### **Hardware Specifications:**

Processor	:Intel i3/i5, 1.8 GHz machine
Main Memory	:4GB RAM or above
Hard disk	:1TB or above

### **Software Specifications:**

Operating system	: Windows 7 and above
Front end	: HTML, CSS, JavaScript
Back end	: SQL, PHP
Software	: Visual Studio Code, XAMPP

## 2.2 Non-Functional Requirements

Non-functional requirements are requirements that are not directly concerned with the specific functions delivered by the system. They may relate to emergent system properties such as reliability, response time and store occupancy. Alternatively, they may define constraints on the system such as the capabilities of I/O devices and the data representations used in system interfaces. The plan for implementing functional requirements is detailed in the system design. The plan for implementing non-functional requirements is detailed in the system architecture. Non-functional requirements are often called qualities of a system. Other terms for non-functional requirements are "constraints", "quality attributes", "quality goals", "quality of service requirements" and "non-behavioral requirements". Qualities, that are non-functional requirements, can be divided into two main categories: Execution qualities, such as security and usability, which are observable at run time.

### Reliability:

- This system is designed to have a very simple database just to cater the exact need of Real Estate Management. It is tested for all constraints at developing stage.
- Porter booking shall show always provide real time information about the recent properties.
- User should never be surprised by the behavior of the website and it is easy to use to stored data.

### Usability:

- The interface should use the terms and concepts, which are draws from the experience of the people who will make most of the system.
- It defines how difficult it will be for a user to learn and operate the system. Usability can be assessed from different point of view.

### Performance:

- The system provides user-friendly interface, any common people with little technical knowledge can use the system.
- System is robust, reliable and fast, provides more efficiency.

### Security:

- System provides security for the admin by only allowing them to enter into the account with their respective username and password.
- Only admin have the privileges to delete/add database contents which are used by the user.

## Chapter 3

### SYSTEM DESIGN

System Design process partitions the system into subsystems based on the requirements. It establishes overall system architecture and is concerned with identifying various components, specifying relationships among components, specifying software structure, maintaining a records of design decisions and providing a blueprint for the implementation phase. Design consists of architecture design and detailed design is concerned with the details of how to package processing modules and how to implement the processing algorithms, data structures and interconnections among modules and data structures.

#### 3.1 ER Diagram

ER Diagram stands for Entity Relationship Diagram, also known as ERD is a diagram that displays the relationship of entity sets stored in a database. In other words, ER diagrams help to explain the logical structure of databases. ER diagrams are created based on three basic concepts: entities, attributes and relationships. ER Diagrams contain different symbols that use rectangles to represent entities, ovals to define attributes and diamond shapes to represent relationships.

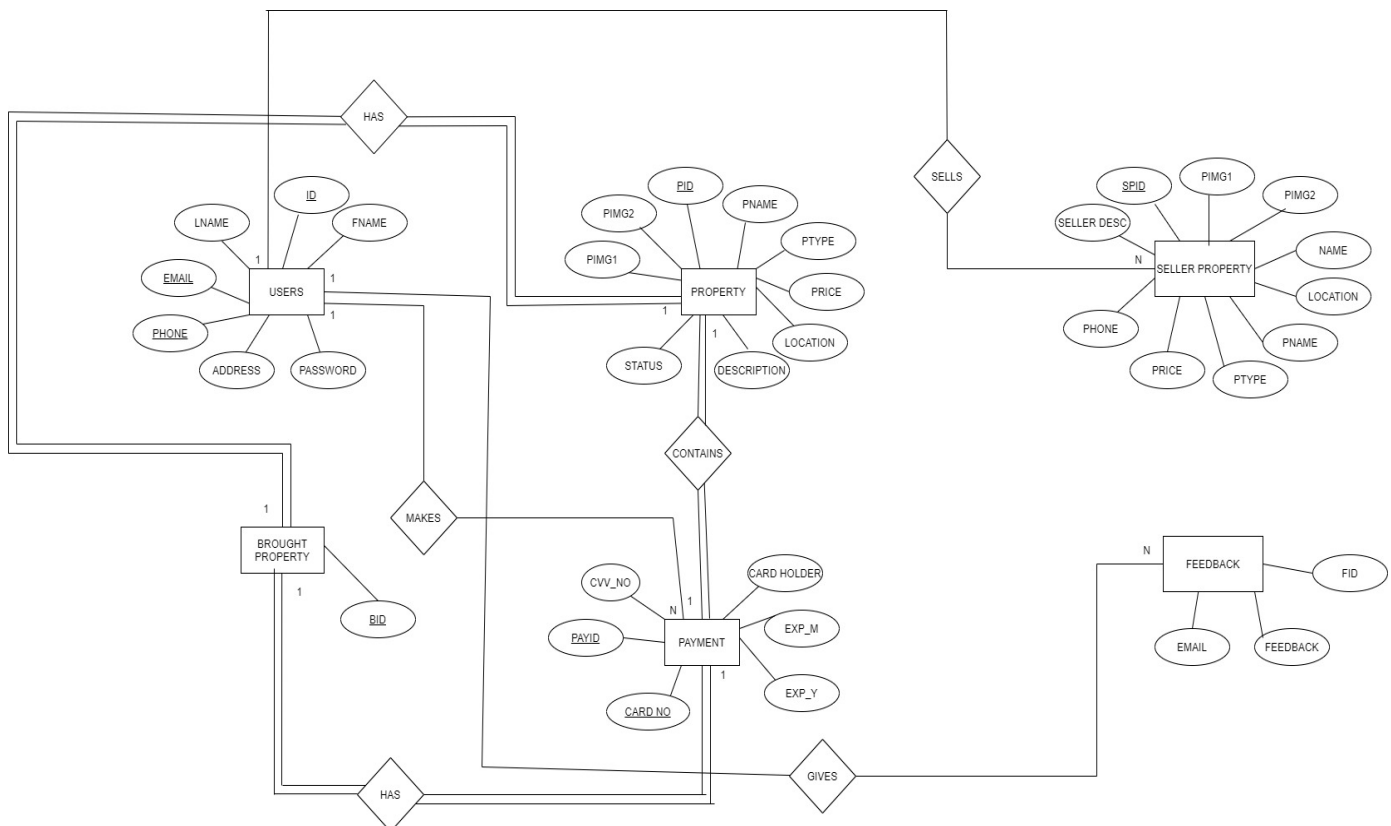


Figure 3.1 ER Diagram of Real Estate Management System

Figure 3.1 there are 6 entities namely user, property, seller property, feedback, payment, brought property. The user entity has the attributes id , fname , lname, email, phone, address, password. Property has attributes pid, pname, ptype, price, location, status, description and images. The seller properties has seller id, seller name, location, pname, ptype, price, phone, description. The payment entity has payment number, card number, card holder, expire month and year. The feedback has the attribute has email and feedback. The user “makes” payment for the property he brought with ratio of 1:N. The entity brought property contains the details of property purchased by the user. We took a relation “has” as a relationship between brought property and payment entity with 1:1 because single brought property has single payment. We took a relation “sell” as a relationship between user and seller property entity with 1:N ratio because a single user can sell any number of property. We took a relation “has” between brought property and the property with the ratio of 1:1. There is a relation “gives” between the user and the feedback with 1:N ratio because a single user can give any number of feedback.

### 3.2 Schema Diagram

The design of the database is called a schema. This tells us about the structural view of the database. It gives us an overall description of the database. A database schema defines how the data is organized using the schema diagram. A schema diagram is a diagram which contains entities and the attributes that will define that schema

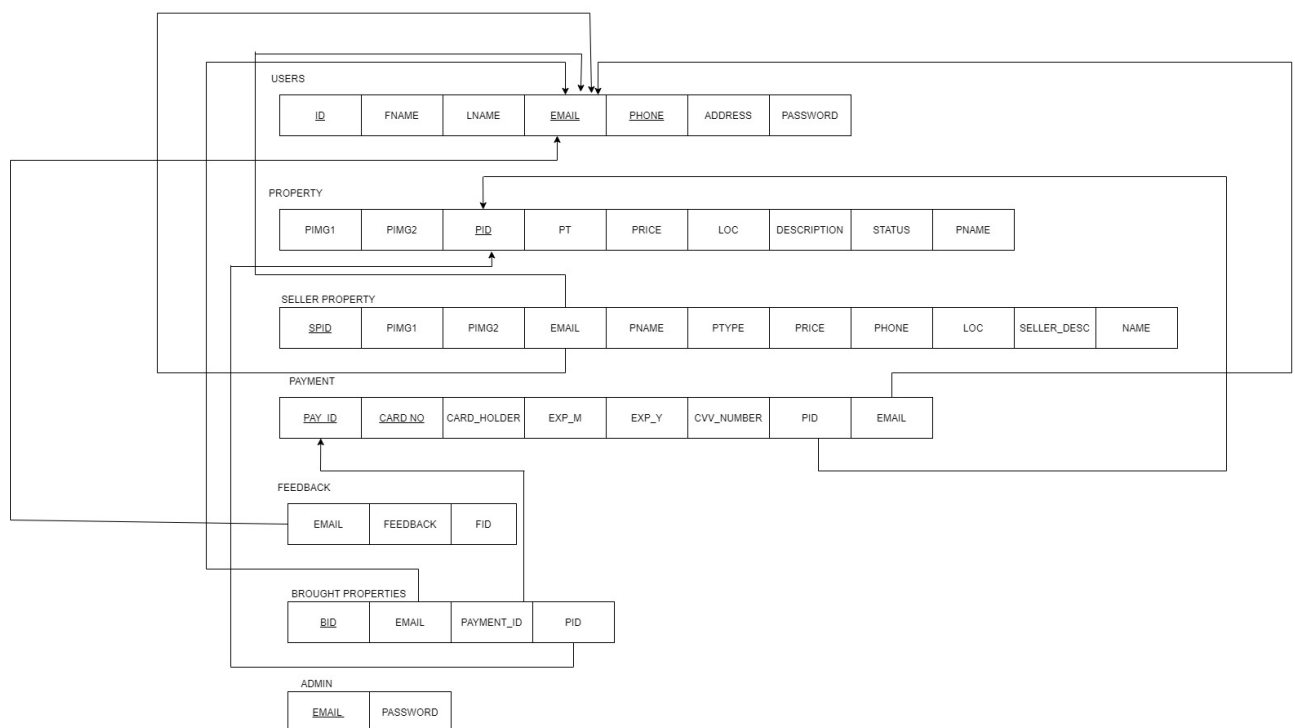


Figure 3.2 Schema Diagram of Real Estate Management System

Figure 3.2 there are 7 tables namely user, property, seller property, feedback, payment, brought property and the admin. The user table has the id, fname, lname, email, phone, address, password where email and password are primary key. Property has pid, pname, ptype, price, location, status, description and images where pid is the primary key. The seller properties have seller id, seller name, location, pname, ptype, price, phone, description where spid is the primary key and email is the foreign key which references user table of email where that email is a primary key. The payment entity has payment number, card number, card holder, expire month and year where payid and card no is the primary key, pid and email are the foreign keys. The feedback has email and feedback where email is the foreign key. Brought properties has bid, email, payment\_id and pid where pid is the foreign key references the property table of pid.

### **3.3 Description of the Tables**

1. Admin: It stores admin details

- Password associated with admin to login to the website
- Email address of the admin.

2. User: It stores the information of the user who books the property

- Id: it is the user identification number
- Fname: first name of the user
- Lname: last name of the user
- Email: Email address of the user.
- Address: address of the user.
- Password: Password associated with user to login to the website
- Phone: phone number of the user

3. Property: It contains the property details.

- Pimg1: Property image 1
- Pimg2: Property image 2
- Pname: Name of the property.
- Pid: Property identification number.
- Pt: Type of the property.
- Price: Price of the property.
- Loc: Location of the property.
- Description: Property description.
- Status: Current Status of the property.

4. Seller property: It contains selling property details.

- Spid: Selling property id.
- Pimg1:Image1 of the selling property.
- Pimg2:Image2 of the selling property.
- Name: Seller's name.
- Email: Seller email.
- Pname: Property name.
- Ptype: Property type.
- Price: Price of the property.
- Phone: Phone Number of the seller.
- Loc: Location of the property.
- Sellerdesc: Description of selling property.

5. Payment: Keeps track of Payment.

- Payid: Payment id of the payment done.
- Card\_no: Card number of the card.
- Card\_holder: Name of the card holder.
- Exp\_mm: Expiry month of the card.
- Exp\_yy: Expire year of the card.
- Cvv: the last digits of the card.
- Pid: Property id of the buying property.
- Email: Email of the user.

6. Brought Properties: Gets the list of brought properties.

- Bid: Brought id.
- Pid: Property id of the buying property.
- Email: Email of the user.
- Pay\_id: Payment id.

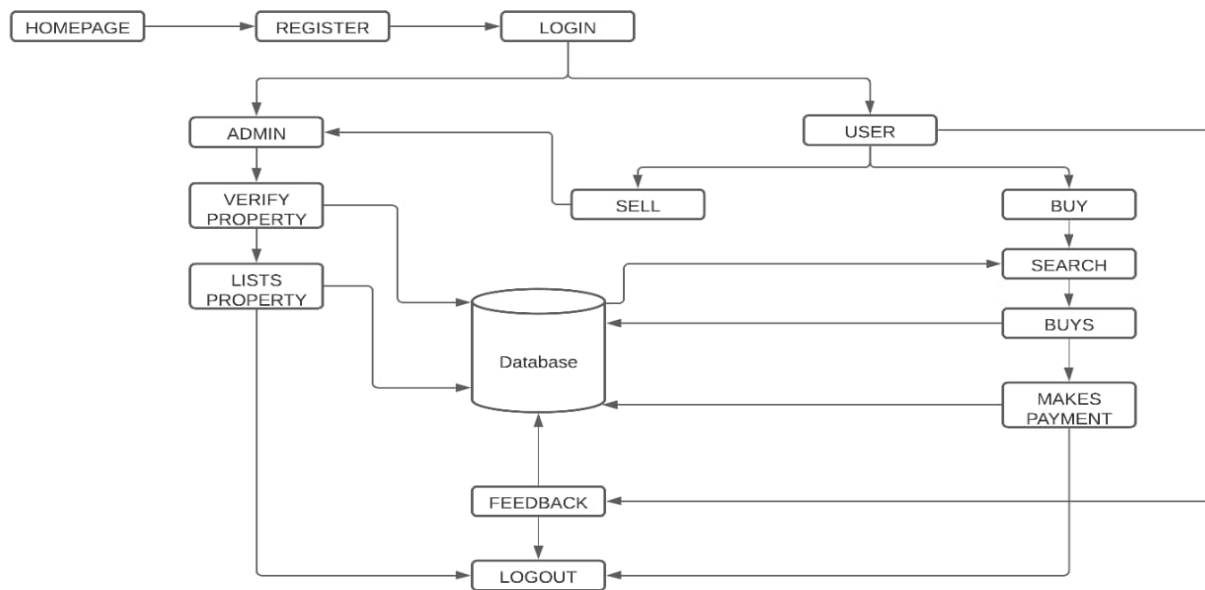
7. Feedback: User can give the feedback.

- Email: User email id.
- Feedback: Feedback of the user.



### 3.3 Block Diagram

A Block Diagram is a diagram of a system in which the principal parts or functions are represented by blocks connected by lines that show the relationships of the blocks. They are heavily used in engineering in hardware design, electronic design, software design, and diagrams. Block diagrams are typically used for higher level, less detailed descriptions that are intended to clarify overall concepts without concern for the details of implementation. Contrast this with the schematic diagrams and layout diagrams used in electrical engineering.



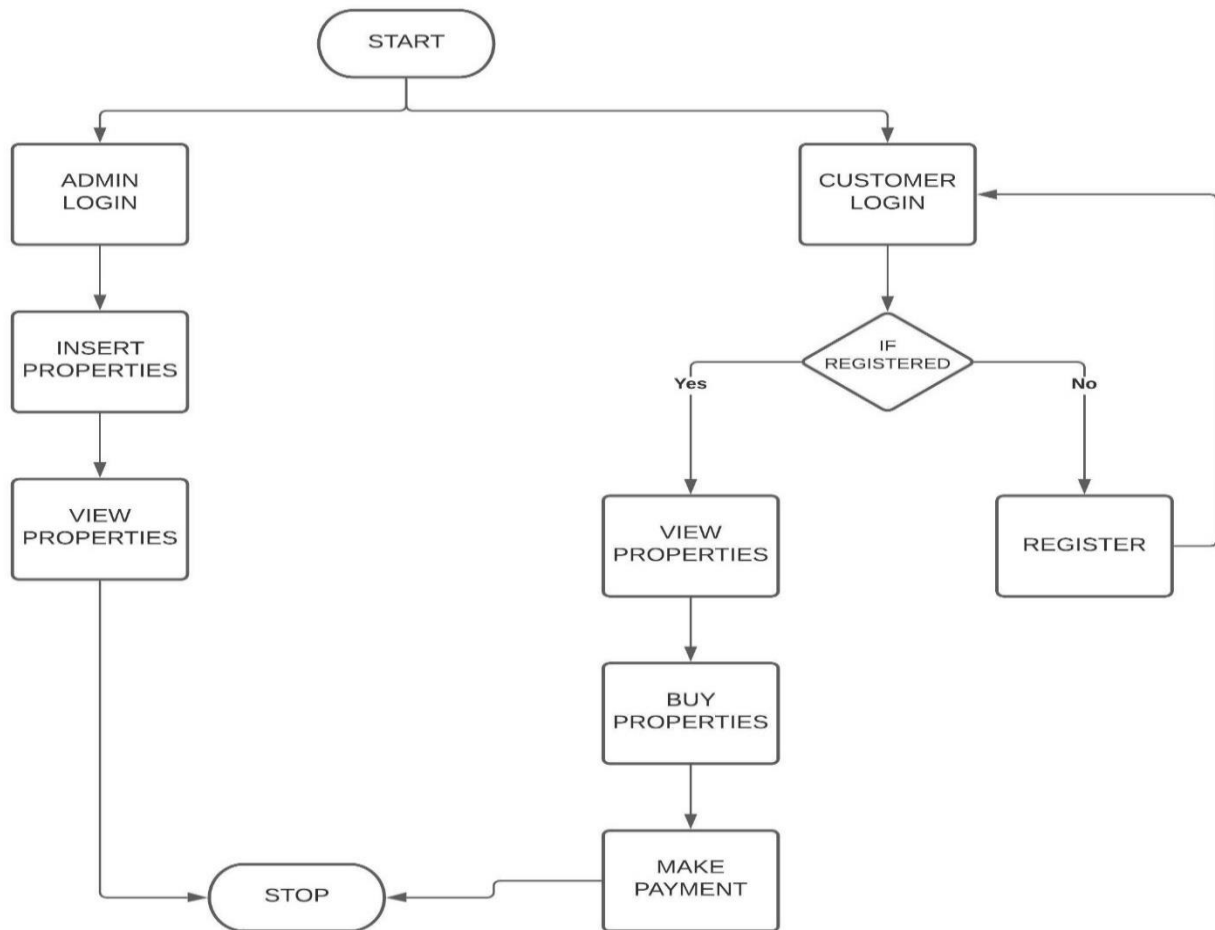
**Figure 3.3 Block Diagram of Real Estate Management System**

The website consists of login, register, after login the user can sell or buy, if user wants to sell user should enter the property details and send it to admin. If the user wants to buy user can access the property details and if it is available user can reserve the property by making payment. If user want user can give the feedback and logout. Admin will verify the property and list the properties in the website.

### 3.4 Flowchart

A Flowchart is a diagram that depicts a process, system or computer algorithm. They are widely used in multiple fields to document, study, plan, improve and communicate often complex processes in clear, easy-to-understand diagrams. Flowcharts, sometimes spelled as flow charts, use rectangles, ovals, diamonds and potentially numerous other shapes to define the type of step, along with connecting arrows to define flow and sequence. They can range from simple, hand- drawn charts to

comprehensive computer-drawn diagrams depicting multiple steps and routes.



**Figure 3.4 Flowchart of Real Estate Management System**

Figure 3.4 represents Flowchart of Real Estate Management System. If there is no account existing register to the website. If there is an account then just login to the account. The user can buy and sell properties. For buying the property the use searches the property, buys and makes payment. For selling the property user enters the property details and it is sent to the admin to verify the property. The user can give feedback or logout of the website. The admin can insert the properties, verifies the seller property and lists them on the website and can logout.

## Chapter 4

### IMPLEMENTATION

PHP: Hypertext Pre-processor (or simply PHP) is a server-side scripting language designed for web development, and also used as a general-purpose programming language. PHP code may be embedded into HTML code, or it can be used in combination with various web template systems, web content management systems, and web frameworks. PHP code is usually processed by a PHP interpreter implemented as a module in the web server or as a Common Gateway Interface (CGI) executable. The web server combines the results of the interpreted and executed PHP code, which may be any type of data, including images, with the generated web page. PHP code may also be executed with a command-line interface (CLI) and can be used to implement standalone graphical applications.

This project uses HTML as front-end tool. Hypertext Mark-up Language (HTML) is the standard mark-up language for creating web pages and web applications. With Cascading Style Sheets (CSS) and JavaScript, it forms a triad of cornerstone technologies for the world wide web. Web browsers receive HTML documents from a web server or from local storage and render the documents into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for the appearance of the document. HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects such as interactive forms may be embedded into the rendered page. HTML provides a means to create structured documents by structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. HTML elements are delineated by tags, written using angle brackets. Browsers do not display the HTML tags but use them to interrupt the content of the page.

```
<?php
    $con = mysqli_connect('localhost','root','realestate');
    if(!$con)
    {
        echo 'please check your Database connection';
    }
?>
```

**Figure 4.1 Code Snippet for connection module**

Figure 4.1 defining the database server, database user, database password and database project for establishing connection with the database.

```

<?php
require_once('connection.php');
if(isset($_POST['btnsave']))
{
    $name = mysqli_real_escape_string($con,$_POST['name']);
    $ltext = mysqli_real_escape_string($con,$_POST['ltext']);
    $email = mysqli_real_escape_string($con,$_POST['email']);
    $phone = mysqli_real_escape_string($con,$_POST['phone']);
    $address = mysqli_real_escape_string($con,$_POST['address']);
    $password = mysqli_real_escape_string($con,$_POST['password']);
    if(empty($password))
    {
        echo 'Please fill the Password';
    }
    else
    {
        $check_duplicate_email="SELECT Email from users where Email='$email'";
        $checkemailr=mysqli_query($con,$check_duplicate_email);
        $count=mysqli_num_rows($checkemailr);
        if($count>0)
        {
            echo "<script>alert('Email id already exists');</script>";
            echo"<script> window.location.href ='Sign-Up.php';</script>";
        }
        $check_duplicate_phone="SELECT Phone from users where Phone=$phone";
        $checkphoner=mysqli_query($con,$check_duplicate_phone);
        $count1=mysqli_num_rows($checkphoner);
        if($count1>0)
        {
            echo "<script>alert('Phone number already exists');</script>";
            echo"<script> window.location.href ='Sign-Up.php';</script>";
        }
        else
        {
            $sql="insert into users(Fname,Lname,Email,Phone,Address>Password)
values('$name','$ltext','$email', '$phone', '$address', '$password')";
            $result=mysqli_query($con,$sql);
            if($result)
            {
                header("location:Login.php");
            }
            else
            {
                echo 'Check your connection and try again';
            }
        }
    }
}
?>

```

Figure 4.2 Code Snippet for Register

Figure 4.2 the input fields are stored in the database using post operation. If all the details are right then it proceeds to the next page.

```

<?php
require_once('connection.php');
if(isset($_POST['btnlogin']))
{
    $email=$_POST['email'];
    $password=$_POST['password'];
    $query="select *from users where email='$email'";
    $result=mysqli_query($con,$query);
    if($row=mysqli_fetch_assoc($result))
    {
        $db_password=$row['Password'];
        if($password==$db_password)
        {
            session_start();
            $_SESSION['email']=$email;
            header("location:homellogin.php");
        }
        else
        {
            echo "<script>alert('Incorrect Credentials');</script>";
            echo"<script> window.location.href ='Login.php';</script>";
        }
    }
    else
    {
        echo "<script>alert('Please check Your Email');</script>";
        echo"<script> window.location.href ='Login.php';</script>";
    }
}
?>

```

Figure 4.3 Code Snippet for Login

Figure 4.3 indicates the login module for user. If the email id and password matches then he/she can login into the website else cannot login.

```

<?php
require_once('connection.php');
$email=$_SESSION['email'];
$pid=$_GET['pid'];
echo "Property ID of your Property that you are Buying is $pid";
if(isset($_POST['pay']))
{
    $card_no = $_POST['card_num'];
    $card_holder = $_POST['card_hold'];
    $exp_mm = $_POST['exp_m'];
    $exp_yy = $_POST['exp_y'];
    $cvv = $_POST['cvv_no'];
    $query = "insert into payments(card_no,card_hold,exp_m,exp_y,card_no,pid,email)
values('$card_no','$card_holder','$exp_mm','$exp_yy','$cvv','$pid','$email')";
    $query_run=mysqli_query($con,$query);
}

```

```

if($query_run)
{
    $ss="SELECT * from payments where card_no = $card_no";
    $quu=mysqli_query($con,$ss);
    $res=mysqli_fetch_assoc($quu);
    $payid=$res['payid'];
    $q="UPDATE property set Status='N' where Pid='$pid'";
    $result= mysqli_query($con,$q);
    $q_brought="INSERT INTO broughtproperty(pid,email,paymentid) values
($pid','$email','$payid)";
    $q_broughtrun=mysqli_query($con,$q_brought);
    echo '<script type="text/javascript"> alert("payment succesfully done") </script>';
    echo '<script> window.location.href = "Userbuying.php";</script>';

}
else
{
    echo '<script type="text/javascript"> alert("Enter the valid payment details") </script>';
}
}
?>

```

**Figure 4.4 Code snippet for payment module**

Figure 4.4 indicates the payment module. If all the entered details are right then it proceeds for payment.

## Chapter 5

### TESTING

Software testing is the process used to identify the correctness, security, completeness and quality of developed computer software. This includes the process of executing the program or applications with the intent of finding errors. An individual unit, functions or procedures of a developed project is verified and validated and these units are fit for use.

#### 5.1 Testing process

Best testing process is to test each subsystem separately, as we have done in the project. Best done during implementation. Best done after small sub-steps of the implementation rather than large chunks. Once each lowest level unit has been tested, units are combined with related units and retested in combination. This proceeds hierarchically bottom-up until the entire system is tested as a whole. Typical levels of testing:

- Module- package, abstract data type, class
- Sub-system- collection of related modules, cluster of classes, method-message paths
- Acceptance testing- whole system with real data

Alpha testing is acceptance testing with a single client (common for bespoke systems).

Beta testing involves distributing systems to potential customers to use and provide feedback. In this project, beta testing has been followed. This exposes the system to situations and errors that might not be anticipated by us.

##### 5.1.1 Unit testing

Unit testing is the process of testing individual software components unit or modules. Since it needs the detailed knowledge of the internal program design and code this task is done by the programmer and not by testers.

##### 5.1.2 Integration Testing

Integration testing is another aspect of testing that is generally done in order to uncover errors associated with the flow of data across interfaces. The unit-tested modules are grouped together and tested in small segments, which makes it easier to isolate and correct errors. This approach is continued until we have integrated all modules to form the system as a whole. After the completion of each module it has been combined with the remaining module to ensure that the project is working properly as expected.

### 5.1.3 System Testing

System testing tests a completely integrated system to verify that it meets its requirements. After the completion of the entire module they are combined together to test whether the entire project is working properly.

### 5.2 Test Cases

A Test Case is a software testing document, which consists of events, action, input, output, expected result and actual result. Technically a test case includes test description, procedure, expected result and remarks. Test cases should be based primarily on the software requirements and developed to verify correct functionality and to establish conditions that reveal potential errors.

Test cases no	Test Case	Expected results	Status
1	Logging into website	Email id and password provided correct	Successful
2	Logging into website	Email incorrect	Unsuccessful
3	Logging into website	Password Incorrect	Unsuccessful
4	Logging into website	Any field left empty	Unsuccessful

**Table 5.1 Test Case for Login**

Table 5.1 represents the test case for the login module. It shows both successful and unsuccessful results for the test cases.

Test cases no	Test Case	Expected results	Status
1	Registration for new user	All details provided correctly	Successful
2	Registration for new user	Any one field is incorrect	Unsuccessful
3	Registration for new user	Any field left empty	Unsuccessful

**Table 5.2 Test Case for Signup**

Table 5.2 represents the test case for the signup module. It shows both successful and unsuccessful results for the test cases.



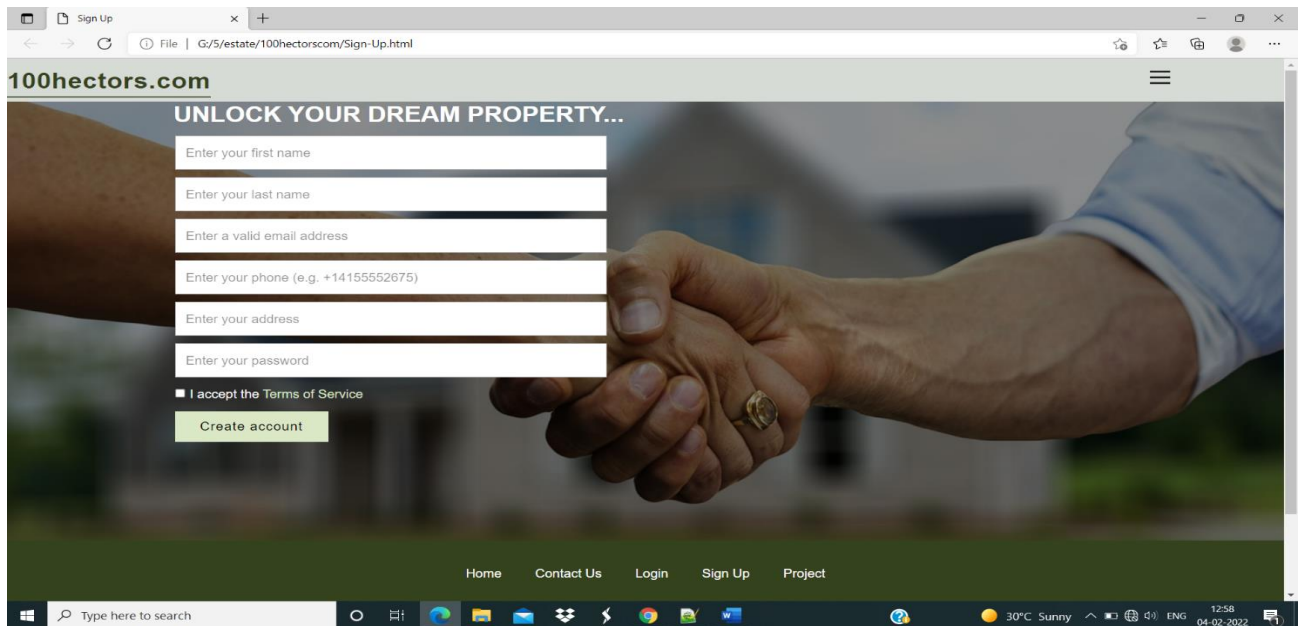
Test cases no	Test Case	Expected results	Status
1	Payment	All details provided correctly	Successful
2	Payment	Any one field is incorrect	Unsuccessful
3	Payment	Any field left empty	Unsuccessful

**Table 5.3 Test Case for Payment**

Table 5.3 represents the test case for the payment module. It shows both successful and unsuccessful results for the test cases.

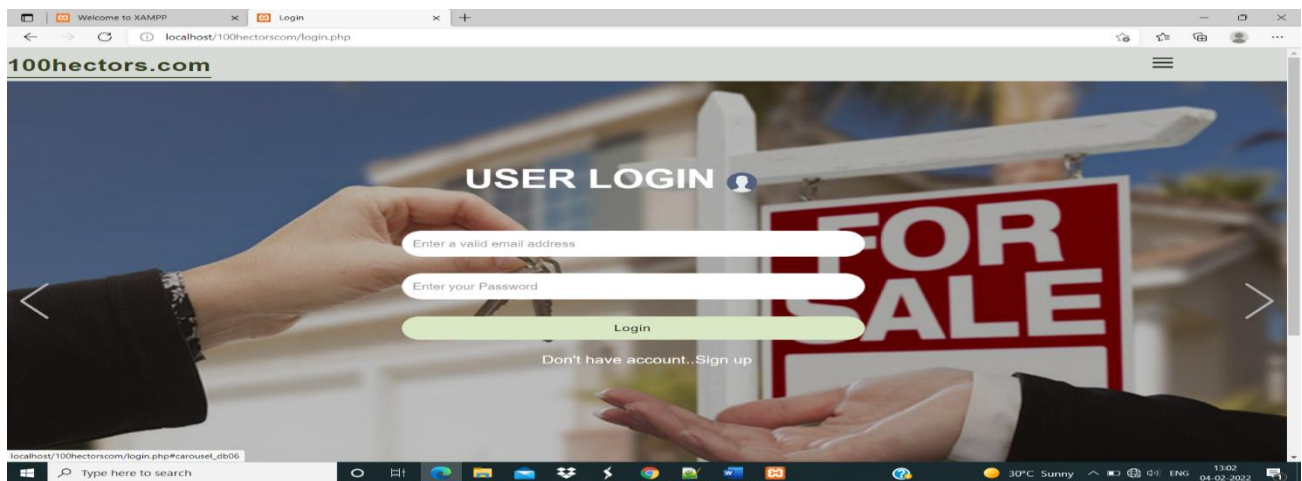
## Chapter 6

### SCREENSHOTS



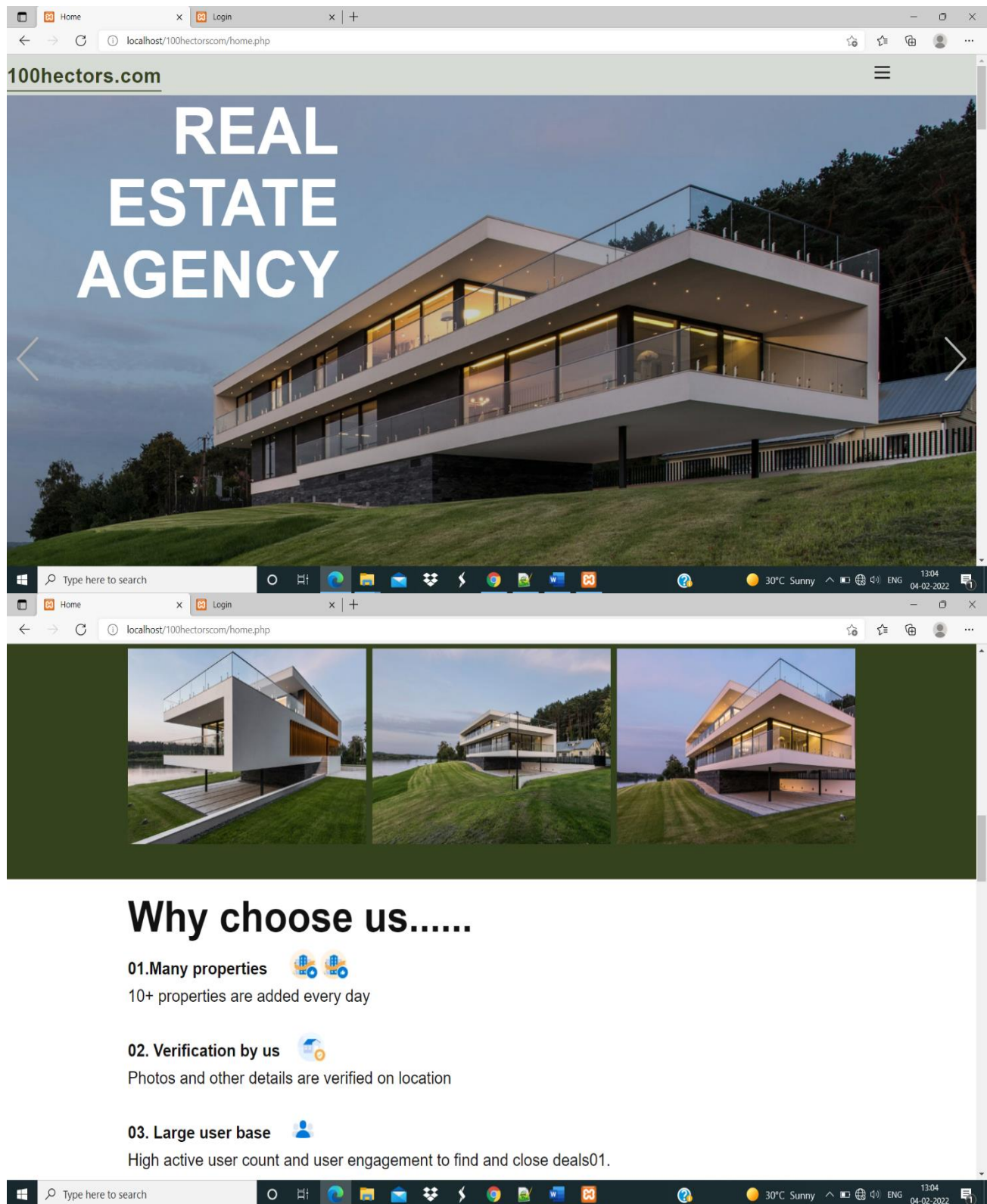
**Figure 6.1 Screenshot of Signup page**

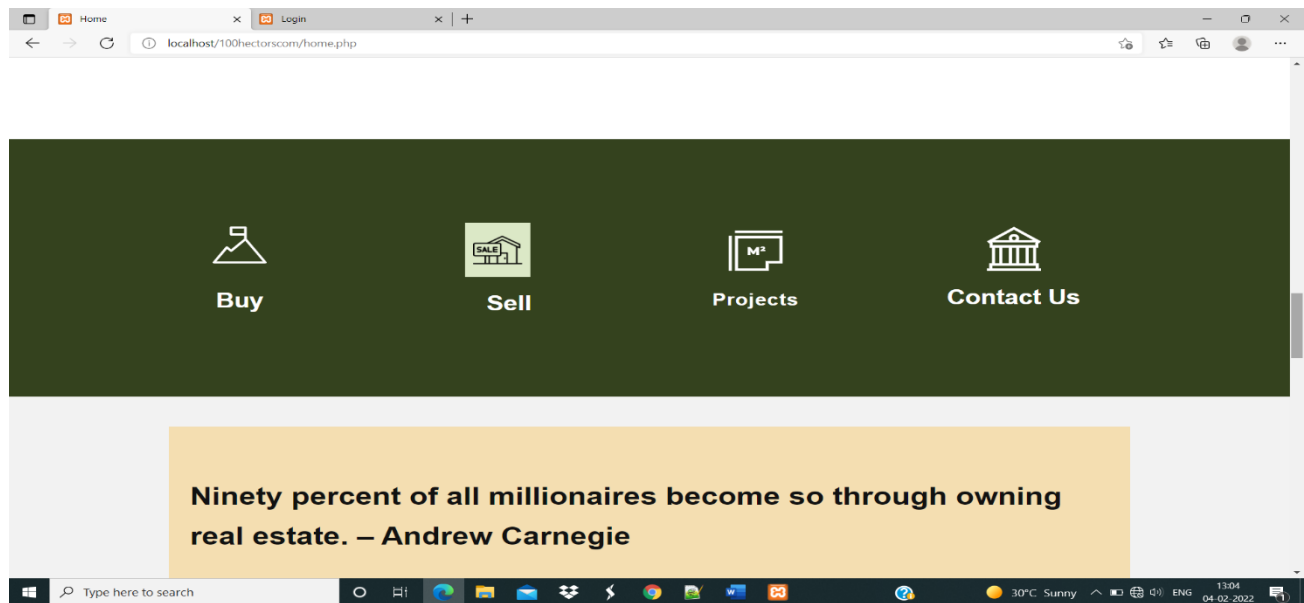
Figure 6.1 indicates the signup page. It contains certain fields such as fname, lname, phone, address and password. If all the entered details are right then it proceeds to the next page.



**Figure 6.2 Screenshot of Login page**

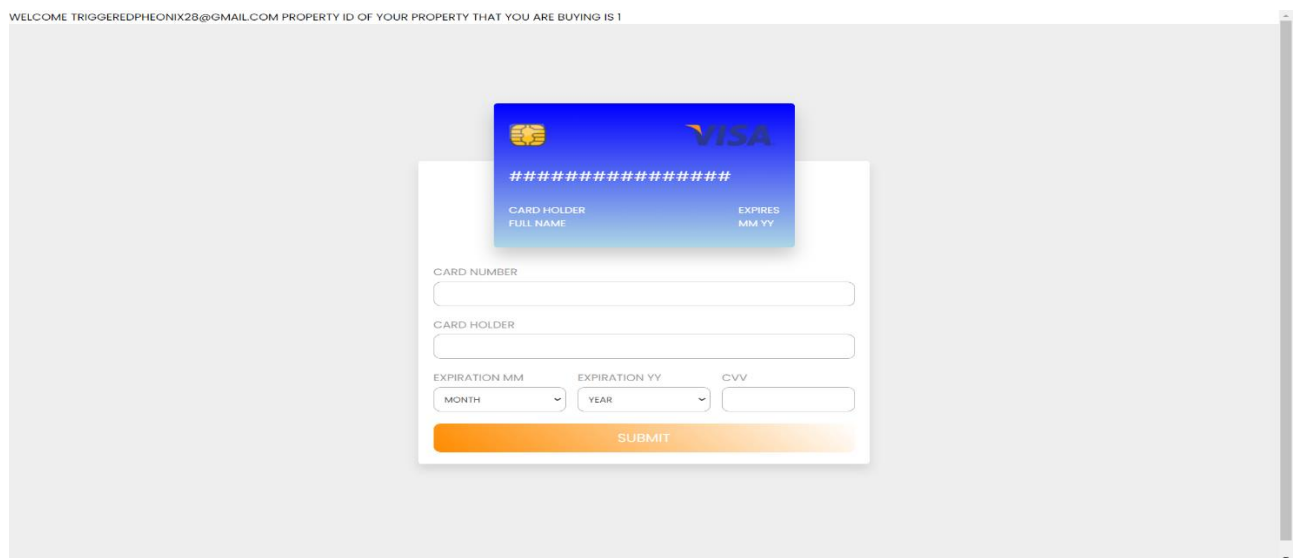
Figure 6.2 indicates the login page for the user which has the input field for user details such as email and password.





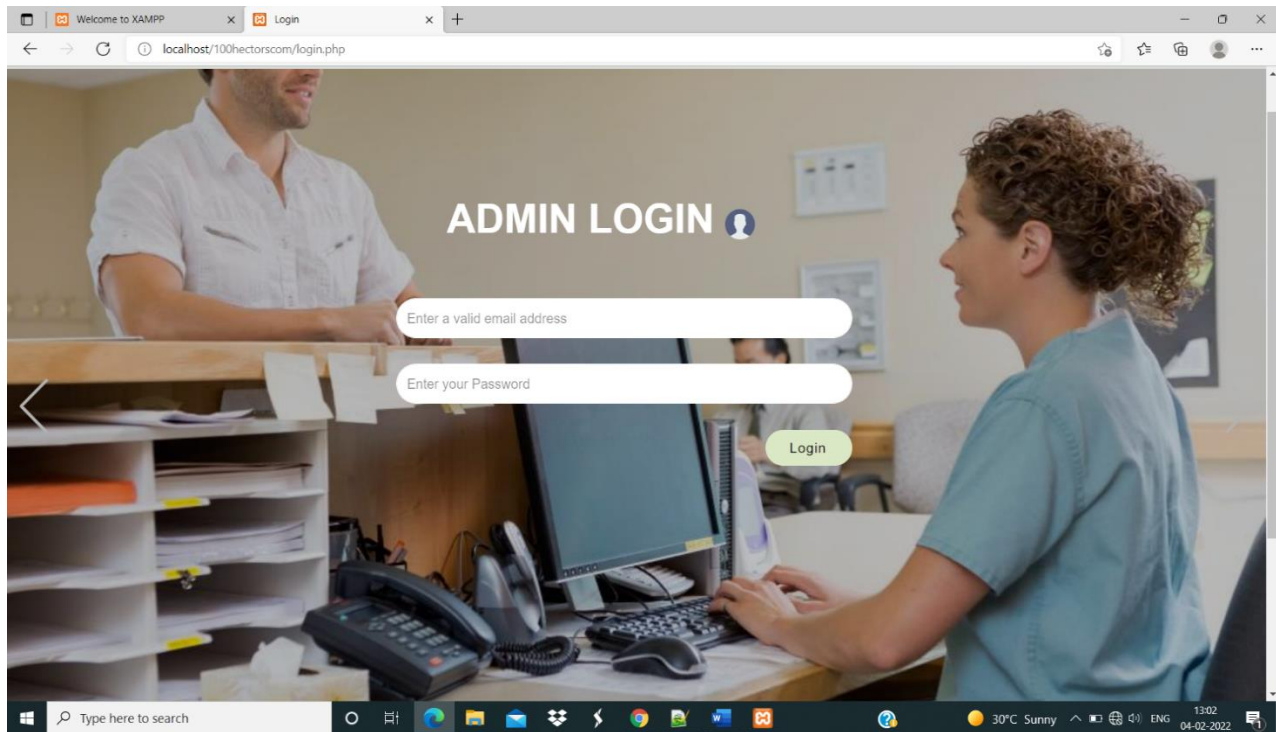
**Figure 6.3 Screenshot of Home page**

Figure 6.3 indicates the home page which contains the navigation bar through which we can navigate to different pages.



**Figure 6.4 Screenshot of Payment page**

Figure 6.4 indicates the payment page which has the input field for payment details. If all the entered details are right then it proceeds for payment.



**Figure 6.5 Screenshot of admin login page**

Figure 6.5 indicates the login page for the admin which has the input field for admin details such as email and password.

**Figure 6.6 Screenshot of Admin Insert page**

Figure 6.6 indicates the screenshot the admin insert page where admin can insert the properties and it will be listed in the website.

## **Chapter 7**

### **CONCLUSION**

The Real Estate Management System facilitates the customers to look into the property and its details also to sell property. The aim of case study is to design and develop a database maintaining the records of different properties, customer details. People can book or sell the property through internet, sitting in their home by a single click of mouse. Using their credit cards people can easily make payments for their property. System provides major advantages such as speed and accuracy of operation, time efficiency, automatic data validation, data security and reliability, dynamic and user friendly.

## REFERENCES

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