A PROJECT REPORT ON

HOME AUTOMATION

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Department of Computer Science and Engineering

At: Bharthana, Ta: Surat, Dist: Surat, Pin: 395007
July-May 2017-2018

CANDIDATE'S DECLARATION

I declare that fifth semester report entitled "**HOME AUTOMATION**" is my own work conducted under the supervision of the guide **Mr. Nirav Patel (External guide)** And **Miss. Hiral Patel (Internal guide)**.

I further declare that to the best of my knowledge the report for DIPL. final year does not contain part of the work which has been submitted for the award of DIPL. Degree either in this or any other university without proper citation.

(Signature)

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Enrollment No: 159550307030

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Student's Name: Jungade Krunal P.
Enrollment No: 159550307017

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(Signature)

Student's Name: Patel Shrey K.
Enrollment No: 159550307030

MAHAVIR SWAMI
COLLEGE OF POLYTECHNIC

CERTIFICATE

This is to certify that the project entitled **"*HOME AUTOMATION*"** is a bonafied report of the work carried out by Mr. ***(1) Smit Bafna (159550307003) (2) Raza Mohhamed Chidimar (159550307005) (3) Krunal Jungade (159550307017) (4) Shrey Patel (159550307030)*** for Industry Defined Project in Semester VII under the guidance and supervision of **Miss. *Hiral Patel*** for the partial fulfillment of award of the Diploma of Computer Science and Engineering at Mahavir Swami College of Polytechnic,Surat,Gujarat.

To the best of my knowledge and belief, this work embodies the work of candidate themselves, have duly completed, fulfills the requirement of the ordinance relating to the Bachelor Degree awarded by Gujarat Technological University and is up to the standard in respect of content, presentation and language for being referred to the Examiner.

Assistant Prof.
Hiral Patel
Internal Project Guide

Prof. Hiral Patel
Head of Department

Mahavir Swami College of Polytechnic
At: Bharthana, Ta:Surat , Dist: Surat, Pin: 395007

ACKNOWLEDGEMENT

As a student's of 5th semester Computer Science and Engineering of Mahavir Swami College of Polytechnic.We have the privilege to prepare and present the project report on "HOME AUTOMATION". We have put our sincere efforts to gain the knowledge and ideas about HOME AUTOMATION.

We have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and organizations. We would like to extend our sincere thanks to all of them.

We are highly indebted to Mr. Nirav Patel, our External Guide for his guidance and constant supervision as well as for providing necessary information regarding the project & also for his support in completing the project. We like to thank Miss. Hiral Patel, H.O.D. of Computer Science and Engineering department for giving us this opportunity and giving us constant support. We would like to express our gratitude towards Hiral Patel, our Project Guide for his kind co-operation and encouragement which helped in completion of this project.

We would like to express our special gratitude and thanks to industry persons for giving us such attention and time.

And at last, we would like to thank our parents and loved once who inspired and support us from the beginning of the project.

Smit Bafna

Raza Chidimar Mohammed

Krunal Jungade

Shrey Patel

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ABSTRACT

Home Automation is an integration of software with controlling device. It makes user Comfortable and Easy for using home devices like fan, lights etc.
The implementation and design of is made using the method that
WLAN technology handheld to control of the selective home devices with integral security and protected
system. The devices has been distributed in each room with its own board, these boards are connected to the desktop personal computer (PC) through via microcontroller.
The software consist of Assembly language for programming microcontroller (8051 MICROCONTROLLER) and
visual basic language like (PHP language) that is use to communicate between PC and two boards, also it is used to design Graphical User Interface
(GUI) which involving all devices needed to display in Home PC screen . The system is low cost and flexible with the increasing variety of devices to be controlled. So it will convert home into smart home .

COMPANY PROFILE

Dominant InfoTech, offshore Web Development Company in India from August 2015. We specialize in developing custom software and related applications and we can develop cost effective and high quality software for you. A brief introduction of what we do is given below:

1. Web Design.
2. Web Development
3. Android & IOS App Development.
4. ERP Development.
5. Website Maintenance
6. Digital Marketing
7. Graphics Designing.
8. Open Sources Custom and Development work
9. Payment Gateways Integration (PayPal, SecurePay, CCAvenue, EBC, PayU India, etc..,)

We specialize in providing services and solutions to sectors like banking, finance, retail, hospitality, education, e-commerce, etc. Our fast-paced growth can be attributed to our innovative products, quality services, skilled team and our adoption to agility. Dominant InfoTech breakthrough technology and continued innovation serves our client's mission of reducing cost, time and improves operational efficiency without compromising of quality.

Website: http://www.dominantinfotech.com/
LinkedIn: https://www.linkedin.com/nhome/?trk=hb_signin
Google Plus: https://plus.google.com/118280957678363734182/about
Facebook: https://www.facebook.com/DominantInfotech/
Slideshare: http://www.slideshare.net/DominantInfotech/

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ABBREVIATIONS

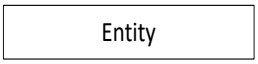
ID	Identification
No.	Number
SRS	System Requirement Specification
E-Mail	Electronic Mail
HTML	Hypertext Mark-up Language
OO	Object Oriented
CA	Cost Analysis
GUI	Graphical User Interface

JS	Java Script

NOTATIONS

ER Diagram:

1. Entity



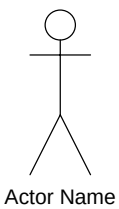
2. Key attribute

3. Relationship

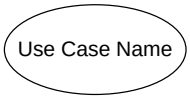
4. Link

Use-Case Diagram:

1. Actor

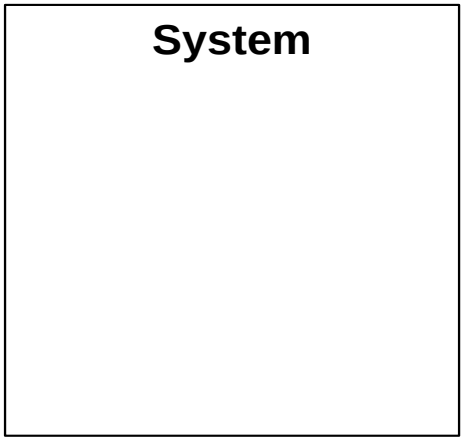


2. Use-Case



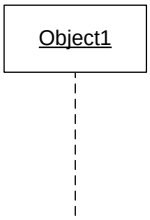
3. Association

4. System Boundary

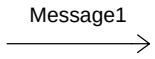


Sequence Diagram:

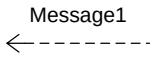
1. Object Lifetime



2. Message



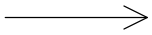
3. Message (return)



Activity Diagram:

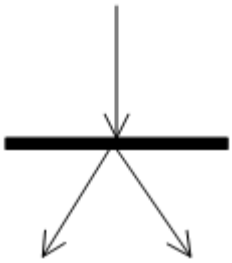
1. Action State

2. Control Flow

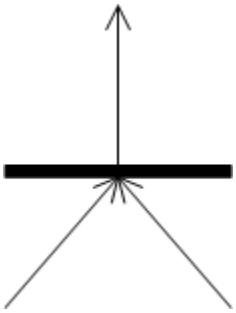


3. Decision

4. Transition (fork)



5. Transition (join)



6. Initial State

7. Final State

1. INTRODUCTION

1.1 PROJECT SUMMARY

The aim of this project was to build a home automation system so that the householder could dial into their house with a modem, from the office or even the other side of the world, and control their home appliances.

The main control unit talks to a module fitted in each appliance, which contains a small custom-programmed microcontroller. Originally intended the module to communicate with the main system over the mains wiring, but problems caused by not having direct mains access meant a wire link had to be used instead. This was designed to be easily converted to a mains link if required.

1.2 PURPOSE

The process of controlling various operating equipment, machinery, factory operations, etc., automatically (sometimes remotely) using control systems can be termed as automation. Automation is an efficient method to use in every field such that to reduce manpower, energy usage and also for improving the quality and efficiency of any system.

The Software includes:-

- Heating, ventilation and air conditioning (HVAC): it is possible to have remote control of all home energy monitors over the internet incorporating a simple and friendly user interface.
- Lighting control system
- Occupancy-aware control system: it is possible to sense the occupancy of the home using smart meters and environmental sensors like CO_2 sensors- .which can be integrated into the building automation system to trigger automatic responses for energy efficiency and building comfort applications.
- Appliance control and integration with the smart grid and a smart meter, taking advantage, for instance, of high solar panel output in the middle of the day to run washing machines.
- Security: a household security system integrated with a home automation system can provide additional services such as remote surveillance of security cameras over the Internet, or central locking of all perimeter doors and windows.
- Leak detection, smoke and CO detectors

1.3 SCOPE

This project work is complete on its own in remotely and automatically switching on and off of any electrical appliance not limited to household appliances, and sends a feedback message indicating the new present state of the appliance. It does not implement control of multiple appliances or automatic detection of faults in the controlled appliance..

1.4 OBJECTIVE

The objective of this project is to implement a low cost, reliable and scalable home automation system that can be used to remotely switch on or off any household appliance, using a microcontroller to achieve hardware simplicity, low cost short message service (SMS) for feedback and voice dial from any phone to toggle the switch state.

1.5 TECHNOLOGY AND LITERATURE REVIEW

- **PHP 7.1.1:**

During 2014 and 2015, a new major PHP version was developed, which was numbered PHP 7. The numbering of this version involved some debate.While the PHP 6 Unicode experiment had never been released, several articles and book titles referenced the PHP 6 name, which might have caused confusion if a new release were to reuse the name.After a vote, the name PHP 7 was chosen.

The foundation of PHP 7 is a PHP branch that was originally dubbed *PHP next generation* (*phpng*). It was authored by Dmitry Stogov, Xinchen Hui and Nikita Popov,[42] and aimed to optimize PHP performance by refactoring the Zend Engine to use more compact data structures with improved cache locality while retaining near-complete language compatibility.As of 14 July 2014, WordPress-based benchmarks, which served as the main benchmark suite for the phpng project, showed an almost 100% increase in performance. Changes from phpng are also expected to make it easier to improve performance in the future, as more compact data structures and other changes are seen as better suited for a successful migration to a just-in-time (JIT) compiler.[1] Because of the

significant changes, the reworked Zend Engine is called *Zend Engine 3*, succeeding Zend Engine 2 used in PHP 5.

- **HTML 5(for displaying of data):**

HTML can be considered as the main language of the web in some respects. All browsers understand it and because of its simplicity it's generally not taxing for the computers involved. The main aim of HTML is to format a web page hopefully in the same way for every browser, although it doesn't always work out that way in practice.

- **CSS 3 (for styling of displayed data):**

Cascading style sheets allows you to enhance your web pages in a way that HTML on its own never could and to keep a logically structured document in the process. Here it is shown how to add background images and colors and to manipulate text and other elements. It is possible to add borders, boxes and alter margins. In CSS precise control is enabled over where objects are placed either relatively or finely, with absolute pixel precision.

A style sheet can be embedded within the pages or in a separate file with the. CSS extension then linked in. A style sheet can control background images, colors and properties.

CSS has improved the original messy attempt at controlling presentation within HTML:

- .Control of text color of any elements.
- Control of background colors.
- Control of borders around elements.
- Spacing between elements and borders.
- Text manipulation and decoration.

- **MY SQL SERVER 2008 (as database engine):**

Microsoft SQL Server is a relational database server, developed by Microsoft. It is a software product whose primary function is to store and retrieve data as requested by other software applications, be it those on the same computer or those running on another computer across a network (including the Internet). There are at least a dozen different edition of Microsoft SQL Server aimed at different audiences and for different workloads (ranging from small applications that store and retrieve data on the same computer, to millions of users and computers that access huge amounts of data from the Internet at the same time.)

- **jQuery (for validation of displayed data):**

jQuery is a cross-platform JavaScript library designed to simplify the client-side scripting of HTML. It is free, open-source software using the permissive MIT License. Web analysis indicates that it is the most widely deployed JavaScript library by a large margin.

jQuery's syntax is designed to make it easier to navigate a document, select DOM elements, create animations, handle events, and develop Ajax applications. jQuery also provides capabilities for developers to create plug-ins on top of the JavaScript library. This enables developers to create abstractions for low-level interaction and animation, advanced effects and high-level, themeable widgets. The modular approach to the jQuery library allows the creation of powerful dynamic web pages and Web applications.

The set of jQuery core features—DOM element selections, traversal and manipulation—enabled by its *selector engine* (named "Sizzle" from v1.3), created a new "programming style", fusing algorithms and DOM data structures. This style influenced the architecture of other JavaScript frameworks like YUI v3 and Dojo, later stimulating the creation of the standard *Selectors API*.

Microsoft and Nokia bundle jQuery on their platforms.[7] Microsoft includes it with Visual Studio[8] for use within Microsoft's ASP.NET AJAX and ASP.NET MVC frameworks while Nokia has integrated it into the Web Run-Time widget development platform.

2. PROJECT MANAGEMENT

2.1 PROJECT PLANNING

Effective management of a software project depends on thoroughly planning the progress of the project. A well-planning strategy leads to the best and optimal use of the resources available and ensures completion of project on time. Project plan sets out the resources available to the project, the work breakdown and a schedule for carrying out the work. The project needs a lot of research and thus scheduling was a difficult task as there was a need for carrying out a lot of study about various algorithms and techniques and testing them at various stages, thus maintaining the schedule was also difficult.

2.1.1 Project Development Approach and Justification.

For this project the software development model used is Incremental Model. Based on the nature of project and application, the methods and tools to be used and controls and deliverable that are required, a process model for software engineering is chosen. In our system Incremental model is used. The incremental model has same phases that are in waterfall model. But it is iterative in nature. The incremental model has following phases.

1. Analysis
2. Design
3. Code
4. Test

Incremental build model

- The incremental build model is a method of software development where the model is designed, implemented and tested incrementally (a little more is added each time) until the product is finished.
- It involves both development and maintenance.
- The product is defined as finished when it satisfies all of its requirements. This model combines the elements of the waterfall model with the iterative philosophy of prototyping.

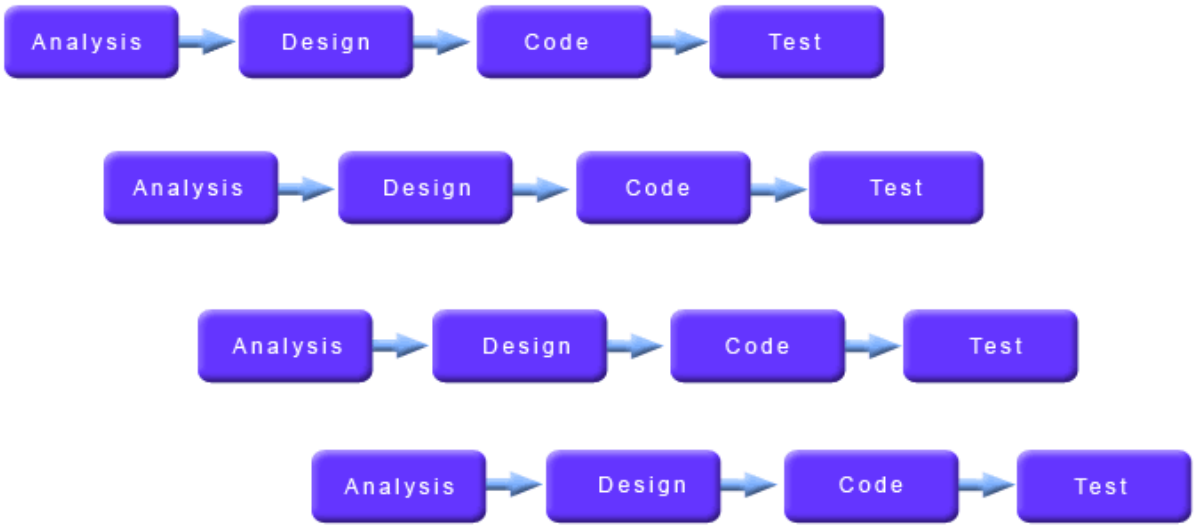


Fig 2.1.1 Incremental Model

- The product is decomposed into a number of components, each of which are designed and built separately (termed as builds). Each component is delivered to the client when it is complete.

- This allows partial utilization of product and avoids a long development time. It also creates a large initial capital outlay with the subsequent long wait avoided. This

ADVANTAGES:

- Less possibility will change the requirement.
- Benefits of product are as possible to get earlier.
- Easier to control.
- Easier to include additional features.
- Low less if project is scraped.

DISADVANTAGES:

- Later enhancement may break the system.
- Discomfort to developers.
- Sometimes it is not possible to divide a problem.

2.1.2 Project Plan

The objective of Software Project Plan is to provide a framework that enables the team members to make reasonable estimates of resources, cost and schedule. The Project Plan which was developed at the initial stage is always required to be updated as and when the project shapes up. Also the critical areas and milestones decided earlier can be verified whether they are being achieved or not.

The plan was made on the basis of:

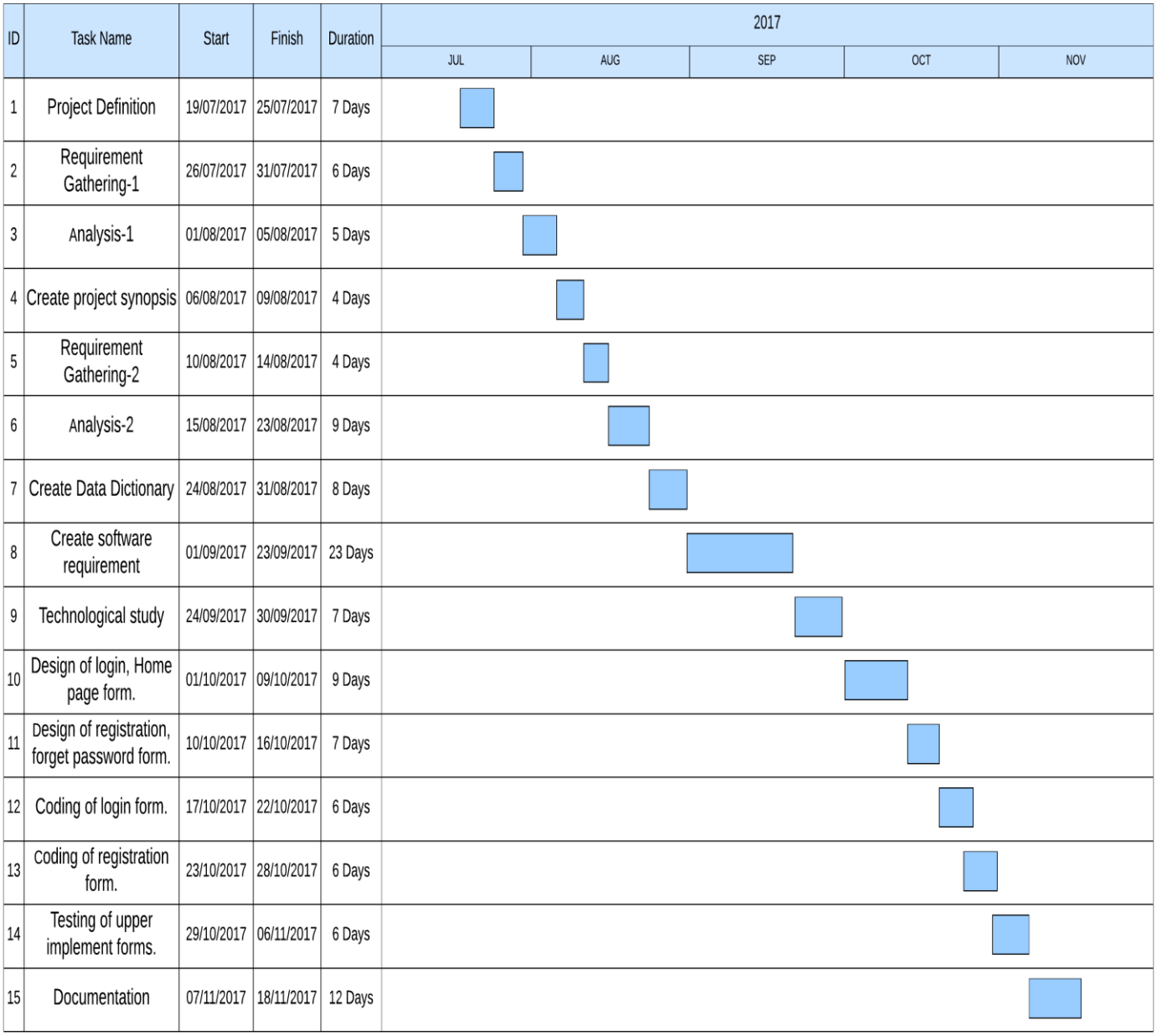
1. Establish Project Scope
2. Determine Feasibility
3. Analysis Risks
4. Define required resources
    a. Determine human resources required
    b. Define reusable software resources
    c. Identify environmental resources

Table 2.1.1 Project plan

ID	TASK NAME	START	FINISH	DURATION
1	Project Definition	19/7/2017	25/7/2017	7 Days
2	Requirement Gathering-1	26/7/2017	31/7/2017	6 Days
3	Analysis-1	1/8/2017	5/8/2017	5 Days
4	Create project synopsis	6/8/2017	9/8/2017	4 Days
5	Requirement Gathering-2	10/8/2017	14/8/2017	4 Days
6	Analysis-2	15/8/2017	23/8/2017	9 Days
7	Create Data Dictionary	24/8/2017	31/8/2017	8 Days
8	Create software requirement specification	1/9/2017	23/9/2017	23 Days

9	Technological study	24/9/2017	30/9/2017	7 Days
10	Design of login; contact us, Home page form.	1/10/2017	9/10/2017	9 Days
11	Design of registration, forget password form.	10/10/2017	16/10/2017	7 Days
12	Coding of login form.	17/10/2017	22/10/2017	6 Days
13	Coding of registration form.	23/10/2017	28/10/2017	6 Days
14	Testing of upper implement forms.	29/10/2017	6/11/2017	9 Days
15	Documentation	7/11/2017	18/11/2017	12 Days

GANTT CHART:



ID	Task Name	Start	Finish	Duration
1	Project Definition	19/07/2017	25/07/2017	7 Days
2	Requirement Gathering-1	26/07/2017	31/07/2017	6 Days
3	Analysis-1	01/08/2017	05/08/2017	5 Days
4	Create project synopsis	06/08/2017	09/08/2017	4 Days
5	Requirement Gathering-2	10/08/2017	14/08/2017	4 Days
6	Analysis-2	15/08/2017	23/08/2017	9 Days
7	Create Data Dictionary	24/08/2017	31/08/2017	8 Days
8	Create software requirement	01/09/2017	23/09/2017	23 Days
9	Technological study	24/09/2017	30/09/2017	7 Days
10	Design of login, Home page form.	01/10/2017	09/10/2017	9 Days
11	Design of registration, forget password form.	10/10/2017	16/10/2017	7 Days
12	Coding of login form.	17/10/2017	22/10/2017	6 Days
13	Coding of registration form.	23/10/2017	28/10/2017	6 Days
14	Testing of upper implement forms.	29/10/2017	06/11/2017	6 Days
15	Documentation	07/11/2017	18/11/2017	12 Days

Fig 2.1.2 Gantt Chart

2.1.3 Roles and Responsibilities

All the activities were carried out by four members and the work was divided between the team members are depending upon their capabilities.

Table 2.1.2 Roles and responsibilities

		MEMBER NAME			
ID	**ROLE**	**Smit Bafna**	**Raza Chidimar Mohhamad**	**Krunal Jungade**	**Shrey Patel**
1	Requirement Gathering		✓	✓	✓
2	Analysis Planning	✓	✓	✓	✓
3	Database Design and Normalization	✓	✓	✓	
4	GUI Design	✓	✓	✓	✓
5	Data Validation	✓			✓
6	Database and GUI Connectivity	✓	✓	✓	✓
7	Testing	✓	✓	✓	✓
8	Deployment and Server Configuration	✓	✓	✓	✓

2.2 ESTIMATION

COCOMO (Constructive Cost Estimation Model) is to be used in our project.

COCOMO was proposed by Boehm. He postulated that any software development project can be classified into one of the following three categories based on the development complexity: organic, semidetached, and embedded. These three product classes correspond to application, utility, and system programs, respectively. Normally, data processing programs are considered to be application programs.

Boehm’s definitions of organic, semidetached and embedded systems are elaborated below.

Organic: We can consider a development project to be of organic type, if the project deals with developing a well – understood application program, the size of the development team is reasonably small, and the team members are experienced in developing similar types of projects.

Semidetached: A development project can be considered to be of semidetached type, if the development team consists of a mixture of experienced and inexperienced staff. Team members may have limited experience on related systems but may be unfamiliar with some aspects of the system being developed.

Embedded: A development project is considered to be of embedded type, if the software being developed is strongly coupled to complex hardware, or if stringent regulations on the operational procedures exist.

2.3 FEASIBILITY STUDY

An important outcome of the preliminary investigation is the determination that the system is feasible or not. The main aim of the feasibility is to determine whether it would be technically feasible to develop a project. The feasibility study activity involves the analysis of the problem and collection of all relevant information relating to the product such as the different data items which would be input to the system, the processing required to be carried out on these data, the output required to be produced by the system as well as the various constraints on the behavior of the system.

Feasibility studies of four solid dimensions are:

Technology: Technical feasibility assesses whether the current technical resources are sufficient for system. The technology used for developing this project is Microsoft Visual Studio 2010.

Finance: Finance feasibility determines whether the money are available to develop the system. The development of system is financially feasible as the overall cost incurred in

developing the system was not very high. This was calculated roughly as the software used were the once which are readily available in the market without much higher cost.

Time: The time required to complete the project was approximately of the twelve months and four people working on the project. This time to be spent in developing the product was appropriate for the user also.

Resources: The resources required were already available and thus had no hindrance in the overall performance of the product. Most of the people have a computer. Visual studio is easily available on internet and tutorial for its installation is also available in market.

3. SYSTEM ANALYSIS

3.1 STUDY OF CURRENT SYSTEM

Today’s smart home automation are more emphasize about smart living, living greener and security. Our smart home is sustainable and it ensures that our home is not utilizing unnecessary energy. In addition, the smart home also can prevent any intruders by alerting us with alarm or send any signal to us through smartphone related application. The current trend in smart home automation includes automated lights, remotely mobile control, and receiving notifications of mobile, email and text.

3.2 PROBLEM AND WEAKNESSES OF CURRENT SYSTEM

Home Automation is one of modern life's pleasures, giving us the ability to control our home's electronics at the touch of a finger. All of this automated equipment is made of software, hardware, and application interfaces. Items such as home theater systems, thermostats, televisions, and lights can now all be controlled with a universal remote or smartphone.

The Most Common Home Automation Problems & Complaints:

- **System Integration**
- **Wiring**
- **Overheating**
- **Physical Damage**

3.3 REQUIREMENTS OF NEW SYSTEM

We live in a time unlike any other. With so many technological advancements at our fingertips, our lives are made easier, which is fortunate considering the fast-paced lives most of us lead. In recent years, great strides have been made in making homes a bit more “tech savvy.” This technology, in short, allows the homeowner to run his or her home while away through a remote, often on a Smartphone or iPad. In fact, these homes have been labeled as being “smart,” due to the fact that they can seemingly think on their own. This ability to “think,” also known as being an automated home

3.3.1 User Requirements

As a user requirement, customer can see all details of device on-line they can know anything about company if they have some question and also they can know anything about system and then they can provide maintenance. Company provides these services.

3.3.2 System Requirements

This system requires a computer with Internet connection.

- Performance Requirements
  - 99% up time
  - Increased Performance by Independent all platform
- Safety Requirements
  - System integrity check
  - Rollback to last known best state
  - Extensible Database design to accommodate future trends.
- Security Requirements
  - Dynamic password for log in.
  - Multi level encryption for data storage.

3.4 HARDWARE AND SOFTWARE REQUIREMENTS

3.4.1 Hardware Requirements

- 8051 Microcontroller
- Pentium 3, intel core i3, core i5, and higher
- 1 GB RAM(maximum)
- 512 MB Hard Disk
- Monitor
- Keyboard
- Mouse
- Modem for internet access

3.4.2 Software Requirements

- Windows XP, 7, and higher.
- Web browser
- SQL server 2005 or 2008
- HTML
- Java script
- Microsoft Office Excel
- Microsoft Office Word

3.5 FEATURES OF NEW SYSTEM

Home automation system may seem like a daunting task as there are differences in communication protocols, user interfaces, installation methods, costs, personalization and customer support networks.

The following are used in our system:

Intuitive and Comprehensive Interface: This eliminates the task of loading one app to turn on the lights and another to turn your home audio system off.

Reliable Operation: Many do-it-yourself systems rely on cloud servers and the Internet and if either go down, the system stops working. Custom-designed home automation systems are more secure and dependable and gives you and your family peace of mind.

- **Scalable Design**

- **Secure from Hackers**

4. SYSTEM DESIGN

4.1 DATA MODELING

Data Modeling is a method used to define and analyze data requirements needed to support the business process of an organization. The data requirements are recorded as a conceptual data model with associated. Data definition actual implementation of the conceptual model is called a logical data modal. Data modeling defines not just data elements, but their structures and relationships between them. Data modeling technique and methodologies are used to model. Data in a standard, consistent, predictable manner in order to manage it is a resource.

4.2 DATA DICTIONARY

A Data Dictionary is a collection of description of the data objects or items in a data model for the benefits of programmers and other who need to refer to them.

The Data Dictionary is an organized of all data elements that are pertinent to the system, with precise rigorous definition so that both user and system analysts can have can have common understanding of inputs, outputs, components of stores and even intermediate calculations.

A data dictionary is a catalog of the elements in the system. These elements center on data and the way they are structured to meet user requirements and organization needs. Here all the data fields in their respective tables are allotted so as to access these data in the system. The data tables are created in a back-end tool like Microsoft Access, My SQL, Oracle, etc.

Analysts use data dictionary for the following important reasons:

- To manage the details in large system
- To communicate a common meaning for all system elements
- To document the feature of the system.
- To facilitate analysis of the details in order to evaluate the characteristics and determine where system changes should be made.
- To locate errors and omissions in the system.

The data dictionary contains types of descriptions for the data flowing through the system.

Data Elements is the most fundamental level which is also considered as the building blocks for all other data in the system. It refers to all the different data used like fields, data types to make the system fully functional irrespective to the table used in the system. Here all the different type of fields used to make table are written sequentially without referring to the tables. This process helps in the process of Normalization of tables.

Next to Data Elements comes the Data storage which provides the information of where and how each data element is stored in which table and it also give information of any constraint if there. This step also gives knowledge of different data types used for different field and their size. All the normalized tables are showed in data storage.

Data Flow stage shows the flow of data in the system. This step is can be already seen in the data flow diagrams above in this document. This step refers to all the data flow paths were transactions are done in the computerized system.

The data flow step also includes different processes used in the system and it is followed by External Entities used in the system.

Table 4.2.1 User Information

PRIMARY KEY: User_Id

Field Name	**Data Type**	**Constraint**	**Description**
User_Id	int(10)	Primary Key	Uniquely Define All The Users
Username	varchar(30)	Not Null	User's Name
Password	text	Not Null	User's Password
Email	text	Not Null	User's Email ID
Firstname	varchar(50)	Not Null	User's Firstname
Lastname	varchar(50)	Not Null	User's Lastname
Address	text	Not Null	User's Address
City	varchar(20)	Not Null	User's City
State	varchar(20)	Not Null	User's State
Contact_No	Int(11)	Not Null	User's Contact Number

Table 4.2.2 Room Information

PRIMARY KEY: Room_Id

Field Name	**Data Type**	**Constraint**	**Description**
Room_Id	int(10)	Primary Key	Uniquely Define All Rooms
Room_Name	varchar(30)	Foreign Key	Room Name

Table 4.2.3 Device Information

PRIMARY KEY: Device_Id
FOREIGN KEY: Room_Id

Field Name	**Data Type**	**Constraint**	**Description**
Device_Id	int(10)	Primary Key	Uniquely Define All The Devices
Device_Name	varchar(30)		Name Of Device
Room_Id	int(10)	Foreign Key	Refrence From Room Table
Status	varchar(20)		Its Shows The Device Status
State	varchar(20)		Describe Active or Deactive

4.3 ER DIAGRAM

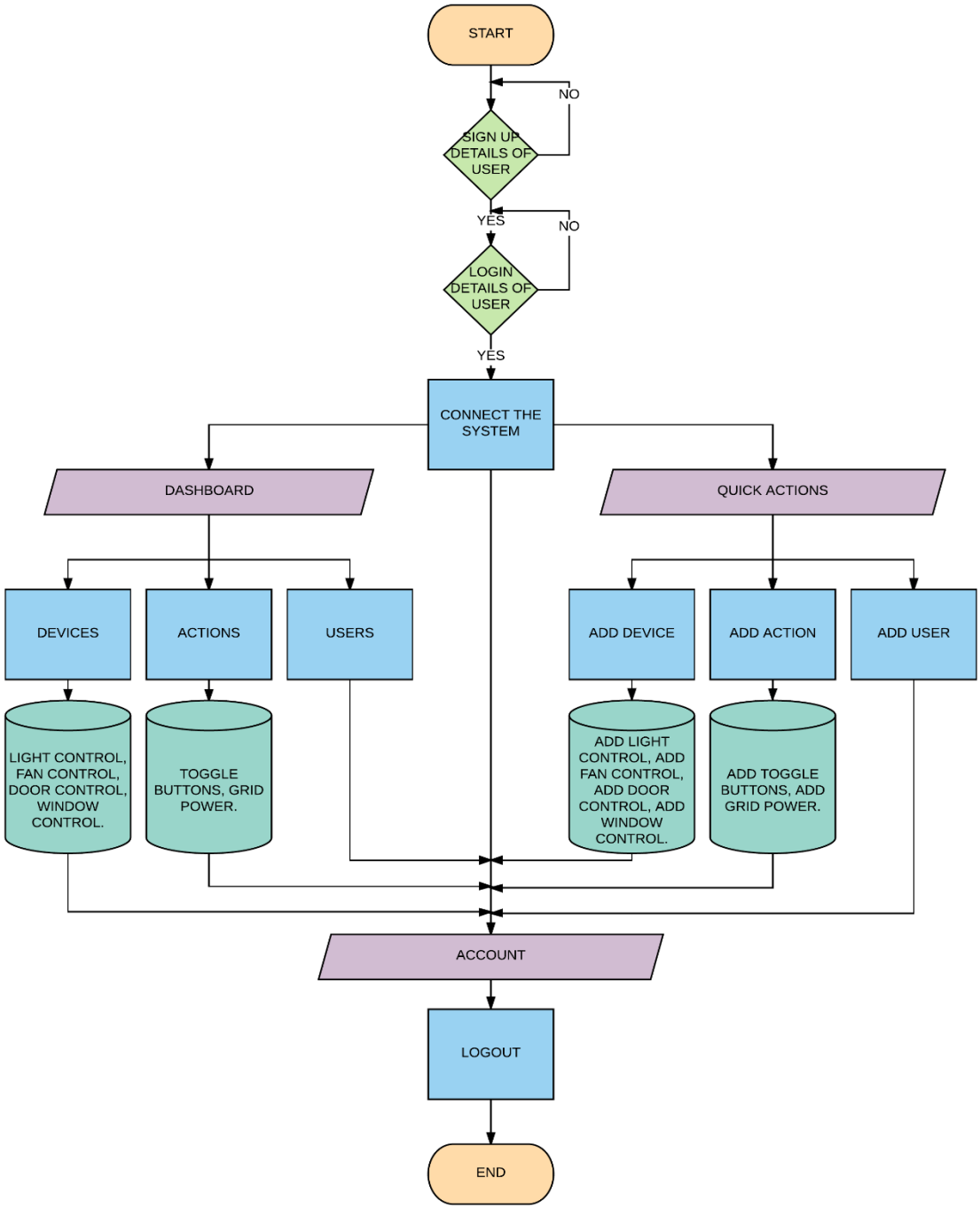


Fig 4.3.1 ER Diagram

4.4 USE CASE DIAGRAM

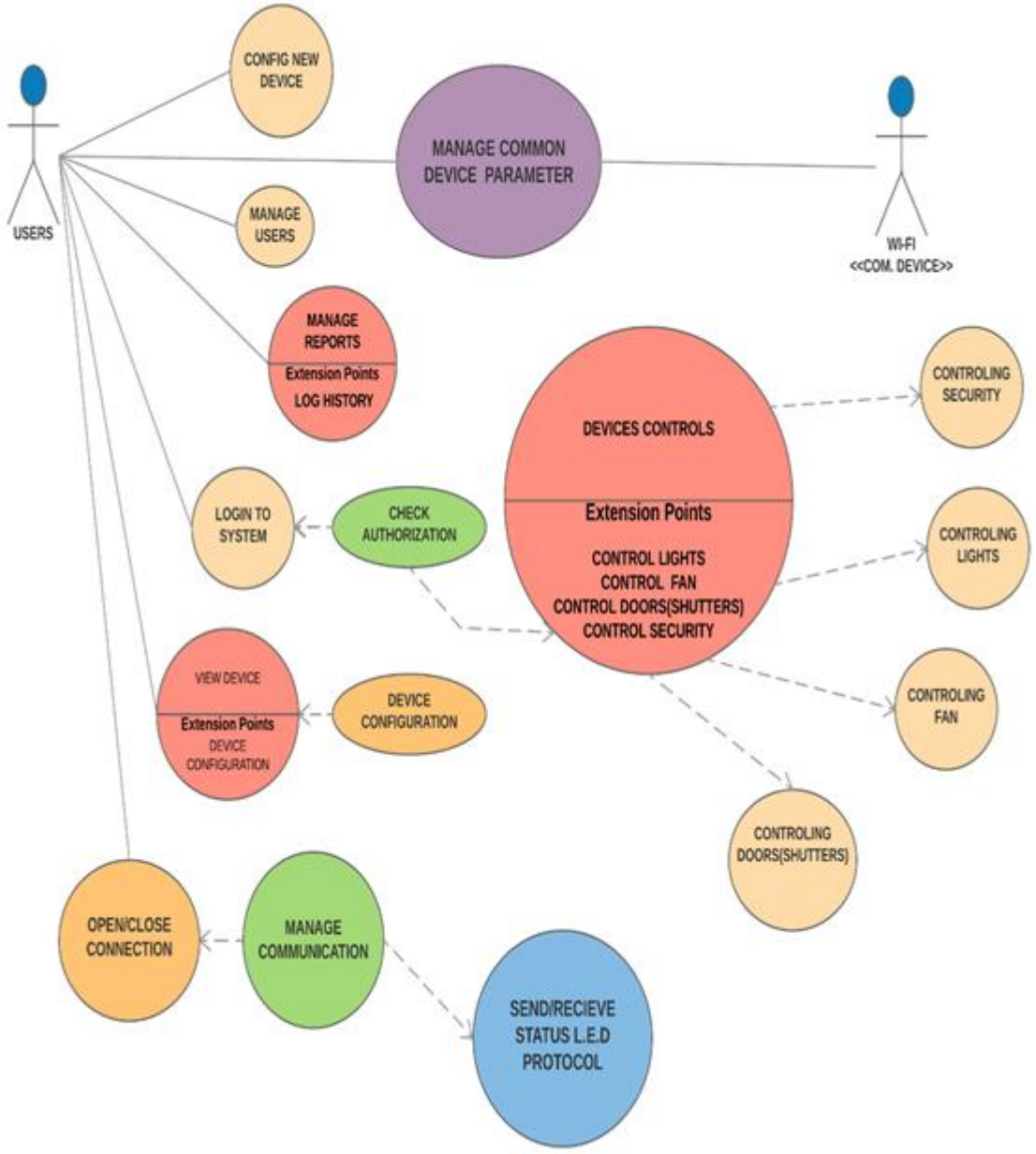


Fig 4.4.1 Use Case Diagram

4.5 CLASS DIAGRAM

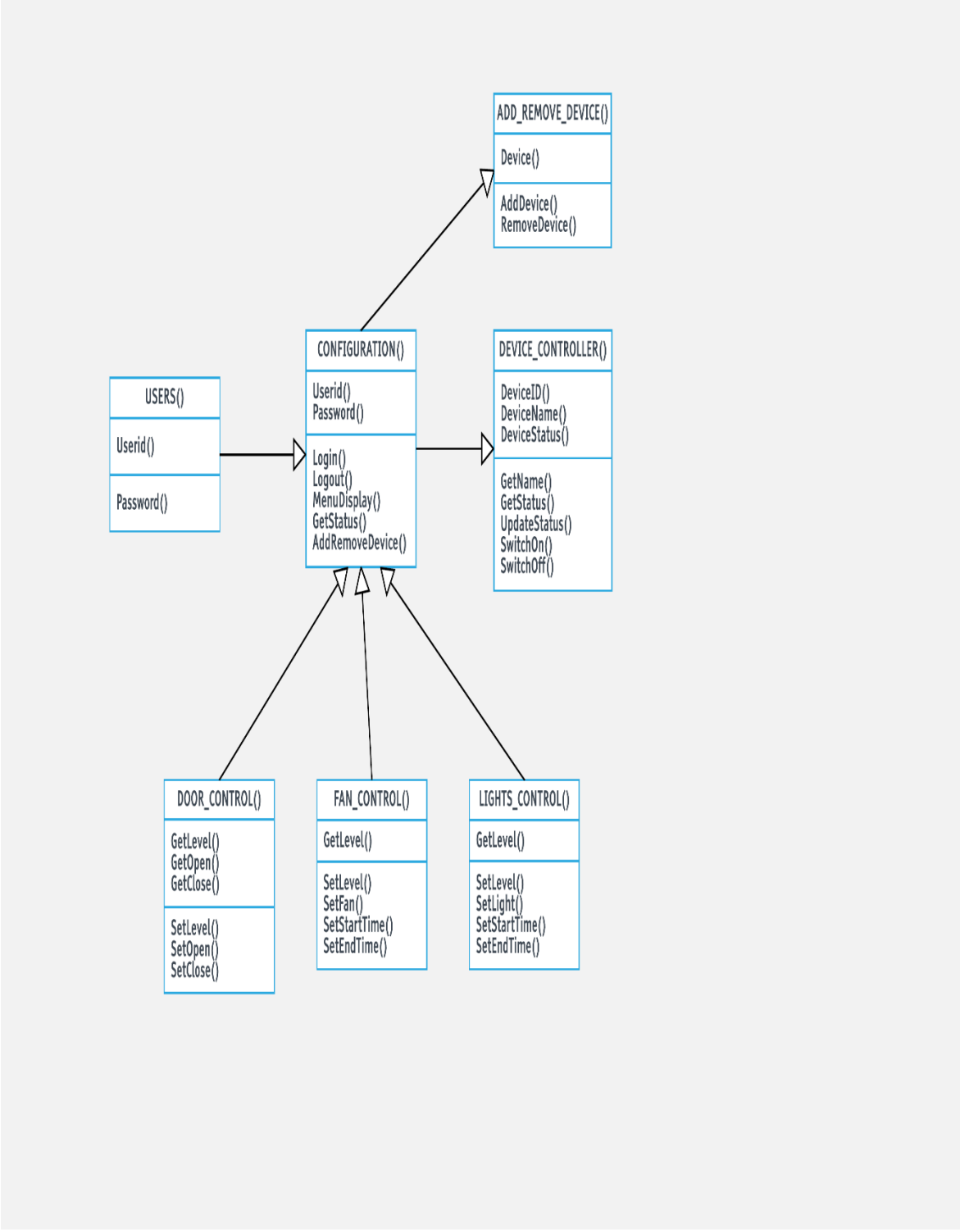


Fig 4.5.1 Class Diagram

4.6 SEQUENCE DIAGRAM

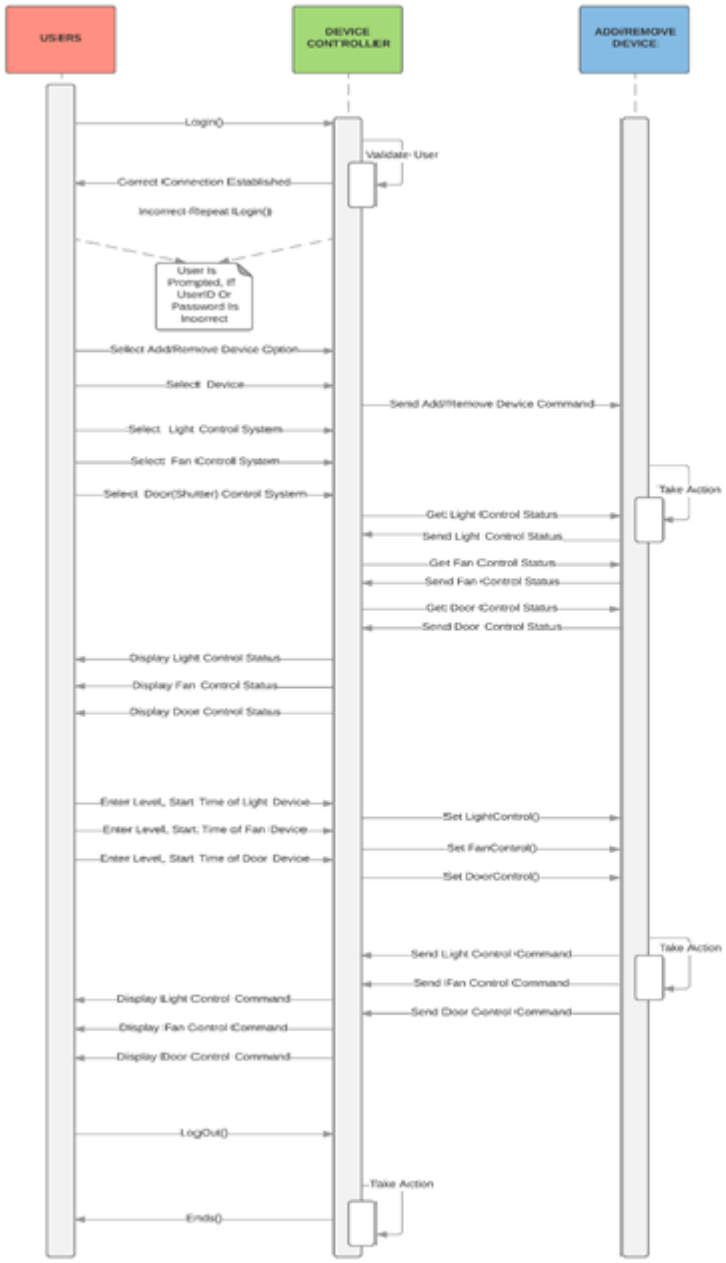


Fig 4.6.1 ER Diagram

4.7 ACTIVITY DIAGRAM

Fig 4.7.1 Activity Diagram

5. IMPLEMENTATION

5.1 SYSTEM ARCHITECTURE

THREE TIER ARCHITECTURE

In this asp.net tutorial you will learn how to implement 3-tier architecture in asp.net using c#. 3-Tier architecture is also called layered architecture. Some people called it n-tier architecture. Layer architectures are essentially objects and work in object oriented environment just like asp.net. 3-tier architecture is a very well known architecture in the world of software development, it doesn't matter whether you are developing web based application or desktop based, it is the best architecture to use.

3-TIER ARCHITECTURE IN ASP.NET USING C#

3-Tier architecture consists of:

1. UI or Presentation Layer
2. Business Access Layer or Business Logic Layer
3. Data Access Layer

UI OR PRESENTATION LAYER

Presentation layer consists of pages like .aspx or desktop based form where data is presented to users or getting input from users.

BUSINESS ACCESS LAYER OR BUSINESS LOGIC LAYER

Business logic layer contains all of the business logic. Its responsibility is to validate the business rules of the component and communicating with the Data Access Layer. Business Logic Layer is the class in which we write functions that get data from Presentation Layer and send that data to database through Data Access Layer.

DATA ACCESS LAYER

Data Access Layer is also the class that contains methods to enable business logic layer to connect the data and perform desired actions. These desired actions can be selecting, inserting, updating and deleting the data. DAL accepts the data from BAL and sends it to the database or DAL gets the data from the database and sends it to the business layer. In short, its responsibility is to communicate with the backend structure.

ILLUSTRATION OF 3-TIER ARCHITECTURE WITH DIAGRAM

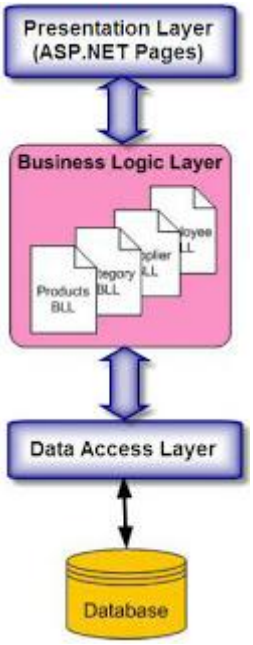


Fig 5.1.1 3-Tier Architecture

The figure clearly describe about the purpose of BAL and DAL. The main advantage of 3-tier architecture is to separate the presentation layer from data access layer. You will not write any function to communicate with database in presentation layer, all the required functions for communication with database will be available in Data Access Layer. Its mean at presentation layer you will just focus at information that you will present in front of user.

Main advantages of uses of 3-tier Architecture:

- Removes a huge processing burden from client machines.
- It can be used to consolidate enterprise-wide business rules as application server's process business rules in a single place for use by multiple applications. When rules change, only a change to the application server is required.
- Any knowledge of the database server may be hidden from the client. Database queries may be presented to client in alternative forms.

5.2 CODING STANDARDS

1. In database all tables are having names according to their data content.
2. Tables and their fields name are having identification character, for ex: fields of table User Information is User_ID, User_Name, User_Type, User_Email_ID etc.
3. Modules are divided into purchase module, production module, sales module & all are tagged according their functionality.
4. All functions are using pass by value type of parameter passing.
5. Global variables are declared in special file called setvalue.
6. Different variable names are used in classes to avoid scope resolution problem with global variable.
7. Wherever necessary variables with same name as global ones are accessed using object of that class only to avoid unintentional global variable update.
8. All modules are having specifications for functionality which it performs, environment effects & error conditions listed in APIs.
9. Exceptions are handled at function level as well as class level.
10. Comments are written at each looping code for estimated iterations.
11. Sub routines are used for initialization part where system itself is an object & no constructor is available due to it.
12. Constant values are assigned in capital variable names. Ex: MAX=10
13. Reusable codes are separated & called dynamically.
14. Allocated memory is released using coding only to increase system performance.
15. Code optimization is taken care at sub revision coding update part.
16. Error finder routines are implemented but invisible to end user.

17. Error codes are also throwed along with user defined exceptions as per the error codes are specified in documentation.
18. Frequent data while bulk data entry task are saved in temporary variables and repeated on display automatically to increase ease of use.
19. Short cut keys are catched and code is executed accordingly.
20. Event handling is done based on subroutines on operation on objects of components.

5.3 SCREEN SHOTS

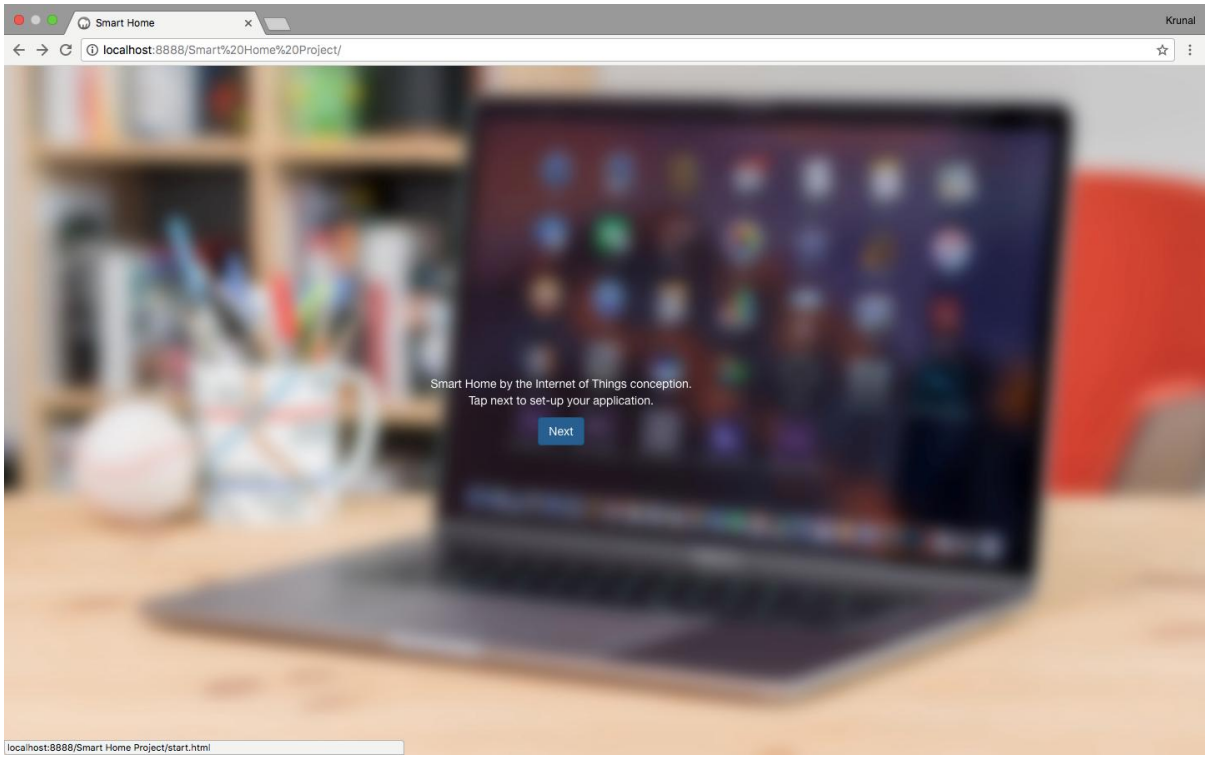


Fig 5.3.1 Introduction Page

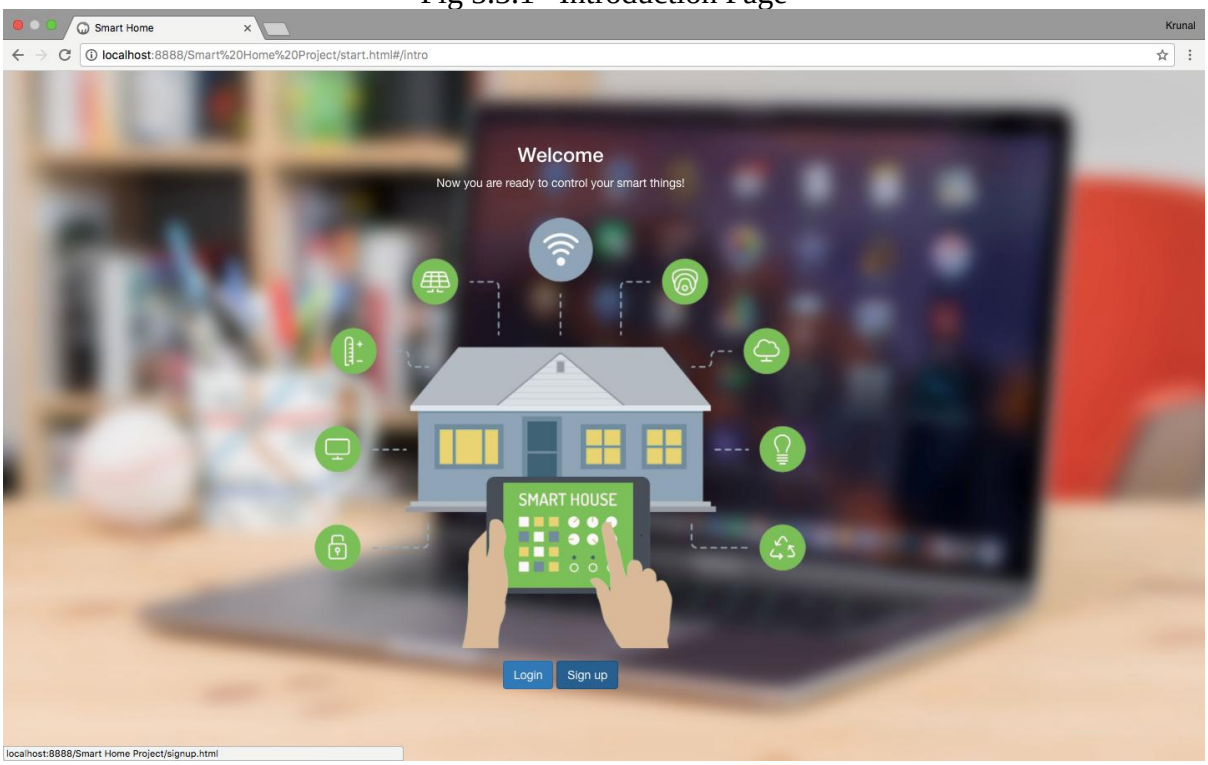


Fig 5.3.2 Introduction Page-2

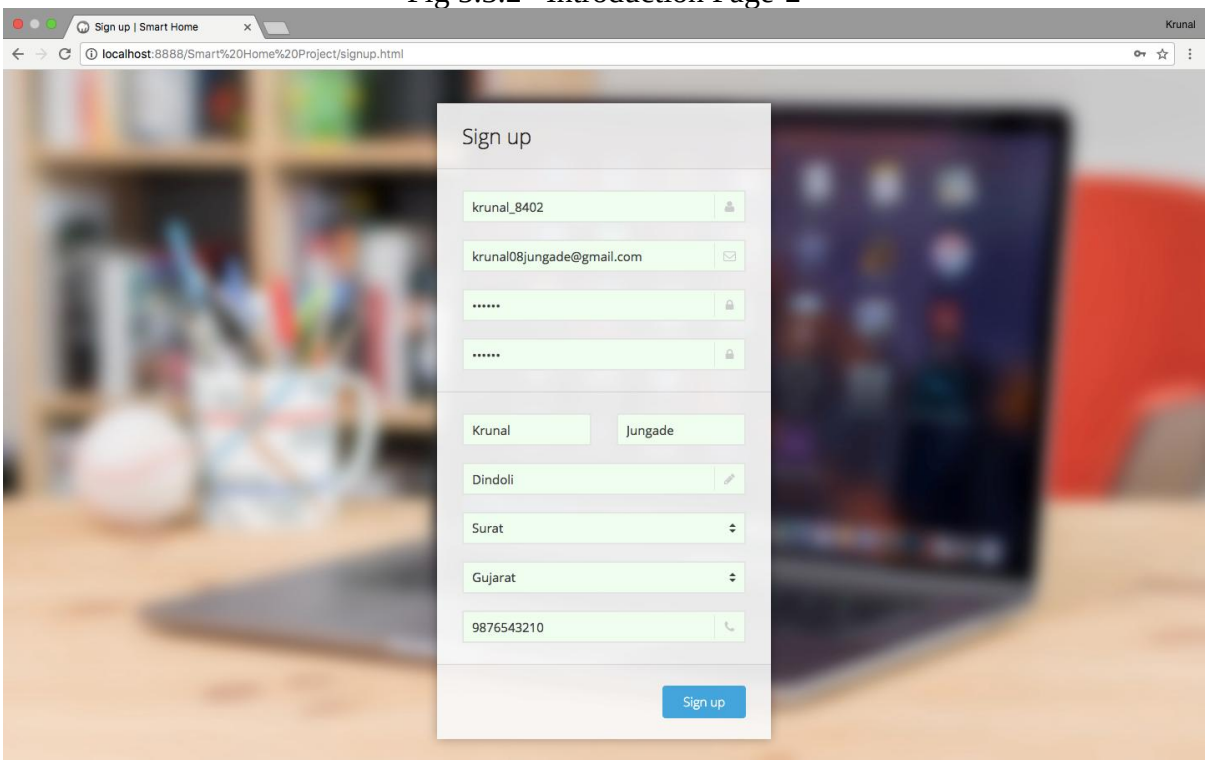


Fig 5.3.3 Sign up Form

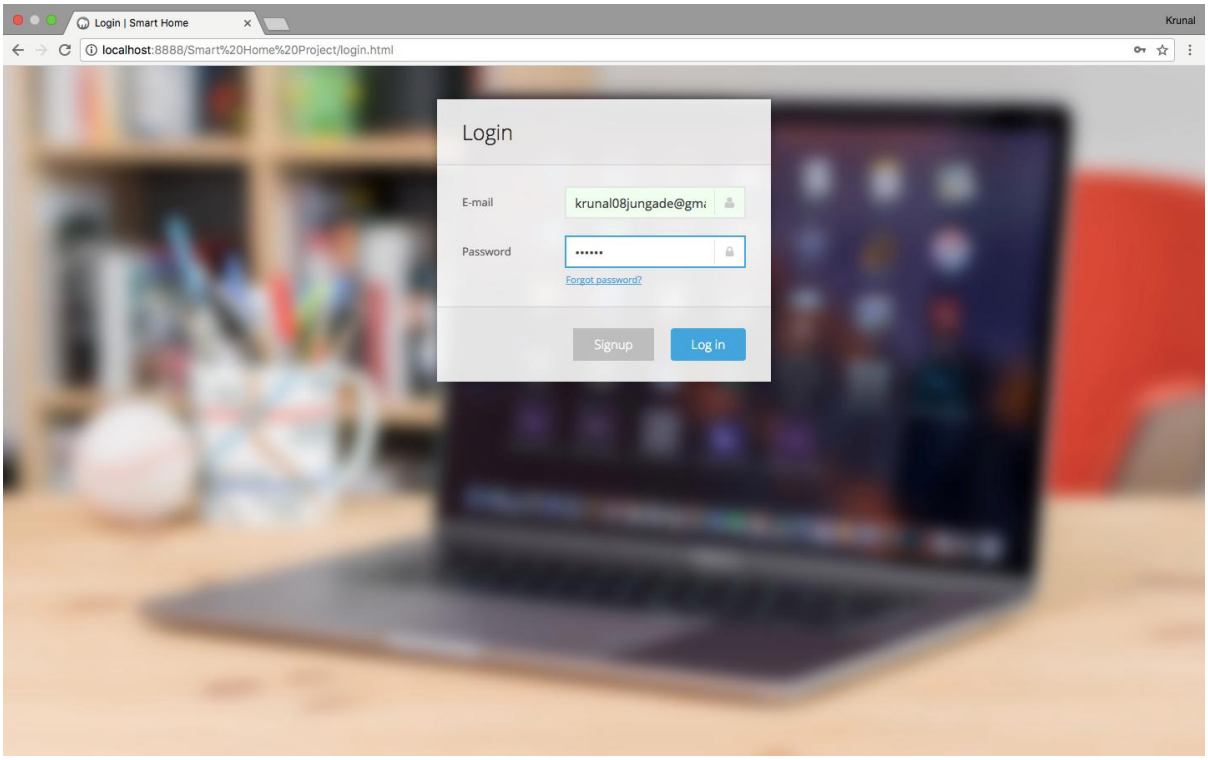


Fig 5.3.4 Login Form

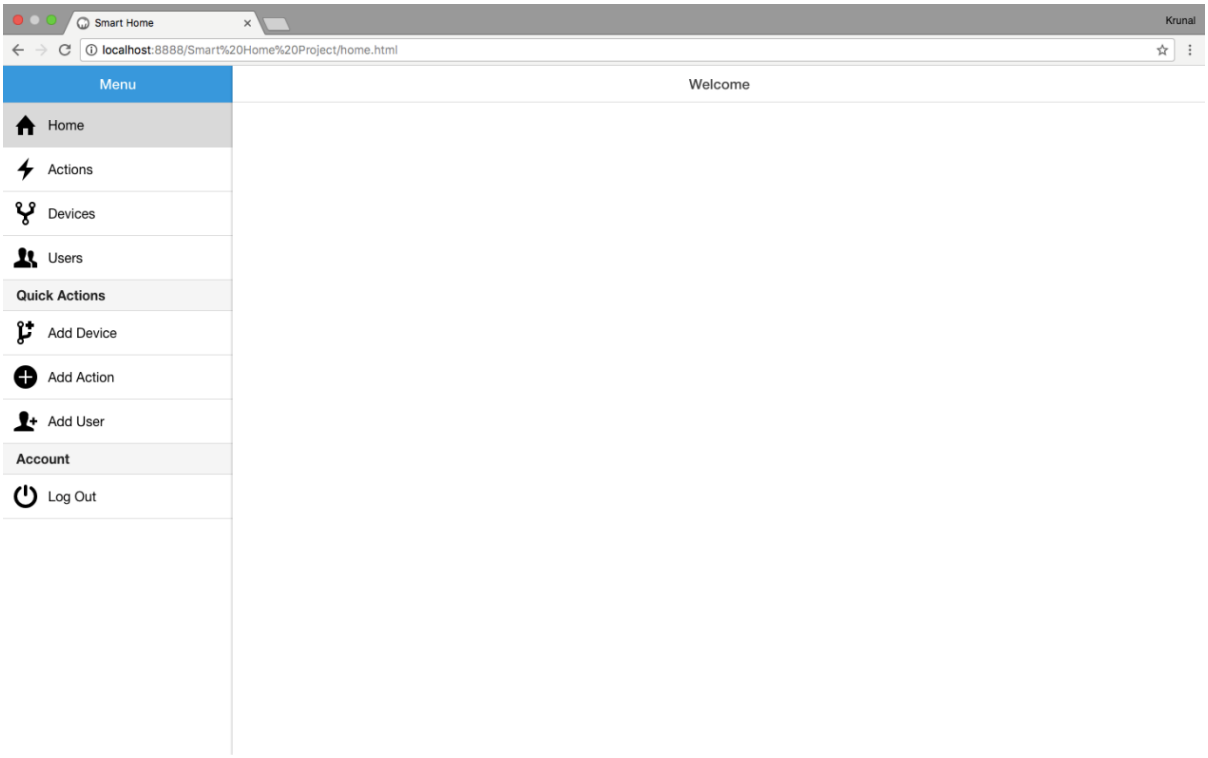


Fig 5.3.5 Home Page

6. TESTING

Software testing is an investigation conducted to provide stakeholder with information about the quality of the product or service under test and checking the software is working properly or not. Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation. Test techniques include, but are not limited to, the process of executing a program or application with the intent of finding software bugs (errors or other defects).

Software testing can be stated as the process of validating and verifying that a software program/application/product:

1. Meet the requirement that guided its design and development.
2. Works as expected.
3. Can be implemented with the same characteristics.

Software testing, depending on the testing method employed, can be implemented at any time in the development process. However, most of the test effort occurs after the requirements have been defined and the coding process has been completed. As such, the methodology of the test is governed by the software development methodology adopted.

6.1 TESTING PLANS

The purpose of test plan is to serve as test approach for the “Diamond gems analysis and planning” test plan aims:

- To define overall scope of testing.
- To identify the target test items.
- To define different testing approach.
- To details the activities, dependencies and efforts require to conduct the testing.
- To define various criteria needed to conduct the test.

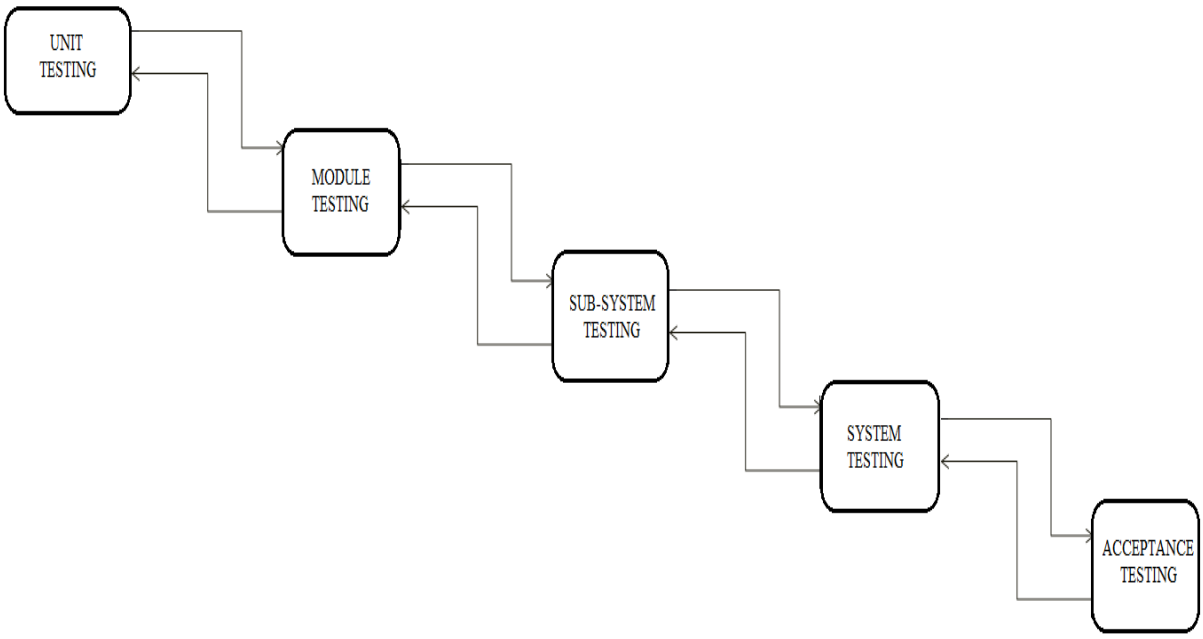


Fig 6.1.1 Testing Plan

6.2 TESTING STRATEGY

Designing effective test cases is important, but so is strategy you use to execute them. Should you develop a formal plan for your tests? Should you test the entire program as a whole or run tests only on a small part or it? Should you return tests you've already conducted as you add new component to a large system? When should you involve the customer? These and many other questions are answered when you develop a software testing strategy.

A test strategy is an outline that describes the testing portion of the software development cycle. It is created to inform project managers, testers and developer about some key issue of the testing process. This includes the testing objective, methods of testing new function, total time and resources required for the project, and the testing environment.
Test strategies describe how the product risks of the stakeholder are mitigated at the test-level, which types of test are to be performed, and which entry and exit criteria apply. They are created based on development design document. System design document are

primarily used and occasionally, conceptual design document may be referred to, Design document describe the functionality of the software to be enabled in the upcoming release. For every stage of development design, a corresponding test strategy should be created to test the new feature sets.

Test strategies can range from informal to very formal. In its simplest form, the test strategy is exactly that- a *strategy*. It's a roadmap for what testing will be done, and details the in which the testing will be accomplished:

- How we do testing?
  Answer to this question might identify the types of testing needed, such as manual or automated testing.
- Where we do testing?
  These answers detail the actual test environment, including specific server names, and many include a diagram of all physical or logical components.
- Who can do testing?
  The test strategy must specify the testing resources and other resources needed to accomplish the testing.
- When testing will be done?
  good test strategy outlines the time of the first internal build for testing and likely includes a rough schedule for the reminder of the project.

These high level questions need answer early in a project. The test strategy also might address related testing topics such as purchasing test tools or the defect-reporting process.

There are three types of testing.

- Unit test
- Validation test
- Integration test

Unit test:

- Ours is the web based multiuser application. We have to take care of concurrent database access and updates. We used server, which would cater to all the needs of the application access and MS SQL database management system. We found that concurrent database access and updates worked fine.
- Each function was tested to acquire the expected results.
- The interfaces were verified with the end user and some changes in the representation of inputs mechanism were made.
- The database connection checked every time. Connection open and closed properly to optimized the database performance.
- Pages are tested, appropriate data is fetched or not.

Validation test:

- A validation test for each field was carried out by entering invalid data sets. Validations were carried out using JavaScript.

Integration test:

- When all modules completed and tested, They were then integrated to check if they work iteratively with each other.
- The intent was to expose faults in the interaction between software modules and functions.

6.3 TESTING METHODS

Black-box Testing

Black-box testing is a method of software testing that tests the functionality of an application as opposed to its internal structures or working specific knowledge of the application's code/internal structure and programming knowledge in general is not required. Test cases are built around specifications and requirement, i.e., what the application is supposed to do. It uses external descriptions of the software, including specifications, requirements, and designs to derive test cases. These tests can be functional and non-functional, through usually functional. The test designer selects valid and invalid inputs and determines the correct output. There is no knowledge of the test object's internal structure.

This method of test can be applied to all levels of software testing: unit, integration, functional, system and acceptance. It typically comprises most if not all testing at higher levels, but can also dominate unit testing as well.

White-box Testing

White-box testing (also known as clear box testing, glass box testing, transports box testing and structural testing,) is a method of testing software that tests internal structures or working of an application, as opposed to its functionality (i.e., black-box testing).in white-box testing an internal perspective of the system, as well as programming skills, are required and used to design test cases. The tester chooses inputs to exercise paths through the code and determine the appropriate outputs. This is analogous to testing nodes in a circuit, e.g. in-circuit testing (ICT).

While white-box testing can be applied at the unit, integration and system levels of the software testing process, it is usually done at unit level. It can test paths within a unit, paths between units during integration and between subsystems during a system level test. Through this method of test design can uncover many errors or problems. It might not detect unimplemented parts of the specification or missing requirements.

6.4 TEST CASES

6.4.1 Purpose

The purpose of this application is to provide strong integration between all modules and all information of the organization and product are available online. So any user can see all details online and they can ask any question and can online payment and purchase diamond online. Any changes in organization can see by owner or employees of organization with live updates.

For login of employee they have name and password. For registration of user they have to fill up all details and they can registration. We will test that all these things should done properly. For that we will test login and registration module.

6.4.2 Required Input and Expected Results

Table 6.4.1 Test case for Login

Sr. No.	Test case	Input	Expected Output	Actual Output
1.	If Username and password field is blank	-	Required field validation for Username and password are displayed	Username Is Compulsory and Password Is Compulsory are displayed
2.	If Username field is blank	-	Required field validation for Username is displayed	Username Is Compulsory are displayed
3.	If Password field is blank	-	Required field validation for password is displayed	Password Is Compulsory Are displayed
4.	Invalid Username	@smit	Redirect Back to login Page	Username Or Password is

				Wrong are displayed
5.	Invalid password	Password = ****	Redirect Back to login Page	Username Or Password is Wrong displayed
6.	Username and password are correct	Username=smit Password=***	User/Admin Home page will be displayed	Login in Successfully

Table 6.4.2 Test case for Registration

Sr. No.	Test case	Input	Expected Output	Actual Output
1.	If Name is blank	-	Required field validation for Name are displayed	Name Is Compulsory
2.	If Email ID is Incorrect	Smit.yahoo.com	Regular Expression Validation are displayed	Email ID is wrong
3.	If Name is entered	raza	Record Saved In Database	Record saved successfully

Table 6.4.3 Test case for Feedback

Sr. No.	Test case	Input	Expected Output	Actual Output

1.	If Name is blank	-	Required field validation for Name are displayed	Name Is Compulsory
2.	If Email ID is Incorrect	smit.yahoo.com	Regular Expression Validation are displayed	Email ID is wrong
3.	If Name is entered	raza	Record Saved In Database	Record saved successfully

7. LIMITATION AND FUTURE ENHANCEMENT

7.1 LIMITATIONS

The new system has been designed to meet almost all of the user requirements but it too has certain limitations some of which can be enhanced in the future enhancements or updates.

- As new technology comes then it is not easy to provide training to staff members.
- Creating Awareness is difficult.
- Internet is compulsory required as our application is web based application

HARDWARE LIMITATIONS:

As the above description about software and hardware requirement is required for better result. We should have to set high screen resolution for better resolution and to show the website.

INTERFACES TO OTHER APPLICATIONS:

HOME AUTOMATION is the web-based application so there is compatibility with the local server & the local pc's browsers like Internet Explorer 6, 7, 8 or Mozilla Firefox or Google Chrome etc. we are using marquee tag for creating animation.

PARALLEL OPERATIONS:

There is parallel operation load on the website is also occur when many users like client, employee, supplier are accessing website at the same time. Because of all accessing the database so site is going to slow down. Parallel operations are mainly that accessing data from database & fetching product details from the web server so this is quite hard to handle all things in this website. At this time mostly sites are built in ASP.net language & our website also build in supported in this language platform. Many site we seen that most of contain multiple languages supported but in the case of our website all browsers supported.

RELIABILITY REQUIREMENTS:

Your application must be reliable against causing failure, in our site reliability dependent on the server where our website was hosted. This reliability constraint is mostly required for running the website successfully on the server without causing any failure even if there is failure occur on the server like some diamond information will missing at that time when any client request for that diamond. Reliability can achieve by us to making some backup information of diamond on the server if there is any failure or diamond or all product information missing problem occur, server could access that information from other disk. If we want to make our website reliable, we have to use redundant method to handle failure.

SAFETY AND SECURITY CONSIDERATION:

It is providing very strong security because as we all know; diamond is a very valuable and costly so it requires strong safety and security.

We can also provide safety to our web-based application because suppose at the login time application will be close with any reason then the session automatic secure password and Email ID of all users so nobody from outside of organization can misuse it.

8. CONCLUSION AND DISCUSSION

There is need of research and advancement in Home Automation systems to meet consumer needs with adaptable solutions. We have gone through some of the most

common & recent techniques that have been implemented in field of Home Automation systems. We have discussed their advantages and disadvantages over each other. We have tried
to come up with a better and efficient solution that is cost.

8.1 SELF ANALYSIS OF PROJECT VIABILITIES

Android is the new world of application development, which has been incorporated in almost every mobile phone of modern day life. Developers can design thousands of applications as per consumer requirements. Mini computers, tablets and many portable electronics have been running on Android Operating System. Developers can design applications to interact with other devices using various communication features incorporated in devices. It could be Bluetooth, WIFI or even SMS (Short Message Service).

8.2 PROBLEM ENCOUNTERED AND POSSIBLE SOLUTION

Due to many tables in our project we have a problem in normalization. We solve this problem using DBMS (database management system) books.

8.3 SUMMARY OF PROJECT WORK

Application is helpful to customer Thousands and thousands of homeowners are looking for new, innovative ways to make their lives just a tiny bit easier. Although there are some effective ways to achieve this goal, nothing works better than the home automation system. With a highly effective system, you will be able to automate many mundane tasks, so you no longer need to perform them manual. The concept may seem like something out of the future, but it is here today and you should definitely begin reaping the benefits immediately. Within this comprehensive article, you'll learn more about a Wifi based home automation system.

APPENDICES

Unified Modeling Language (UML)

UML was created and proposed more out of need to represent and develop software systems in a methodical ways using object oriented approach. In short, UML supports specifications with several diagrams which capture and document different perspective of problem domain starting from inception to installation and maintenance too. These diagrams are:

- ER Diagram: The object relationship pair can be graphically represented by a diagram called Entity Relationship Diagram.

- Class Diagram: Class diagram is the most important diagram which shows the static view of the system by showing the classes and their relationships.

- Use Case Diagram: A Use Case diagram describes the system from the user point of view. In other words it shows the relationship between the system and the external world.

- Sequence Diagram: The Sequence diagram is an interaction diagram that shows how objects talk to each other. In other words, the diagram shows how operation is carried out according to time and how objects are created and manipulated.

- Activity Diagram: Activity diagram is used to model the functional view and focuses on activities for a process. It resembles a flow chart.

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EXPERIENCE

Today after 5 months since we ventured into the idea of developing “Home Automation”. We are proud of all the sincere efforts and commitment that we and the seniors have put into it as it’s our “hard work” that has eventually paid off to reach the goal.

Throughout our engineering we have been taught to work as a good team members first. This is due to the guidance and help given by our Faculty Members; we are able to produce such a good work. One has to learn to work in a team. Throughout our career we would be interacting with lot many people on the professional front. These people will be having different beliefs, philosophies, principles, outlooks, visions and approaches.

Overall, it was a nice learning experience. At times, it was tough. The knowledge and the information gained eventually surely made up for more than what we had to miss. There is a vast ocean of knowledge out there and we have taken my plunge. The learning curve was initially steep, but later it became less hazardous as we progressed.

All along we have been well and truly supported and encouraged by our Faculty Members and Friends and so they deserve our hearty thanks.

To conclude, “Dominant Infotech” gave us a solid foundation on which we would be able to build a successful carrier ahead. This project has been a wonderful working experience up to now and will become an everlasting memory.