

SMART STREET LIGHT MANAGEMENT SYSTEM

*A mini-project report submitted to the **JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD** in partial fulfillment of the requirements for the award of
the degree of*

BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING

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ABSTRACT

Lighting Automation is a sphere used for remote monitoring and controlling of outdoor as well as indoor lights. Lighting Automation gives us control of all lighting device through our smart phones. This technology helps us to control our lighting load with a single click. This can be done through Dual tone multiple frequency(DTMF) tones which are sent by an android application . A Radio frequency transmitter catches this signal and sends the tone to all the receivers present in its frequency. A Radio frequency receiver is present at the street light devices which is used to catch the signals and operate the lights. Similarly, all the monitoring activities can be done through our desktop web application. When the android application sends signal to the RF transmitter at the same time it sends the signal to the server. The server receives the data and stores it in the database accordingly. In the database we have attribute values like the unique node id, location, status, time period and sector names. In this project we have developed a website through which controller can view the statistics of all the lights under his control. Taking security into consideration the rights are given to view the interface to only some people by asking for a user name and password. The website has a home page which has information about the website and contact numbers. In addition to that it has a reporting page which has a dynamic drop down. It consists of sector, segment, road, lane and device as inputs and loads the report of the user's choice on the same page. The report consists of different attributes of the light device like location, time etc

CONTENTS

TITLE	PAGE NO
• CHAPTER 1 Introduction	1-2
• CHAPTER 2 System Analysis	
2.1 Existing System	3-4
2.2 Proposed System	4-5
2.3 Feasibility Study	6-8
• CHAPTER 3 System Requirement	
3.1 Introduction	9
3.2 System Requirements	
3.2.1 Hardware Requirements	9
3.2.2 Software Requirements	10
• CHAPTER 4 System Design	
4.1 UML Diagrams	11
4.1.1 Use case Diagram	12-13
4.1.2 Class Diagram	14-15
4.1.3 Activity Diagram	16-17
4.1.4 Sequence Diagram	18- 19
4.1.5 Component Diagram	20
• CHAPTER 5 Technologies Used	
5.1 PHP	21-22
5.2 HTML	22
5.3 CSS	22-23
5.4 Javascript	23-24
5.5 JQuery	24
5.6 AJAX	24-25

•	CHAPTER 6 Implementation	
	6.1 Pseudocodes	26-55
	6.2 Database	56-58
•	CHAPTER 7 Testing	
	7.1 Types of Testing	59-63
	7.2 Testcases for login	63-64
	7.3 Testcases for reporting module	64-65
•	CHAPTER 8 Conclusion	66
•	CHAPTER 9 Future Work	67
•	CHAPTER 10 Bibliography	68

CHAPTER 1

INTRODUCTION

One of the most important civilization indexes is the development of a good transportation network. This includes streets, roads and highways that have to be adequately illuminated so that a sufficient visibility is guaranteed in order to decrease the accident rate and increase the flow of the vehicles and safety. However, these streets and roads are illuminated constantly for more than 13 hours daily. This in turn requires a huge amount of electrical power to light all the streets and roads. About 30% of the total electrical power of any country is consumed in lighting the roads and the streets . The spending cost for the energy is high. Additionally, environment pollution by the emitted CO₂ is too high.

A well-designed, street lighting system should permit users to travel at night with good visibility, in safety and comfort, while reducing many malfunctions occurs during night and enhancing the appearance of the neighborhood. Conversely, poorly designed lighting systems can lead to poor visibility which may not be helpful for any pedestrian and who are passing by that street.

Quite often, street lighting is poorly designed and inadequately maintained (e.g., there are large numbers of burned-out lamps), and uses obsolete lighting technology, thus consuming large amounts of energy and financial resources.

Providing street lighting is one of the most important and expensive responsibilities of a city. Street lighting is a particularly critical concern for public authorities in developing countries because of its strategic importance for economic and social stability. Our proposed plan for street light monitoring and control system can provide street lighting maintenance. This maintenance can also enable municipalities to expand street lighting to additional areas, increasing access of providing street light for all the streets and also other under served areas. In addition, improvements in lighting quality and expansion in services can improve safety conditions for both vehicle traffic and pedestrians.

The application is designed in such a way that we place Radio Frequency transmitters for each device or for a group of devices. Dual tone multiple frequency(DTMF) tones are

sent by an android application to a Radio frequency transmitter . A Radio frequency transmitter catches this signal and sends the tone to all the receivers present in its frequency. A Radio frequency receiver is present at the street light devices which is used to catch the signals and operate the lights. Similarly, all the monitoring activities can be done through our desktop web application. When the android application sends signal to the RF transmitter at the same time it sends the signal to the server. The server receives the data and stores it in the database.

CHAPTER 2

SYSTEM ANALYSIS

2. EXISTING SYSTEM AND PROPOSED SYSTEM

2.1 Existing System

At present, street lighting control at most of the places is only by manual control, a control switch set in each of the street lights, it is the so-called first generation of the original street light control, which is inefficient and a waste of manpower, and inconvenient to operate street light opening and closing time. Or using optical-control method, set up optical control circuit, changes the resistance by using of light-sensitive device to control street lights. Which light up automatically in the evening after dark, turn off automatically after dawn in the morning, but the low reliability of the method, vulnerable to interference, night street lighting is too bright and is a waste of energy and other issues. The time of lighting is not only lack of precision, many street lights are controlled by using the mid-night lights strategy, energy-saving effect is poor.



Fig 2.1.1 Present System

2.1.1 DEMERITS

- Maintenance must be done regularly.
- Energy consumption is more.
- Inefficient street lighting operation.

2.2 Proposed System

Automation, Power consumption and Cost Effectiveness are the important considerations in the present field of electronics and electrical related technologies. Industry of street lighting systems are growing rapidly and going complex with rapid growth of industry and cities. To control and maintain complex street lighting system more economically, various street light control systems are developed. These systems are developed to control and reduce energy consumption of a town's public lighting system using different technologies. The Proposed work is to control switching of street light automatically according to light intensity to develop flow based dynamic control statistics using infrared detection technology and maintain wireless communication using android application.

This proposed system utilizes the latest technology for the sources of light as LED Lamps instead of generally used street lamps such as High Pressure Sodium Lamps, etc. The LED technology is preferred as it offers several advantages over other traditional technologies like energy saving due to high current luminous efficiency, low maintenance cost, high color rendering index, rapid start up speed, long working life etc.



Fig 2.2.1 Smart Street Light Management System

With its energy reduction, management improvement, general compatibility, this smart street light management system shows a future proof and sustainable solution that can be implemented today with future benefits. And with the user-friendly web-based interface of the Street Light Control System, the information present in database about nodes, sector, segment is retrieved through the reporting module.

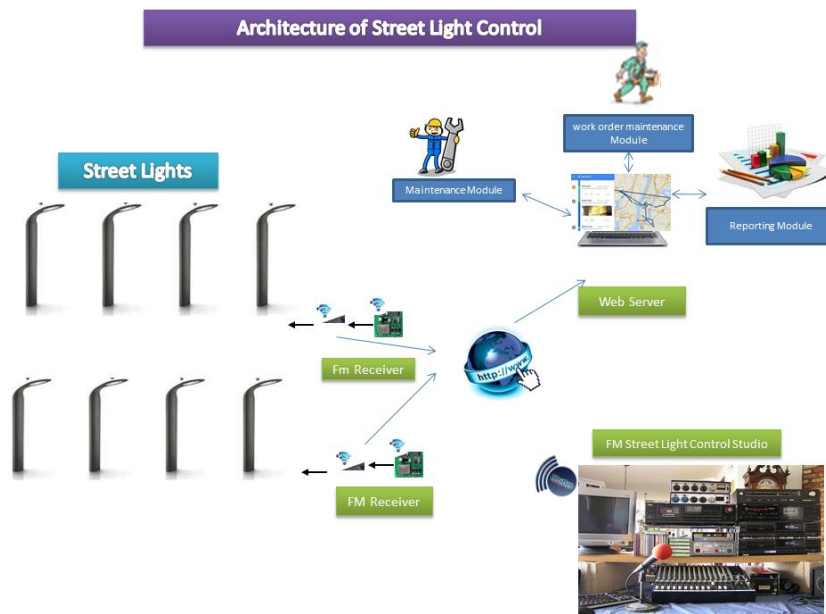


Fig 2.1.3 System architecture

2.2.1 MERITS

- Can easily track, monitor and control the Energy usage pattern thus resulting in savings in energy.
- Wireless monitoring and controlling.
- Proper data collection for analysis.
- Low maintenance cost and long working life.
- Can maintain street lights with greater efficiency.

2.3 FEASIBILITY STUDY:

2.3.1 DESCRIPTION: - Street Lights serve as a source of lighting, which helps in maintaining security and convenience of the riders at night. In India, many street lights are manually operated, which has actually been a lot of inconvenience to the workers as well as the riders. Failing to switch on the lights can prove fatal to anyone. Lighting automation system uses to Switch ON/ OFF the lights and the Smart Street Light Management System will help in monitoring the street lights. In other words, the management of these lights can be achieved through the system.

2.3.2 POSSIBLE SOLUTIONS: - The problem encountered with the existing system is manual operation, efficiency and cost .The different solutions for the problem mentioned are:-

- **SOLAR PANELS:** - Solar panel refers to a design to absorb the sun's rays as a source of energy for generating electricity or heating. A photovoltaic (PV) module is a packaged; connect assembly of typically 6×10 solar cells. Solar Photovoltaic panels constitute the solar array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications. Most solar panels turn on and turn off automatically by sensing outdoor light using a light source. Solar streetlights are designed to work throughout the night. Many can stay lit for more than one night if the sun is not available for a couple of days. Older models included lamps that were not fluorescent or

LED. Solar lights installed in windy regions are generally equipped with flat panels to better cope with the winds.

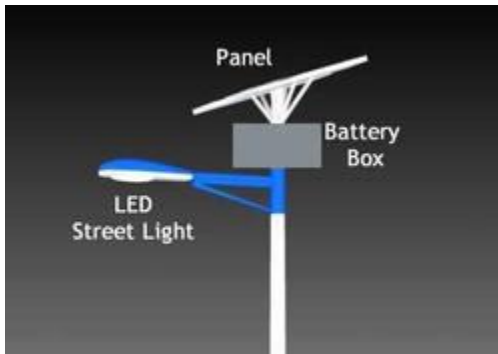


Fig : 3.1 SOLAR PANELS

- **SMART STREET LIGHT MANAGEMENT SYSTEM:** - This system uses sources of light as LED Lamps instead of generally used street lamps such as High Pressure Sodium Lamps. Each street light will be installed with a device that will work with a FM receiver. These street lights can be operated with an android phone and at the same time the lights will interact with the FM receiver which in turn is connected to the web server. A web site is specially designed to monitor the functionalities of the street lights such as Status, ON and OFF times etc.

2.3.3 EVALUATION CRITERIA: - Two solutions are discussed for the above problem but the feasible solution must be selected i.e. the best optimal solution must be implemented.

- **SOLAR PANELS:** - This system uses conventional source of energy and has low maintenance cost after the installation but the primary disadvantage of the solar panel is power generation is reduced during the times of cloud covers. Solar panels are expensive to install. Apart from this, location is also a factor determined for evaluating as they cannot be installed in cold regions due to low availability of sunlight.

- **SMART STREET LIGHT MANAGEMENT SYSTEM:** - This proposed system utilizes the latest technology for the sources of light as LED Lamps instead of generally used street lamps such as High Pressure Sodium Lamps, etc. Apart from this, monitoring of the street lamps becomes simpler with the website creation for the administrators. This website consists of different modules like tracking, reporting etc. It can be implemented in any location as it is weather independent.

2.3.4 FEASIBLE SOLUTION: - After comparing the two solutions, Smart Street Light Management System can be selected as a feasible solution because it uses the latest technology like LED bulbs instead of the conventional lights. The LED technology is preferred as it offers several advantages over other traditional technologies like energy saving due to high current luminous efficiency, low maintenance cost, high color rendering index, rapid start up speed, long working life etc. Switch on and off through your android phones. The useful information is collected from the street light at the end of each day. This information is stored in a database and based on this information tables are derived. Table contains information like, Status, ON and OFF time etc. This System also reduces the intervention of humans.

2.3.5 CONCLUSION: - We can conclude that using this methodology 2- way communication can be possible. Technical solution for implementation of wireless intelligent smart street lighting system is made easier. It provides a low cost infrastructure for managing street lighting system. Energy consumption can be controlled making it eco-friendly in usage.

CHAPTER 3

SYSTEM REQUIREMENTS

3.1 INTRODUCTION

System Requirements specification plays an important role in creating quality software solutions. Specification is basically a representation process. Requirements are represented in a manner that ultimately leads to a successful software implementation.

The system requirements specification is produced at the culmination of the analysis task. The function and performance allocated to the software as a part of system engineering are refined by establishing a complete information description, indication description, a detailed function and behavioral description, indication of performance requirements and design constraints, appropriate validation criteria and other data pertinent to requirements.

3.2 SYSTEM REQUIREMENTS

Requirements are refined and analyzed to assess the clarity. Requirements are represented in a manner that ultimately leads to successful software implementation. Each requirement must be consistent with the overall objective. The development of this project deals with the following requirements:

- Hardware Requirements
- Software Requirements

3.2.1 HARDWARE REQUIREMENTS

- system: AMD A8
- Hard Disk: 8GB
- Mouse: Touch Pad
- RAM: 8GB

- Keyboard: 101 keyboard

3.2.2 SOFTWARE REQUIREMENTS

- Operating System: Windows 8
- Coding Language: PHP, JAVA, JAVASCRIPT, JQUERY
- Data Base: MYSQL
- IDE: XAMPP, ECLIPSE

CHAPTER 4

SYSTEM DESIGN

4.1 INTRODUCTION

Software design is the process of implementing software solutions to one or more set of problems. It's an iterative process through which requirements are translated into a blueprint for constructing the software. During the design process, the software specifications are transformed into design models that describe the details of data structures, system architecture, interface and components. The design needs to be correct and complete, understandable, maintainable at the right level.

UML diagrams are most widely-used for planning, modeling of a project, and for development approaches.

4.2 UML DIAGRAMS

We all know that UML is for visualizing, specifying, constructing and documenting the components of software and non-software systems. The UML diagrams are used to model the design.

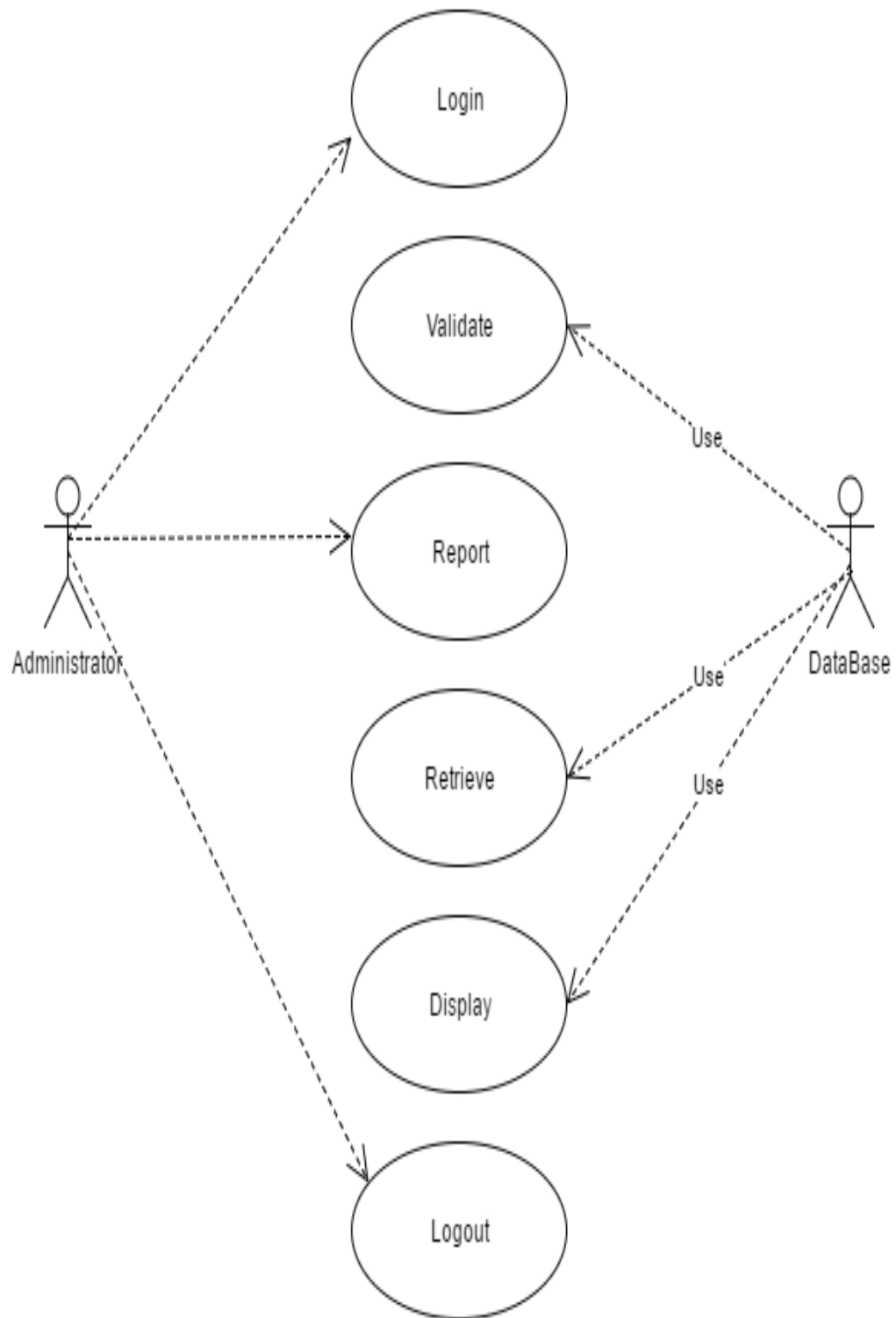
The Unified Modeling Language is a common language for business analysts, software architects and developers used to describe, specify, design, and document existing or new business processes, structure and behavior of artifacts of software systems. So it represents the system functionalities and their flow. UML can be applied to diverse application domains. It can be used with all major object and component software development methods and for various implementation platforms. It is a modeling language to capture the architectural, behavioral and structural aspects of a system.

4.1.1 USECASE DIAGRAM:-

Use case diagram is used to capture the dynamic nature of a system. It consists of use cases, actors and their relationships. Use case diagram is used at a high level design to capture the requirements of a system. While a usecase itself might drill into a lot of detail about every possibility, a use-case diagram can help provide a higher-level view of the system. It has been said before that "Use case diagrams are the blueprints for your system". They provide the simplified and graphical representation of what the system must actually do.

Due to their simplistic nature, use case diagrams can be a good communication tool for stakeholders. The drawings attempt to mimic the real world and provide a view for the stakeholder to understand how the system is going to be designed. Siau and Lee conducted research to determine if there was a valid situation for use case diagrams at all or if they were unnecessary. What was found was that the use case diagrams conveyed the intent of the system in a more simplified manner to stakeholders and that they were "interpreted more completely than class diagrams".

The purpose of the use case diagrams is simply to provide the high level view of the system and convey the requirements in layman's terms for the stakeholders. Use case diagrams are used to gather the requirements of a system including internal and external influences. These requirements are mostly design requirements. So when a system is analyzed to gather its functionalities use cases are prepared and actors are identified. Use case diagrams specify the events of a system and their flows. But use case diagram never describes how they are implemented. Use case diagrams are considered for high level requirement analysis of a system. So when the requirements of a system are analyzed the functionalities are captured in use cases. These diagrams are used at a very high level of design. Then this high level design is refined again and again to get a complete and practical picture of the system. A well structured use case also describes the pre condition, post condition, exceptions. And these extra elements are used to make test cases when performing the testing.



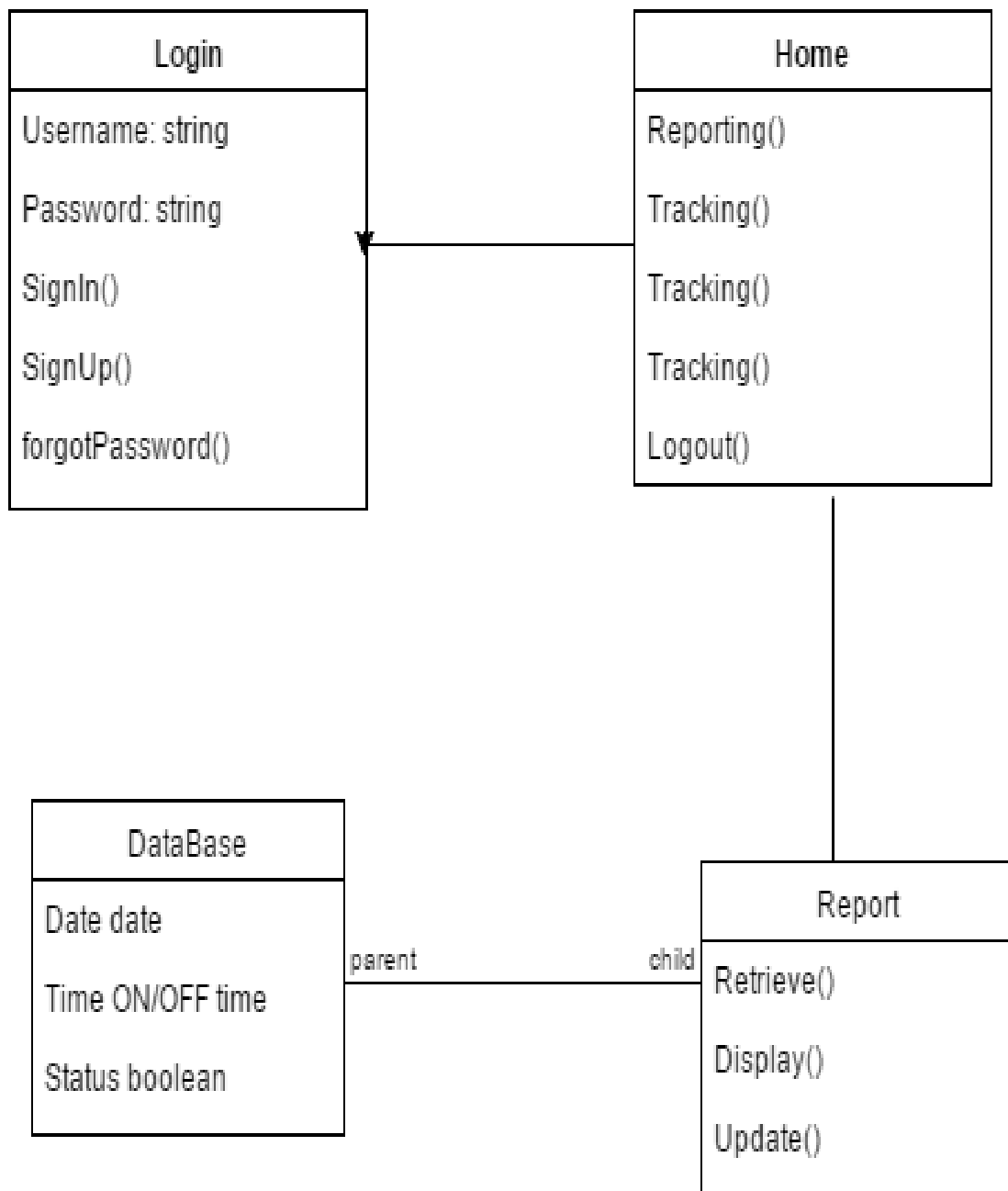
4.1.2 CLASS DIAGRAM

Class diagrams are the most popular UML diagrams used by the object oriented community. Basically the class diagram represents the static view of a system. It describes the objects in a system and their relationships. Class diagram consists of attributes and functions. Class diagram is basically a graphical representation of the static view of the system and represents different aspects of the application. So a collection of class diagrams represent the whole system. Class diagrams are not only used to visualize the static view of the system but they are also used to construct the executable code for forward and reverse engineering of any system.

Class diagrams can also be used for data modeling. The classes in a class diagram represent both the main elements, interactions in the application, and the classes to be programmed. Class diagrams are useful in all forms of object-oriented programming (OOP). In a class diagram, the classes are arranged in groups that share common characteristics. A class diagram resembles a flowchart in which classes are portrayed as boxes, each box having three rectangles inside. The top rectangle contains the name of the class; the middle rectangle contains the attributes of the class; the lower rectangle contains the methods, also called operations, of the class. Lines, which may have arrows at one or both ends, connect the boxes. These lines define the relationships, also called associations, between the classes.

The following points should be remembered while drawing a class diagram:

- The name of the class diagram should be meaningful to describe the aspect of the system.
- Each element and their relationships should be identified in advance.
- Responsibility (attributes and methods) of each class should be clearly identified.
- For each class minimum number of properties should be specified. Because unnecessary properties will make the diagram complicated.



4.1.3 ACTIVITY DIAGRAM

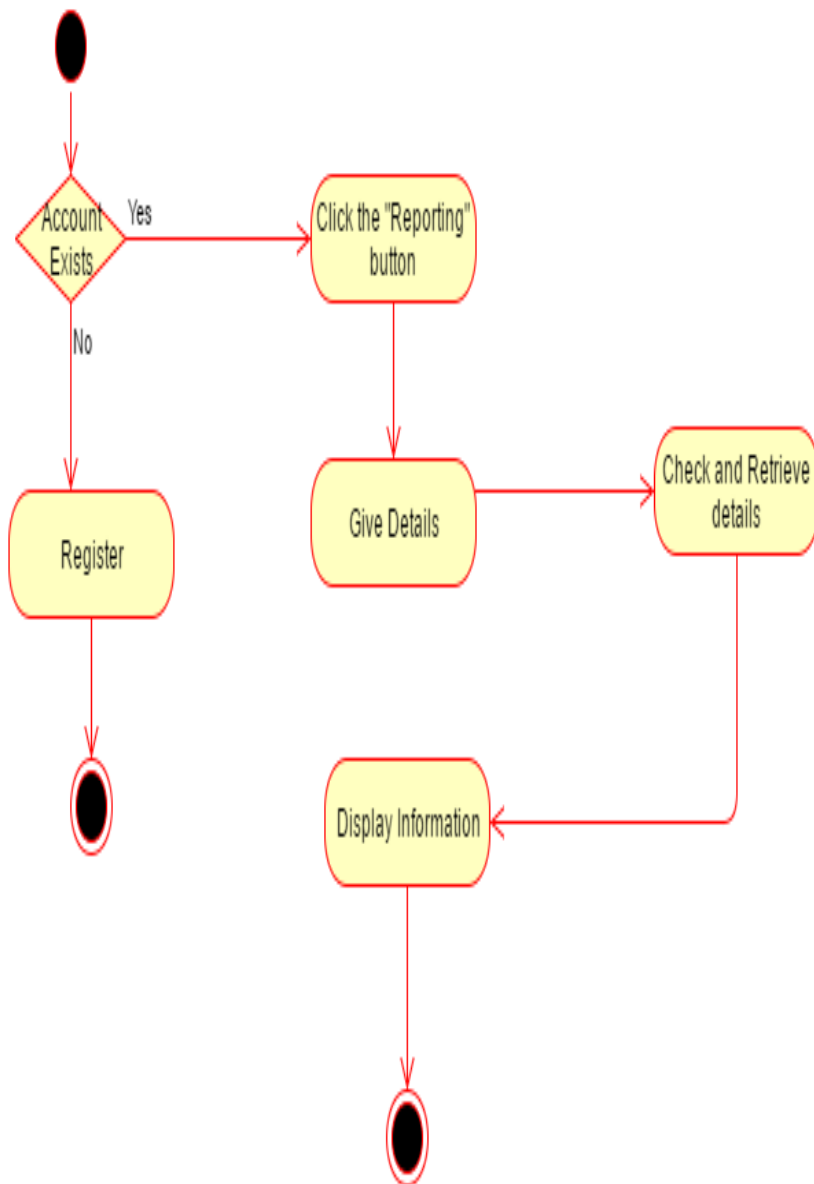
Activity diagram describes the flow control from one activity to another without any messages. These diagrams are used to model high level view of business requirements. Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams are intended to model both computational and organizational processes (i.e. workflows). Activity diagrams show the overall flow of control.

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams are intended to model both computational and organizational processes (i.e. workflows). Activity diagrams show the overall flow of control. The activity diagram is suitable for modeling the activity flow of the system. An application can have multiple systems. Activity diagram also captures these systems and describes flow from one system to another. This specific usage is not available in other diagrams. These systems can be database, external queues or any other system.

While in UML, activity diagrams were a specialized form of state diagrams in UML, the activity diagrams were reformalized to be based on Petri net-like semantics, increasing the scope of situations that can be modeled using activity diagrams. These changes cause many UML activity diagrams to be interpreted differently in UML.

The basic purposes of activity diagrams are similar to other four diagrams. It captures the dynamic behaviour of the system. Other four diagrams are used to show the message flow from one object to another but activity diagram is used to show message flow from one activity to another.

Activity is a particular operation of the system. Activity diagrams are not only used for visualizing dynamic nature of a system but they are also used to construct the executable system by using forward and reverse engineering techniques. The only missing thing in activity diagram is the message part



4.1.4 SEQUENCE DIAGRAM

Sequence diagrams are used to capture time ordering of message flow and collaboration diagrams are used to understand the structural organization of the system..Generally a set of sequence and collaboration diagrams are used to model an entire system.

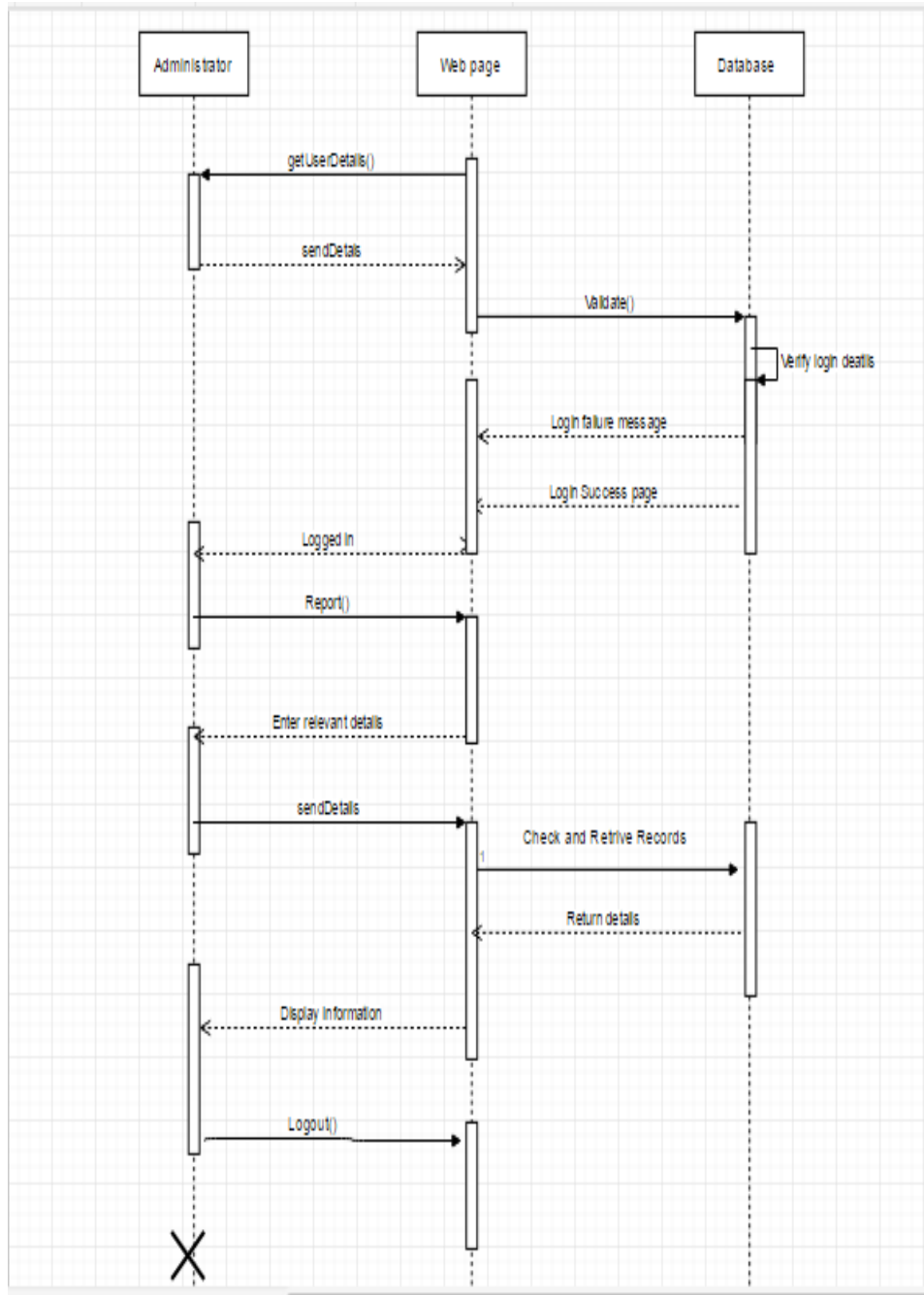
The Sequence Diagram models the collaboration of objects based on a time sequence. It shows how the objects interact with others in a particular scenario of a use case. With the advanced visual modeling capability, you can create complex sequence diagram in few clicks. Besides, Visual Paradigm can generate sequence diagram from the flow of events which you have defined in the use case description.

Collaboration diagram is very similar to a Sequence diagram in the purpose it achieves; in other words, it shows the dynamic interaction of the objects in a system. A distinguishing feature of a Collaboration diagram is that it shows the objects and their association with other objects in the system apart from how they interact with each other. The association between objects is not represented in a Sequence diagram.

A Collaboration diagram is easily represented by modeling objects in a system and representing the associations between the objects as links. The interaction between the objects is denoted by arrows.

The purposes of interaction diagrams are to visualize the interactive behaviour of the system. Now visualizing interaction is a difficult task. So the solution is to use different types of models to capture the different aspects of the interaction.

Sequence diagrams are used to capture the order of messages flowing from one object to another. And the collaboration diagrams are used to describe the structural organizations of the objects taking part in the interaction. A single diagram is not sufficient to describe the dynamic aspect of an entire system so a set of diagrams are used to capture is as a whole.



4.1.5 COMPONENT DIAGRAM

Component diagrams are special kind of UML diagram to describe static implementation view of a system. This diagram is used from implementation perspective. A component is something required to execute a stereotype function. Examples of stereotypes in components include executables, documents, database tables, files, and library files.

Components are wired together by using an *assembly connector* to connect the required interface of one component with the provided interface of another component.

This may have a visual stereotype in the top right of the rectangle of a small rectangle with two even smaller rectangles jutting out on the left.

The lollipop, a small circle on a stick represents an implemented or provided interface. The socket symbol is a semicircle on a stick that can fit around the lollipop. This socket is a dependency or needed interface.



CHAPTER 5

TECHNOLOGIES USED

Lighting Automation system gives us control of all lighting devices on our desktop monitor or we can control our lighting through our smart phones. This technology helps us to control our lighting load with a single click. Lighting automation provide us require brightness as per the requirement without any manual intervention. Coming to led street light, it can produce me light with less wattage. LEDs produce more light per watt than do incandescent bulbs; this is useful in battery powered or energy saving devices. It offers several advantages over other traditional technologies like energy saving due to high current luminous efficiency. LED lights are environmentally friendly because they consume so little energy. They are free from hazardous chemicals such as mercury and lead which release toxins. LED Lamps instead of generally used street lamps such as High Pressure Sodium Lamps, etc. High Pressure Sodium street lights is a high intensity discharge lamp that uses sodium high pressure as the primary light producing element. High-pressure sodium lamps produce light from the yellow, red and orange spectrums. The LED based efficient lighting puts out white light because consists of various colors, which undergo varying degrees of refraction and diffusion.

5.1 PHP

PHP is widely used in web development now a days. Dynamic websites can be easily developed by PHP. We used PHP for server side scripting which is used to manage dynamic content, databases and to make dynamic and interactive web page. We can add, delete, modify the elements within your database through PHP. It is an interpreted language, i.e. there is no need for compilation. PHP is faster than other scripting language e.g. asp and jsp. 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. It is integrated with a number of popular databases, including MySQL, PostgreSQL, Oracle, Sybase, Informix, and Microsoft SQL Server.

PHP is pleasingly zippy in its execution, especially when compiled as an Apache module on the Unix side. The MySQL server, once started, executes even very complex queries with huge result sets in record-setting time.

5.2 HTML

HTML stands for Hyper Text Markup Language used to create web pages. It is widely used language on the web. We can create static website by HTML only. It is used to define the content of web pages. An HTML document is made of many HTML tags and each HTML tag contains different content.

5.3 CSS

CSS stands for Cascading Style Sheet used to design HTML tags. CSS is a widely used language on the web. HTML, CSS and JavaScript are used for web designing. It helps the web designers to apply style on HTML tags. **CSS** to specify the layout of web pages and used to describe how HTML elements should be displayed. It allows a logical division between the structure of a web page, (handled by the HTML) and the way it should look. In short, CSS is the language used for implementing front-end web design. Hence using HTML5 and CSS to develop and deploy web content and web applications, to create refined and accurate web pages and web systems that operate across devices, web browsers. CSS is used to control the style of a web document in a simple and easy way.

CSS handles the look and feel part of a web page. Using CSS, you can control the color of the text, the style of fonts, the spacing between paragraphs, how columns are sized and

laid out, what background images or colors are used, layout designs, variations in display for different devices and screen sizes as well as a variety of other effects.

When a browser displays a document, it must combine the document's content with its style information. It processes the document in two stages:

The browser converts HTML and CSS into the DOM (Document Object Model). The DOM represents the document in the computer's memory. It combines the document's content with its style. The browser displays the contents of the DOM.

5.4 JQuery

JQuery is a multi-browser JavaScript library designed to simplify the client-side scripting of HTML. *JQuery* simplifies HTML document traversing, event handling, animating, and Ajax interactions for Web Development. It is cross-platform and supports different types of browsers. It takes a lot of common tasks that requires many lines of JavaScript code to accomplish, and binds them into methods that can be called with a single line of code whenever needed which means "write less do more". It is also very useful to simplify a lot of the complicated things from JavaScript, like AJAX calls and DOM manipulation.

JQuery is the most popular and the most extendable. jQuery is a fast, small, and feature-rich JavaScript library. It makes things like HTML document traversal and manipulation, event handling, animation, and Ajax much simpler with an easy-to-use API that works across a multitude of browsers. With a combination of versatility and extensibility, jQuery has changed the way that millions of people write JavaScript. jQuery simplifies HTML document traversing, event handling, animating, and Ajax interactions for rapid web development.

jQuery is a JavaScript toolkit designed to simplify various tasks by writing less code. jQuery is a framework built using JavaScript capabilities. So while developing your applications using jQuery, you can use all the functions and other capabilities available in JavaScript.

5.5 JavaScript

JavaScript is very easy to implement because it is integrated with HTML. It is open and cross-platform. JavaScript is used to create interactive websites. It is mainly used for Client-side validation, dynamic drop-down menus.

JavaScript provides the functionality which is used to program the behavior of web pages and used for manipulation, form validation, and dynamic changes of content. JavaScript itself is fairly compact but very flexible, and developers have written a lot of tools on top of the core JavaScript language, to unlock a huge amount of extra functionality with very little effort. These include:

Application Programming Interfaces (APIs) built into web browsers, providing various functionality like dynamically creating HTML and setting CSS styles, grabbing and manipulating a video stream from the user's webcam, or generating 3D graphics and audio samples.

5.6 AJAX

AJAX is an **Asynchronous JavaScript and XML**. It is a group of inter-related technologies like JavaScript, DOM, XML, HTML, CSS etc. AJAX allows you to send and receive data asynchronously without reloading the web page. So it is fast. AJAX allows you to send only important information to the server not the entire page. So only valuable data from the client side is routed to the server side. It makes your application interactive and faster. AJAX is rapidly becoming an integral part of several websites, several well established brands online now use AJAX to handle their web applications because it provides better interactivity to their users, this is due to the fact that implementing AJAX on a website, does not require a page to be reloaded for dynamic content on web pages. While there are numerous reasons to switch to AJAX there are quite a few matters that would make you reconsider using this combination of technologies as well.

With AJAX, several multi purpose applications and features can be handled using a single web page, avoiding the need for clutter with several web pages. AJAX is much responsive, small amount of data transfer at a time. Reduce the server traffic in both side request. Also reducing the time consuming on both side response.

AJAX make asynchronous calls to a web server. This means client browsers are avoid waiting for all data arrive before start the rendering. The XMLHttpRequest object is part of a technology called Ajax (Asynchronous JavaScript and XML). Using Ajax, data could then be passed between the browser and the server, using the XMLHttpRequest API, without having to reload the web page. With the widespread adoption of the XMLHttpRequest object it quickly became possible to build web applications like Google Maps, and Gmail that used XMLHttpRequest to get new map tiles, or new email without having to reload the entire page. Ajax requests are triggered by JavaScript code; your code sends a request to a URL, and when it receives a response, a callback function can be triggered to handle the response. Because the request is asynchronous, the rest of your code continues to execute while the request is being processed, so it's imperative that a callback be used to handle the response.

CHAPTER 6

IMPLEMENTATION

A user interface is designed so that the controller can monitor the activities of all the Street light devices present under his control. Taking into consideration about the security issues a username and password is provided to the controller so that only he can access the website. If the login is successful then a session is created for the user which will timed out after a certain amount of time. The website consists of a home page and a reporting page.

6.1 Forms and Reports

6.1.1 Layout styles

The web page is build on a template with the following layouts

1) layout.css is common for all the web pages

layout.css

```
a{outline:none; text-decoration:none; color:#FF9900; background-color:#FFFFFF;}  
.fl_left, .imgl{float:left;}  
.fl_right, .imgr{float:right;}  
img{display:block; margin:0; padding:0; border:none;}  
.imgl, .imgr{border:1px solid #C7C5C8; padding:5px;}  
.imgl{margin:0 8px 8px 0; clear:left;}  
.imgr{margin:0 0 8px 8px; clear:right;}  
  
/*--Wrapper--*/  
div.wrapper{display:block; width:100%; margin:0; text-align:left;}  
div.wrapper h1, div.wrapper h2, div.wrapper h3, div.wrapper h4, div.wrapper h5,  
div.wrapper h6{margin:0 0 15px 0; padding:0; font-size:20px; font-weight:normal; line-  
height:normal;}  
.col1, .col1 a{color:#AAAAAA; background-color:#FFFFFF;}  
.col2{color:#333333; background-color:#373E46; border-bottom:1px solid #D5D5D5;}  
.col3{color:#666666; background-color:#6A737C; padding:20px 0;}
```

```

.col4{color:#666666; background-color:#FFFFFF; border-top:1px solid #D5D5D5;
border-bottom:1px solid #D5D5D5;}
.col5{color:#666666; background-color:#E9E9E9;}
.col5 a{color:#999999; background-color:#E9E9E9;}
.col6, .col6 a{color:#605B5B; background-color:#D0D0D0;}
.col7{color:#666666; background-color:#FFFFFF; padding:20px 0;}

/*--Generalise--*/
#header, #topbar, #breadcrumb, #featured_intro, #latest, .container, #footer,
#copyright{display:block; position:relative; width:960px; margin:0 auto;}

/* --Header--*/
#header{padding:2px 0 20px 0;}
#header .fl_left{display:block; float:left; margin-top:7px; overflow:hidden;}
#header .fl_right{display:block; float:right; width:468px; height:60px; margin-top:21px;
overflow:hidden;}
#header h1, #header p, #header ul{margin:0; padding:0; list-style:none; line-
height:normal;}
#header h1 a{font-size:46px; color:#AAAAAA; background-color:#FFFFFF;}
#header .fl_left p{margin-top:5px;}

/*--Topbar-- */
#topbar{padding:20px 0; z-index:1000;}
#topbar #search{display:block; float:right; margin:0; padding:0; overflow:hidden;}

/* --Homepage--*/
#latest{padding:30px 0;}
#latest ul, #latest p{margin:0; padding:0; list-style:none; display:inline;}
#latest h2{margin:0 0 15px 0; padding:0 0 8px 0; font-size:20px; font-weight:normal;
border-bottom:1px dotted #C7C5C8;}

```

```

#latest li{display:block; float:left; width:300px; margin:0 30px 0 0; padding:0;}
#latest li.last{margin-right:0;}
#latest li p.ingholder{display:block; width:290px; height:100px; margin:0 0 15px 0;
padding:4px; border:1px solid #C7C5C8;}
#latest a{font-weight:bold;}

/*--Content-- */
.container{padding:20px 0;}
.content{display:block; float:left; width:630px;}

/*--Column--*/
.column{display:block; float:right; width:270px;}
.column .holder{display:block; width:260px; margin-bottom:20px; padding-left:10px;}

/*--Footer--*/
#footer{padding:20px 0;}
#footer h2, #footer p, #footer ul, #footer a{margin:0; padding:0; font-weight:normal; list-
style:none; line-height:normal;}
#footer p{line-height:1.6em;}
#footer h2{color:#666666; background-color:#E9E9E9; font-size:18px; font-
weight:normal; margin-bottom:20px;}
#footer li{margin-bottom:5px;}
#footer .footbox{display:block; float:left; width:200px; margin:0 20px 0 0; padding:0;}
#footer .thumbbox{display:block; float:right; width:300px;}
#footer .thumbbox ul{margin:0; padding:0; list-style:none;}
#footer .thumbbox li{display:block; float:left; width:80px; height:80px; margin:0 15px
15px 0; padding:4px; border:1px solid #D0D0D0;}
#footer .thumbbox li.last{margin-right:0;}
#footer .last{margin:0;}

```

2) The following layout is for the home page

navi.css

```
#topnav{display:block; float:left; width:700px; margin:5px 0 0 0; padding:0; list-  
style:none;}  
#topnav ul, #topnav li{float:left; list-style:none; margin:0; padding:0;}  
#topnav li a:link, #topnav li a:visited, #topnav li a:hover{display:block; margin:0 35px 0  
0; padding:0; font-size:14px; text-transform:uppercase; color:#FFFFFF; background-  
color:#373E46;}  
#topnav ul ul li a:link, #topnav ul ul li a:visited{border:none;}  
#topnav li.last a{margin-right:0;}  
#topnav li a:hover, #topnav ul li.active a{color:#999999; background-color:#373E46;}  
#topnav li li a:link, #topnav li li a:visited{width:150px; float:none; margin:0;  
padding:7px 10px; font-size:12px; font-weight:normal; color:#FFFFFF; background-  
color:#373E46;}  
#topnav li li a:hover{color:#999999; background-color:#D5D5D5;}  
#topnav li ul{z-index:9999; position:absolute; left:-999em; height:auto; width:170px;  
border-left:1px solid #000000; border-bottom:1px solid #000000;}  
#topnav li ul a{width:140px;}  
#topnav li ul ul{margin:-32px 0 0 0;}  
#topnav li:hover ul ul{left:-999em;}  
#topnav li:hover ul, #topnav li li:hover ul{left:auto;}  
#topnav li:hover{position:static;}  
#topnav li.last a{margin-right:0;}  
  
/* -----Column Navigation----- */  
.column .subnav{display:block; width:260px; margin-bottom:30px; padding:0 0 0 10px;}  
.column .subnav ul{margin:0; padding:0; list-style:none;}  
.column .subnav li{margin:0 0 3px 0; padding:0;}
```

```
.column .subnav ul ul, .column .subnav ul ul ul, .column .subnav ul ul ul ul, .column
.subnav ul ul ul ul ul{border-top:none; padding-top:0;}
.column .subnav a{display:block; margin:0; padding:5px 10px 5px 20px; color:#666666;
background:url("images/orange_file.gif") no-repeat 10px center #FFFFFF; text-
decoration:none; border-bottom:1px dotted #C7C5C8;}
.column .subnav a:hover{color:#FF9900; background-color:#FFFFFF;}
.column .subnav ul ul a, .column .subnav ul ul ul a, .column .subnav ul ul ul ul a, .column
.subnav ul ul ul ul ul a{background:url("images/black_file.gif") no-repeat #FFFFFF;}
.column .subnav ul ul a{padding-left:40px; background-position:30px center;}
.column .subnav ul ul ul a{padding-left:50px; background-position:40px center;}
.column .subnav ul ul ul ul a{padding-left:60px; background-position:50px center;}
.column .subnav ul ul ul ul ul a{padding-left:70px; background-position:60px center;}
```

select_style.css

```
body
{
background-color:#E6E6E6;
font-family:helvetica;
}
#heading
{
text-align:center;
margin-top:150px;
font-size:30px;
color:blue;
}
#select_box
{
width:500px;
background-color:#819FF7;
```

```
padding:10px;
height:200px;
border-radius:5px;
box-shadow:0px 0px 10px 0px grey;
}
select
{
width:400px;
height:50px;
border:1px solid #BDBDBD;
margin-top:20px;
padding:10px;
font-size:20px;
color:grey;
border-radius:5px;
}
```

3) The following css file is used for printing the reporting

table.css

```
table{ width:100%; border-collapse:collapse; table-layout:auto; vertical-align:top;
margin-bottom:15px; border:1px solid #CCCCCC;}
table thead th{color:#FFFFFF; background-color:#666666; border:1px solid #CCCCCC;
border-collapse:collapse; text-align:center; table-layout:auto; vertical-align:middle;}
table tbody td{vertical-align:top; border-collapse:collapse; border-left:1px solid
#CCCCCC; border-right:1px solid #CCCCCC;}
table thead th, table tbody td{padding:5px; border-collapse:collapse;}
table tbody tr.light{color:#666666; background-color:#F7F7F7;}
table tbody tr.dark{color:#666666; background-color:#E8E8E8;}
```

6.1.2 IMPLEMENTATION FLOW

Firstly the user is requested for login information in the Login page

Login.jsp

```
<div class="Invalid"></div>
<div class="login-page">
  <div class="form">
    <form action="LoginServlet" method="post">
      <input type="text" name="username" placeholder="username"/>
      <input type="password" name="password" placeholder="password"/>
      <button>login</button>
      <p class="message">Not registered? <a
href="http://localhost/StreetLights/Register.html">Create an account</a></p>
    </form>
  </div>
</div>
```

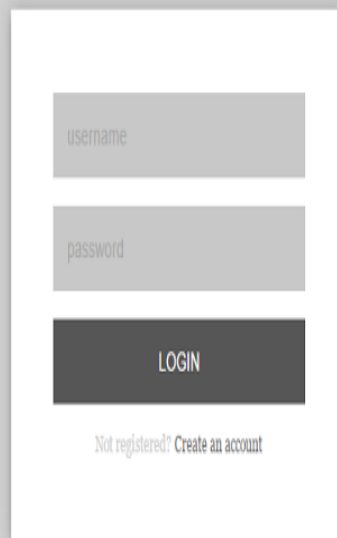
LoginServlet.java

```
public class LoginServlet extends HttpServlet
{
  private static final long serialVersionUID = 1L;
  public void doPost(HttpServletRequest req,HttpServletResponse res)throws
ServletException,IOException
  {
    res.setContentType("text,html");
    String username=req.getParameter("username");
    String password=req.getParameter("password");
    if(password.equals("vnrvjiet")&& username.equals("fms"))
    {
      HttpSession session=req.getSession();
```

```
session.setAttribute("username",username);  
req.getRequestDispatcher("/Home.html").include(req, res);  
}  
else  
{  
    req.setAttribute("message", "Invalid Username/Password");  
    req.getRequestDispatcher("/Login.jsp").forward(req,res);  
}  
}  
}
```

LOGIN PAGE :

Smart Street Light Control and Management



A login form with a white background and a subtle drop shadow, centered on a light gray page. The form contains three input fields: a 'username' field, a 'password' field, and a 'LOGIN' button. Below the button is a link for users who are not registered.

username

password

LOGIN

Not registered? [Create an account](#)

If the login credentials are incorrect

Smart Street Light Control and Management

Invalid Username/Password

username

password

LOGIN

Not registered? [Create an account](#)

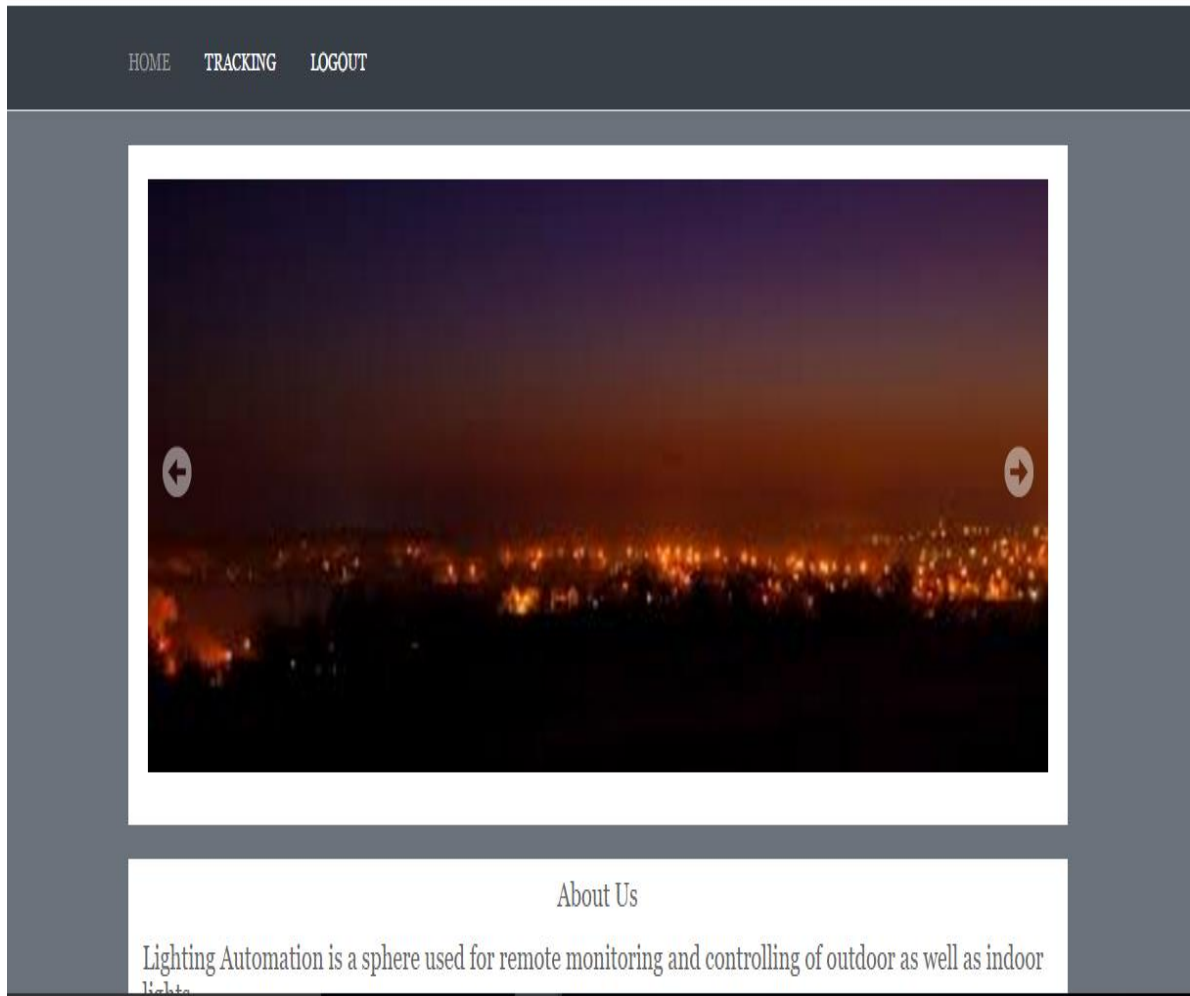
If the login credentials are correct then the control goes to the “HOME” page

Home.html

```
<body id="top">
<div class="wrapper col1">
  <div id="header">
    <div class="fl_left">
      <h1><a href="index.html">Smart Street Light Control and Management</a></h1>
    </div>
    <br class="clear" />
  </div>
</div>
<div class="wrapper col2">
  <div id="topbar">
    <div id="topnav">
    </div>
  </div>
</div><br><br>
<div class="Invalid"></div>
<div class="login-page">
  <div class="form">
    <form action="LoginServlet" method="post">
      <input type="text" name="username" placeholder="username"/>
      <input type="password" name="password" placeholder="password"/>
      <button>login</button>
      <p class="message">Not registered?
      <a href="http://localhost/StreetLights/Register.html">Create an account</a></p>
    </form>
  </div>
</div>
```

HOME PAGE:

Smart Street Light Control and Management



The other web page is “Reporting” module. It consists of a two div elements. One div consists of 5 dynamic drop downs about Segment, Sector, Road, Lane, Device. After the user hits the submit button a report of all the user choices is loaded into the adjacent div element.

Reporting.php

```
function valid(){
var answer=document.getElementById('sb');
var answer1=document.getElementById('new_select');
var answer2=document.getElementById('new_select1');
var answer3=document.getElementById('new_select2');
var answer4=document.getElementById('new_select3');
if(answer[answer.selectedIndex].value=="void")
    alert("Select an option");
else if(answer1[answer1.selectedIndex].value=="void1")
    alert("Select an option");
else if(answer2[answer2.selectedIndex].value=="void2")
    alert("Select an option");
else if(answer3[answer3.selectedIndex].value=="void3")
    alert("Select an option");
else if(answer4[answer4.selectedIndex].value=="Select Device")
    alert("Select an option");
else
{
$(document).ready(function(){
    $('#table_box').load('output.php');
});
}
}
function fetch_select(val)
{
$.ajax({
type: "POST",
url: "db.php",
data: {
```

```

    get_option: val
  },
  success: function (response) {
    document.getElementById("new_select").innerHTML=response;
  }
});
}

function fetch_select1(val)
{
$.ajax({
  type: "POST",
  url: "db1.php",
  data: {
    get_option: val
  },
  success: function (response) {
    document.getElementById("new_select1").innerHTML=response;
  }
});
}

function fetch_select2(val)
{
$.ajax({
  type: "POST",
  url: "db2.php",
  data: {
    get_option: val
  },
  success: function (response) {
    document.getElementById("new_select2").innerHTML=response;

```

```

    }
    });
}
function fetch_select3(val)
{
    $.ajax({
        type: "POST",
        url: "db3.php",
        data: {
            get_option: val
        },
        success: function (response) {
            document.getElementById("new_select3").innerHTML=response;
        }
    });
}
function fetch_select4(val)
{
    $.ajax({
        type: "POST",
        url: "db4.php",
        data: {
            get_option: val
        },
        success: function(response)
        {
            document.getElementById("Submit").innerHTML=response;
        }
    });
}

```

Output.php

```
<?php
session_start();

$host = 'localhost';
$user = 'root';
$pass = '';

mysql_connect($host, $user, $pass);
mysql_select_db('smartstreet');

if($_SESSION['dev']!="All Devices")
{
    $n=(10000*$_SESSION['sec']+1000*$_SESSION['segm']+100*$_SESSION['lan']+10*$_SESSION['rod']+$_SESSION['dev']);

    $query = "SELECT l.Node,l.Loc,l.DOI,l.Status,w.On_Time,w.Off_Time FROM location l ,`working table` w where l.Node='$n' and l.Node=w.Node";
    $result = mysql_query($query)OR DIE(mysql_error());

    echo '<center>';
    echo '<table border="1">';
    echo "<tr><th>". "Node Id" . "</th><th>". "Location" . "</th><th>". "Date Of Installment". "</th><th>". "Status". "</th><th>". "On_Time". "</th><th>". "Off_Time". "</th></tr>";
    while($row = mysql_fetch_array($result)){
        echo "<tr><td>". $row['Node'] . "</td><td>". $row['Loc'] . "</td><td>". $row['DOI']. "</td><td>". $row['Status']. "</td><td>". $row['On_Time']. "</td><td>". $row['Off_Time']. "</td></tr>";
    }
    echo "</table>";
    echo "</center>";
}
else
```

```

{
$query1="Select Device from node where Sector='{$_SESSION['sec']}' and
Segment='{$_SESSION['segm']}' and Lane='{$_SESSION['lan']}' and
Road='{$_SESSION['rod']}'";
$result1=mysql_query($query1)OR DIE(mysql_error());
echo '<center>';
echo '<table border="1">';
echo "<tr><th>". "Node Id" . "</th><th>" . "Location" . "</th><th>" . "Date Of
Installment".
"</th><th>". "Status". "</th><th>". "On_Time". "</th><th>". "Off_Time". "</th></tr>";
while($row1=mysql_fetch_array($result1)){
$n=(10000*$_SESSION['sec']+1000*$_SESSION['segm']+100*$_SESSION['lan']+10*$_
_SESSION['rod']+$row1['Device']);
$query = "SELECT l.Node,l.Loc,l.DOI,l.Status,w.On_Time,w.Off_Time FROM
location l,`working table` w where l.Node='$n' and l.Node=w.Node";
$result = mysql_query($query)OR DIE(mysql_error());
while($row = mysql_fetch_array($result)){
echo "<tr><td>" . $row['Node'] . "</td><td>" . $row['Loc'] . "</td><td>" . $row['DOI'].
"</td><td>". $row['Status']. "</td><td>". $row['On_Time']. "</td><td>". $row['Off_Time'].
"</td></tr>";
}
}
echo "</table>";
echo "</center>";
}
exit;
?>

```

Database retrieval :

db.php

<?php


```

session_start();
if(isset($_POST['get_option']))
{
    $host = 'localhost';
    $user = 'root';
    $pass = '';
    mysql_connect($host, $user, $pass);
    mysql_select_db('smartstreet');
    $seg = $_POST['get_option'];
    $s=mysql_query("Select Number from sector where Name='$seg'");
    $r=mysql_fetch_array($s);
    $_SESSION["sec"]=$r['Number'];
    $find=mysql_query("select distinct SegmentName from segment where
Sectorno='{$_SESSION['sec']}'");
    echo "<option>". "Select Segment". "</option>";
    while($row=mysql_fetch_array($find))
    {
        echo "<option>". $row['SegmentName']. "</option>";
    }
    exit;
}
else
    echo "Error";
?>

```

db1.php

```

<?php
session_start();
if(isset($_POST['get_option']))
{

```

```

$host = 'localhost';
$user = 'root';
$pass = "";
mysql_connect($host, $user, $pass);
mysql_select_db('smartstreet');
$seg = $_POST['get_option'];
$s=mysql_query("select Segmentno from segment where SegmentName='$seg'");
$r=mysql_fetch_array($s);
$_SESSION["segm"]=$r['Segmentno'];
$find=mysql_query("select      distinct      Lane      from      node      where
Segment='{$_SESSION['segm']}' and Sector='{$_SESSION['sec']}'");
echo "<option>". "Select Lane". "</option>";
while($row=mysql_fetch_array($find))
{
    echo "<option>". $row['Lane']. "</option>";
}
exit;
}
else
    echo "Error";
?>

```

db2.php

```

<?php
session_start();
if(isset($_POST['get_option']))
{
    $host = 'localhost';
    $user = 'root';
    $pass = "";

```

```

mysql_connect($host, $user, $pass);
mysql_select_db('smartstreet');
$seg = $_POST['get_option'];
$_SESSION["lan"]=$seg;
$find=mysql_query("select distinct Road from node where Lane='{$_SESSION['lan']}'
and Sector='{$_SESSION['sec']}' and Segment='{$_SESSION['segm']}'");
echo "<option>". "Select Road". "</option>";
while($row=mysql_fetch_array($find))
{
    echo "<option>".$row['Road']."</option>";
}
exit;
}
else
    echo "Error";
?>

```

db3.php

```

<?php
session_start();
//if(isset($_POST['get_option']))
//{
    $host = 'localhost';
    $user = 'root';
    $pass = "";
    mysql_connect($host, $user, $pass);
    mysql_select_db('smartstreet');
    $seg = $_POST['get_option'];
    echo "<option>". "Select Device". "</option>";
    $_SESSION['rod']=$seg;

```

```

$find=mysql_query("select Device from node where Sector='{$_SESSION['sec']}' and
Segment='{$_SESSION['segm']}' and Lane='{$_SESSION['lan']}' and Road='$seg'");
while($row=mysql_fetch_array($find))
{
    echo "<option>".$row['Device']."</option>";
}
exit;
//}
//else
//echo "Error";
?>

```

db4.php

```

<?php
session_start();
if(isset($_POST['get_option']))
{
    $_SESSION['dev']=$_POST['get_option'];
}
exit;
?>

```

Smart Street Light Control and Management

The screenshot shows a web application interface for "Smart Street Light Control and Management". At the top, there is a dark blue navigation bar with the following links: HOME, TRACKING, REPORT, and LOGOUT. Below the navigation bar, the main content area is divided into two columns. The left column contains a vertical stack of five white dropdown menus with dark blue text, each followed by a small downward arrow icon. The labels for these dropdowns are "Select sector", "Select Segment", "Select Lane", "Select Road", and "Select Device". Below these dropdowns is a green "Submit" button. The right column is currently empty, showing a dark blue background.

First the user chooses a value from the first drop down “Enter sector”. Suppose the user enters “VNRVJIET”

Smart Street Light Control and Management

[HOME](#) [TRACKING](#) [REPORT](#) [LOGOUT](#)

VNRVJIET ▾

Select Segment ▾

Select Lane ▾

Select Road ▾

Select Device ▾

Submit

Then automatically all the segments under the VNRVJIET sector are loaded into the second dropdown. In this case VJIM and VNR college

Smart Street Light Control and Management

[HOME](#) [TRACKING](#) [REPORT](#) [LOGOUT](#)

VNRVJIET ▾

VJIM ▾

Select Lane ▾

Select Road ▾

Select Device ▾

Submit

Next depending upon the sector and segment values “Lane ” drop down is loaded.

Smart Street Light Control and Management

[HOME](#) [TRACKING](#) [REPORT](#) [LOGOUT](#)

VNRVJIET ▾

VJIM ▾

1 ▾

Select Road ▾

Select Device ▾

Submit

Similarly, “Road” drop down is dynamically loaded.

Smart Street Light Control and Management

The screenshot shows a web application interface for "Smart Street Light Control and Management". At the top, there is a dark blue navigation bar with the following links: HOME, TRACKING, REPORT, and LOGOUT. Below the navigation bar, the main content area is divided into two sections. On the left, there is a dark blue sidebar containing five white input fields with dropdown arrows, and a green "Submit" button at the bottom. The input fields contain the following text: "VNRVJIET", "VJIM", "1", "1", and "Select Device". On the right, there is a large, empty dark blue rectangular area.

Next Device drop down is loaded with an additional option of “all devices” which reports about all the devices present in the till now selection.

Smart Street Light Control and Management

[HOME](#) [TRACKING](#) [REPORT](#) [LOGOUT](#)

VNRVJIET

VJIM

1

1

All Devices

Submit

| Node Id | Location | Date Of Installment | Status | On_Time | Off_Time |
|---------|----------|---------------------|--------|----------|----------|
| 11111 | Block A | 2016-10-01 | 1 | 17:00:00 | 05:00:00 |
| 11119 | Block A | 2016-10-01 | 0 | 17:00:00 | 04:08:00 |

If we select only one device

Smart Street Light Control and Management

[HOME](#)[TRACKING](#)[REPORT](#)[LOGOUT](#)

VNRVJIE

VJIM

1

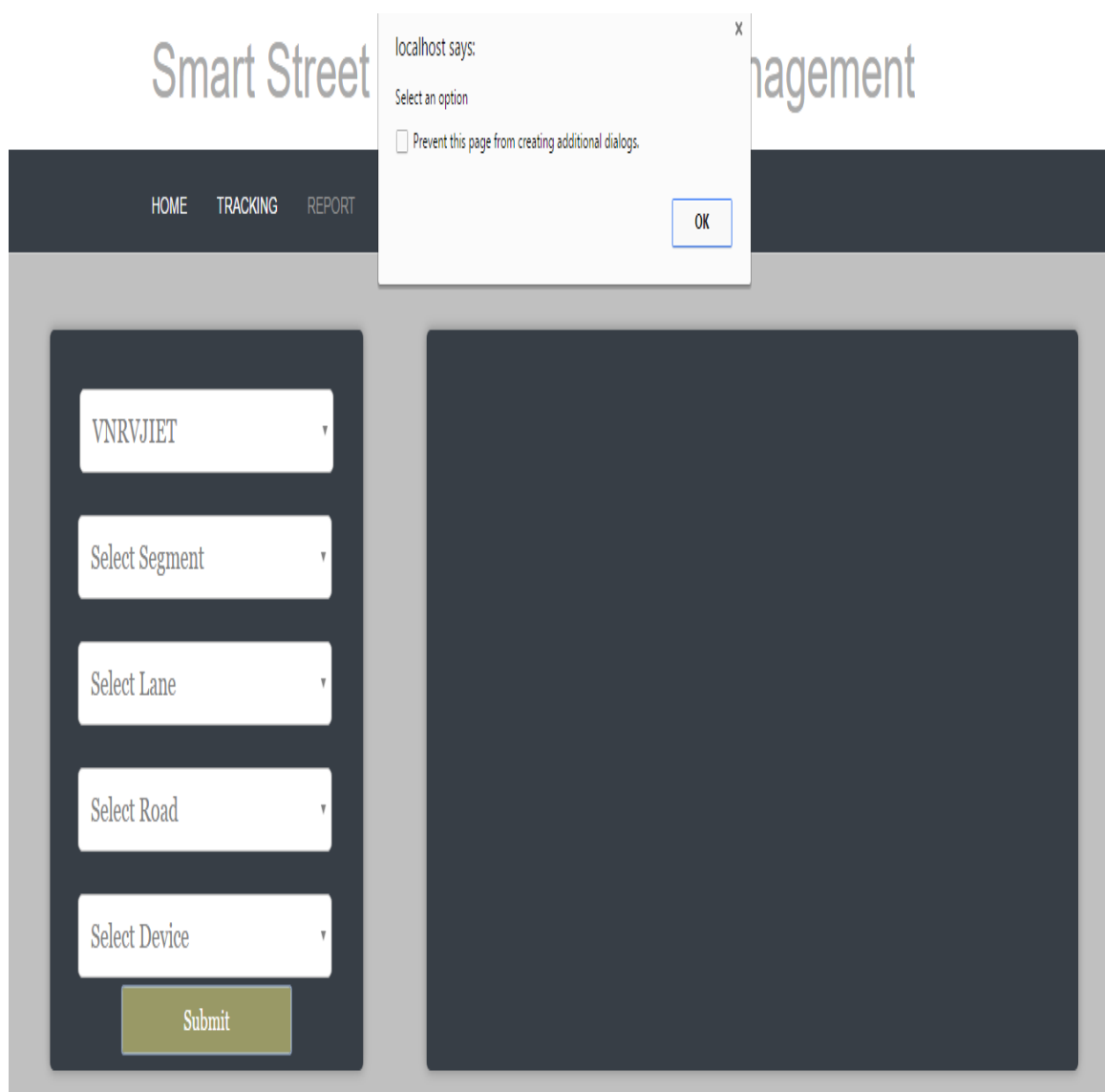
1

9

Submit

| Node Id | Location | Date Of Installment | Status | On_Time | Off_Time |
|---------|----------|---------------------|--------|----------|----------|
| 11119 | Block A | 2016-10-01 | 0 | 17:00:00 | 04:08:00 |

In case if we hit submit button without entering one of the drop down then an alert message is prompted.



At the end we have logout option to log off the system

LogoutServlet.Java

```
public class LogoutServlet extends HttpServlet
{
    /**
     *
     */
    private static final long serialVersionUID = 1L;

    public void doGet(HttpServletRequest request, HttpServletResponse response)
    throws ServletException, IOException
    {

        HttpSession session=request.getSession();
        session.invalidate();

        request.setAttribute("message", "Logged out successfully");
        request.getRequestDispatcher("/Login.jsp").forward(request,response);

    }
}
```

LOGOUT:

Smart Street Light Control and Management

Logged out successfully

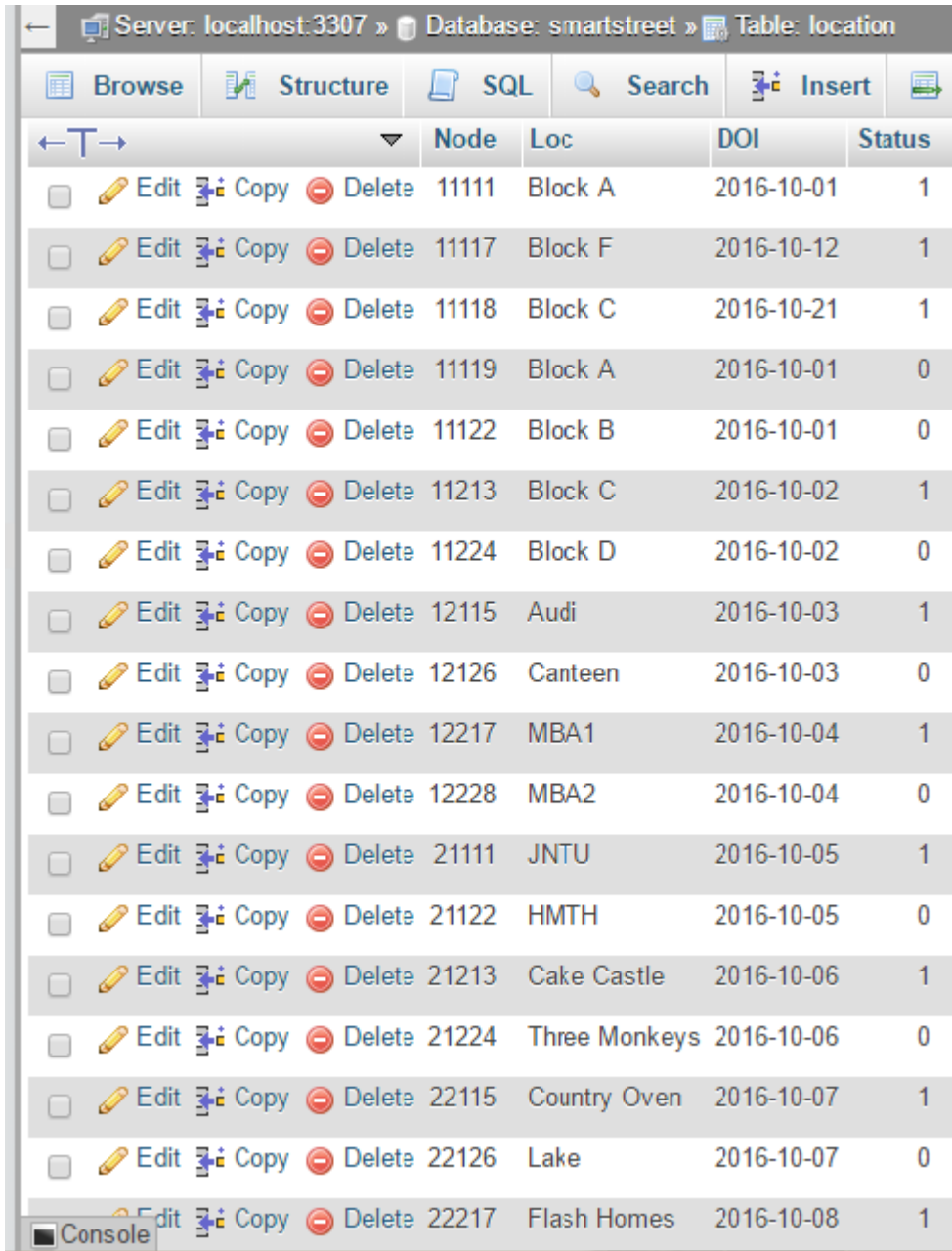
LOGIN

Not registered? [Create an account](#)

6.2 DATABASE

Table 1 : location

The columns present in this table are Node , Location, Date of Installation, Status.



| | | | | Node | Loc | DOI | Status |
|--------------------------|------|------|--------|-------|---------------|------------|--------|
| <input type="checkbox"/> | Edit | Copy | Delete | 11111 | Block A | 2016-10-01 | 1 |
| <input type="checkbox"/> | Edit | Copy | Delete | 11117 | Block F | 2016-10-12 | 1 |
| <input type="checkbox"/> | Edit | Copy | Delete | 11118 | Block C | 2016-10-21 | 1 |
| <input type="checkbox"/> | Edit | Copy | Delete | 11119 | Block A | 2016-10-01 | 0 |
| <input type="checkbox"/> | Edit | Copy | Delete | 11122 | Block B | 2016-10-01 | 0 |
| <input type="checkbox"/> | Edit | Copy | Delete | 11213 | Block C | 2016-10-02 | 1 |
| <input type="checkbox"/> | Edit | Copy | Delete | 11224 | Block D | 2016-10-02 | 0 |
| <input type="checkbox"/> | Edit | Copy | Delete | 12115 | Audi | 2016-10-03 | 1 |
| <input type="checkbox"/> | Edit | Copy | Delete | 12126 | Canteen | 2016-10-03 | 0 |
| <input type="checkbox"/> | Edit | Copy | Delete | 12217 | MBA1 | 2016-10-04 | 1 |
| <input type="checkbox"/> | Edit | Copy | Delete | 12228 | MBA2 | 2016-10-04 | 0 |
| <input type="checkbox"/> | Edit | Copy | Delete | 21111 | JNTU | 2016-10-05 | 1 |
| <input type="checkbox"/> | Edit | Copy | Delete | 21122 | HMTH | 2016-10-05 | 0 |
| <input type="checkbox"/> | Edit | Copy | Delete | 21213 | Cake Castle | 2016-10-06 | 1 |
| <input type="checkbox"/> | Edit | Copy | Delete | 21224 | Three Monkeys | 2016-10-06 | 0 |
| <input type="checkbox"/> | Edit | Copy | Delete | 22115 | Country Oven | 2016-10-07 | 1 |
| <input type="checkbox"/> | Edit | Copy | Delete | 22126 | Lake | 2016-10-07 | 0 |
| <input type="checkbox"/> | Edit | Copy | Delete | 22217 | Flash Homes | 2016-10-08 | 1 |




















































Table 2: Node

This table consists of columns Sector, Segment, Lane, Road, Device .

| Browse | | Structure | SQL | Search | Insert | Export |
|--------------------------|------------------|-----------|---------|--------|--------|--------|
| Options | | | | | | |
| ←T→ | | Sector | Segment | Lane | Road | Device |
| <input type="checkbox"/> | Edit Copy Delete | 1 | 1 | 1 | 1 | 1 |
| <input type="checkbox"/> | Edit Copy Delete | 1 | 1 | 1 | 1 | 7 |
| <input type="checkbox"/> | Edit Copy Delete | 1 | 1 | 1 | 1 | 8 |
| <input type="checkbox"/> | Edit Copy Delete | 1 | 1 | 1 | 1 | 9 |
| <input type="checkbox"/> | Edit Copy Delete | 1 | 1 | 1 | 2 | 2 |
| <input type="checkbox"/> | Edit Copy Delete | 1 | 1 | 2 | 1 | 3 |
| <input type="checkbox"/> | Edit Copy Delete | 1 | 1 | 2 | 2 | 4 |
| <input type="checkbox"/> | Edit Copy Delete | 1 | 2 | 1 | 1 | 5 |
| <input type="checkbox"/> | Edit Copy Delete | 1 | 2 | 1 | 2 | 6 |
| <input type="checkbox"/> | Edit Copy Delete | 1 | 2 | 2 | 1 | 7 |
| <input type="checkbox"/> | Edit Copy Delete | 1 | 2 | 2 | 2 | 8 |
| <input type="checkbox"/> | Edit Copy Delete | 2 | 1 | 1 | 1 | 1 |
| <input type="checkbox"/> | Edit Copy Delete | 2 | 1 | 1 | 2 | 2 |
| <input type="checkbox"/> | Edit Copy Delete | 2 | 1 | 2 | 1 | 3 |
| <input type="checkbox"/> | Edit Copy Delete | 2 | 1 | 2 | 2 | 4 |
| <input type="checkbox"/> | Edit Copy Delete | 2 | 2 | 1 | 1 | 5 |
| <input type="checkbox"/> | Edit Copy Delete | 2 | 2 | 1 | 2 | 6 |
| <input type="checkbox"/> | Edit Copy Delete | 2 | 2 | 2 | 1 | 7 |

Table 3: Location

This table consists of columns node, on_time and off_time.

| Browse Structure SQL Search | | | | | | |
|-----------------------------|--|--|--|---------|----------|----------|
| + Options | | | | | | |
| ← T → | | | Node | On_Time | Off_Time | |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 11111 | 17:00:00 | 05:00:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 11117 | 15:00:00 | 05:08:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 11118 | 13:00:00 | 06:08:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 11119 | 17:00:00 | 04:08:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 11122 | 17:30:00 | 05:00:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 11213 | 18:00:00 | 05:00:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 11224 | 18:31:00 | 05:00:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 12115 | 19:00:00 | 06:00:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 12126 | 19:15:00 | 06:00:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 12217 | 19:30:00 | 06:00:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 12228 | 19:45:00 | 06:00:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 21111 | 18:15:00 | 06:30:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 21122 | 18:15:29 | 06:40:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 21213 | 17:45:00 | 05:00:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 21224 | 18:35:00 | 04:00:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 22115 | 19:00:00 | 06:00:00 |
| <input type="checkbox"/> |  Edit |  Copy |  Delete | 22126 | 19:40:00 | 06:00:00 |

CHAPTER 7

TESTING

Testing is the process of evaluation a software item to detect differences between given input and expected output. It should be done during development process. In other words testing is a verification and validation process. Testing allows to deliver software that meets expectations, prevents unexpected results, and improves the long term maintenance of the application. Depending upon the purpose of testing and the software requirements, the appropriate methodologies are applied.

7.1 Types of Testing:

Functional testing – This type of testing ignores the internal parts and focus on the output is as per requirement or not. Functional testing usually describes *what* the system does.

Functional testing does not imply that you are testing a function (method) of your module or class. Functional testing tests a slice of functionality of the whole system.

Functional testing differs from system testing in that functional testing "*verifies* a program by checking it against ... design document(s) or specification(s)", while system testing "*validate[s]* a program by checking it against the published user or system requirements"

Unit testing – Testing of individual software components or modules may require developing test driver modules or test harnesses. Intuitively, one can view a unit as the smallest testable part of an application. In procedural programming, a unit could be an entire module, but it is more commonly an individual function or procedure. In object-oriented programming, a unit is often an entire interface, such as a class, but could be an individual method.^[2] Unit tests are short code fragments^[3] created by programmers or occasionally by white box testers during the development process. It forms the basis for component testing.^[4]

This testing is based on knowledge of the internal logic of an application's code. Tests are based on coverage of code statements, branches, paths, conditions. White-box testing is a method of testing the application at the level of the source code. These test cases are derived through the use of the design techniques mentioned above: Control flow testing, data flow testing, branch testing, path testing, statement coverage and decision coverage as well as modified condition/decision coverage. White-box testing is the use of these techniques as guidelines to create an error free environment by examining any fragile code. These White-box testing techniques are the building blocks of white-box testing, whose essence is the careful testing of the application at the source code level to prevent any hidden errors later on. These different techniques exercise every visible path of the source code to minimize errors and create an error-free environment. The whole point of white-box testing is the ability to know which line of the code is being executed and being able to identify what the correct output should be.

Internal system design is not considered in this type of testing. Tests are based on requirements and functionality. Black-box testing is a method of software testing that examines the functionality of an application without peering into its internal structures or workings. This method of test can be applied to virtually every level of software testing: unit, integration, system and acceptance. It typically comprises most if not all higher level testing, but can also dominate unit testing as well.

Integration testing – Testing of integrated modules to verify combined functionality after integration. Modules are typically code modules, individual applications, client and server applications on a network, etc. This type of testing is especially relevant to client/server and distributed systems. The main function or goal of Integration testing is to test the interfaces between the units/modules. Individual software modules are combined and tested as a group. It occurs after unit testing and before validation testing. Integration testing takes as its input modules that have been unit tested, groups them in larger aggregates, applies tests defined in an integration test plan to those aggregates, and delivers as its output the integrated system ready for system testing.

The individual modules are first tested in isolation. Once the modules are unit tested, they are integrated one by one, till all the modules are integrated, to check the combinational behavior, and validate whether the requirements are implemented correctly or not.

End-to-end testing involves testing of a complete application environment in a situation that mimics real-world use, such as interacting with a database, using network communications, or interacting with other hardware, applications, or systems if appropriate.

System testing – Entire system is tested as per the requirements.

Load testing – It is a performance testing to check system behavior under load. Testing an application under heavy loads, such as testing of a web site under a range of loads to determine at what point the system's response time degrades or fails.

White-box Testing:

White-box testing is a method of testing the application at the level of the source code. These test cases are derived through the use of the design techniques mentioned above: Control flow testing, data flow testing, branch testing, path testing, statement coverage and decision coverage as well as modified condition/decision coverage. White-box testing is the use of these techniques as guidelines to create an error free environment by examining any fragile code. These White-box testing techniques are the building blocks of white-box testing, whose essence is the careful testing of the application at the source code level to prevent any hidden errors later on. These different techniques exercise every visible path of the source code to minimize errors and create an error-free environment. The whole point of white-box testing is the ability to know which line of the code is being executed and being able to identify what the correct output should be.

Advantages:

White-box testing is one of the two biggest testing methodologies used today. It has several major advantages:

- 1.Side effects of having the knowledge of the source code is beneficial to thorough testing.
- 2.Optimization of code by revealing hidden errors and being able to remove these possible defects.
- 3.Gives the programmer introspection because developers carefully describe any new implementation.
- 4.Provides traceability of tests from the source, allowing future changes to the software to be easily captured in changes to the tests.
- 5.White box tests are easy to automate.
- 6.White box testing give clear, engineering-based, rules for when to stop testing.

Disadvantages:

Although white-box testing has great advantages, it is not perfect and contains some disadvantages:

- 1.White-box testing brings complexity to testing because the tester must have knowledge of the program, including being a programmer. White-box testing requires a programmer with a high level of knowledge due to the complexity of the level of testing that needs to be done.
- 2.On some occasions, it is not realistic to be able to test every single existing condition of the application and some conditions will be untested.
- 3.The tests focus on the software as it exists, and missing functionality may not be discovered.

Black Box Testing :

Black-box testing is a method of software testing that examines the functionality of an application without peering into its internal structures or workings. This method of test can be applied to virtually every level of software testing: unit, integration, system and acceptance. It typically comprises most if not all higher level testing, but can also dominate unit testing as well.

Specific knowledge of the application's code/internal structure and programming knowledge in general is not required. The tester is aware of *what* the software is supposed

to do but is not aware of *how* it does it. For instance, the tester is aware that a particular input returns a certain, invariable output but is not aware of *how* the software produces the output in the first place.

Test cases are built around specifications and requirements, i.e., what the application is supposed to do. Test cases are generally derived from external descriptions of the software, including specifications, requirements and design parameters. Although the tests used are primarily *functional* in nature, *non-functional* tests may also be used. The test designer selects both valid and invalid inputs and determines the correct output, often with the help of an oracle or a previous result that is known to be good, without any knowledge of the test object's internal structure.

In penetration testing, black-box testing refers to a methodology where an ethical hacker has no knowledge of the system being attacked. The goal of a black-box penetration test is to simulate an external hacking or cyberwarfare attack.

7.2 TEST CASES FOR LOGIN MODULE

Test Case ID: 1

Test Case Name: Validating user's credentials

Input: If wrong username or password or any of the field is left blank

Output: Displays invalid username or password

Result: pass

Test Case ID: 2

Test Case Name: Validating user's credentials

Input: Gives a valid username and password

Output: Login successfully.

Result: pass

7.3 TEST CASES FOR REPORT MODULE

Test Case ID: 1

Test Case Name: Select from dropdown lists

Input: If none of the dropdown list is selected

Output: An alert box is displayed to select an option

Result: Pass

Test Case ID: 2

Test Case Name: Select from dropdown lists

Input: If only one of the dropdown list is selected

Output: An alert box is displayed to select an option

Result: Pass

Test Case ID: 3

Test Case Name: Select from dropdown lists

Input: If one only one device is selected

Output: A table related to that device will be displayed.

Result: Pass

Test Case ID: 4

Test Case Name: Select from dropdown lists

Input: If all the devices are selected

Output: A table consisting of all the devices will be displayed.

Result: Pass

CHAPTER 8

CONCLUSION

The existing system is commonly used in all streets of street light system. But in this system there is a loss of heavy electricity in the whole night. If the street light is not stopped after the night, the loss will continue throughout the day. And also the street light is not necessary when there are no human movements in the street. Smart Street Light Management System can be very efficiently used for tracking, monitoring and operation of street lights in a city, manages the electric flow and keeps a close check on maintenance module. Less expenditure on recurring maintenance charges. Designed a smart lighting system with modular approach design, which makes the system scalability and expandability where the energy monitoring and tracking module of smart street light management system can measure and track the energy being consumed due to the switching on of street lights Streetwise/Area wise or centrally. And the deterioration of street lights can be identified and recorded. Status of all the switches are displayed on the reporting module.

As the demand of electric energy increases day by day due to the entry of new upcoming electronic devices / gadgets in human life, there is a gap between supply and demand. So let's use this electronic technology itself as an energy saving tool. Lighting Automation gives us control of all lighting devices on our desktop monitor or we can control our lighting through our smart phones. This technology helps us to control our lighting load with a single click. The project results in huge energy savings, cost saving, reliable, and profitable.

CHAPTER 9

FUTURE WORK



Fig 9.1: The Future

By providing energy and communication through the Lighting Automation, smart street light system becomes a real platform for implementing other smart city systems, thus further improving living conditions and increasing the business attractiveness of the city. This project can be further extended by incorporating drone systems. Using the Image analysis on the pictures taken by the drone we can maintain the Street Lights. It compares the picture taken with the best case scenario picture(all street lights are on) and displays which street light is not working. As we get immediate updates about the workings of the lights controller can fix any technical problems as early as possible .

CHAPTER 10

BIBLIOGRAPHY

Good Teachers are worth more than thousand books, we have them in our department

Reference books:

| Sl. No | Author(s) | Book title | Publisher | Year | Pages |
|--------|-----------------|--|------------------|------|-------|
| 1. | Herbert Schildt | Java: The complete reference 7th Edition | Tata McGraw Hill | 1996 | 1024 |

Reference Sites:

<http://www.w3schools.com>

<http://www.stackoverflow.com>

<http://www.wikipedia.com>

<http://www.css-tricks.com/dynamic-dropdowns>

