Project Title

Electricity Billing System

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Electricity Billing System

Abstract

The purpose of Electricity Billing System is to automate the existing manual system by the help of computerized equipment and full-fledged computer application, fulfilling their requirements, so that their valuable data/information can be stored for a longer period with easy accessing and manipulation of the same. The required software and hardware are easily available and easy to work with.

Electricity Billing System, as described above, can lead to error free, secure, reliable and fast management system. It can assist the user to concentrate on their other activities rather to concentrate on the record keeping. Thus, it will help organization in better utilization of resources. The aim is to automate its existing manual system by the help of computerized equipment and full-fledged computer application, fulfilling their requirements, so that their valuable data/information can be stored for a longer period with easy accessing and manipulation of the same. Basically, the project describes how to manage for good performance and better services for the clients.

Objective:

- To develop an online system to calculate the electrical bill for the customer.
- Generate a report on the power consumption information through online.

Functionalities provided by the electricity billing system are as follows-

- Show the information and description of the electricity bill.
- Editing, adding and updating of records is improved which results in proper resource management of electricity data.
- Manage the information of Store Record.

Introduction:

Electricity Billing System is a web-based application developed in Java programming language. It mainly focuses on the calculation of Units consumed during the specified and the money to be paid to electricity offices.
This system helps in maintaining the bills and doing calculation of units.
Admin and customers all have a different interface and different privileges according to their needs.

A customer can only manage his account and cannot see any details of other customers, admin can see the details of all the customer's accounts and the admin can manage all the accounts of the customers. This system also has the option for customer to get the location of the electricity bill payment office.

Scope:

Our project aims at Business process automation i.e., we have tried to computerize various processes of Electricity Billing System. In the sector of electricity board, we have computerized their departments.

Scope of any software depends upon the following things:

1. It satisfies the user requirement.
2. Be easy to understand by the user and operator.
3. Be easy to operate.
4. Have a good user interface.
5. Be expandable
6. Delivered on schedule within the budget.

We have tried to make the such type of software, which satisfy the above given requirements.

Significance:

- Easy to update information.
- Work becomes very speedy.
- Access of any information individually.
- Decrease the load of the person involve in existing manual system.
- Well-designed reports.
- Easy & fast retrieval of information.
- Accuracy in work.
- It contains better storage capacity.
- Robust database back-end.
- Creating and changing issues at ease.

Modules:

Our system has only two main interfaces. One is for the admin and the other one is for the user, here user is a customer.
Along with these, we have other interfaces which can be discussed as below:

Register Module:

Through this module new user can easily register himself on the website. In this module, the user register's itself by entering the necessary data. This module additionally confirms the new user registration with the previously enrolled users.

Login Module:

After registration, one can log in to the system as the end-user of the system on the behalf of the user. The user will get only those privileges that are given to the user for which one has registered. For example, if a user has registered as a customer, then the user only has the privileges to view the data and cannot make any changes to the data that is shown.

User Module:

The user can only see the details of his account, not of any other account. The customer can see the monthly usage of electricity but cannot
make any changes to the data.

Admin Module:

The admin has the access to the database. The admin can manipulate the details in the database. The admin has right to delete any record of user in the database. The admin has the access to fetch all the records from the database and display it on the browser.

User Interface Design:

User Interface Design is concerned with the dialogue between a user and the computer. It is concerned with everything from starting the system or logging into the system to the eventually presentation of desired inputs and outputs. The overall flow of screens and messages is called a dialogue.

The following steps are various guidelines for User Interface Design:

- The system user should always be aware of what to do next.
- The screen should be formatted so that various types of information, instructions and messages always appear in the same general display area.
- Use display attributes sparingly.
- Default values for fields and answers to be entered by the user should be specified.
- A user should not be allowed to proceed without correcting an error.
- The system user should never get an operating system message or fatal error.

Technologies Used:

Frontend Used:

HTML5:

HTML (Hypertext Markup Language) is the code that is used to structure a web page and its content. For example, content could be structured within a set of paragraphs, a list of bulleted points, or using images and data tables.

CSS3:

Stands for "Cascading Style Sheet." Cascading style sheets are used to format the layout of Web pages. They can be used to define text styles, table sizes, and other aspects of Web pages that previously could only be defined in a page's HTML.

JavaScript (ES6):

JavaScript (JS) is a scripting language, primarily used on the Web. It is used to enhance HTML pages and is commonly found embedded in HTML code. JavaScript is an interpreted language. Thus, it doesn't need to be compiled. JavaScript renders web pages in an interactive and dynamic fashion. This allowing the pages to react to events, exhibit special effects, accept variable text, validate data, create cookies, detect a user’s browser, etc.

Backend Used:

Java (8 version):

Java is a general-purpose, class-based, object-oriented programming language designed for having lesser implementation dependencies. It is a computing platform for application development. Java is fast, secure, and reliable, therefore. It is widely used for developing Java applications in laptops, data canters, game consoles, scientific supercomputers, cell phones, etc.

Spring Boot (2.6.3):

Spring Boot is an open-source micro framework maintained by a company called Pivotal. It provides Java developers with a platform to get started with an auto configurable production-grade Spring application. With it, developers can get started quickly without losing time on preparing and configuring their Spring application.

Database Used:

Oracle (11g XE):

Oracle database is a relational database management system. It is also called Oracle DB, or simply Oracle. It is produced and marketed by Oracle Corporation. It was created in 1977 by Lawrence Ellison and other engineers. It is one of the most popular relational database engines in the IT market for storing, organizing, and retrieving data.

Hardware Requirements:

Table 1.8: Table of Hardware Requirements

	Minimum System Requirements	**Recommended System Requirements**
Processor	7th Gen Intel Core i7	9th Gen Intel Core i7 or better
RAM	4GB	8GB or more
Storage	256GB SSD	512GB or more
Display	14-inch FHD (1920 X 1080)	15.6-inch FHD IPS(1920 X 1080)
Graphics	4GB NVIDIA GeForce GTX 1060	8GB NVIDIA GeForce GTX 2070
Battery	Up to 2 hours	Up to 5 hours

Project Life Cycle:

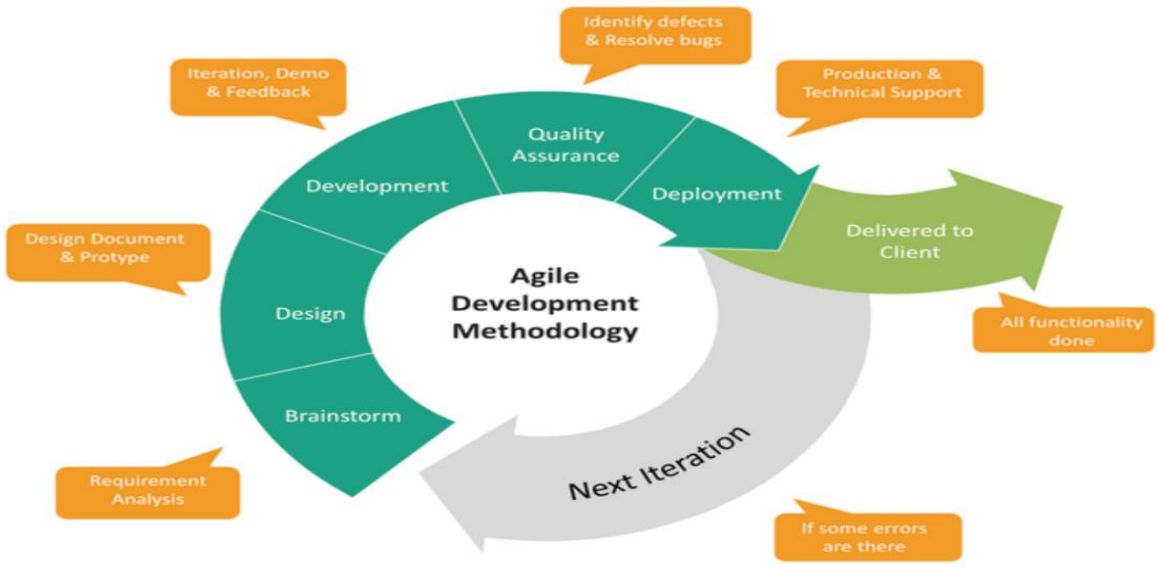
Agile Software Development Methodology

The Agile software development methodology is one among the only and effective processes to show a vision for a business need into software solutions. Agile may be a term want to describe software development approaches that employ continual planning, learning, improvement, team collaboration, evolutionary development, and early delivery. It encourages flexible responses to vary.

The agile software development emphasizes on four core values.

- Individual and team interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

Phases of Agile Methodology:



Agile Methodology Phases

Phase-1: Requirement Analysis: - In this phase, we gather data and analyse how electricity billing system works. Also collected requirements after reviewing earlier papers & journals.

Phase-2: Design: - On the basis of gathered information we design and build a model.

Phase-3: Development: - Deliver the working software based on iteration, requirements or feedback.

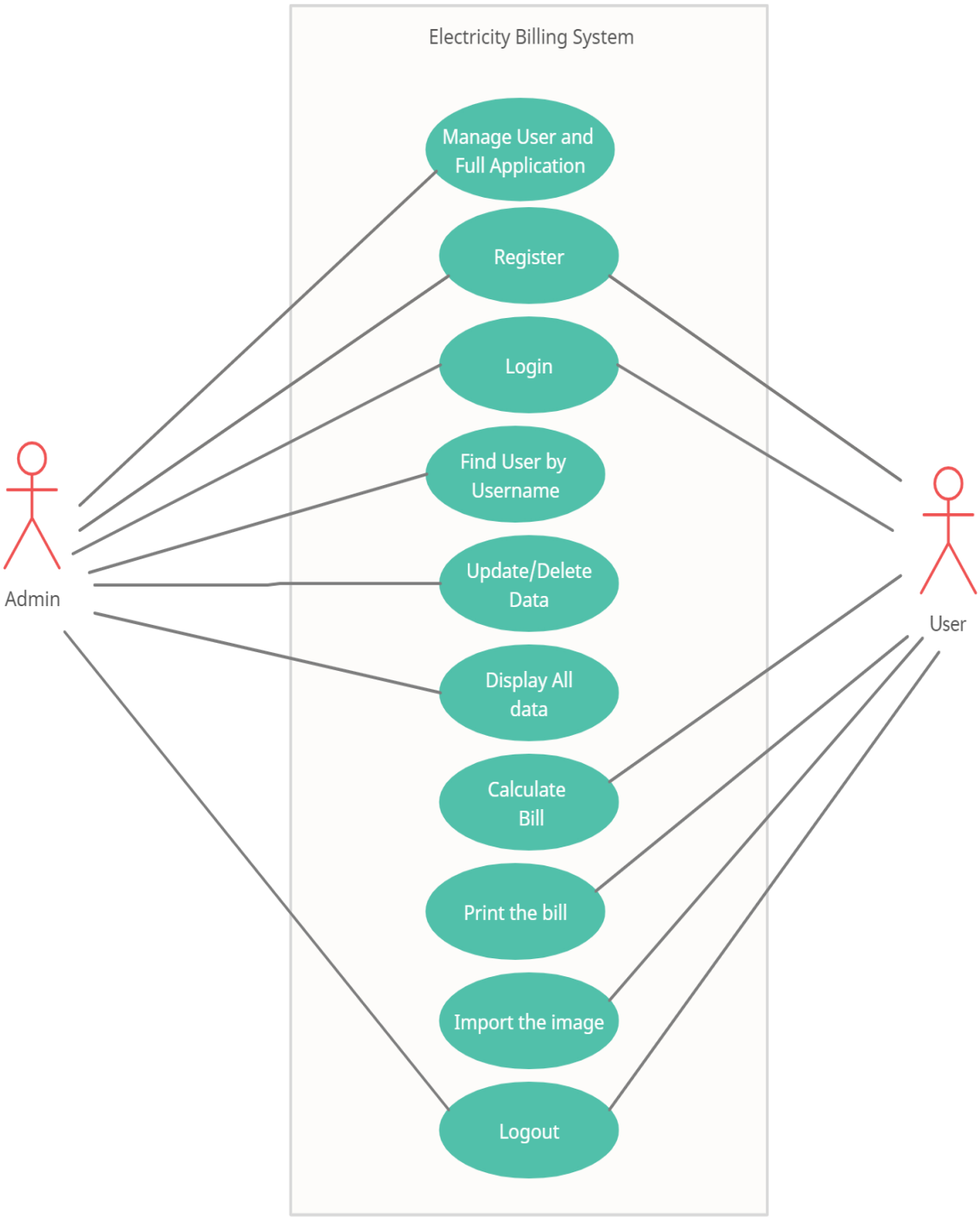
Phase-4: Quality Assurance: - This is a testing phase where we test our model.

Phase-5: Deployment: - In this phase we deploy our final release of the iteration into production.

Phase-6: Feedback: - Accept the user feedback and work it into the requirements of next iteration.

Use Case Diagram:

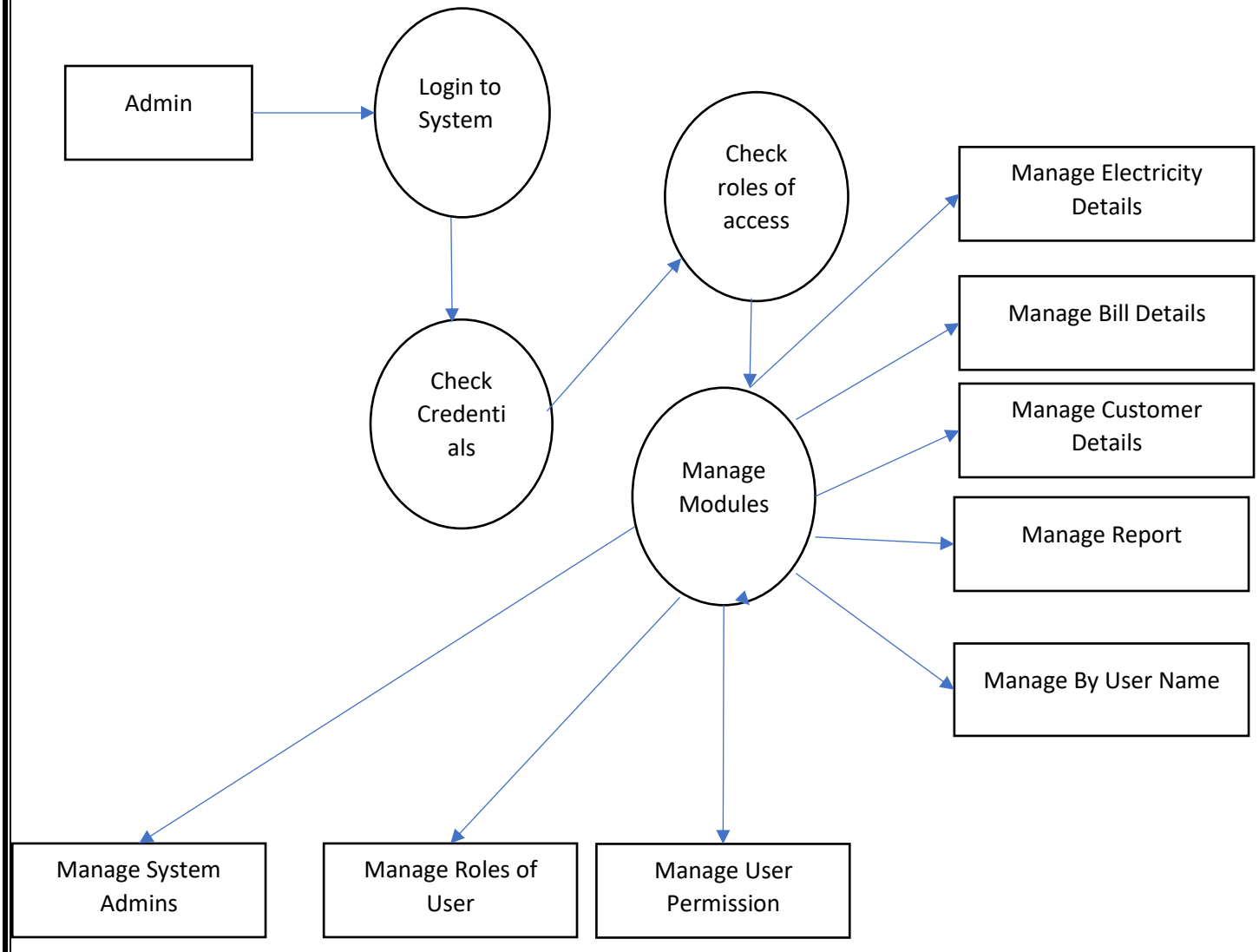
A use case depicts a series of steps that give something significant value to an actor and is drawn as a horizontal ellipse. A use case diagram apprehends the functional features of a system with processes implement in the system. While discussing the functionality and procedures of the framework, you discover important characteristics of the framework that you represent in the use case diagram.



Use Case diagram of Electricity Billing System

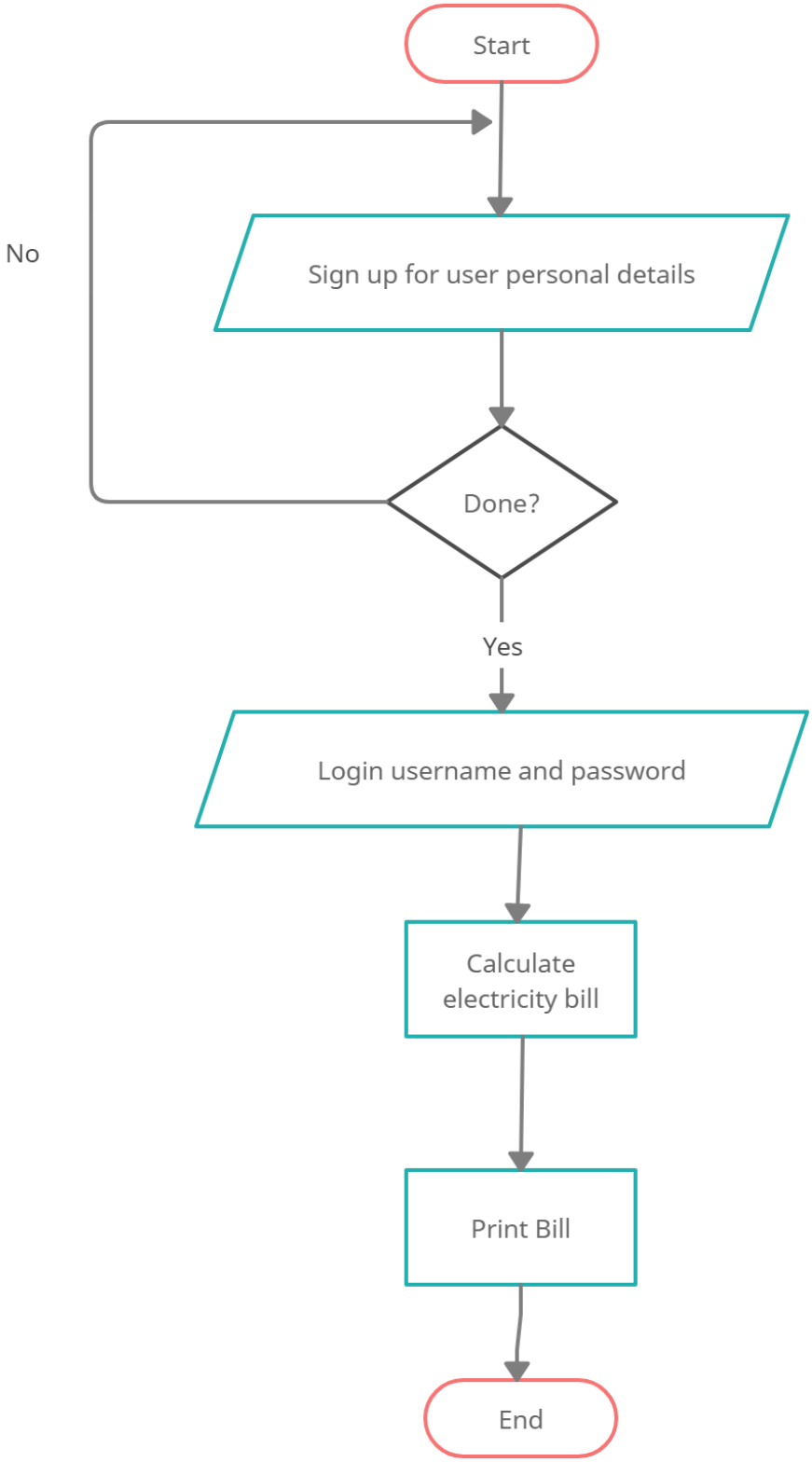
Dataflow Diagram:

A data flow diagram should be the first mechanism used by framework analyst to model system fundamental. These fundamentals are the system operations; the information used by this operations and external organization that interact with the framework and the data flows in the system.



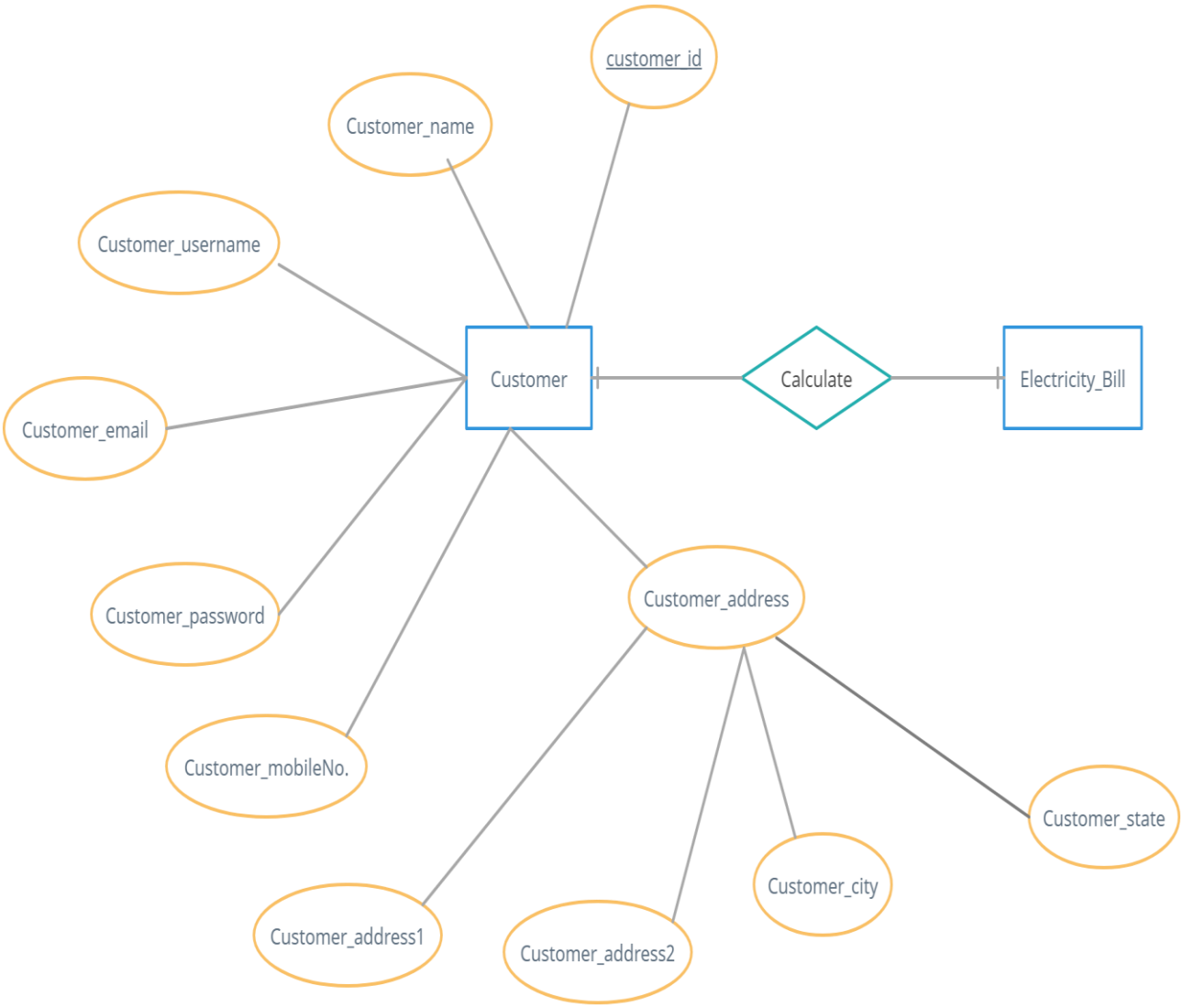
Admin Dataflow Diagram of Electricity Billing System

Flowchart:



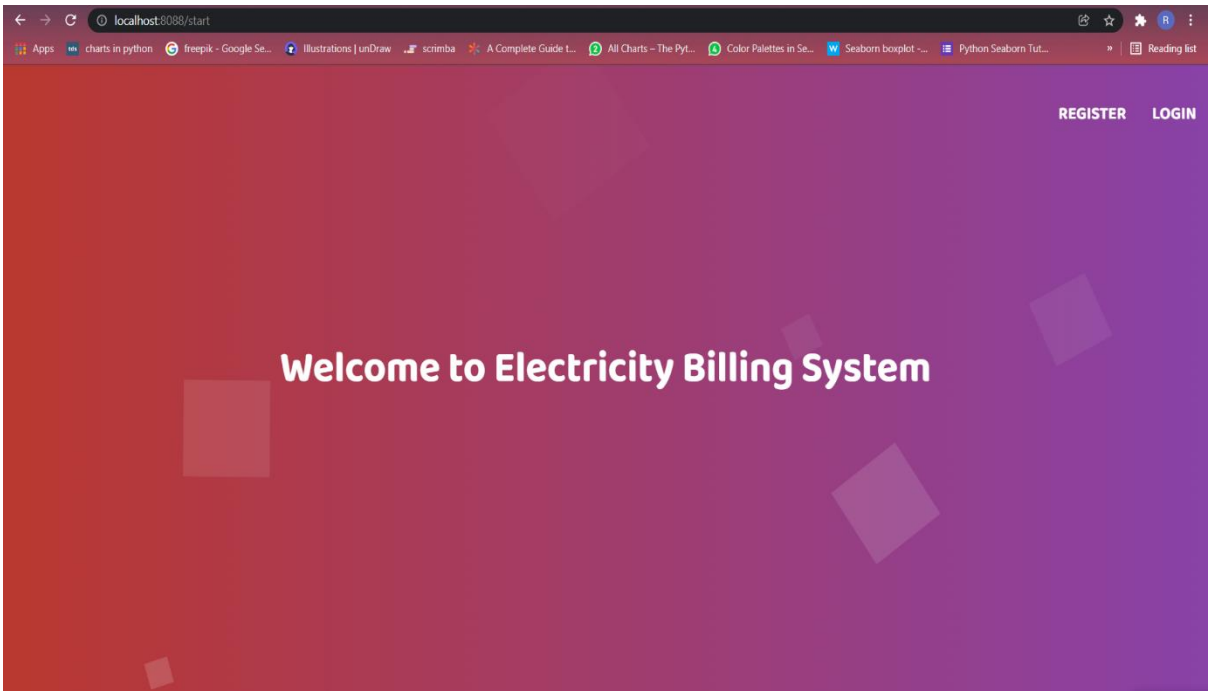
User Flowchart of Electricity Billing System

Entity Relationship Diagram:

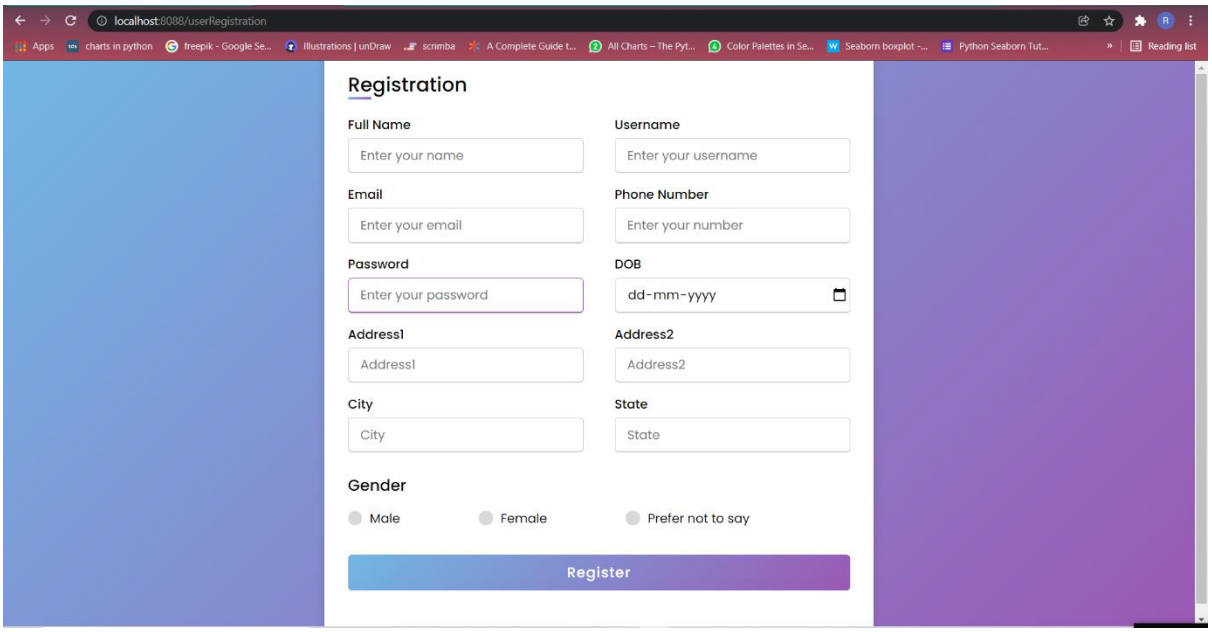


ER Diagram of Electricity Billing System

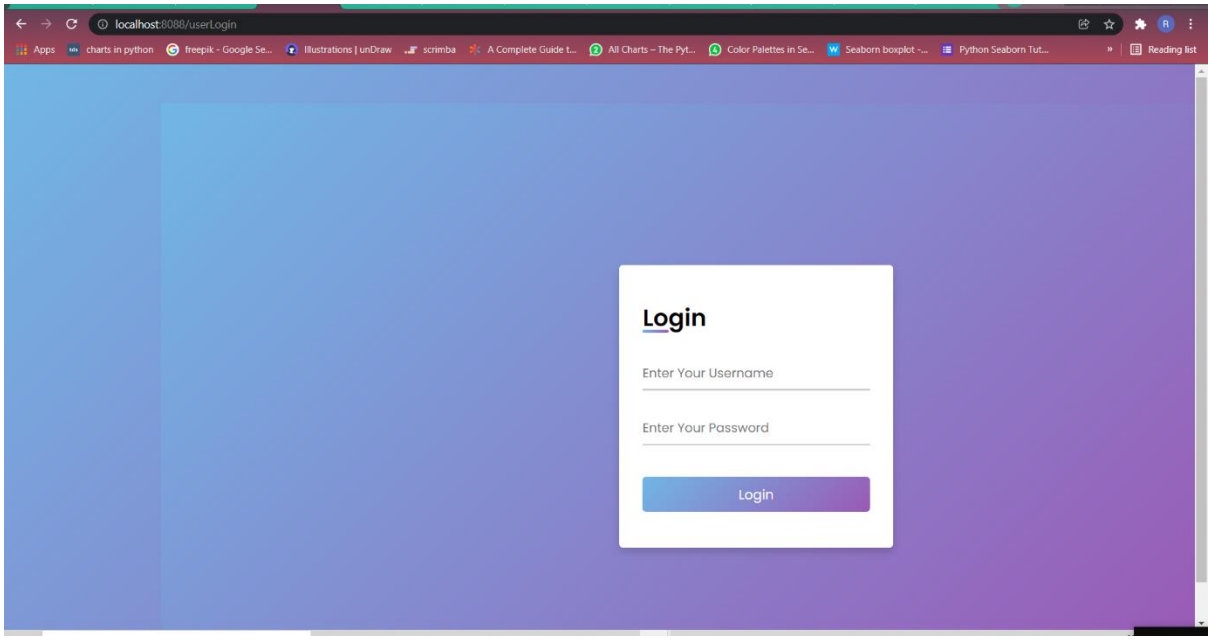
Snapshots



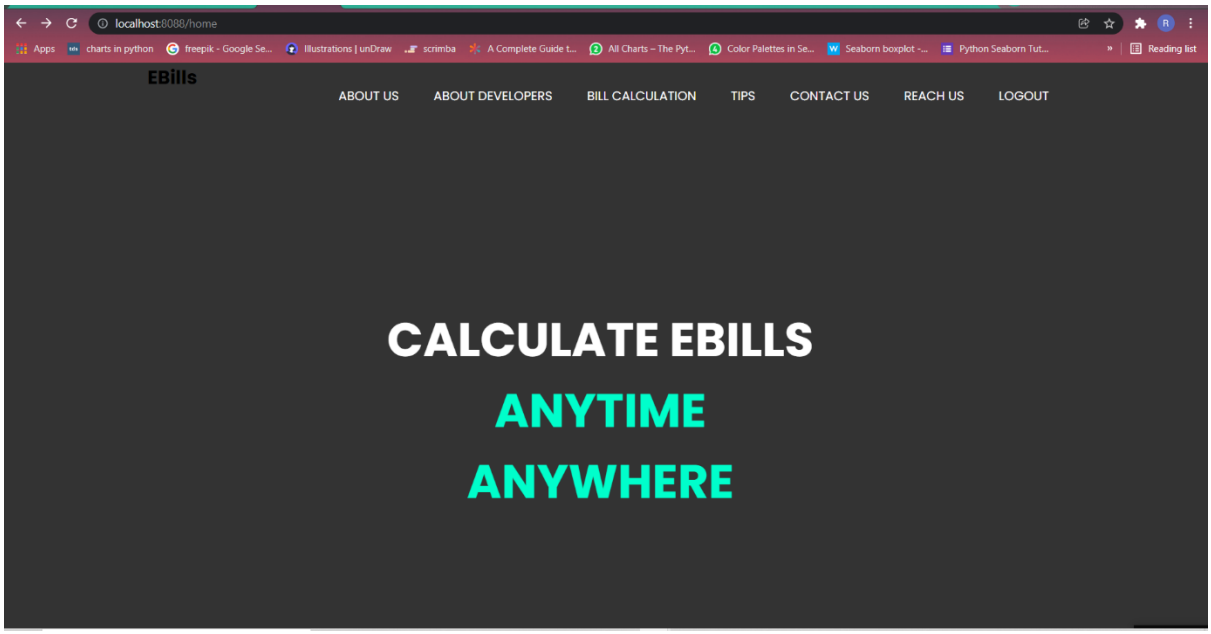
First Page



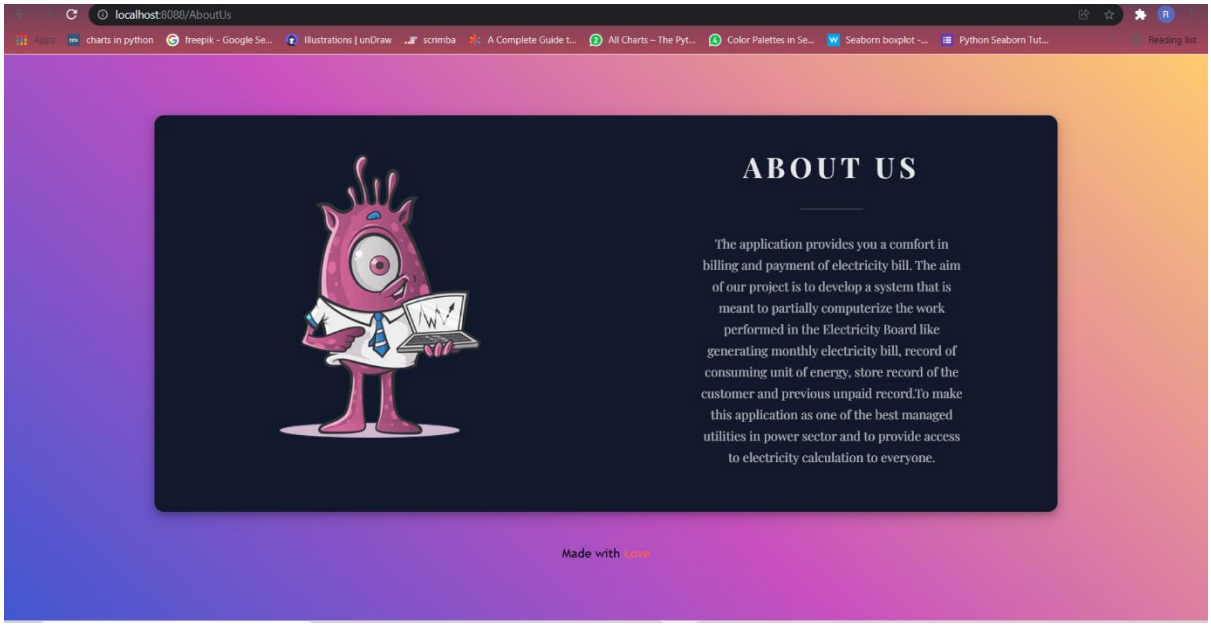
Register Page



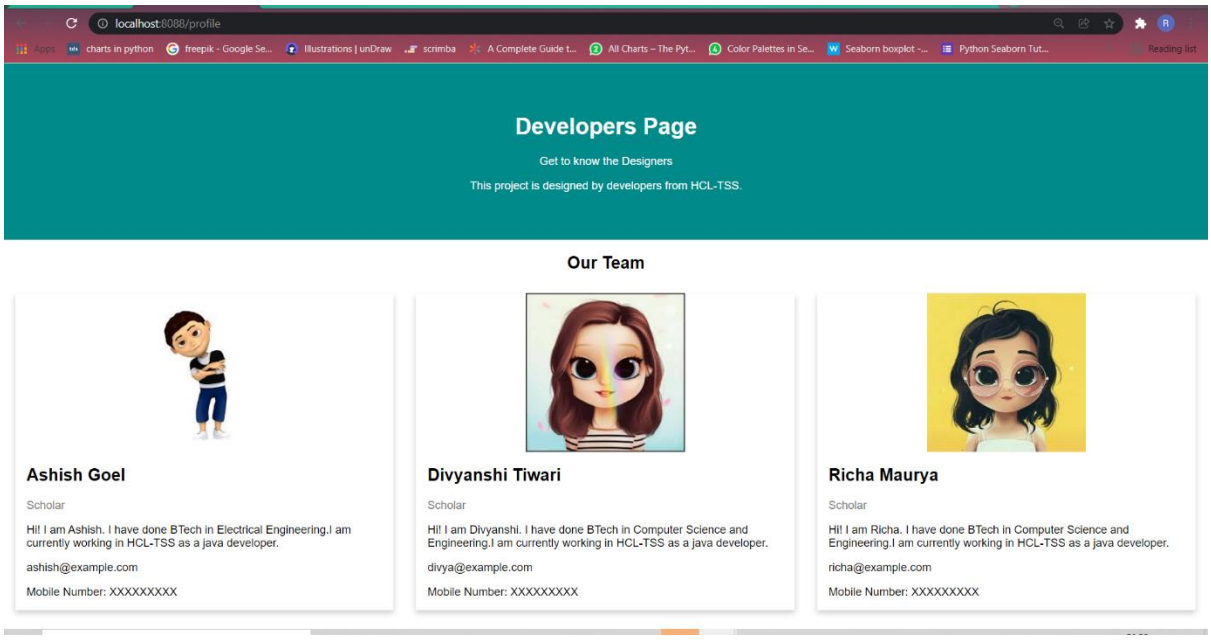
Login Page



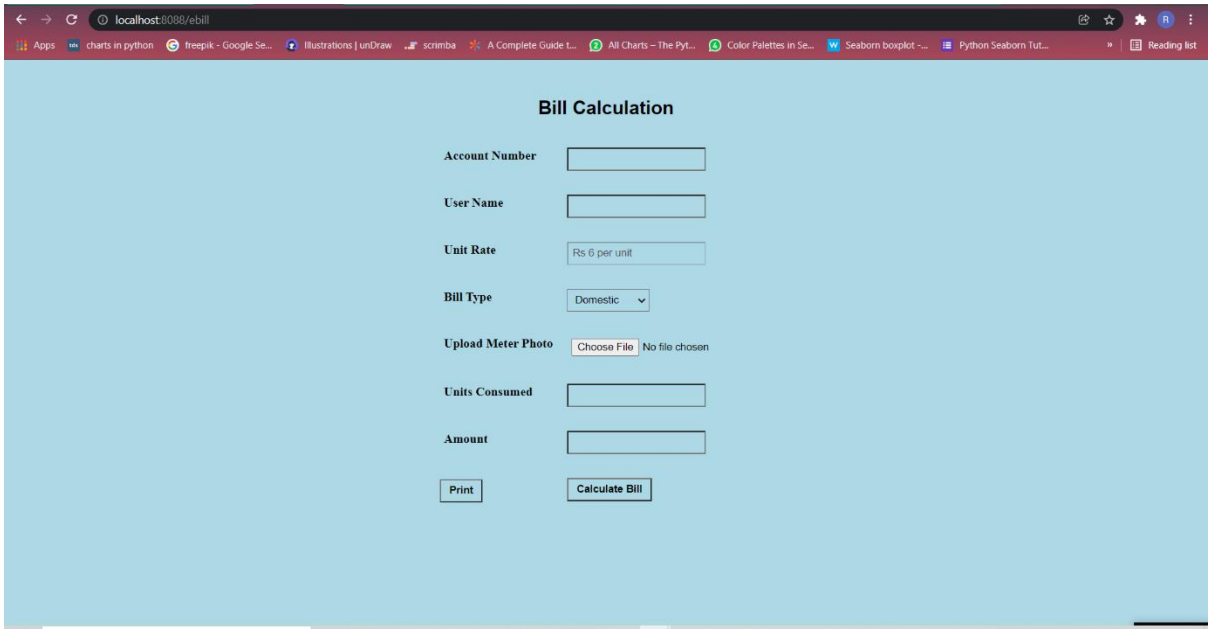
Home Page



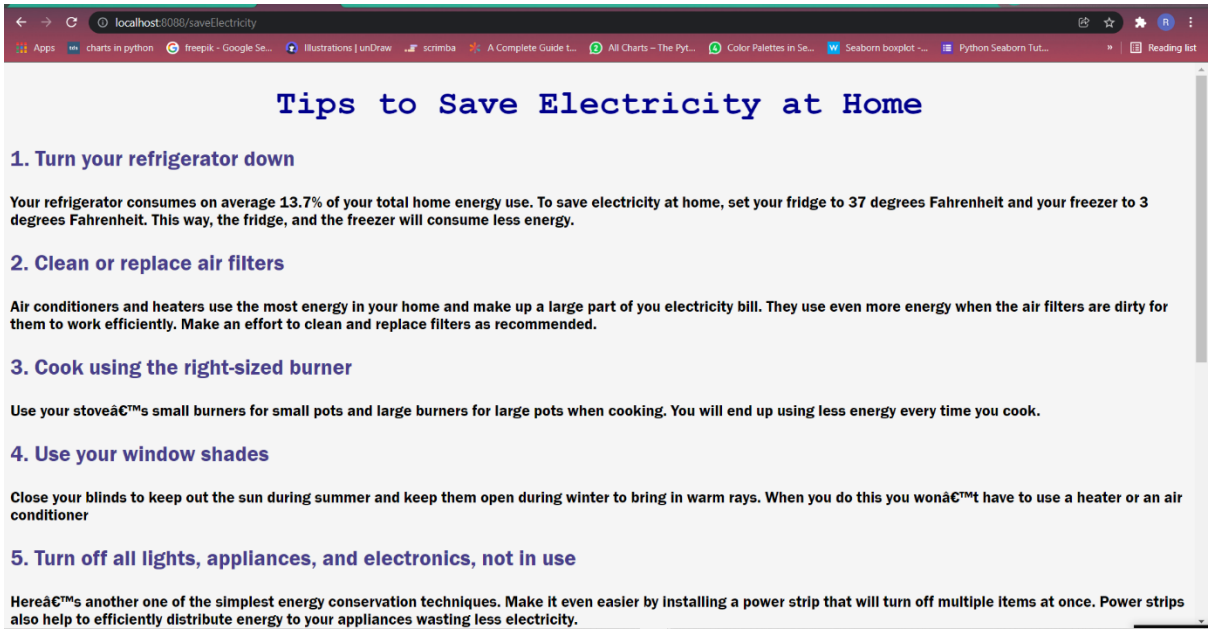
About Us Page



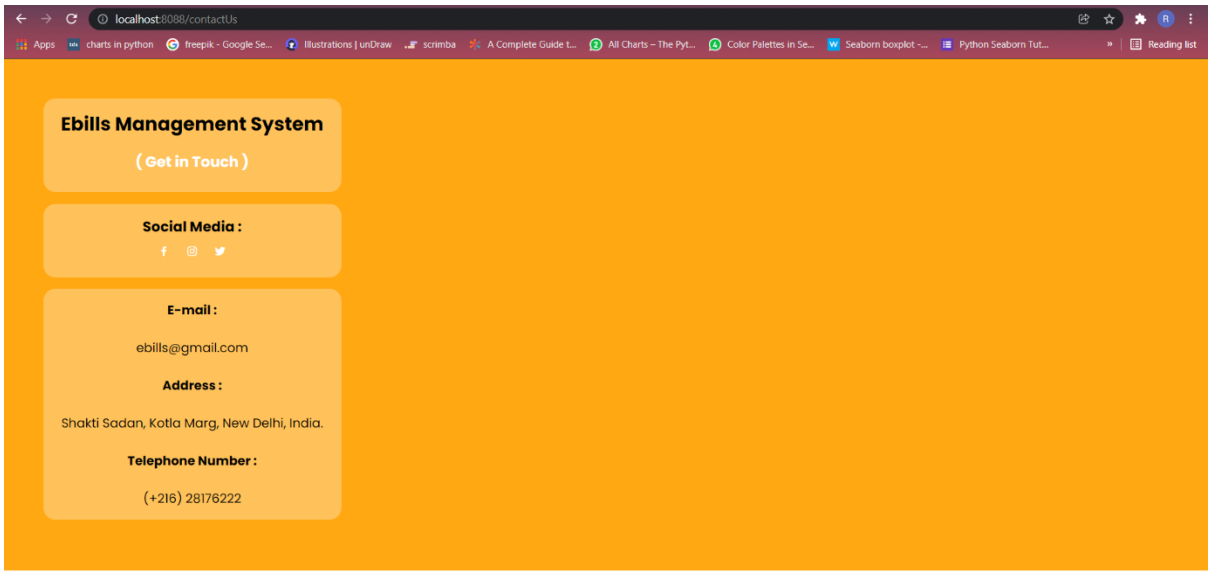
About Developers Page



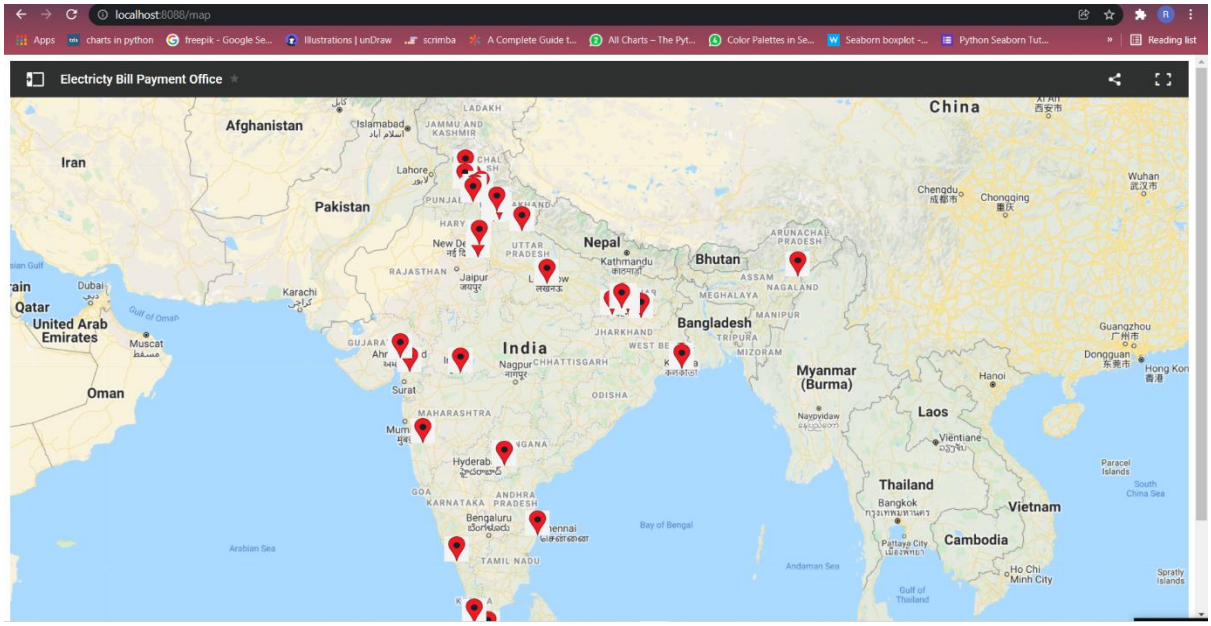
Bill Calculation Page



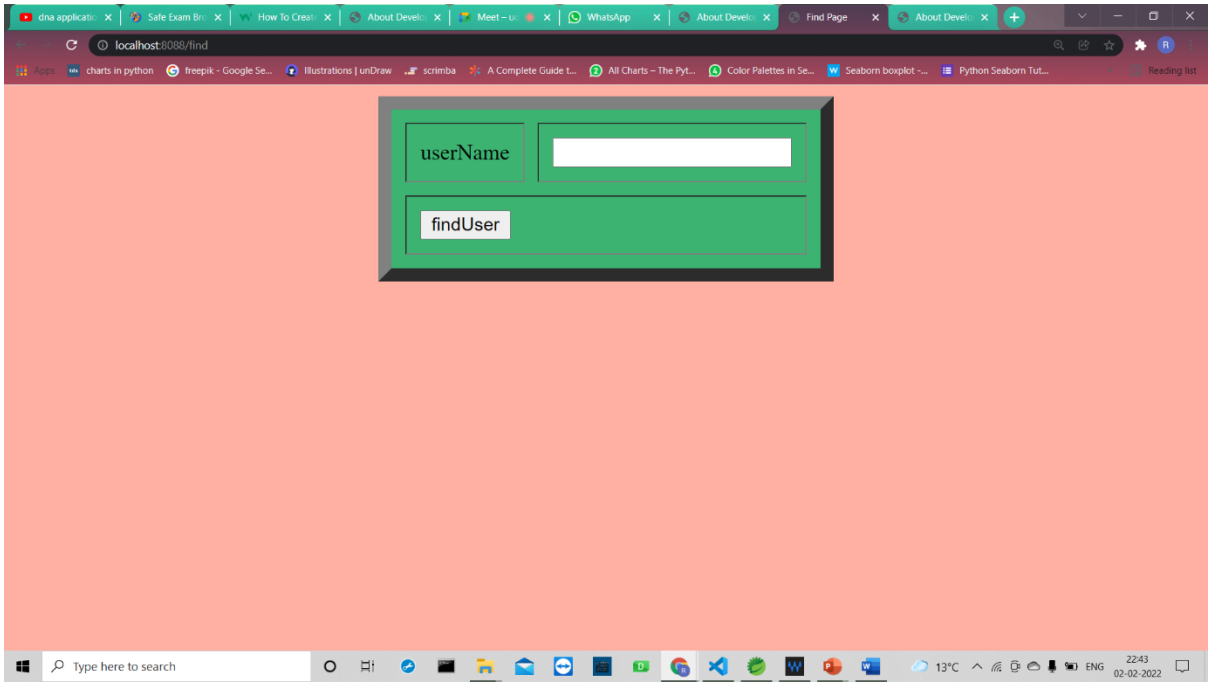
Tips to save Electricity Page



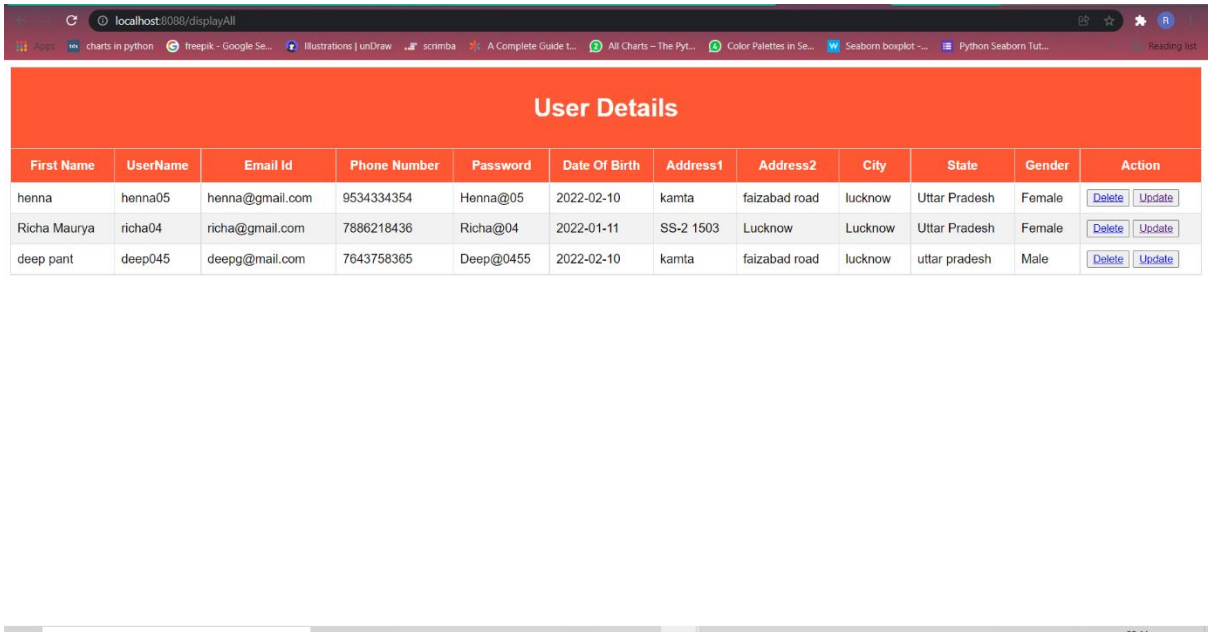
Contact Us Page



Reach Us Page

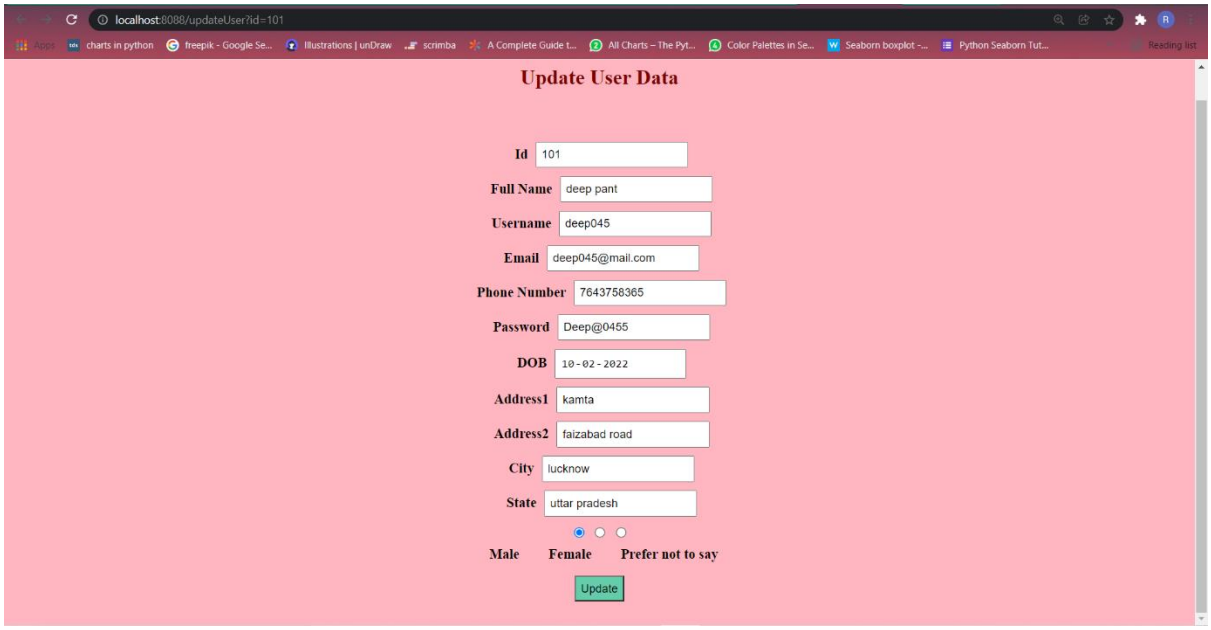


Find User Page

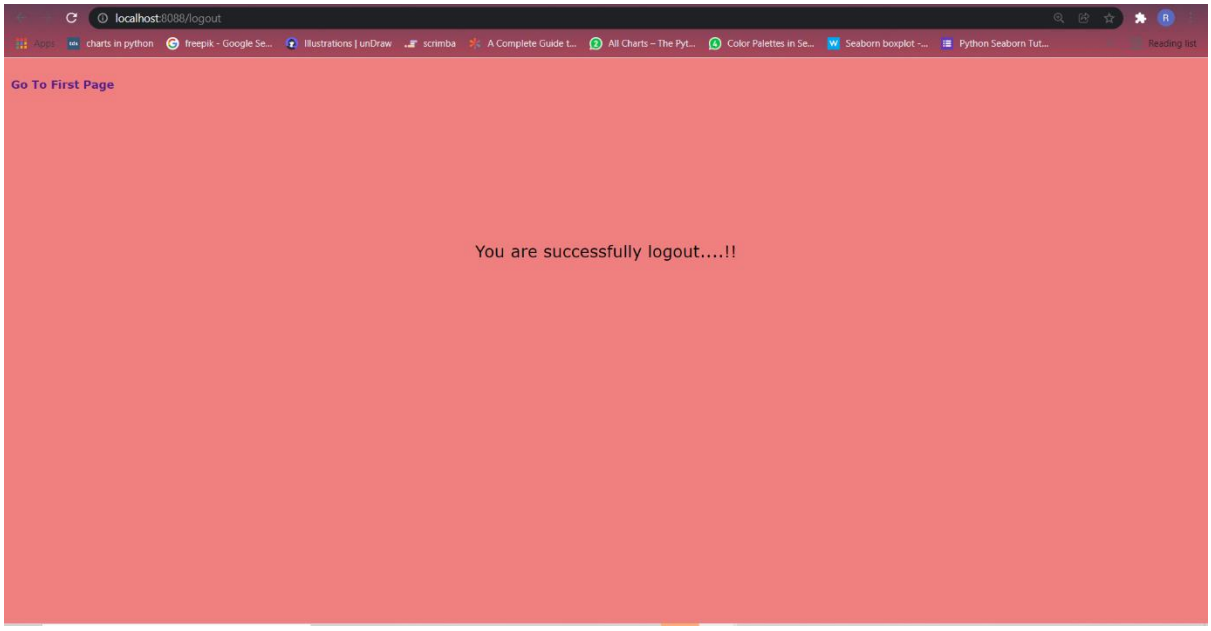


First Name	UserName	Email Id	Phone Number	Password	Date Of Birth	Address1	Address2	City	State	Gender	Action
henna	henna05	henna@gmail.com	9534334354	Henna@05	2022-02-10	kamta	faizabad road	lucknow	Uttar Pradesh	Female	Delete Update
Richa Maurya	richa04	richa@gmail.com	7886218436	Richa@04	2022-01-11	SS-2 1503	Lucknow	Lucknow	Uttar Pradesh	Female	Delete Update
deep pant	deep045	deepg@mail.com	7643758365	Deep@0455	2022-02-10	kamta	faizabad road	lucknow	uttar pradesh	Male	Delete Update

Display All Page



Update Data Page



Logout Page

Conclusion:

Electricity Billing System:

Our project is only a humble venture to satisfy the needs to manage their project work. Several user-friendly coding has also adopted. At the end it is concluded that we have made effort on following points.

- A description of the background and context of the project and its relation to work already done in the area.
- Made statement of the aims and objectives of the project.
- We define the problem on which we are working in the project.
- We describe the requirement Specifications of the system and the actions that can be done on these things.
- We understand the problem domain and produce a model of the system, which describes operations that can be performed on the system.
- We included features and operations in detail, including screen layouts.
- We designed user interface and security issues related to system.
- Finally, the system is implemented and tested according to test cases.

Future Scope of the Project:

In a nutshell, it can be summarized that the future scope of the project circles around maintaining information regarding:

- We can add printer in future.
- We can give more advance software for Electricity Billing System including more facilities.
- We will host the platform on online servers to make it accessible worldwide.
- Integrate multiple load balancers to distribute the loads of the system
- Implement the backup mechanism for taking backup of codebase and database on regular basis on different servers.
- The above-mentioned points are the enhancements which can be done to increase the applicability and usage of this project. Here we can maintain the records of Electricity and Unit of Energy.
- Also, as it can be seen that now a days the players are versatile, i.e. so, there is a scope for introducing a method to maintain the Electricity Billing System.
- Enhancements can be done to maintain all the Electricity Unit of Energy Bill Store Record Electricity Board.
- We have left all the options open so that if there is any other future requirement in the system by the user for the enhancement of the system then it is possible to implement them.