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Electricity Bill Management System

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Abstract
Science and innovation with all its interesting progressions has been taking human existence norms to a higher level. The entire world will be in a real sense stuck without these developments. This project is a development project, which makes the method of covering electricity bill basic contrasted with other existing tasks. This undertaking has been done using Java Swing as front end and MySQL as back end. The motivation behind the task is to construct an application program to lessen the manual work for dealing with the measure of units devoured by the clients and producing the power charge as per the type of customer – individual or business. It shows the details about customer, units devoured by them and bill history. It empowers them cover their bill if not paid. The date of payment will be refreshed while covering the bill. It keeps up the error free database and effectively joins the future turns of events and changes.
Keywords: Bill Payment History, Bill Payment, Electricity bill, Java Swing, MySQL, Type of customer.

I. INTRODUCTION

It is another idea of taking care of the electricity bill utilizing Java Swing and MySQL, where the other existing techniques for power charge the executives use Java, PHP, Python, C# and MS Access worker. This system is made to keep the records about the bills of the clients. The administrator can deal with every one of the records; the enlisted customers like individual customers, business customers can just deal with their own records and they can't perceive any subtleties of different customers. This framework helps in keeping up the bill and payments. There are four modules to be specific Registration, Login, Admin and Billing screen.

II. SOFTWARE DESCRIPTION

A. JAVA

Java is one of the coding languages which is absolutely object situated. It is having numerous highlights of C++. This language can be utilized for doing online projects.
Java supports

- Data abstraction and encapsulation.
- Inheritance.
- Polymorphism.
- Dynamic Binding

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B. BENEFITS AND APPLICATION OF OOPS

Since oops supports inheritance and polymorphism, it disposes of repetitive codes and broaden the usage of existing classes. Subsequently, we can construct the projects on an exemplary turning out model for advancement. This guarantees high efficiency. Data hiding assists the software engineer with making secure applications.

It is not difficult to have different items to coincide and better chance of upgradation. Programming intricacy can undoubtedly oversee.

These are the features of Java,

- Compiled and interpreted.
- Platform independent and portable.
- Object oriented.
- Robust and secure.
- Distributed.
- Familiar, simple and small.
- Multithreaded and interactive.
- High performance.
- Dynamic and extensible.

The Java compiler compiles and interprets the source file and generates machine language which will be directly run through the Java Runtime Environment. Since this code is platform independent it are often ported to any system we use or work on. This component empowers the developer to create programs. As a matter of fact, java programming language gives a limitless number of cacheable applets and applications.

Everything in java is addressed in objects. All the information and objects are reset inside the objects and classes. Java gives many defend, its exacting run time and compile time checking. Java gives shields to code composed, it's planned as a trash gathered language alleviating the software engineers practically all memory the executive's issues.

C. JAVA SWING

The swing API could be a bunch of extensible GUI segments to facilitate the developer's life to make a Java based front end/GUI applications. It is based on top of AWT. The API goes about as a substitution of AWT.API has almost every control equivalent to AWT controls. Swing component follows a **Model-View-Controller (MVC) architecture to satisfy the following criteria,**

- A solitary API is to be sufficient to help various look and feels.
- API is to be model driven so the most elevated level.
- API isn't needed to have information.
- API is to utilize the Java Bean model so builds tool and Integrated Development Environment can offer better types of assistance to the engineers for use.

MVC Architecture

Swing API design approximately based MVC engineering in the following manner.

- Model addresses component's information.
- View addresses visual representation of the component's information.
- Controller takes the input from the client on the view and mirrors the progressions in the component's information.

Swing Features

- **Light Weight** – Swing components are free of the native operating system's API as swing API controls are delivered generally utilizing pure Java code as opposed to underlying

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operating system cells.

- **Rich Controls** – Swing gives a rich arrangement of advanced controls like tree, tabbed pane, slider, color picker and table controls.
- **Highly Adaptable**– Swing controls can be altered in a simple manner as visual appearance is autonomous of interior portrayal.
- **Pluggable look-and-feel** – Swing based GUI application look and feel can be changed at run-time dependent on available values.

D. MYSQL

MySQL is the most well known open source social SQL database administration framework. MySQL is extraordinary compared to other RDBMS being utilized for creating different online programming applications.

RDBMS

A Relational Data Base Management System (RDBMS) is a product of PC that

- Enables us to do a database with tables, segments and files.
- Guarantees the referential trustworthiness between columns of various tables.
- Interprets a SQL query and joins data from different tables.
- Updates he indexes autonomously.

RDBMS Terminology

- **Database –** A database is an assortment of tables with related information.
- **Table –** A table is matrix with information. A table in a database is like a basic spreadsheet.
- **Redundancy –** Storing information twice, redundantly to make the framework quicker.
- **Primary key –** A Primary key is unique and not null. A key worth can't happen twice in one table. With a key, we can just discover one line.
- **Foreign key –** A Foreign key is a connecting pin between two tables.
- **Compound key –** A compound key is a key that comprises of various columns, since one column isn't adequate one of a kind.
- **Referential integrity –** Referential integrity ensures that a foreign key worth consistently focuses to a current row.

III. FLOW CHART

Our flow chart diagram is mentioned in Fig 1. In which registration, login, administrator and customer bill component are there.
Descriptions of these components are described further.

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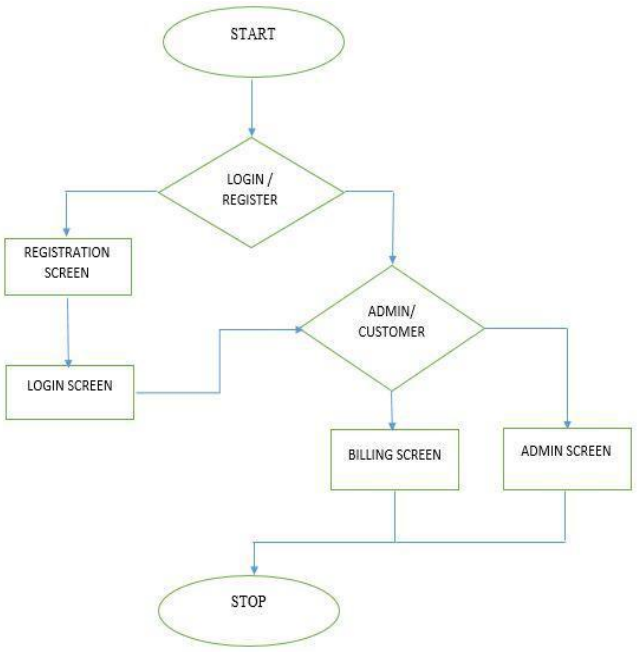

Fig 1: Flow chart

MODULE DESCRIPTION
A. REGISTRATION

This screen contains different fields like first name, last name, address line1, address line2, city, state, pin code, contact number, type of customer, username, password. From the start, administrator ought to likewise enlist his/her details. Decisions about the type of customer are an administrator, individual and business. In the event that any field is left vacant, a pop-up will be shown after submission. After the effective submission of the details, a message named "Successfully registered" will be shown and the login screen will show up.

B. LOGIN
This screen contains different fields like username and password. There are two unique buttons called login and sign up. A user needs to enlist his/her details to utilize this scheme. In the event that he/she has effectively enlisted, just he needs to login utilizing username and password, which he/she has entered during enrollment. On the off chance that the client is an executive, administrator screen will be shown. In the event that the client an individual customer or a commercial customer, billing screen will be shown. This will happen due to the following internal process. When the client has signed in, kind of client will be gotten from the dataset by contrast the username and secret key entered. In light of the kind of client the necessary screen will be called.

C. ADMINISTRATOR
After the admin has signed in, administrator screen will be shown. This screen contains different fields like user id, units consumed, month and year. The administrator needs to fill the details of the above fields. He knows just the user id of the client. Bill sum will be determined relying on the type of customer utilizing the units entered by the administrator. There will be various kinds of taxes for various sorts of customers. The administrator needs to refresh the details consistently.

D. CUSTOMER BILL
The fields in the billing screen include details of the customer, most recent bill data, bill history, logout button. Each field is shown utilizing panel. Thus, absolutely four panels are utilized.

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Details of the client, which is in the first panel include name, address, contact number and type of client.
Most recent bill data, which is in the subsequent panel shows the bill details of current month and pay button.
On the off chance that the client has effectively paid, pay button won't be enabled. On the off chance that the client has not paid, he/she can pay by tapping the pay button.
Bill history, which is in the third panel includes columns like year, month, payment date, payment status and units consumed. When the client has paid the bill sum, payment date and payment status will be updated.
Logout button is put in fourth board. The format utilized in this billing screen is Grid layout.

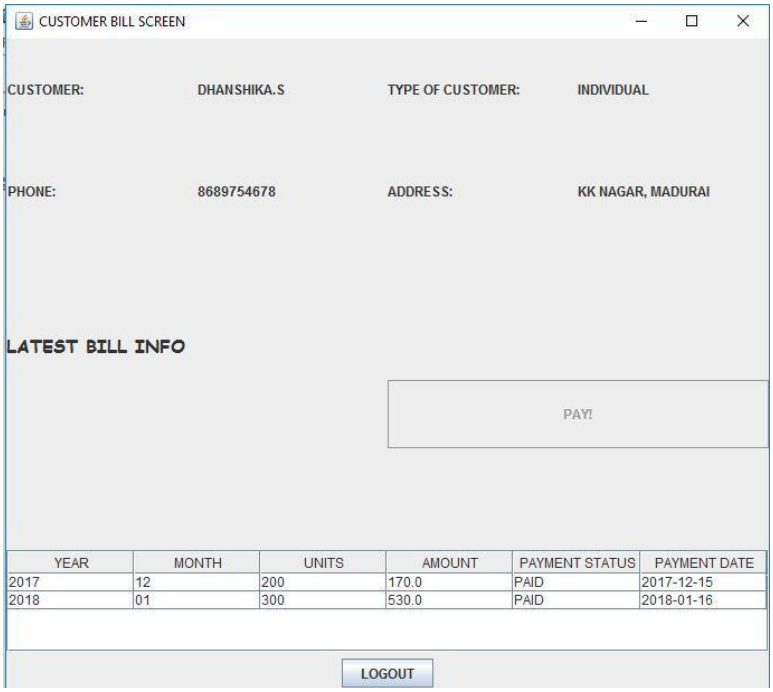

Fig 2: Customer Bill

IV. TOOLS USED

A. NETBEANS

NetBeans is product advancement stage written in Java. The NetBeans stage permits applications to be created from a bunch of measured programming segments called modules. The NetBeans IDE is generally proposed for development in Java, yet furthermore maintains various vernaculars explicitly, PHP, C/C++ and HTML5. NetBeans is cross-platform and runs on Microsoft windows, macOS, Linux, Solaris and other working operating system supporting a viable JVM.

B. FEATURES OF NETBEANS

Maven

All throughout the planet, a key term that surfaces over and again with regards to NetBeans is "Maven ". The way that no modules should be introduced to utilize Maven and that Maven project don't should be imported, however, can just be opened, is a key element valued by NetBeans user.

Out of the box

A vital component of NetBeans is the brief time frame distinction between installing it and starting to make significant applications in it. Notwithstanding its critical plugin ecosystem, very little is should have been installed or configured, since everything is accessible "out of the box" when we start it up.

Java Editor

The language-mindful NetBeans editor identifies blunders while we type and assists us with

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documentation pop-ups and brilliant code fulfillment – all with the speed and straightforwardness of the light weight text editor. Obviously, the Java editorial manager in NetBeans is considerably more than a text editor– it expects lines, matches words and sections and features source code grammatically and semantically.

Java EE

NetBeans tools for the Java EE stage are created in close participation with the Java EE, Glass Fish and Web Logic groups give the most impenetrable combination and simplest utilization of the Java EE specification.

Internet of Things

Straightforwardly from NetBeans we can make, test, troubleshoot, send and profile applications that will run on the Raspberry Pi, cell phones, PDAs, set-top boxes and other versatile and embedded systems.

Configurability

The NetBeans workspace can without a doubt be changed. We can alter the buttons in the toolbar or drag and reposition tabs in the application frame to suit our individual work process and undock tabs and drag them outside the application outline, even onto an alternate screen and change console easy routes to coordinate with our own inclinations.

Git and Mercurial

Without needing to install any plugins, NetBeans naturally allows us to work effectively and instinctively with a wide scope of mainstream version systems, explicitly Git, Mercurial and subversion.

V. CONCLUSION

Electricity Bill Management System utilizing Java Swing and MySQL has been created with the assistance of NetBeans IDE viably. It is basic and easy to understand. Since this framework is executed in Java, it is stage autonomous. It has a wide extension for future development. All manual also as paper works can be completely eliminated in the billing branch. The precision and dependability are without a doubt expanded. It ensures that unapproved individual can't execute this program. This system gives secured processing with no any threats.

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