

Project Report on

Electricity Bill Generation System

Database Management System Laboratory



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CERTIFICATE



This is to certify that the project report entitled: '**Electricity Bill Generation System**' submitted by **Mr. Anurag Singh** RollNo.**B200058CS**, is an authentic report for the work carried out under my supervision as a part of the Database Management System Laboratory during the Odd Semester, 2022 at the **National Institute of Technology Sikkim, Ravangla-737139, Sikkim**

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Introduction

The electricity Billing System aims is to generate electricity bills with all the charges and penalties. The electricity billing system is a technique that is cost-efficient and can reduce problems associated with billing and also reduces the deployment of manpower for taking meter readings. A manual system that is employed is extremely laborious and quite inadequate. It only makes the process more difficult. Our project aims to develop a system that is meant to partially computerize the work performed by the Electricity Board like generating monthly electricity bills, records of consuming units of energy store records of the customer, and previous unpaid records.

The electricity billing system has many advantages both for suppliers as well as consumer's point as follows:

- No bill production
- No bill distribution
- No further actions such as disconnections
- Customer responsible for disconnection
- Load and demand side management
- Limit load
- Load based
- Time based
- Pay to suit your income status
- Daily, weekly, and monthly budgeting
- Show the true cost of consumption
- Reduce consumption when income is tight– make money
- No billing errors
- Reduce consumption when income is tight– make money

- No billing errors

Scope

The project aims at Business process automation, i.e. we have tried to computerize various processes of the Electricity Billing System. In the sector of electricity board we have computerizes their department and stock maintenance.

The scope of any software depends upon the following things:

1. It satisfies the user's 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 such type of software, which satisfy the above-given requirement.

Objectives

The firm handles all of the work manually, which is very tedious and mismanaged. The objective of our project is as follows:

- a. To keep the information of the Customer
- b. To keep the information of consuming unit of energy of the current month
- c. To keep the information of consuming unit of energy of the previous month.
- d. To keep the information of employees working in the department.
- e. To maintain the record of the department.

System Analysis

Identification Of Problem:

The old manual system was suffering from a series of drawbacks. Since the whole of the system was to be maintained with hands process of keeping, maintaining, and retrieving the information was very tedious and lengthy. The records were never used to be in a systematic order. there used to be lots of difficulties in associating any particular transaction with a particular context. If any information was to be found it was required to go through the different registers, and documents there would never exist anything like report generation. There would always be unnecessary consumption of time while entering records and retrieving records. One more problem was that it was very difficult to find errors while entering the records. Once the records were entered it was very difficult to update these records. At present, work done on the electricity board is performed manually which is a great headache for the department. The reason behind it is that there is a lot of information to be maintained and has to be kept in mind while running the business.

The following points should be well considered:

Documents and reports that must be provided by the new system: there can also be a few reports, which can help management in decision-making and cost control but since these reports do not get the required attention, such kinds of reports and information were also identified and given the required attention. Details of the information needed for each document and report. The required frequency and distribution for each document. Probable sources of information for each document and report.

With the implementation of a computerized system, the task of keeping records in an organized manner will be solved. The greatest of all is the retrieval of information, which will be at the click of the mouse. So the proposed system helps in saving time in different operations and making information flow easy giving valuable reports.

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ADVANTAGES OF PROPOSED METHODOLOGY OVER EXISTING METHODOLOGY

The present power usage reading is made manually by moving to the consumer locations. This requires a large number of labor operators and long working hours to accomplish the task. Manual billing is sometimes restricted and delayed by bad weather conditions. The printed billing also tends to get lost. An electricity billing system has been proposed as an innovative solution aimed at facilitating affordability and reducing the cost of utilities. This drawback is reduced by using Electricity billing which is based on the concept of “Get your electricity bill in your currency daily”. The present system measures the power consumption with the help of a power measurement circuit and fed to the ARM controller through an IR sensor. After getting the power consumption values the ARM processor will calculate the bill amount according to the present tariff values and display it to the user. The information is also provided to the electricity department and to the user using GSM technology for bill payment purposes.

Requirements Specification:

Hardware requirements:

- CPU – Intel Core 2 Duo E7300(min)
- RAM – 512MB (min)
- Hard Disk – 50GB (min)

Software requirements:

- PHP, MySQL (Backend and Database)
- IDE (Visual Studio Code)
- HTML, Materialize CSS (Frontend)

Hardware Implementation:

A. Power Supply Unit: The supply of 5V DC is given to the system which is converted from 230V AC supply. Firstly, the step-down transformer will be used here for converting the 230V AC into 12V AC. The microcontroller will support only the DC supply, so the AC supply will be converted into DC using the bridge rectifier. The output of the rectifier will have ripples so we are using the 2200uf capacitor for filtering those ripples. The output from the filter is given to the 7805 voltage regulator which will convert the 12V DC into 5V DC. so, the pure 5V DC is getting as the output from the power supply unit.

B. Microcontroller unit: In the microcontroller unit we are going to use ARM LPC2148 microcontroller which is used to sense the values from the sensors and will transfer to the monitoring section regarding the situation. The controller also converts the data to serial communication for wireless data communication through a GSM modem.

C. Sensor unit: The sensor unit consists of an IR LED and IR Receiver. The LED is placed in the moving unit in the meter. The receiver gets the IR signal for the whole rotation of the moving unit which has the LED.

Communication unit: GSM Modem is a communication technology that is used to transmit messages from the monitoring section to the control section. Whenever there are any abnormalities in the sensors or for a certain period of time, the microcontroller is used to transmit the data to the monitor section. E. Display unit LCD The display unit is mainly achieved by the 16X2 LCD. A liquid crystal display (LCD) is a flat panel display, an electronic visual display that uses the light-modulating properties of liquid crystals (LCs). LCS does not emit light directly. The monitored data from the patient is viewed in the display.

Energy Calculation and Energy Meters Standards :

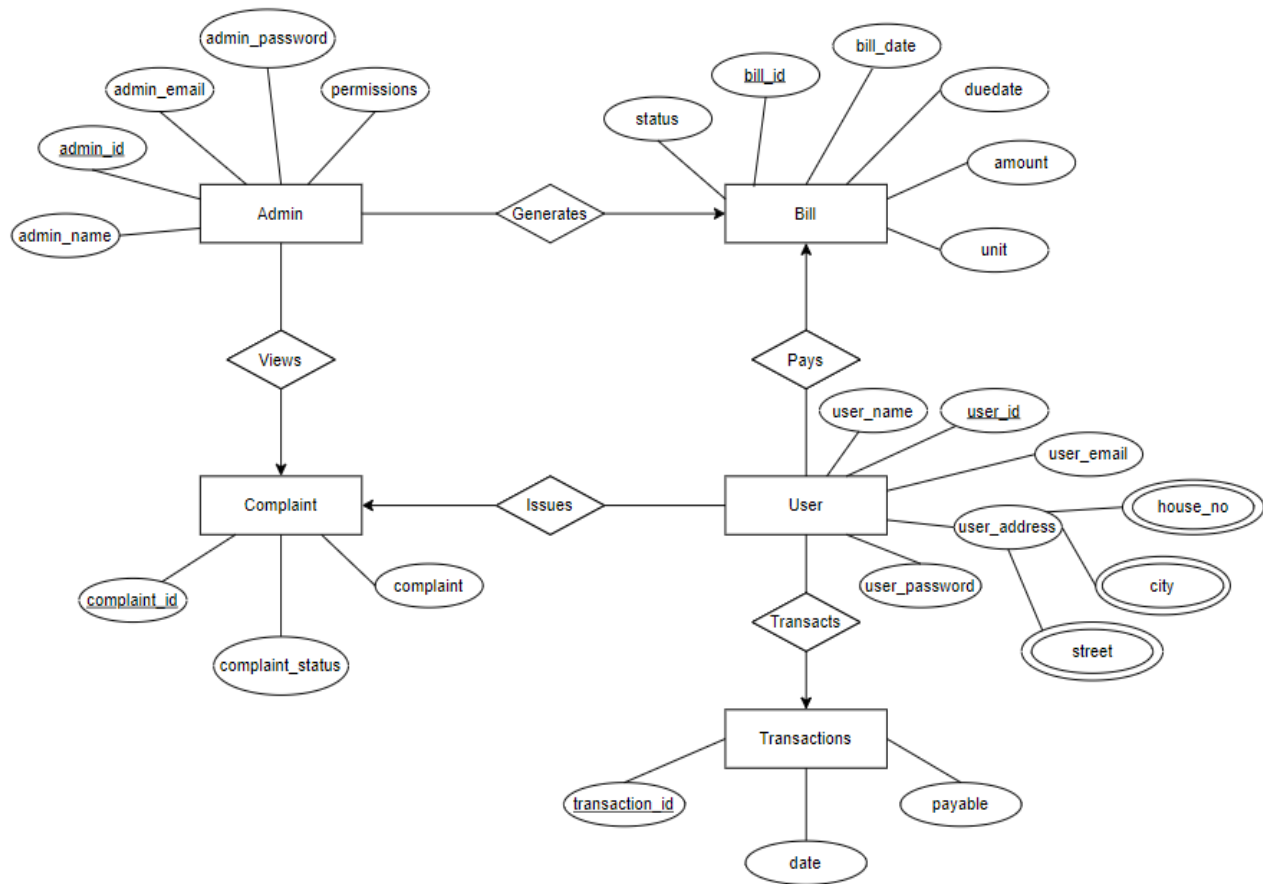
Energy is the measure of how much work has been required over a known period of time. We are using a light bulb as a load with a 100W rating which consumes 100 watts of active power in order to create light (and heat). First of all, a wattmeter is used to measure the power consumed by the load by using the equation. The frequency across 100 W load obtained during an experiment is $F = 0.5 \text{ Hz}$ And $P = 100 \times X / 0.5$
 $P = 200 \times X$ Where X: is the frequency of pulses that are produced by the energy meter. $1 \text{ watt sec} = 1 \text{ kW sec} / 1000$ $1 \text{ watt sec} = 1 \text{ kWh} / (1000 \times 3600)$ Therefore
 $\text{Energy} = P \times \text{Sec} / (1000 \times 3600)$

Approach

We have divided the project working on the following stages:

1. We will first decide on the tables and the respective attributes needed for our database.
2. We will then sketch an ER diagram of the database.
3. We will then plan out the appropriate screens needed for our application.
4. We will then move on to the programming part of the application.
5. We will then create the associated tests for our application to ensure that it works correctly

E-R Diagram



Relational Schema

Admin (admin_password, admin_name ,admin_id ,admin_email , permission)

Bill (bill_id , bill_data , duedate, amount(derived) , units ,status)

Complaint (complaint_id , complaint_status ,complaint)

User (user_name , user_id , user_email ,user_password, user_address, street,city , house_no)

Transaction (transaction_id , date , payable)

Relational table:

Admin

Attribute	Datatype	Type
admin_password	varchar	Not null
admin_name	varchar	Not null
<u>admin_id</u>	Int	Primary key
admin_email	varchar	Not null
permission		

Bill

Attribute	Datatype	Type
bill_id	Int	Primary key
bill_date	Int	Not null
Duedate	int	Not null

amount	Int	Not null
units	Int	Not null
Status	Varchar	Not null

Complaint

Attribute	Datatype	Type
complaint_id	Int	Primary key
complaint_status	Varchar	Not null
complaint	varchar	Not null

User

Attribute	Datatype	Type
user_name	Varchar	Not null
user_id	Int	Primary key
user_email	Varchar	Not null
user_password	Varchar	Not null
user_address	Vharchar	Not null
street	Varchar	Not null
city	Varchar	Not null
house_no	int	Not null

Transaction

attribute	datatype	type
transaction_id	Int	Primary key
date	Int	Not null
payable	Int	Not null

Snapshots of the Project

Electricity bills are generated as well as managed

Sign-in and Sign-up Page:

E-Billing System


admin@gmail.com

.....

Sign In

Sikkim Electricity Billing System

The website at the end of its construction will act as a consumer oriented service for users for easy payment of their respective **Electricity Bill** as well as interact with their providers in case of any queries or grivances.



Sign Up

Full Name

admin@gmail.com

.....

Confirm Password

Contact No.

Address

Sign Up

Overview

⚡ E-Billing System

ADMIN

Dashboard

Customers

₹ Billings

📢 Complaints

Dashboard Overview

⚠️

0

Late Users

ADD DUES

➡️

👥

3

User Defaulting

REMOVE USER(s)

🗑️

⚙️

3

Total Pending Bills

PENDING BILLS

⚙️

₹

₹1000.00

Total Transaction Amount

BILLS AMOUNT

₹

📄

8

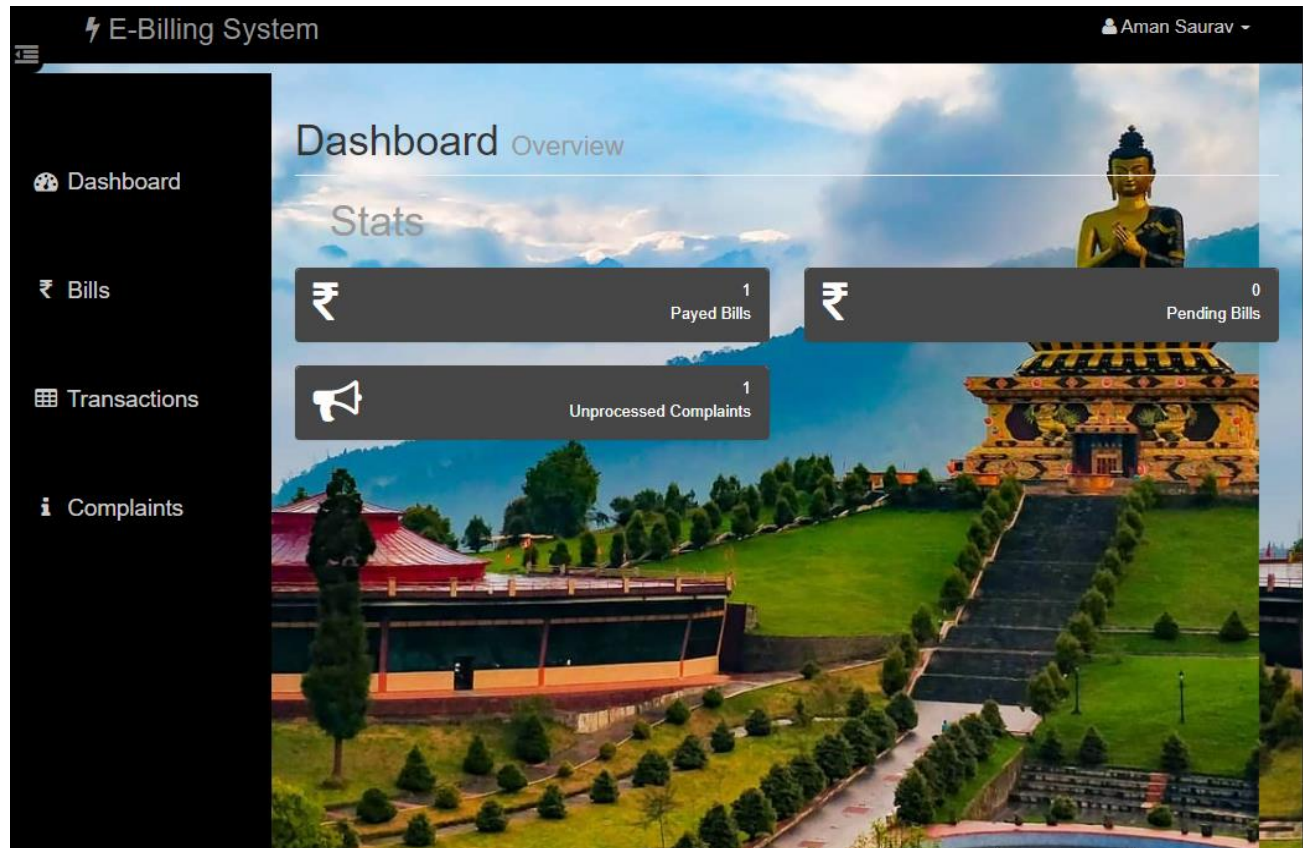
Generated Bills

📢

1

Unprocessed Complaints

Users



Bills

ADMIN

Dashboard

Customers

₹ Billings

i Complaints

Bills

Bills History

Generate New Bill

Bill No.	Customer	Date	UNITS Consumed	Amount	Due Date	Status
BN_24	Tajo	2021-07-10	103	₹206.00	2021-08-09	PENDING
BN_21	Rohit	2021-07-10	98	₹196.00	2021-08-09	PENDING
BN_20	Aslam	2021-07-10	70	₹140.00	2021-08-09	PROCESSED
BN_19	Sanskar Sharma	2021-07-10	78	₹156.00	2021-08-09	PENDING
BN_18	Aman Saurav	2021-07-10	61	₹122.00	2021-08-09	PROCESSED

(1)

Complaints

E-Billing System

ADMIN

Dashboard

Customers

Billings

Complaints

Complaints

Complaint / Not Processed

Complaint No.	User	Complaint	Status	Process
CA-12	Aman Saurav	Bill Generated Late	NOT PROCESSED	PROCESS COMPLAINT

Screenshot Of Database

Server: 127.0.0.1 » Database: ebill

Structure SQL Search Query Export Import Operations Privileges Routines Events Triggers

Filters

Containing the word:

	Table	Action	Rows	Type	Collation	Size	Overhead
<input type="checkbox"/>	admin	★ Browse Structure Search Insert Empty Drop	2	InnoDB	latin1_swedish_ci	16.0 KiB	-
<input type="checkbox"/>	bill	★ Browse Structure Search Insert Empty Drop	8	InnoDB	latin1_swedish_ci	48.0 KiB	-
<input type="checkbox"/>	complaint	★ Browse Structure Search Insert Empty Drop	13	InnoDB	latin1_swedish_ci	48.0 KiB	-
<input type="checkbox"/>	transaction	★ Browse Structure Search Insert Empty Drop	8	InnoDB	latin1_swedish_ci	32.0 KiB	-
<input type="checkbox"/>	unitsrate	★ Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16.0 KiB	-
<input type="checkbox"/>	user	★ Browse Structure Search Insert Empty Drop	7	InnoDB	latin1_swedish_ci	16.0 KiB	-
	6 tables	Sum	39	InnoDB	utf8mb4_general_ci	176.0 KiB	0 B

☐ Check all With selected:

Print Data dictionary

Conclusion

The report is intended to present an overview of the electricity billing system, which can control the usage of electricity on the consumer side to avoid the wastage of power. The electricity billing system is a concept to show the consumer electricity in units and in your currency daily. and the code has been dumped by using flash magic software.

1. The users are not bound to pay excess amounts of money, users have to pay according to their requirements.
2. It can reduce problems associated with billing consumers living in isolated areas and reduce the deployment of manpower for taking meter readings.
3. Electricity billing system is more reliable and user-friendly. From all these, we can conclude that if we implement this Smart electricity billing system then it can become more beneficial

Reference

<https://www.scribd.com/doc/45323163/Electricity-Bill-Project-Report>

[https://www.ijemr.net/DOC/SmartElectricityBillingSystem\(526-529\).pdf](https://www.ijemr.net/DOC/SmartElectricityBillingSystem(526-529).pdf)

<https://stackoverflow.com/>