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Course:

Object Oriented Programming

PROJECT REPORT

Project Report

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Chapter 1: Introduction

Abstract:

Electricity is an energy that play a major role in human life. In day to day life, each and every device from machinery to wrist watch everything works on electricity. It is the most basic requirement next to food, shelter, and clothing. From the past decade's lot of changes took place in electricity departments but even now they are using manual billing system. This approach has a wide range of drawbacks, including billing errors, escape from penalties for late payments, the need for additional staff to bill and collect bills, and paper billing waste. Additionally, the entire lane (transformer) will be disconnected from the power supply in the event of a fire accident or a technical issue, which may inconvenience the neighboring consumers as well. Here, we are concerned about the economic loss that arises due to the manual billing system. In the manual billing system, every month end or for a couple of months' bill is generated. An employee from the electricity department comes to each and every house for billing the meters based on the number of units the consumer has consumed. Hence, in this project, we propose and discuss a new adaptive mechanism which reduces all the above-mentioned losses.

Introduction:

The word smart has been appended with technology, cities. The smart city is all about reducing human effort and to make human life easier. Migration of people from village, semi urban city to city has increased drastically, due to this cause the infrastructure also increased across the city The requirement of things is also increased, among the requirements electricity is an important one. The supply of power to all household, industry, companies is being fulfilled. The current billing process is such that a lineman goes to every household to obtain the meter reading and generates the bill. Customer can pay either make manual payment.

Our project entitled electricity billing system aims is to generate electricity bill with all the charges and penalty manual system that is employed is extremely laborious and quite inadequate it only makes the process more difficult and hard the aim of our project is to develop a system that is meant to partially computerized the work performed in the electricity board, like generating monthly electricity bill, record of consuming unit of energy, store record of the customer and previous unpaid record.

Here, we will use different classes which are related with different class-relationships such as has-a and is-a relation. We also use the main concepts of Object oriented programming.in addition we will use splash screen before start of application which attracts both customer and employee. We use SQL for database.

Objective:

The electricity board handles all of the work manually, which is very boring and miss managed.

The objectives of our project is as follows:

- To keep the information of customer.
- To keep the information of consuming unit of energy of current month.
- To keep the information of consuming unit of energy of previous month.
- To keep the information of employee working in the department.
- To maintain the record of department.

Problem statement:

The old manual system was suffering from a series of drawbacks in whole of the system was to be maintained with hands the process of keeping maintaining and recovering the information was very boring and lengthy. The records were never used to be in a systematic order, there used to be a lot of difficulties in associating any particular transaction with a particular contest. 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 recovering records. One more problem was that it was very difficult to find errors while increasing the records once the records were entered. It was very difficult to update these records. So the main problem statement is to make system of electricity board partially automated (Includes Billing System and Store Customer Data).

Assumptions & constraints:

Assumptions are that this program will be fully functional, and we will extend it so that it can work for large electricity board like K electric but it is also a constraint that due to our small knowledge and less budget it would be difficult we will not be able to make it as big as we think but we have managed to create it to be used for small or medium scale electricity boards. Lack of time was also major constraint, thus it was not possible to make the software foolproof and dynamic.

Scope:

The scopes of this project are:

- **System Functionality:**

The system allows the customers to access and view the value and the accumulate cost of power used through online with centralized database.

- **System User:**

  The target users of this system are the customers and employee in charge.

- **Data:**

  The system can generate the reports based on the power consumption information received from GSM for customer respectively.

Chapter 2: Requirements Analysis

Literature review / Previous research about project:

All these information is taken from different research papers

In traditional monitoring, human labor which is a lineman plays a significant role in collecting and managing field data. Around hundreds plus of the linemen and other supporting staff are required for this manual data collection process (Anderson,1998). The current metering system in Pakistan is not capable to measure variable time price and it is gradually replaced by digital or smart meters. IESCO is the largest electricity utility company in Pakistan RM71.4 billion worth in assets and also the largest power company in Southeast Asia). It serves over seven million customers throughout Islamabad Pakistan and also Rawalpindi IESCO core activities are in the generation, transmission and distribution of electricity. Other activities include repairing, testing and maintaining power plants, providing engineering, procurement and construction services for power plants related products, assembling and manufacturing high voltage switchgears and trading.

Many systems have been proposed in order to reduce this manual billing. Nowadays electricity department is using a billing meter that directly detects the meters and copies the number of units consumed and billing is done but however, in this case, the manpower is again required in order to carry the device to all the meters. Many people/teams proposed a lot of techniques in order to reduce manpower in electricity billing and tried to make that work simple and efficient. Most of those solutions are GSM Based techniques where people place a GSM module connected to it and sends a message from a mobile to the particular SIM to which meter it is placed here they started generating bills to the consumers one in a month or for a couple of months

Consumers can lodge complaint and make their bill payments just by logging into the system. System to capture data related to the consumer's profile in order to assign an identification code with transactions relating to power billing. It constitutes various modules, among which the administrator and consumer module are integral. The consumer is granted access only through the username and password created from the first visit to the online system, or while registering at the web portal. The administrator

module is handled by an authorized Electricity Board employee, in order to grant request relating to validating every transaction online and to order or confirm payment via the electronic system. Various empirical and theoretical studies have been undertaken at the national and international level to analyze various online bill payment systems. The studies mainly focus on online bill payment systems such as: an online power billing system, an e-payment system, a mobile based billing system and so on. These services have not only improved the satisfaction level of customers, but it has also helped in reduction of processing time and transaction time. The survey of literature review covers some major works that have been carried out on online electricity billing. These include but are not limited to: In this paper presented the design and implementation of a web-based application with online capability called Power Billing System (PBS). In the paper, proposed an online payment scheme which uses the traditional e-payment infrastructure but which reveals no payment information to the seller. In this paper presented the design of an advanced centralized billing system using Internet of Things (IOT). In this paper, the author first identified some vulnerability in the mobile billing system. The proposed system can achieve authentication, non-repudiation, and fairness, which are desirable requirements for an undeniable mobile billing system. The billing system design based on internet environment was proposed by Concerning the performance of four network scenarios for billing purposes was presented and discussed by and the result shows that the environments that use differentiated services are both convenient for customers and service providers. The authors of also trying to improve the e-payment system with a smartcard. In this paper, the third party can link a payment to a corresponding withdrawal to prevent money laundering and blackmailing.

Existing System of Electricity Billing System:

In the existing system the exams are done only manually but in proposed system we have to computerize the exams using this application.

- Lack of security of data.
- More man power.
- Time consuming.
- Consumes large volume of pare work.
- Needs manual calculations.
- No direct role for the higher officials

Proposed System of Electricity Billing System:

The aim of proposed system is to develop a system of improved facilities. The proposed system can overcome all the limitations of the existing system. The system provides proper security and reduces the manual work.

- Security of data.

- Ensure data accuracy's.
- Proper control of the higher officials.
- Minimize manual data entry.
- Minimum time needed for the various processing.
- Greater efficiency.
- Better service.
- User friendliness and interactive.
- Minimum time required

Requirements:

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

The proposed system has the following requirements:

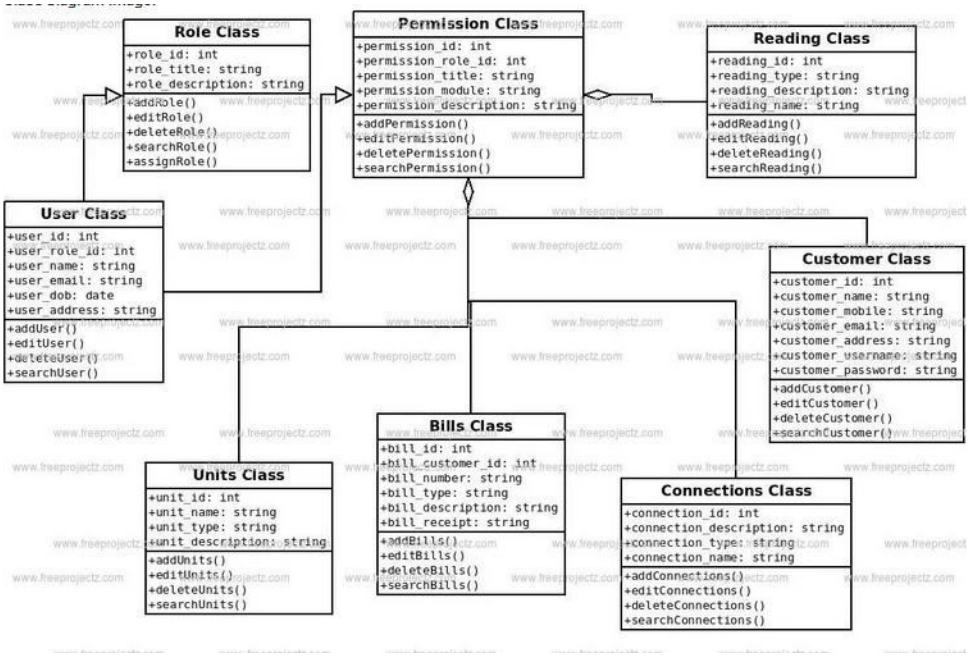
- System needs store information about new entry of Electricity.
- System needs to help the internal staff to keep information of Unit of Energy and find them as per various queries.
- System need to maintain quantity record.
- System need to keep the record of Bill.
- System need to update and delete the record.
- System also needs a search area.
- It also needs a security system to prevent data

Software Requirements:

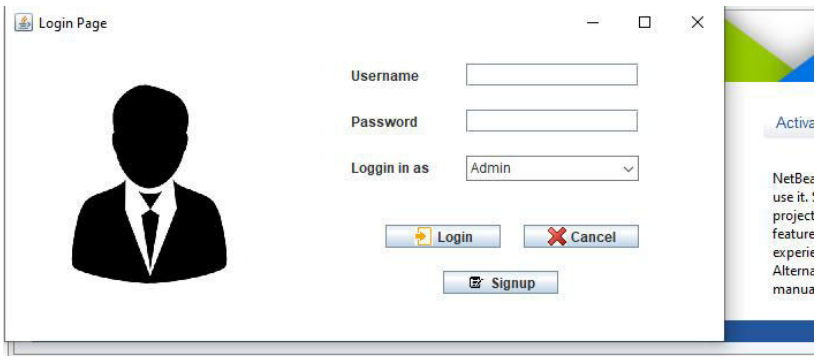
Name of component	Specification
Operating System	Windows 98, Windows XP, Windows7, Linux
Language	Java 2 Runtime Environment
Database	MySQL Server
Browser	Any of Mozilla, Opera, Chrome etc
Web Server	Tomcat 7
Software Development Kit	Java JDK 1.7 or Above
Scripting Language Enable	JSP (Java Server Pages)
Database JDBC Driver	MySQL Jconnector

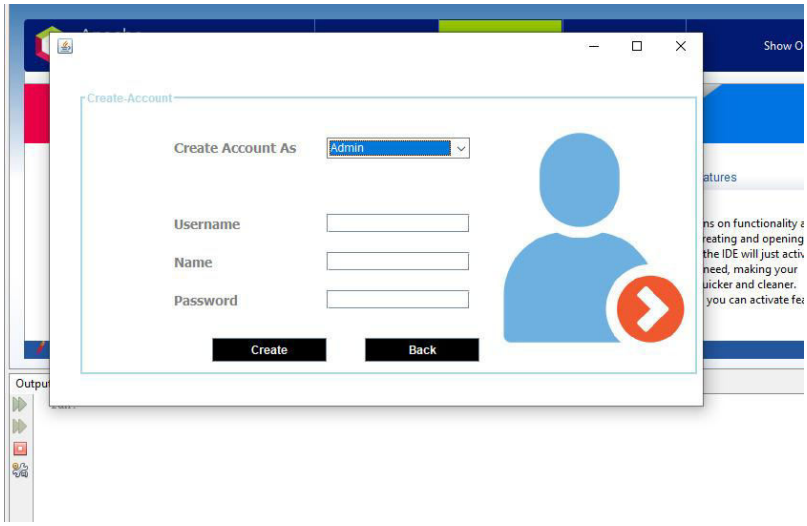
Chapter 3: System Design

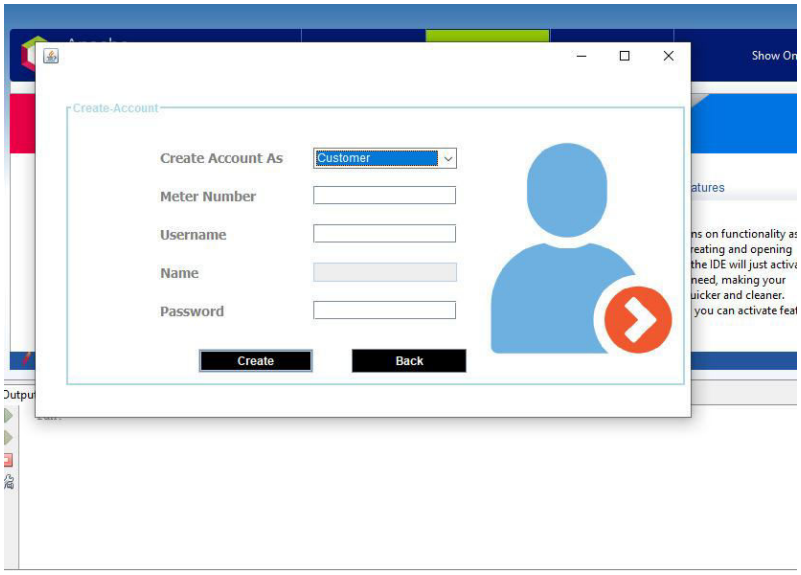
Class Diagram:



UI of Our Project:







Chapter 4: Conclusion

Project Summary:

Our project is only a humble venture to satisfy the needs to manage their project work. Several user friendly coding have also adopted. This package shall prove to be powerful package in satisfying all the requirements of the school. The objective of software planning is to provide a frame work that enables the manger to make reasonable estimates made within a limited time frame at the beginning of the software project and should be updated regularly as the project progresses. At the end it is concluded that we have made effort on following points

1. A description of the background and context of the project and its relation to work already done in the area.
2. Made statement of the aims and objectives of the project.

3. The description of Purpose, Scope, and applicability.
4. We define the problem on which we are working in the project.
5. We describe the requirement Specifications of the system and the actions that can be done on these things.
6. We understand the problem domain and produce a model of the system, which describes operations that can be performed on the system.
7. We included features and operations in detail, including screen layouts.
8. We designed user interface and security issues related to system.
9. Finally, the system is implemented and tested according to test cases.

Future work:

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

1. We can add printer in future.
2. We can give more advance software for Electricity Billing System including more facilities
3. We will host the platform on online servers to make it accessible worldwide
4. Integrate multiple load balancers to distribute the loads of the system
5. Create the master and slave database structure to reduce the overload of the database queries
6. Implement the backup mechanism for taking backup of codebase and database on regular basis on different servers
7. We will use GSM meters which help tracking of consuming units as internet service provider do.

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. In the last we would like to thanks all the persons involved in the development of the system directly or indirectly. We hope that the project will serve its purpose for which it is develop there by underlining success of process.

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