Brooklyn College Final Project report

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**Objective, Scope & Backbone of the Project**

* The current electricity billing system is very time-consuming and inefficient. It makes the process more difficult and challenging.
* Our project aims to develop a system that will partially automate the work done at the Electricity Board. This includes generating monthly electricity bills, recording energy usage, and storing customer records.
* We used Python 3.8 for the front end and MySql-mariaDB engine for the back end to develop our project. Our project is independent of any operating system and can run on any platform.
* The overall project report is divided into further sub-parts. These include developing the model system with the potential for improvement depending on the organization's functionality. The codes were jointly developed by the team, tested with dummy data, and found to be successful and worth implementing with suitable modifications for further implementation.

**Backbone of the Project :**

* I have successfully accomplished a project that involved establishing a connection between MySQL and Python. The decision to use Python was driven by its straightforward structure, robustness, and its proficiency in creating definitions. In combination with MySQL as the backend tool, Python provided the system with flexibility and adaptability, particularly with its efficient management of tables. This made MySQL an ideal choice for storing data related to billing systems and customer information.
* My sincere hope is that the humble efforts will bring about significant positive changes and enhance the lives of those who will utilize the system. I remain open to making necessary adjustments and adaptations to meet specific requirements and ensure the system's effectiveness.

MODULES USED

1. **Inbuilt modules** :

* **sys** : The system module is used to close the interpreter programmatically using sys.exit()
* **mysql-connector** : This module is used to perform the backend operations with the MySQL database.
* **os**  : This module is imported in the program clear the terminal screen programmatically, get the current working directory and make the program Operating System independent.
* **json** : This module is used to import data from .json files to the program.
* **math** : From this module the ceil function is imported to roundoff the generated value for the electric bill.
* **smtplib** : This module is imported to send the electric bills to respective customer.
* **email** : This module is imported to work accordance with smtplib module and ease the template making of the emails.
* **datetime** : This module is imported to get the current time.
* **csv**  : This module is imported to read and write the csv files.
* **hashlib** : This module is imported to hash the password using the md5 hash algorithm and return the hash in a hexadecimal number
* **time** : From this module sleep function is imported to suspend execution of the calling thread for the given number of seconds
* **cProfile** : This module is to provide a deterministic profiling of the python program
* **re** : From the regular expression module compile function imported and is used to compile a regular expression pattern into a regular expression object
* **pyinstaller** : This is used to convert the python file to exe file.

1. **Custom (user made) Modules**

* **adminBillGen** : This contains function for the Admin Homepage.
* **clearscreen** : This contains the function for the clearscreen based on the operating system.
* **customerView** : This contains the function for the billing the view bill and this is accessible to customer only.
* **billEmail** : This contains the function for the emailing the bill to respective customer.
* **billGen** : This contains the function for to generate the bill for the corresponding month.
* **login** : This function to logged into the user in correct department.
* **logout** : This contains the function to logout the user.

FILES GENERATED:

config.json, customer\_details.csv, employee\_details.csv, admin\_message.txt, billEmailnotAdmin\_message.txt, billGennotAdmin\_message.txt, create\_msg.txt, createdBill.txt, custdetails.txt, welcome\_message.txt

An exe file is generated for distribution.

DIRECTORY STRUCTURE :

The master folder contains a folder named ‘files’.

Then the files folder contains the following 5 folder.

config\_file’, ‘customerBillfolder’, ‘details’, ‘export’, ‘messages’

The program has been designed with following modes of operation:

1. Admin
2. Bill Generation
3. Bill Delivery
4. Customer Bill View

Admin : It part has the privileges of a super user. It has the power to create, delete and edit, etc.

Bill Generation : This module has been designed to generate electricity bills based on the inputs of meter reading.

Bill Delivery : This module will email the bill to respective customers address and thus bring the concept of a reduce paper and reduce carbon footprint making the environment greener and sustainable.

Customer View Bill : This portal is only for use by the consumer to view the bill for the current month.

This is all in one program where electricity department can enter the data through the MySQL database, where a consumer can view its own bill just by using this program.

Features:

It has an Admin Panel which the super user can access to enter the data of the consumer to database given by the electricity meter department in form of a csv file. It has a login system where the password are hashed using md5 hash algorithm then the hash are converted to the hexadecimal units. The super user can also add the details of a new operator or delete its details.

It also a configurable json file, and configure the contents of a program.

This program is also Operating System independent.

It also has a portal for the Bill Generation and Bill Delivery Department where the respective operator can generate the electricity bill with help of only one command and also deliver the bill to customers using their emails.

It has also portals for the customers where a consumer can enter its consumer no and get the bill details for the current month.

**Admin Console Screen Shots**

**A screenshot of a computer program

Description automatically generated with medium confidence**

**A screenshot of a computer

Description automatically generated**

**Bill Generation Console Screenshot**

**A screenshot of a computer program

Description automatically generated with medium confidence**

**Bill – Emailing Console Screenshot**

A screenshot of a computer

Description automatically generated

I would like to express my deepest gratitude and heartfelt thanks to Professor Basak Taylan, my project supervisor, for her invaluable guidance and support throughout the duration of this project. Professor Taylan consistently displayed a keen interest in my work and provided constructive advice and constant motivation, which played a crucial role in the successful completion of this project.

I would also like to extend my thanks to my friends for their unwavering motivation and support. Their encouragement has been instrumental in keeping me motivated and focused during this journey.

Once again, I would like to convey my sincere thanks to Professor Taylan, Professor Katherine Chuang and friends for their exceptional support and guidance throughout this project.

All the specific files are locate at my github profile: <https://github.com/haoyuhuang0817/electricity-bill-system/tree/main/electricity%20bill%20management(final)> Top of Form

**END**