DBMS Mini Project

CORE (MINI)BANKING MANAGEMENT SYSTEM

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Section: K

Semester: 5

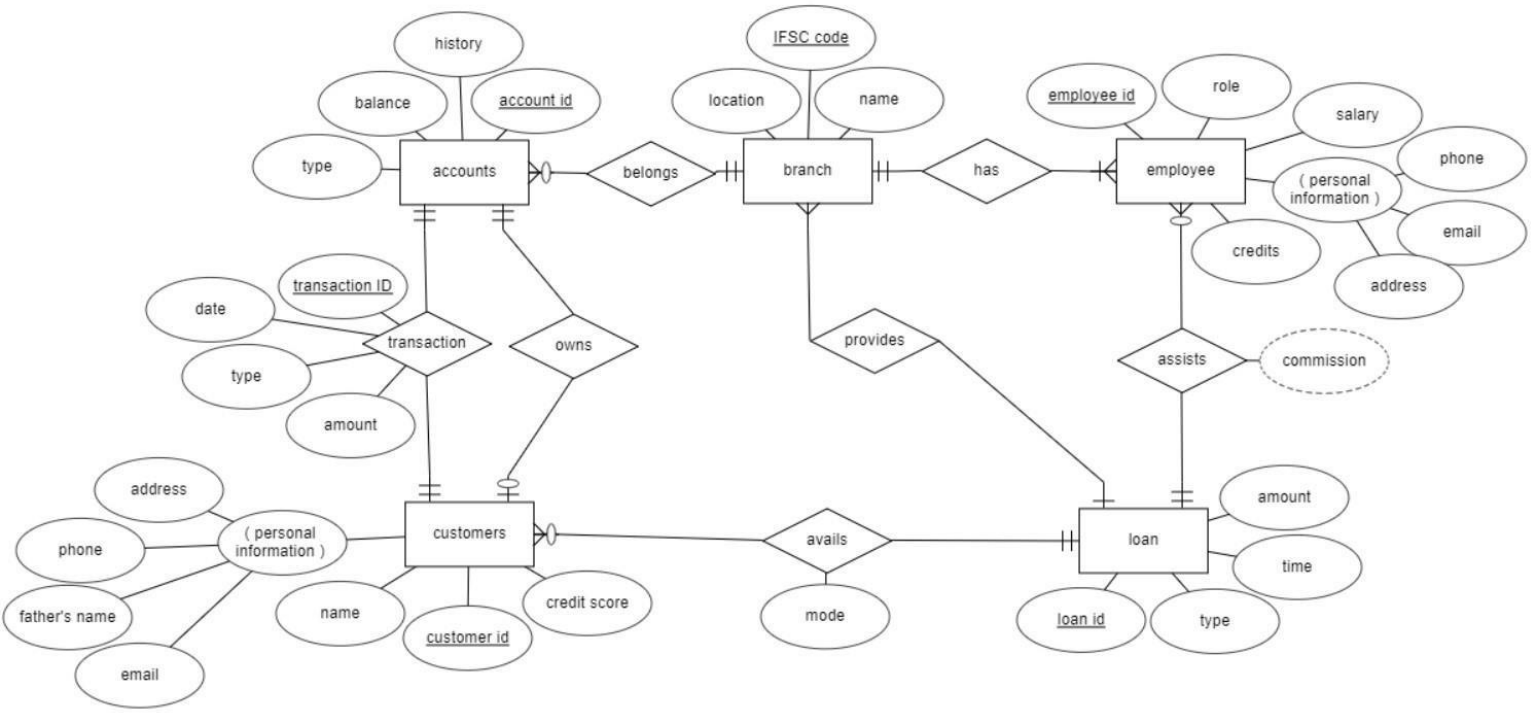
Description

In this project I tried to show the working of a banking account system and cover the basic functionality of a Bank. The Bank Account Management System undertaken as a project is based on relevant technologies.
This project has been developed to carry out the processes easily and quickly, which is not possible with the manuals systems, which are overcome by this software. This project is developed using Python language and MYSQL use for database connection.

The system is designed as an interactive and content management system. The content management system deals with data entry whiles the interactive system deals with system interaction with the admin,
employee and users. The features of this project will save transaction time and therefore increase the efficiency of the system. The system provides the access to the customer to create an account, deposit/withdraw the cash from his account, also to view his profile and history of his account.

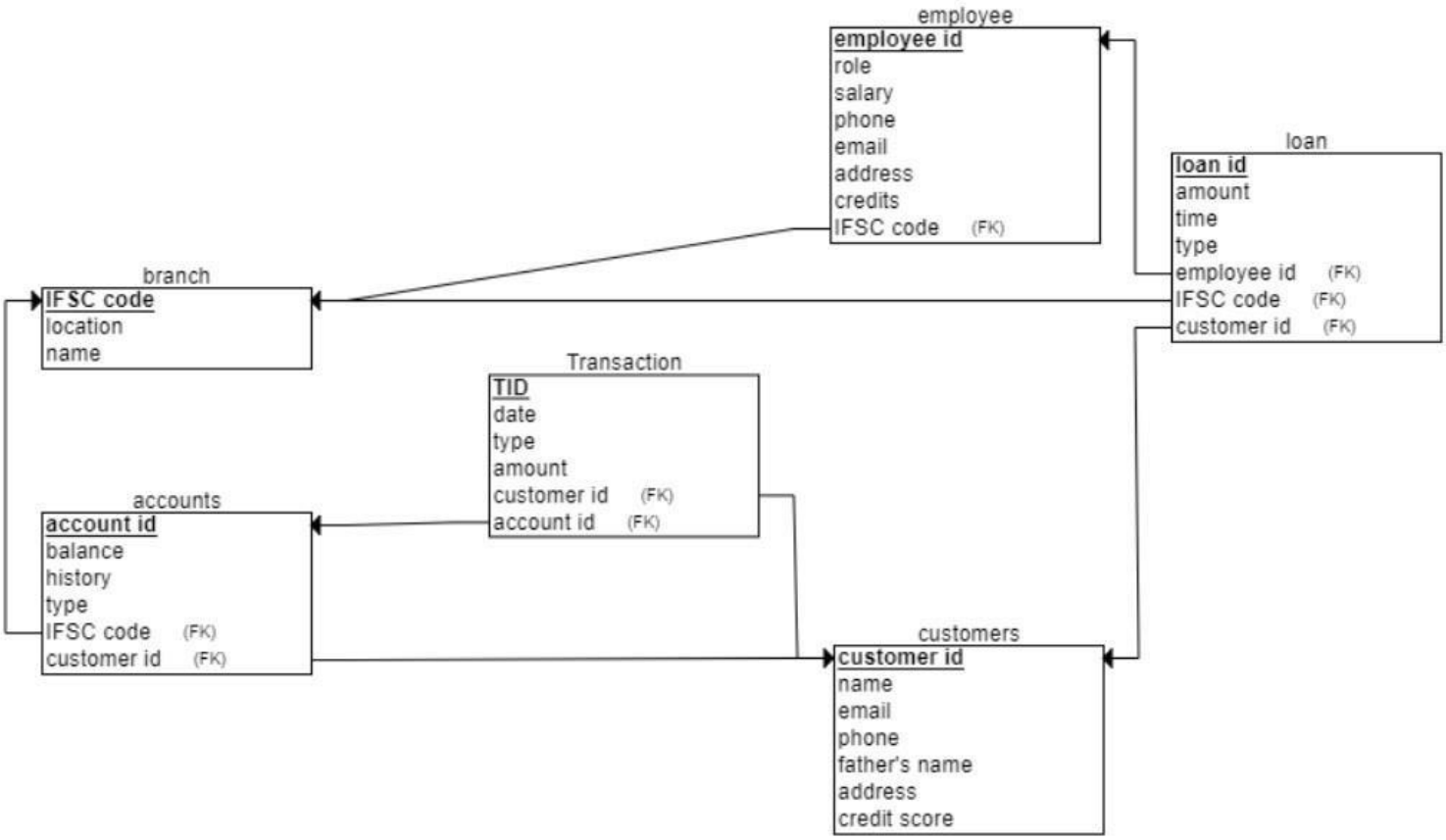
This project has digitalized the basic functions of a bank. It enables the admin to have complete access over the bank. The employees are provided with options to create a customer's account, apply for a loan by a customer, make debit and credit transactions to a customer on request and also view his (loan) customer details. The customer can view his bank profile, account details, loan details and also the transaction history.

ER diagram



The given ER Diagram represents the superficial relationship between entities in a Bank. It is a simple outlook of a bank with basic required functionalities.

- Account: The account belongs to a customer of the bank and has a unique account_id to identify each account. The balance and the transaction history of the same is also tracked by various functionalities.
- Branch: Each branch/unit contains the employees, accounts and an IFSC code.
- Employee: The employees perform various operations to assists the customer.
  The employees help the customers for availing loans.
- Customer: The customer with his profile containing his name, personal information and credit score may or may not have an account and loan.
- Loan: created by the employee for the customer, has a unique identifier loan_id, time period, amount and the loan type like personal, home, education etc.



Relational Schema

Building Database

Creating branch

```
CREATE TABLE branch
(
  name VARCHAR(255) NOT NULL,    IFSC INT(4) NOT NULL,    location VARCHAR(255) NOT
NULL,
  PRIMARY KEY (IFSC)  );
```

Creating customer

```
CREATE TABLE customer
(   customer_id INT(7) NOT NULL,    name VARCHAR(255) NOT NULL,    phone VARCHAR(10) NOT
NULL,    email VARCHAR(255) NOT NULL,    address VARCHAR(255) NOT NULL,    credit_score
INT(1) NOT NULL,
  PRIMARY KEY (customer_id)  );
```

Creating employee

```
CREATE TABLE employee
(
  employee_id INT(7) NOT NULL,
name VARCHAR(255) NOT NULL,
role VARCHAR(10) NOT NULL,
salary INT NOT NULL,   phone
VARCHAR(10) NOT NULL,   email
VARCHAR(255) NOT NULL,
address VARCHAR(255) NOT NULL,
credits INT(1) NOT NULL,   IFSC
INT(4) NOT NULL,
  PRIMARY KEY (employee_id),
  FOREIGN KEY (IFSC) REFERENCES branch(IFSC)
);
```

Creating loan

```
CREATE TABLE loan
(   loan_id INT(10) NOT NULL,
amount INT NOT NULL,   time
INT NOT NULL,   type
VARCHAR(10) NOT NULL,
customer_id INT(7) NOT NULL,
employee_id INT(7) NOT NULL,
  IFSC INT(4) NOT NULL,
  PRIMARY KEY (loan_id),
  FOREIGN KEY (customer_id) REFERENCES customer(customer_id),
  FOREIGN KEY (employee_id) REFERENCES
employee(employee_id),   FOREIGN KEY (IFSC) REFERENCES
branch(IFSC) );
```

Creating account

```
CREATE TABLE account
(   account_id INT(10) NOT
NULL,   balance INT NOT NULL,
type VARCHAR(10) NOT NULL,
IFSC INT(4) NOT NULL,
customer_id INT(7) NOT NULL,
  PRIMARY KEY (account_id),
  FOREIGN KEY (IFSC) REFERENCES branch(IFSC),
  FOREIGN KEY (customer_id) REFERENCES customer(customer_id)
);
```

Creating transaction

```
CREATE TABLE Transaction
(
  TID INT(10) NOT NULL,
date INT(8) NOT NULL,
amount INT NOT NULL,
account_id INT(10) NOT NULL,
customer_id INT(7) NOT NULL,
  PRIMARY KEY (TID),
  FOREIGN KEY (customer_id) REFERENCES
customer(customer_id),   FOREIGN KEY (account_id) REFERENCES
account(account_id)  );
```

Join Queries

1. Customer's bank balance and the amount he/she owes to bank for loan.

```
SELECT customer.name, account.balance, loan.amount FROM customer INNER JOIN account
INNER JOIN loan where customer.customer_id=account.customer_id AND
loan.customer_id=customer.customer_id;
```

```
MariaDB [bank]> SELECT customer.name, account.balance, loan.amount FROM customer INNER JOIN account INNER JOIN loan where
 customer.customer_id=account.customer_id AND loan.customer_id=customer.customer_id;
+-----------------+---------+--------+
| name            | balance | amount |
+-----------------+---------+--------+
| Hilary Welband  |  200000 | 380000 |
| Haneyah Seemein |    3100 | 140000 |
+-----------------+---------+--------+
2 rows in set (0.015 sec)
```

---

2. Names of all the customers along with their addresses and account id who belong to the branch with IFSC code 2000.

```
SELECT branch.name, customer.name, account.account_id, branch.location,
customer.address FROM branch INNER JOIN account INNER JOIN customer  WHERE
branch.IFSC=2000 AND customer.customer_id=account.customer_id;
```

```
MariaDB [bank]> SELECT branch.name, customer.name, account.account_id, branch.location, customer.address
    -> FROM branch INNER JOIN account INNER JOIN customer
    -> WHERE branch.IFSC=2000 AND customer.customer_id=account.customer_id;
+-----------+-------------------+------------+-------------+------------------------+
| name      | name              | account_id | location    | address                |
+-----------+-------------------+------------+-------------+------------------------+
| Bangalore | Haneyah Seemein   |       2000 | Banashankari | Banashankari          |
| Bangalore | Hilary Welband    |       1111 | Banashankari | 44 Knutson Pass       |
| Bangalore | Juliette Nickerson |       2020 | Banashankari | 9 Prairieview Crossing |
+-----------+-------------------+------------+-------------+------------------------+
3 rows in set (0.001 sec)
```

---

3. All the employees working in the branches located in Bangalore

```
SELECT employee.name, employee.role, branch.location, employee.salary,
employee.credits FROM employee INNER JOIN branch WHERE branch.name='Bangalore' AND
employee.IFSC=branch.IFSC;
```

```
MariaDB [bank]> SELECT employee.name, employee.role, branch.location, employee.salary, employee.credits FROM employee INNER JOIN
 branch WHERE branch.name='Bangalore' AND employee.IFSC=branch.IFSC;
+----------------+-----------+---------------------+--------+---------+
| name           | role      | location            | salary | credits |
+----------------+-----------+---------------------+--------+---------+
| Cathrin Kenwyn | Branch Hea | inside Mantri Square |  70000 |      10 |
| Bria Coslitt   | Advisor    | Banashankari        |   4000 |       8 |
| Cris Bazley    | Advisor    | Banashankari        |   4000 |       1 |
| Ade Mathonnet  | Advisor    | Banashankari        |   4000 |       1 |
| Tammie Grogan  | Advisor    | Banashankari        |   4000 |       5 |
| Katey Korpolak | Manager    | Banashankari        | 160000 |       2 |
| Job Ingerith   | Branch Hea | Banashankari        |  70000 |       5 |
+----------------+-----------+---------------------+--------+---------+
7 rows in set (0.004 sec)
```

---

4. Customers who made transactions of more than 1000 rupees

```
SELECT customer.name, transaction.TID, transaction.amount FROM customer JOIN account
JOIN transaction WHERE customer.customer_id=account.customer_id AND
transaction.account_id=account.account_id AND transaction.amount>1000;
```

```
MariaDB [bank]> SELECT customer.name, transaction.TID, transaction.amount FROM customer JOIN account JOIN transaction WHERE
customer.customer_id=account.customer_id AND transaction.account_id=account.account_id AND transaction.amount>1000;
+-----------------+-------+--------+
| name            | TID   | amount |
+-----------------+-------+--------+
| Haneyah Seemein | 44505 |   1400 |
| Haneyah Seemein | 47431 |   1400 |
+-----------------+-------+--------+
2 rows in set (0.001 sec)
```

Aggregate Functions

1. **Maximum salary an employee gets in the bank**

```
SELECT MAX(salary) FROM employee;
```

```
MariaDB [bank]> SELECT MAX(salary) FROM employee;
+-------------+
| MAX(salary) |
+-------------+
|      160000 |
+-------------+
1 row in set (0.000 sec)
```

2. **Average credits/ratings of officer.**

```
SELECT AVG(credits) FROM employee WHERE role='Officer';
```

```
MariaDB [bank]> SELECT AVG(credits) FROM employee WHERE role='Officer';
+--------------+
| AVG(credits) |
+--------------+
|       5.2500 |
+--------------+
1 row in set (0.001 sec)
```

3. **Number of employees working for Bombay branch.**

```
SELECT count(*) AS BombayEmployees FROM employee where IFSC=3000;
```

```
MariaDB [bank]> SELECT count(*) AS BombayEmployees FROM employee where IFSC=3000;
+-----------------+
| BombayEmployees |
+-----------------+
|               8 |
+-----------------+
1 row in set (0.001 sec)
```

4. Number of Advisors working for the bank

```
SELECT count(*) AS BranchHeads FROM employee where role='Advisor';
```

```
MariaDB [bank]> SELECT count(*) AS BranchHeads FROM employee where role='Advisor';
+-------------+
| BranchHeads |
+-------------+
|          13 |
+-------------+
1 row in set (0.000 sec)
```

Set Operations

1. **IDs of customers whose loan amount is greater than 10000 and bank balance more than 2000**

```
SELECT customer_id FROM loan WHERE amount>10000 INTERSECT SELECT customer_id
FROM account WHERE balance>2000;
```

```
MariaDB [bank]> SELECT customer_id FROM loan WHERE amount>10000 INTERSECT SELECT customer_id FROM account WHERE balance>2000;
+-------------+
| customer_id |
+-------------+
|        3141 |
|        2000 |
+-------------+
2 rows in set (0.016 sec)
```

2. **Names of the employees working for Bombay Branch along with Managers**

```
SELECT name FROM employee WHERE IFSC=3000 UNION SELECT name FROM employee WHERE
role='Manager';
```

```
MariaDB [bank]> SELECT name FROM employee WHERE IFSC=3000 UNION SELECT name FROM employee WHERE role='Manager';
+---------------------+
| name                |
+---------------------+
| Ninnette Normington |
| Marwin Duffin       |
| Latashia Berry      |
| Peyter Parsisson    |
| Tallia Beacroft     |
| Bronnie Hearle      |
| Angie Menco         |
| Nananne Verney      |
| Kerrill Happer      |
| Katey Korpolak      |
| Cecilla Wooland     |
+---------------------+
11 rows in set (0.013 sec)
```

3. **All the employees in Bangalore except the managers**

```
SELECT name FROM employee WHERE IFSC=1000 EXCEPT SELECT name FROM employee WHERE
role='Manager';
```

```
MariaDB [bank]> SELECT name FROM employee WHERE IFSC=2000 EXCEPT SELECT name FROM employee WHERE role='Manager';
+---------------+
| name          |
+---------------+
| Bria Coslitt  |
| Cris Bazley   |
| Ade Mathonnet |
| Tammie Grogan |
| Job Ingerith  |
+---------------+
5 rows in set (0.001 sec)
```

4. Names of all good employees and customers for bonus/gifts

```
SELECT name FROM employee WHERE credits>8 UNION SELECT name FROM customer WHERE
credit_score>8;
```

```
MariaDB [bank]> SELECT name FROM employee WHERE credits>8 UNION SELECT name FROM customer WHERE credit_score>8;
+--------------------+
| name               |
+--------------------+
| Marwin Duffin      |
| Corrie Samworth    |
| Agretha Embra      |
| Cathrin Kenwyn     |
| DUMMY              |
| Haneyah Seemein    |
| Janka Kulic        |
| Adella Pegden      |
| Monroe Lightoller  |
| Flore Brazer       |
| Amandie Fairhead   |
| Frances Sirey      |
| Koressa Parlor     |
| Mallorie Parvin    |
| Merrily Pursehouse |
| Bald Coopey        |
| Quentin Stoter     |
| Manny Fullun       |
| Heindrick Helversen |
| Darcee Radbone     |
+--------------------+
20 rows in set (0.001 sec)
```

Function

```
DELIMITER $$
CREATE FUNCTION totalamount(amount INT, type VARCHAR(10))
RETURNS INT
BEGIN
    DECLARE interestpercent INT;
    IF  type = 'Home' THEN
       SET interestpercent = 5;
    ELSEIF type = 'Personal' THEN
       SET interestpercent = 10;
    ELSEIF  type = 'Education' THEN
       SET interestpercent = 2;
ELSEIF  type = 'Fund' THEN
       SET interestpercent = 0;
    END IF;
    RETURN amount * interestpercent + amount;
END $$
DELIMITER;
```

```
MariaDB [bank]> SELECT totalamount(20000,"Personal");
+-------------------------------+
| totalamount(20000,"Personal") |
+-------------------------------+
|                        220000 |
+-------------------------------+
1 row in set (0.026 sec)
```

View

```
CREATE VIEW [leads] AS SELECT
loan.loan_id,customer.name,loan.type,customer.phone,loan.amount  FROM loan INNER
JOIN customer INNER JOIN employee
ON loan.customer_id = customer.customer_id AND loan.employee_id
=employee.employee_id
```

```
MariaDB [bank]> SELECT * FROM leads;
+------------+-------------------+----------+------------+--------+
| loan_id    | name              | type     | phone      | amount |
+------------+-------------------+----------+------------+--------+
|   22112512 | Sophronia Postins | Home     | 1164260229 | 380000 |
|  211251209 | Hilary Welband    | Home     | 3977766598 | 380000 |
|  211281154 | Shawna Corbin     | Home     | 1199864941 | 200000 |
|  211281205 | Elizabeth Farey   | Personal | 9368802991 | 300000 |
| 2147483647 | Haneyah Seemein   | Fund     | 9108630164 | 140000 |
+------------+-------------------+----------+------------+--------+
5 rows in set (0.008 sec)
```

Trigger

```
CREATE TRIGGER update_bal
  AFTER INSERT
  ON Transaction for each row   BEGIN   update account set balance=balance+new.amount
where account.account_id=new.account_id;  END $$
```

Before:

```
MariaDB [bank]> SELECT * FROM account where account_id=2020;
+------------+---------+---------+------+-------------+
| account_id | balance | type    | IFSC | customer_id |
+------------+---------+---------+------+-------------+
|       2020 |   20000 | Savings | 2000 |        9382 |
+------------+---------+---------+------+-------------+
1 row in set (0.001 sec)
```

After:

```
MariaDB [bank]> INSERT INTO transaction values (23232, 20221201, 400, 2020, 2642);
Query OK, 1 row affected (0.028 sec)

MariaDB [bank]> SELECT * FROM account where account_id=2020;
+------------+---------+---------+------+-------------+
| account_id | balance | type    | IFSC | customer_id |
+------------+---------+---------+------+-------------+
|       2020 |   20400 | Savings | 2000 |        9382 |
+------------+---------+---------+------+-------------+
1 row in set (0.001 sec)
```

FRONT-END

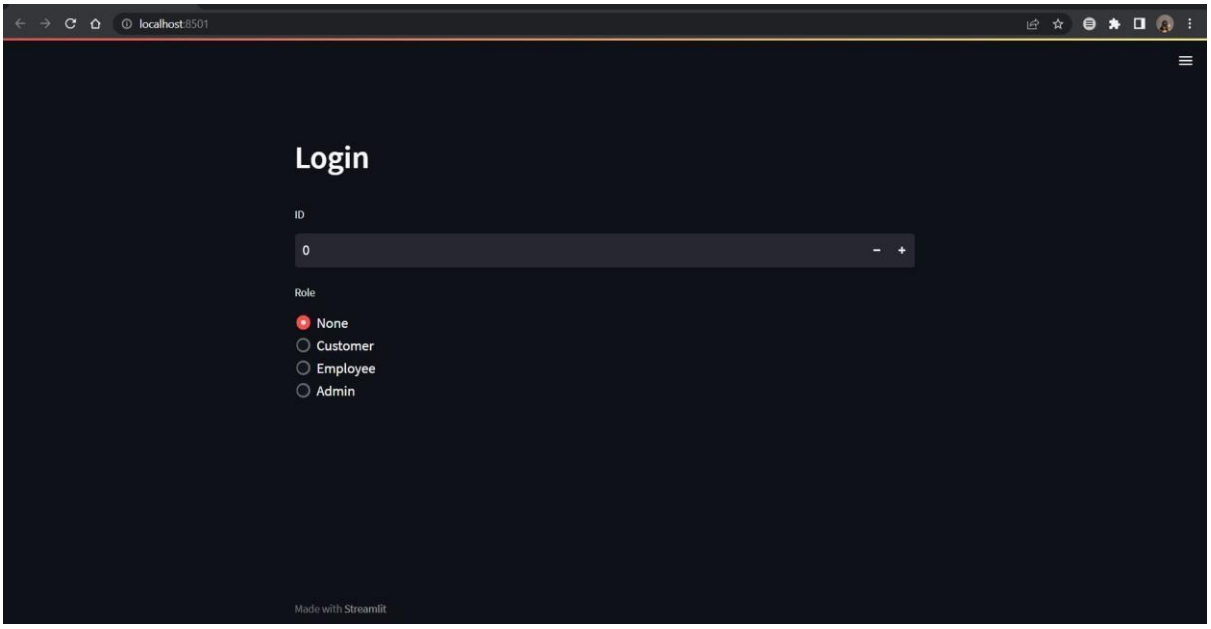
The USER-INTERFACE is a python-library (streamlit) based application, that mainly consists of 3 roles ie. Customer, Employee and Admin.

Customers, Employees and the Admin can login into the accounts with their unique IDs.

The demonstration with screenshots in followed in the next slides.

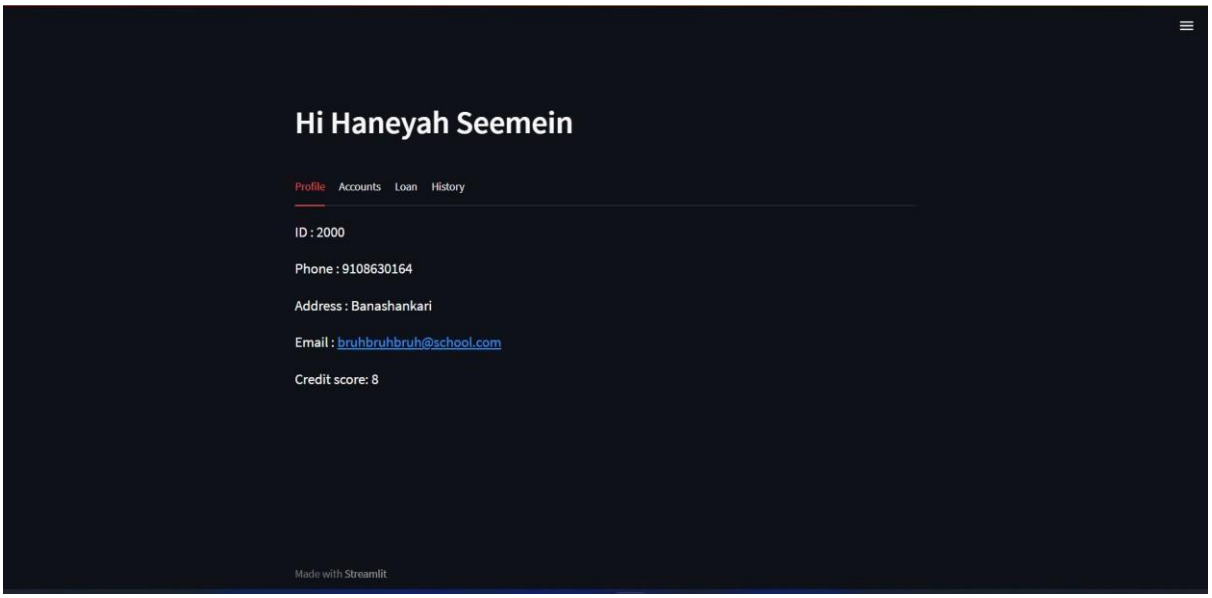
P.T.O

Login Page

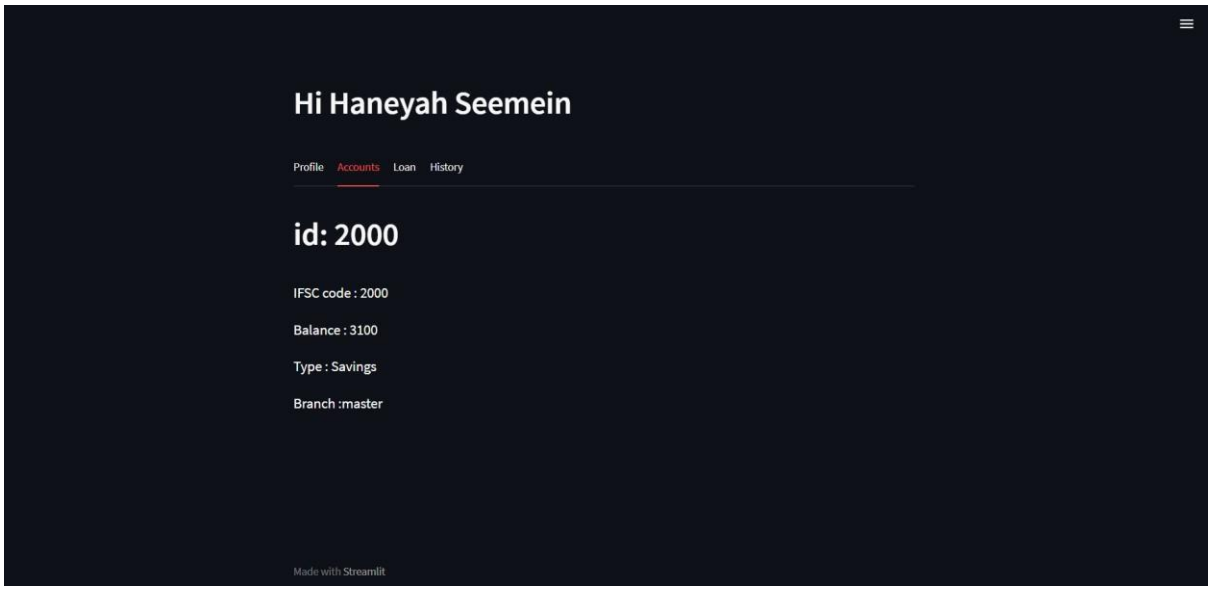

localhost:8501
Login
ID
0
Role
None
Customer
Employee
Admin
Made with Streamlit

Customer’s interface

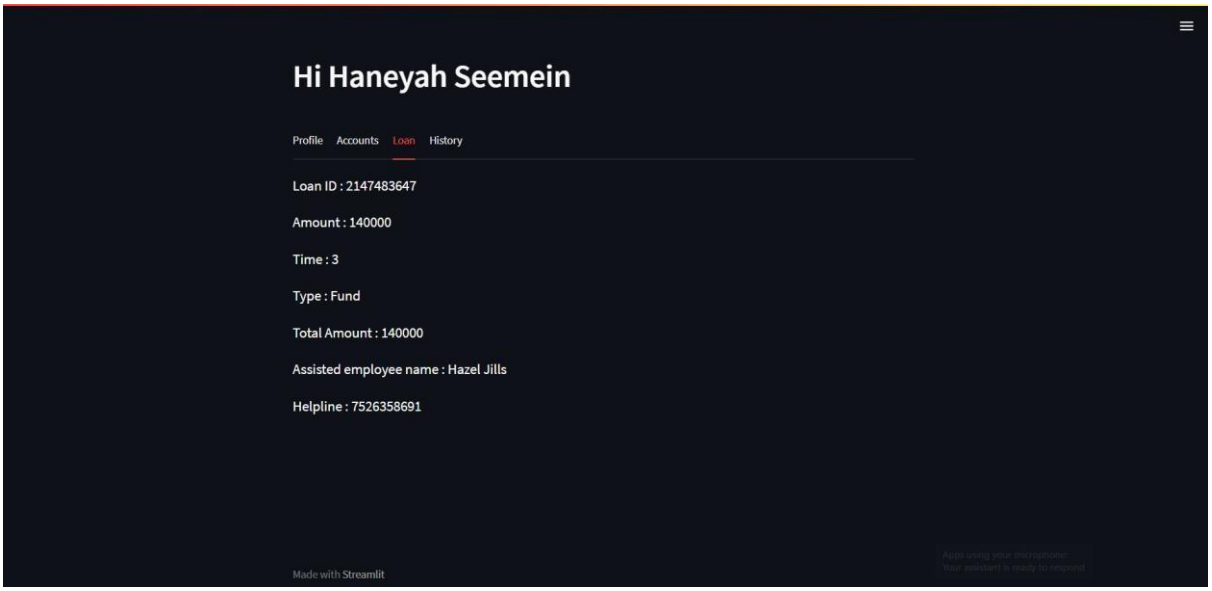
Profile



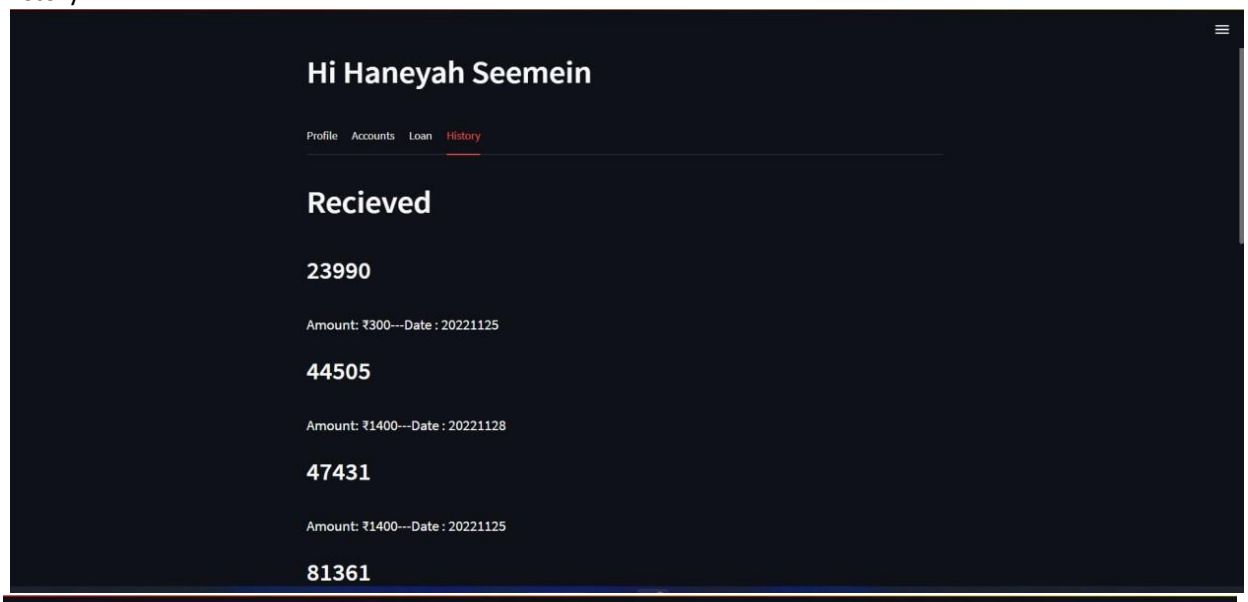
Account

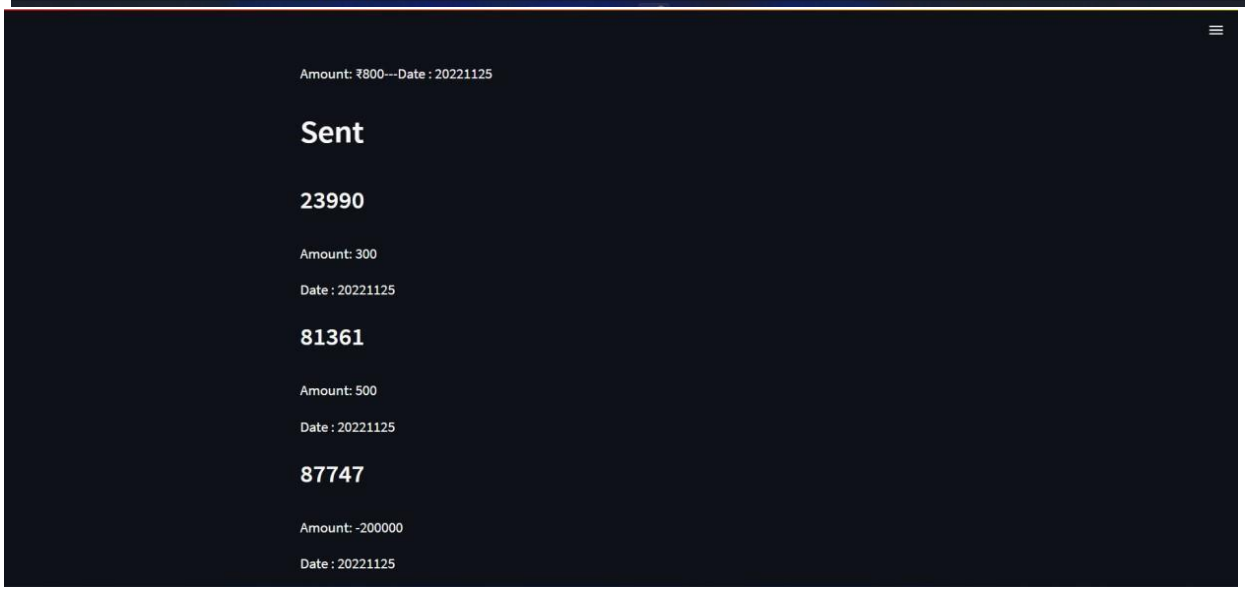


Loan



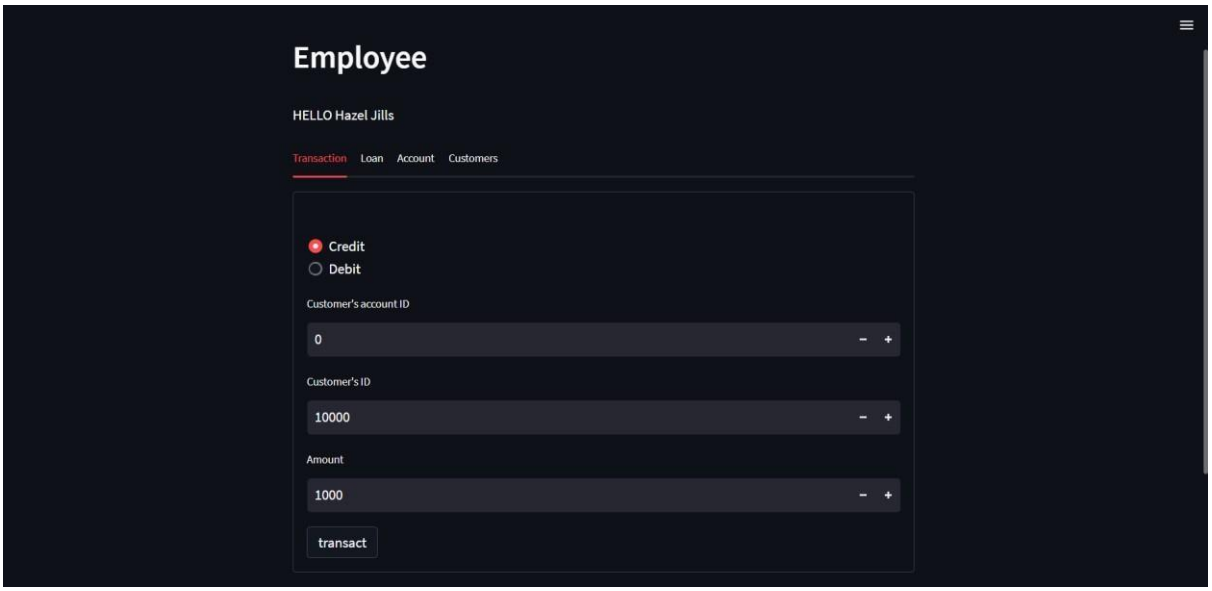
History



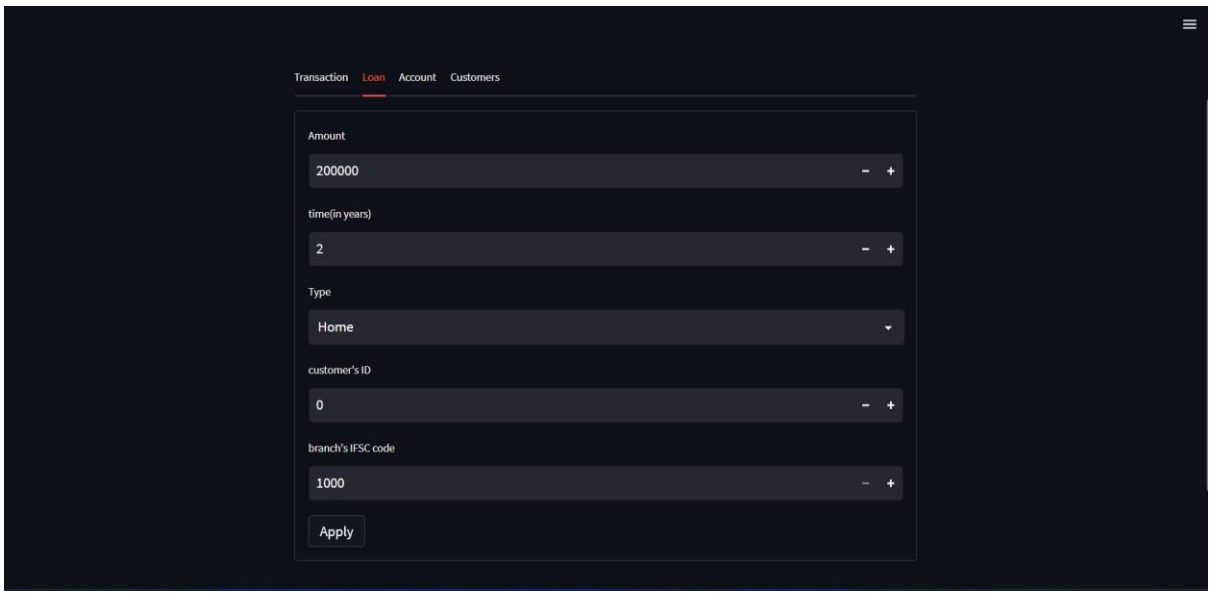


Employee's interface

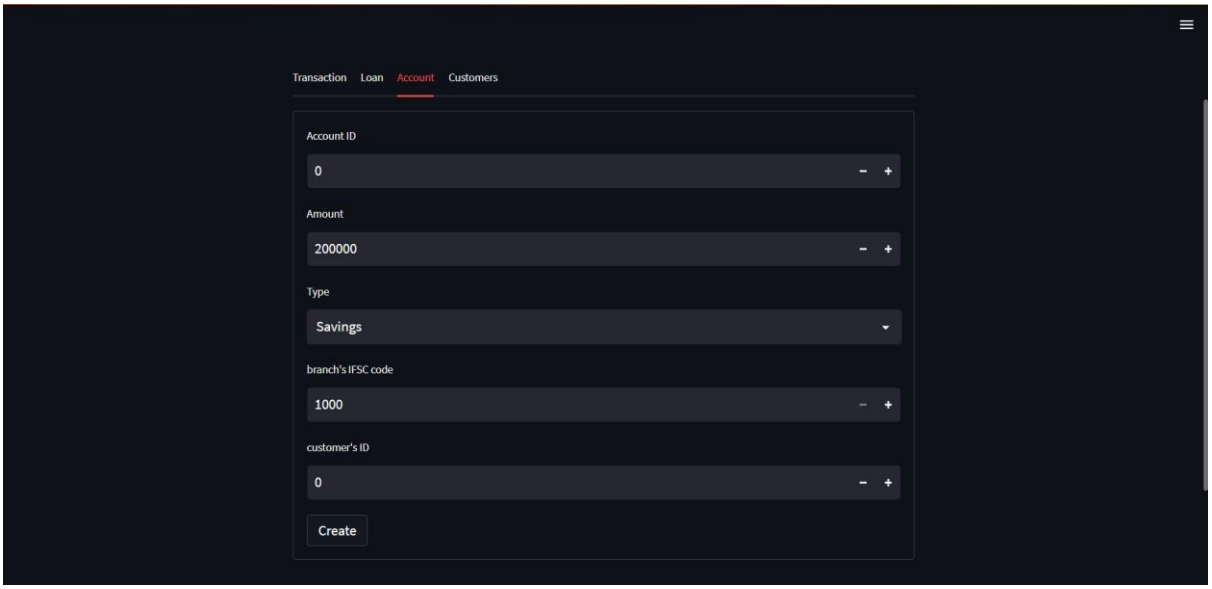
Transaction



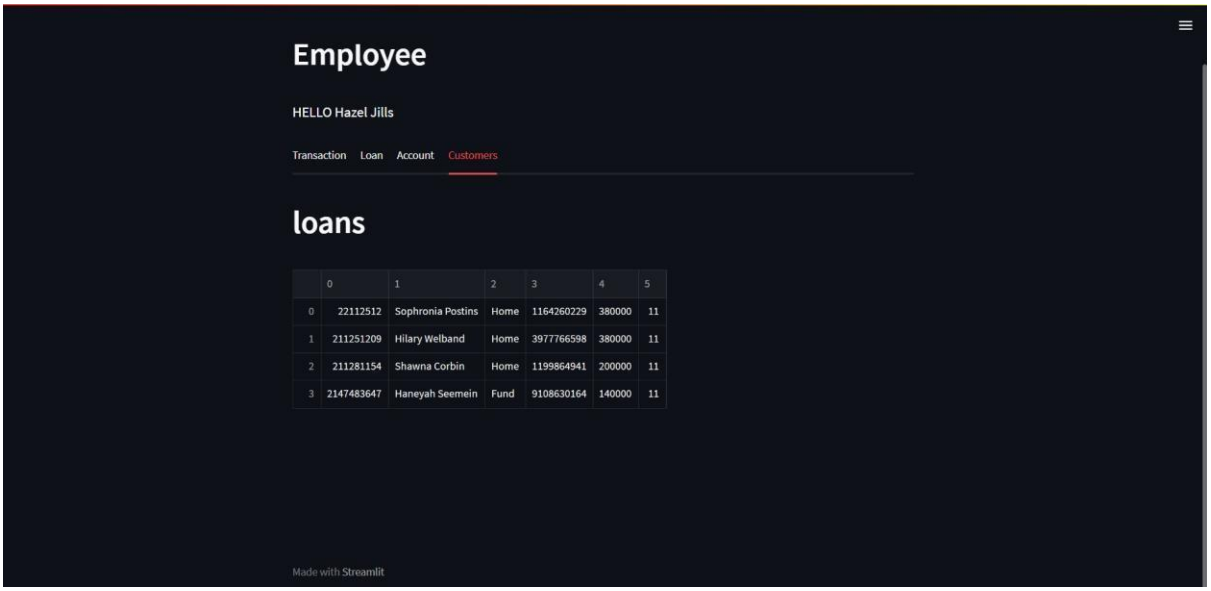
Loan



Account

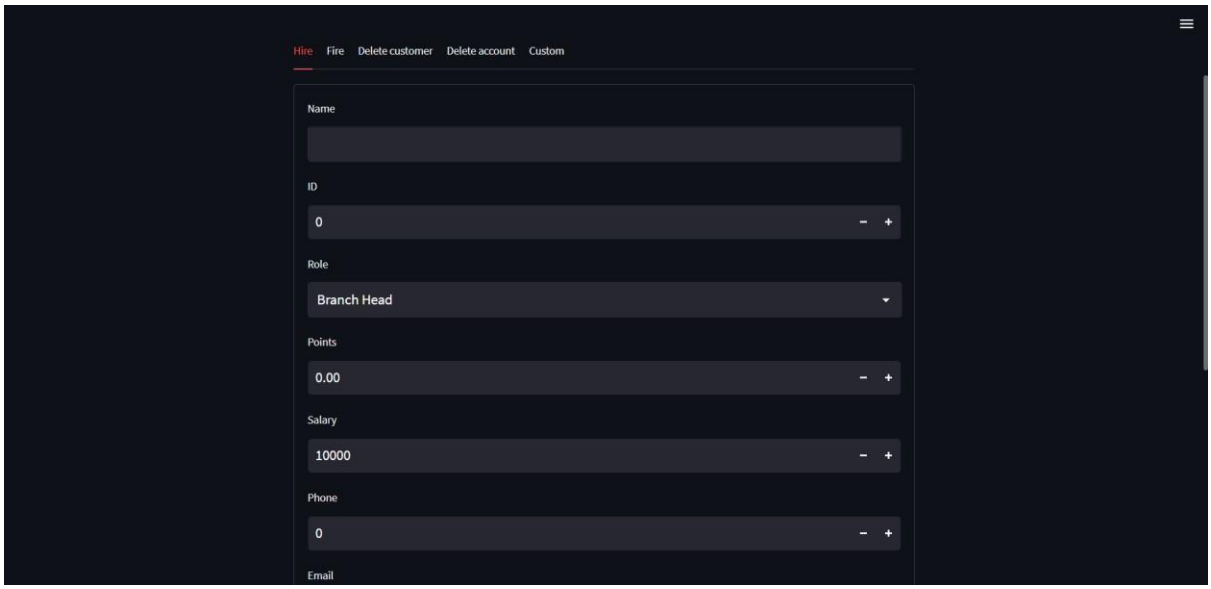


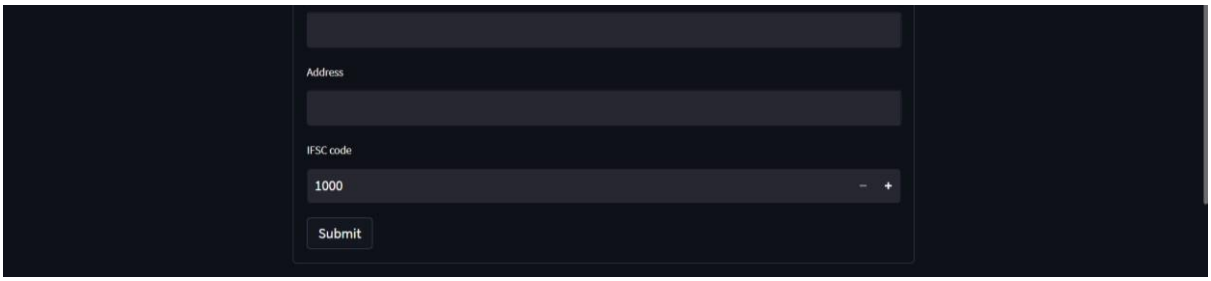
Customers



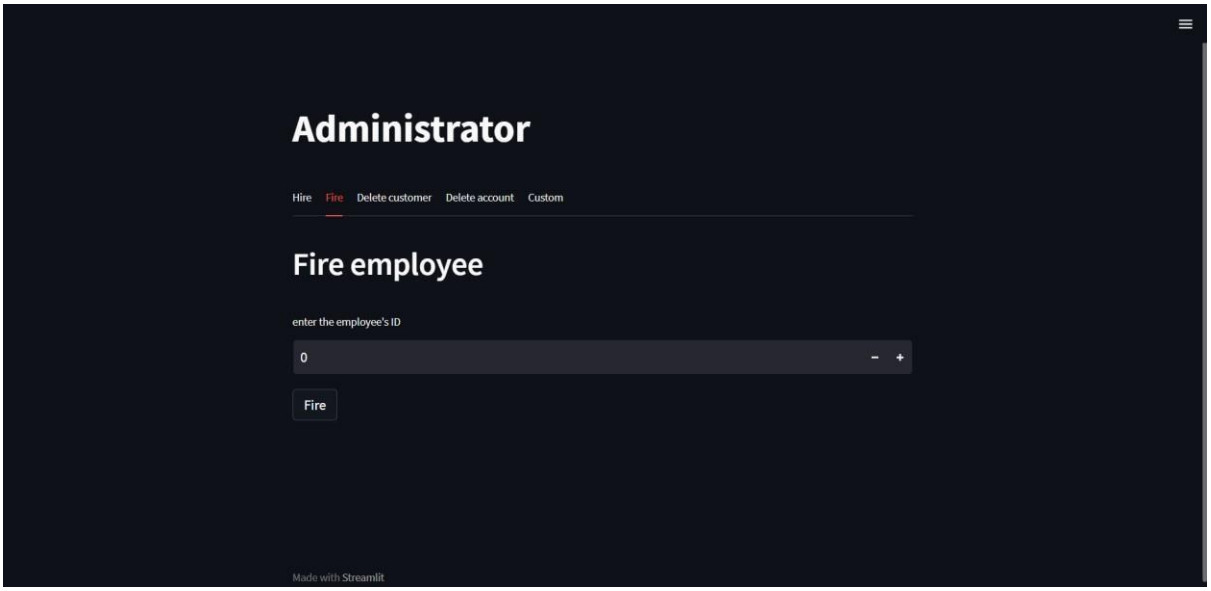
Admin’s Interface

Hire

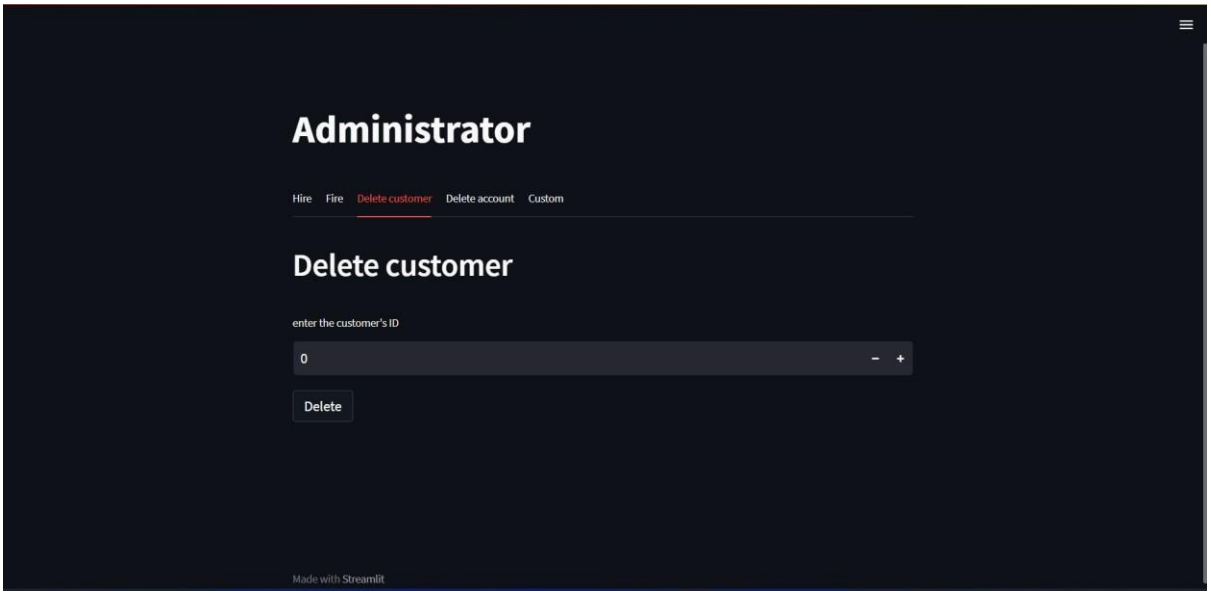




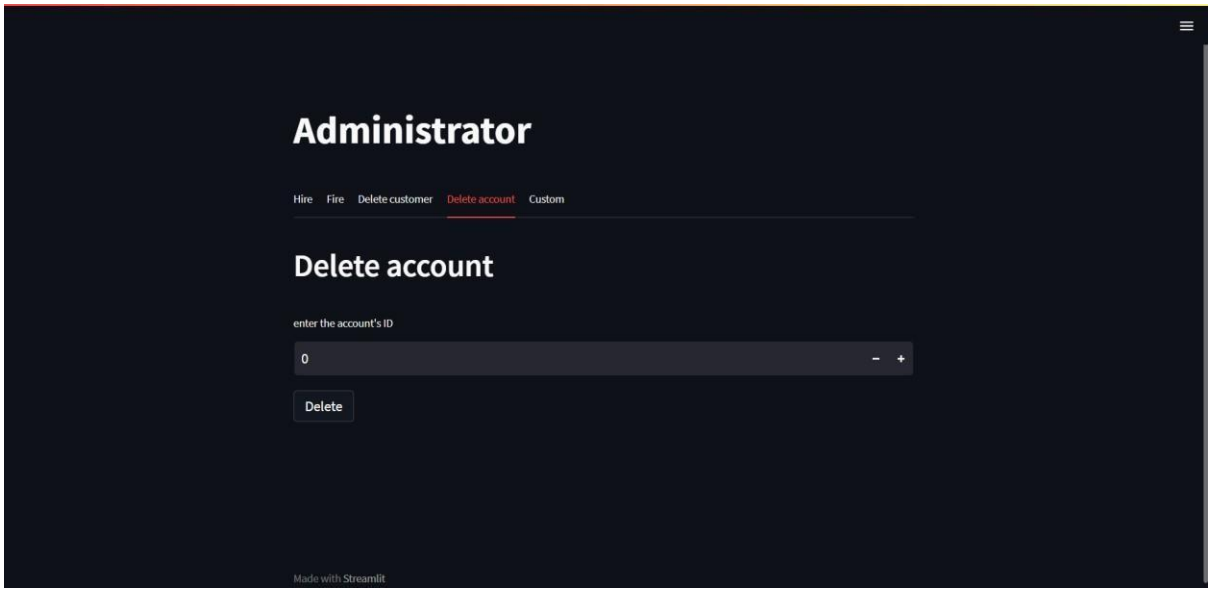
Fire



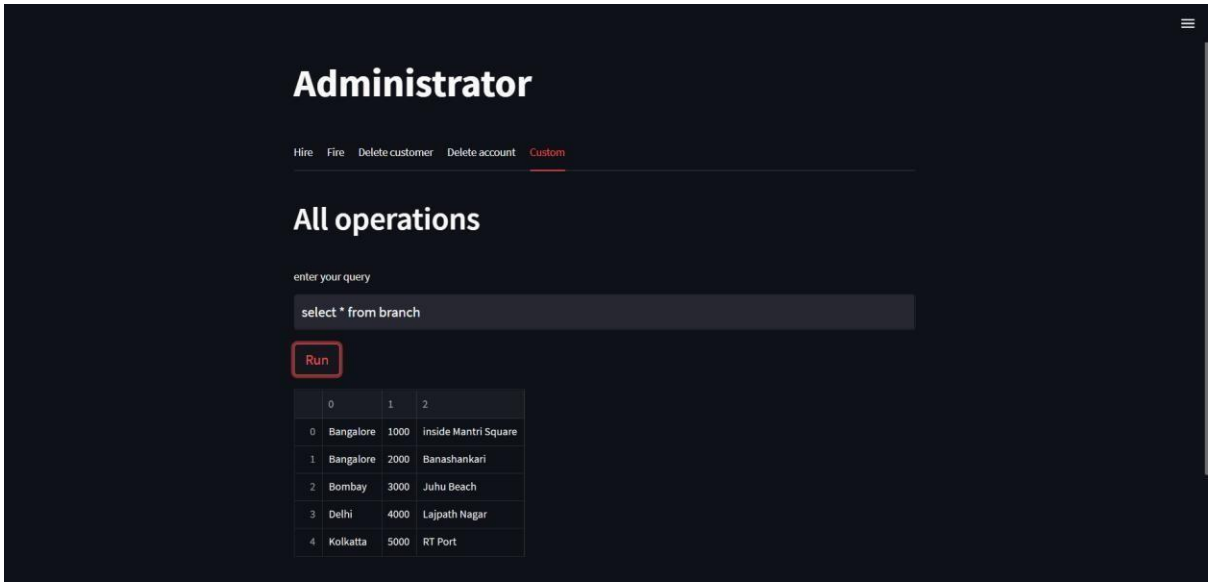
Delete customer



Delete account



Custom



THANK YOU