DBMS Mini Project

CORE (MINI)BANKING MANAGEMENT SYSTEM

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Section: K

Semester: 5

Description

The DBMS project designed for managing a bank is a comprehensive and user-friendly system that caters to the diverse needs of customers, employees, and administrators. With a streamlined UI created using Streamlit in Python, the system ensures efficient and secure access for users with different roles.

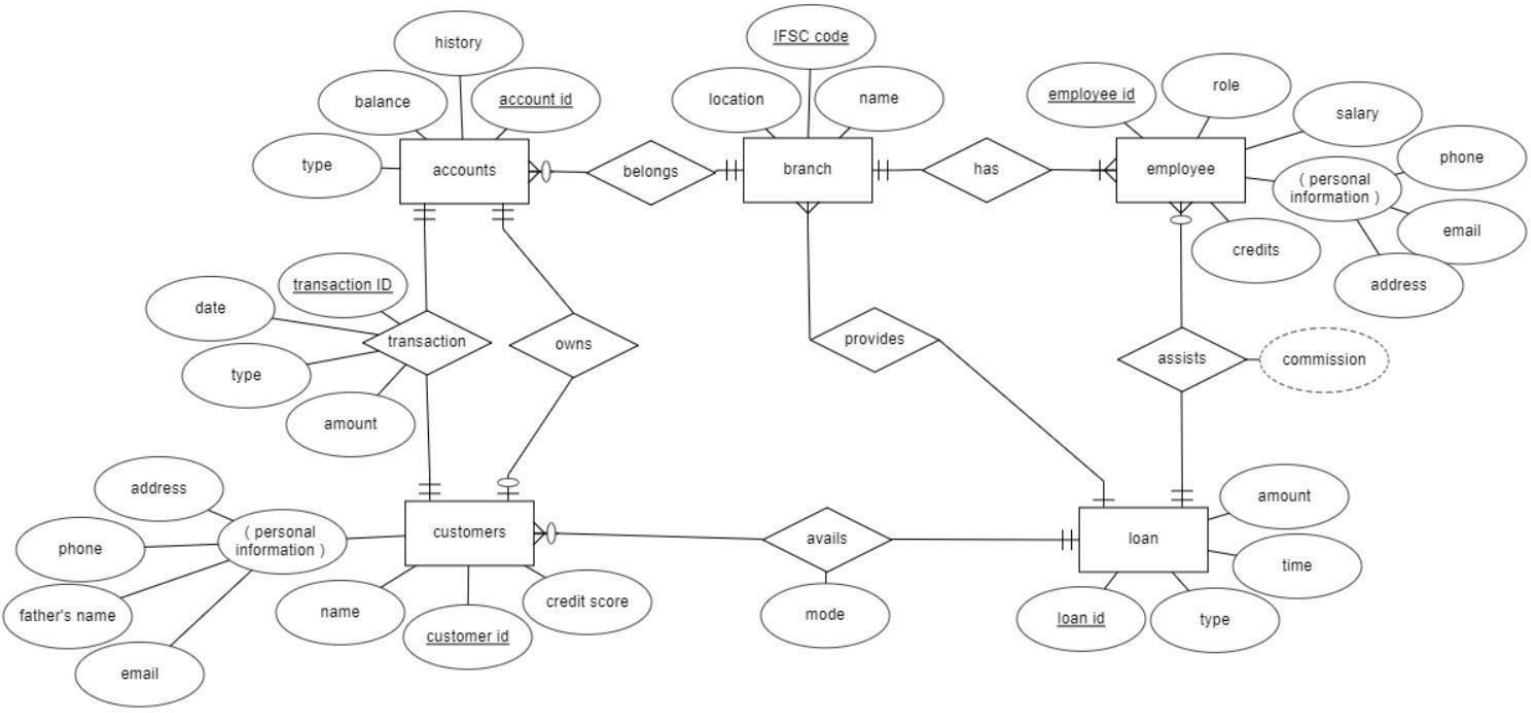
For customers, the platform offers a personalized experience by providing access to their essential banking information. After logging in, they can view their account details, including account ID, balance, account branch, IFSC code, and account type. Additionally, customers can access their transaction history, keeping them informed about their financial activities. For those who have availed loans, the system displays detailed information about their loans, such as Loan ID, loan amount, loan type (e.g., personal, home, education), interest rates, and the employee's name who assisted them. Moreover, customers have access to a helpline number for direct communication with the assisting employee.

Employees have a set of powerful tools at their disposal, allowing them to facilitate financial transactions seamlessly. They can perform credit and debit transactions for customer accounts, apply for loans on behalf of customers, and register new accounts. Furthermore, employees can easily track and access a list of customers they have helped to avail loans, ensuring efficient customer service and relationship management.

For administrators, the system offers control over the bank's operations. They can hire and fire employees, manage customer data by deleting accounts and customers when necessary, and utilize custom commands to meet the bank's specific needs. The interface provides a user-friendly experience for administrators to make essential decisions and tailor the system to the bank's requirements.

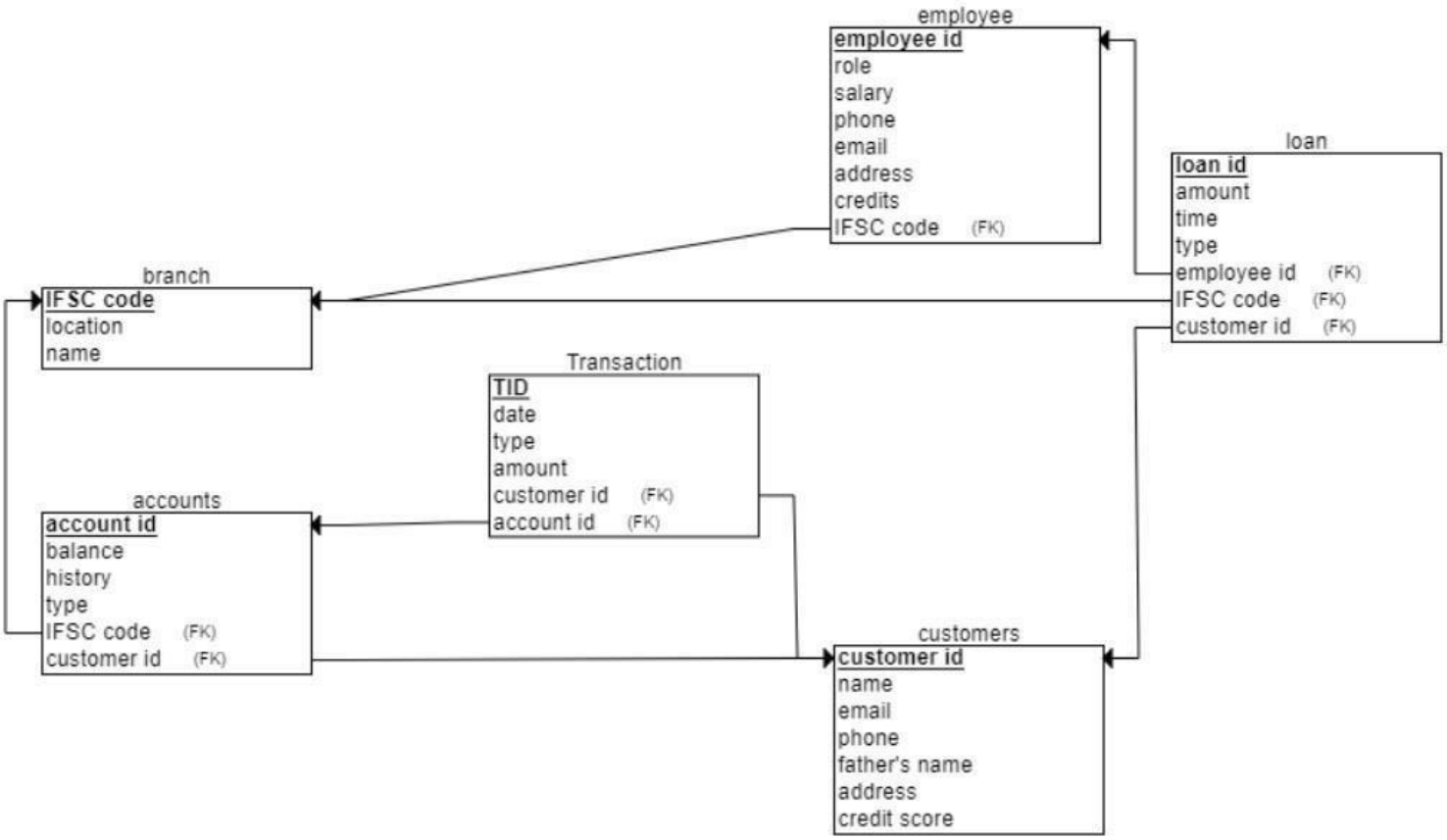
In summary, this DBMS project offers a well-rounded solution for efficient bank management, providing customers with a seamless banking experience, employees with tools to serve customers effectively, and administrators with the control and flexibility they need to manage the bank's operations effectively.

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

. **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)
```

. **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)
```

. 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)
```

. 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

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)
```

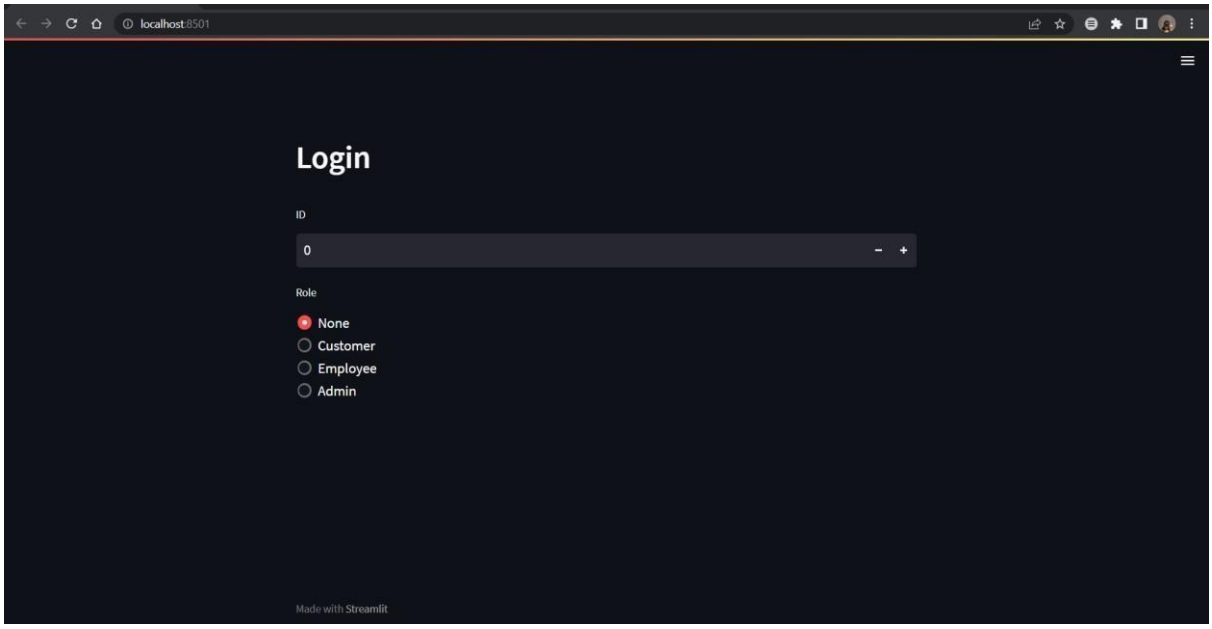
FRONT-END

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 uniqueIDs. The demonstration with screenshots in followed in the next slides.

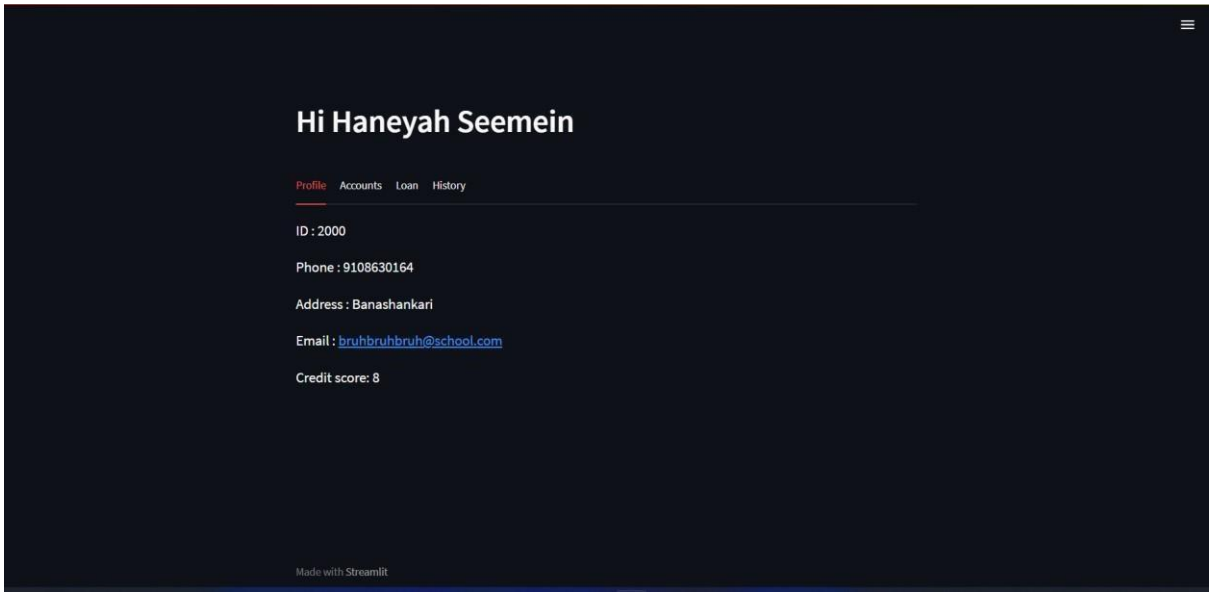
P.T.O

Login Page

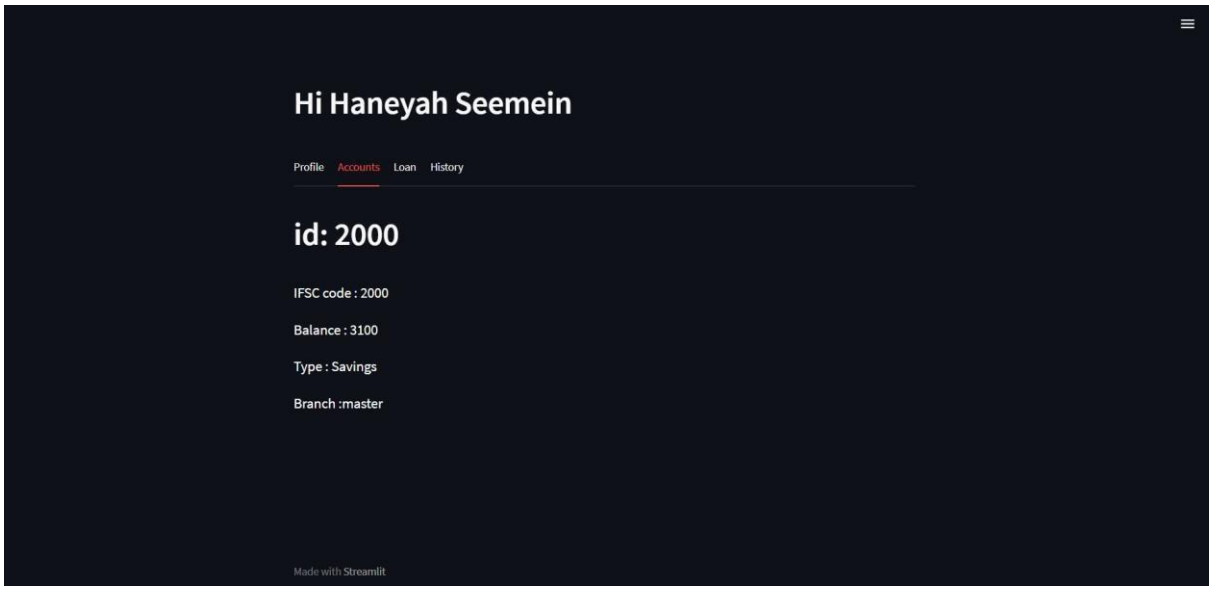

localhost:8501
Login
ID
0
Role
None
Customer
Employee
Admin
Made with Streamlit

Customer’s interface

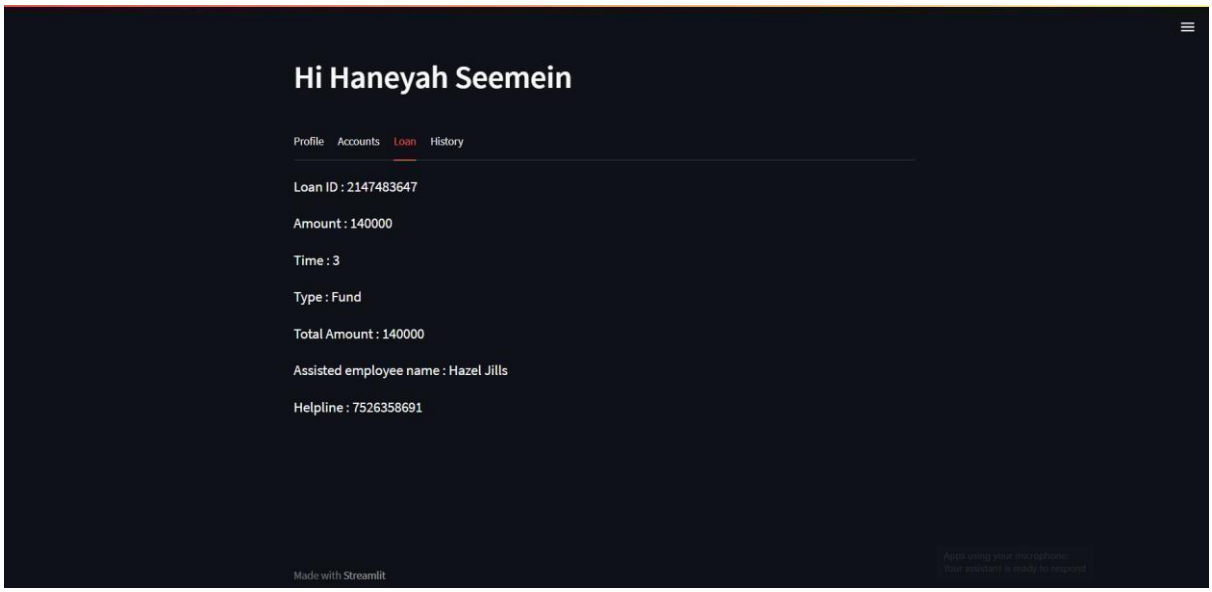
Profile



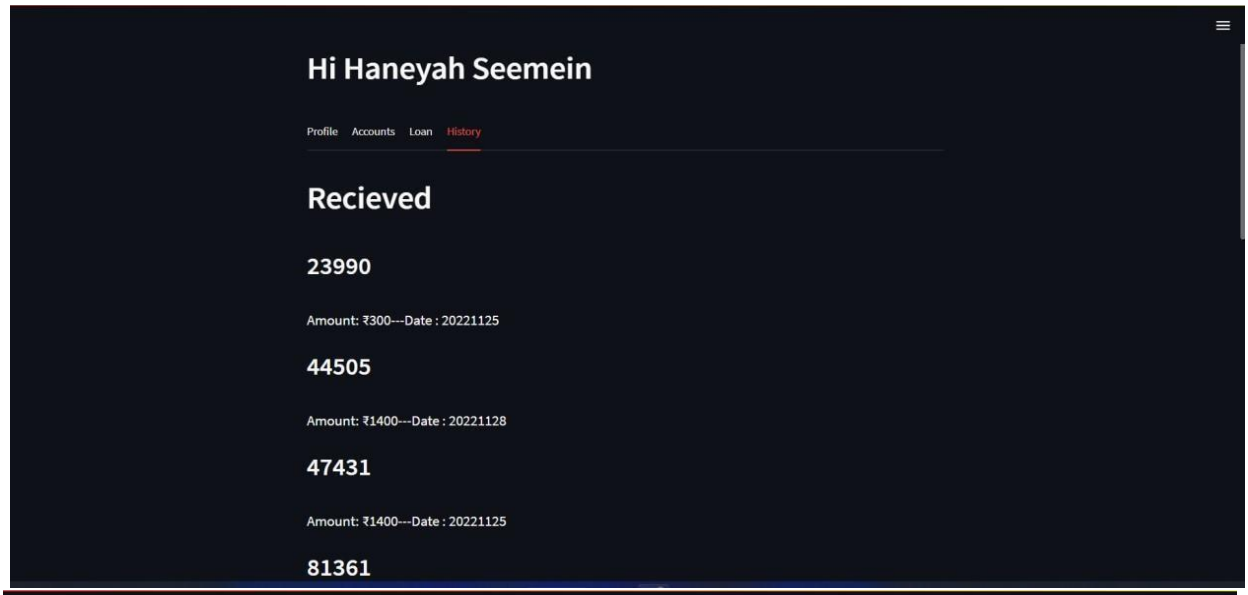
Account

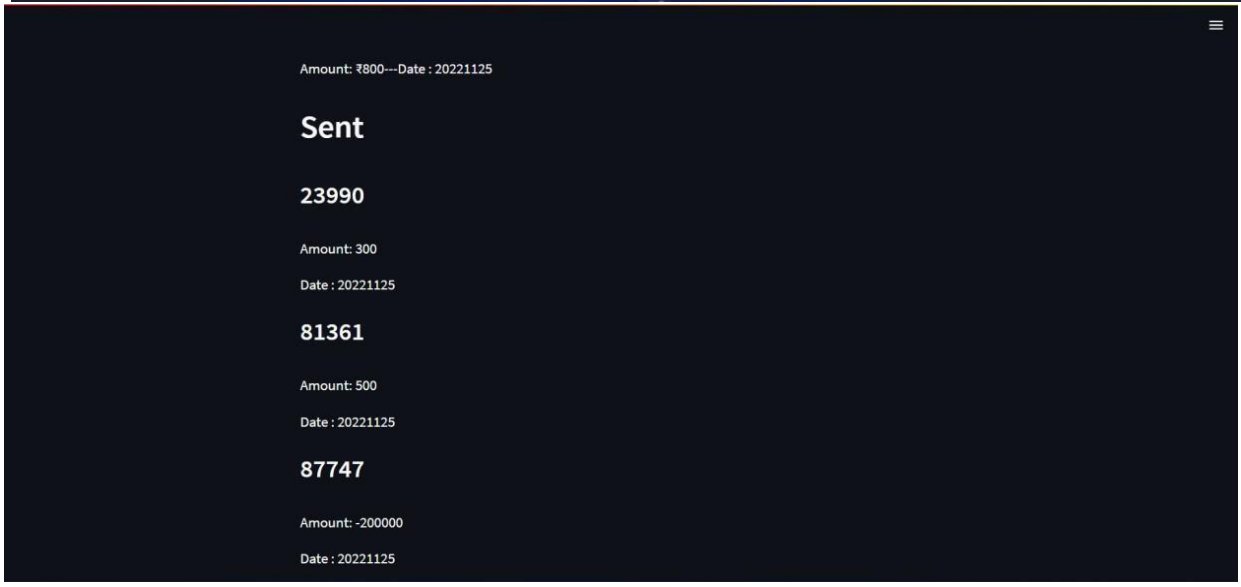


Loan



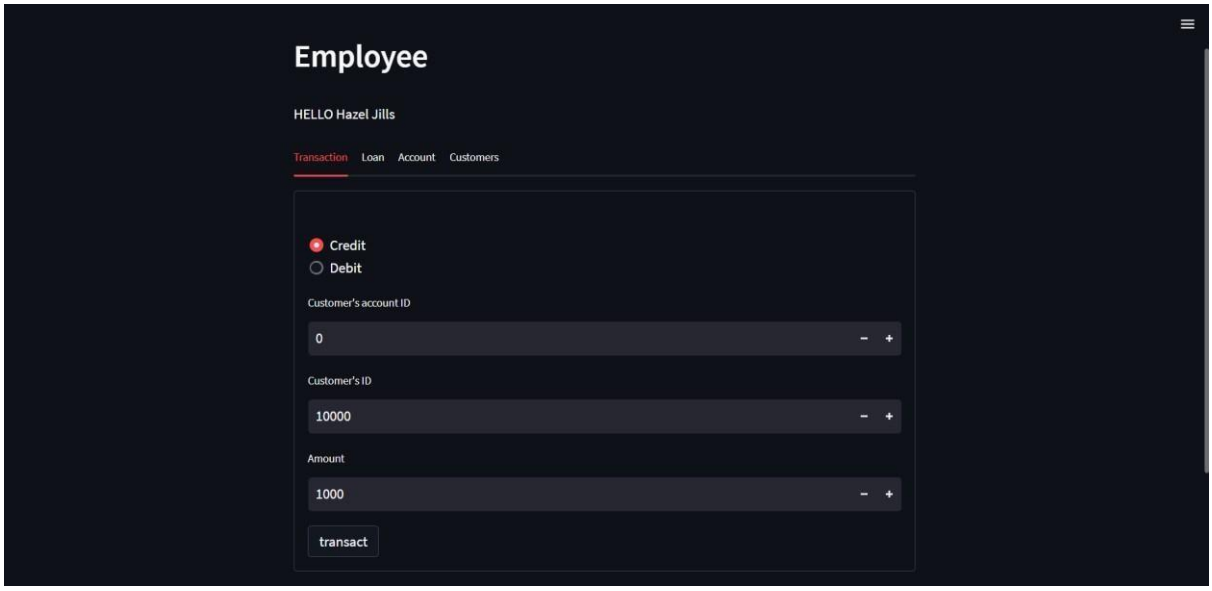
History



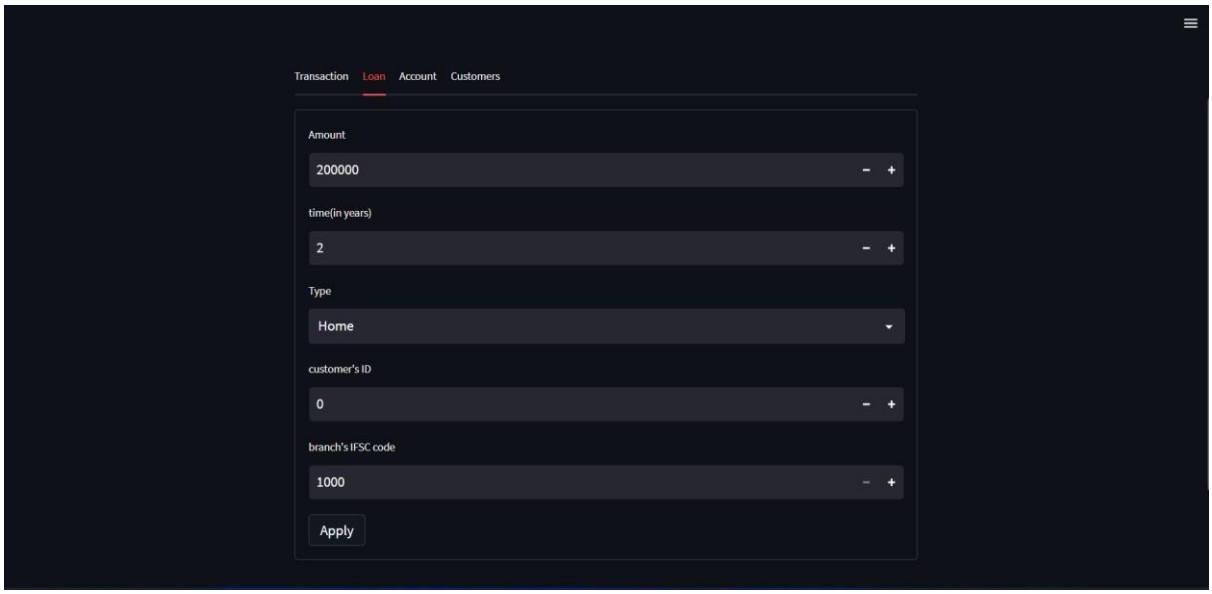


Employee’s interface

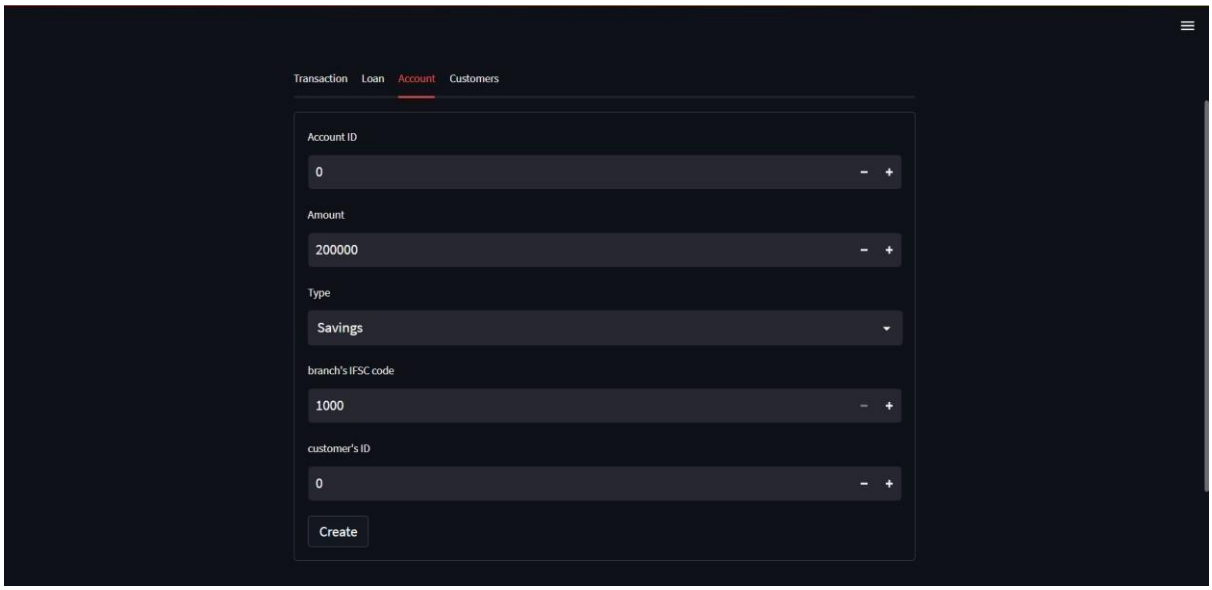
Transaction



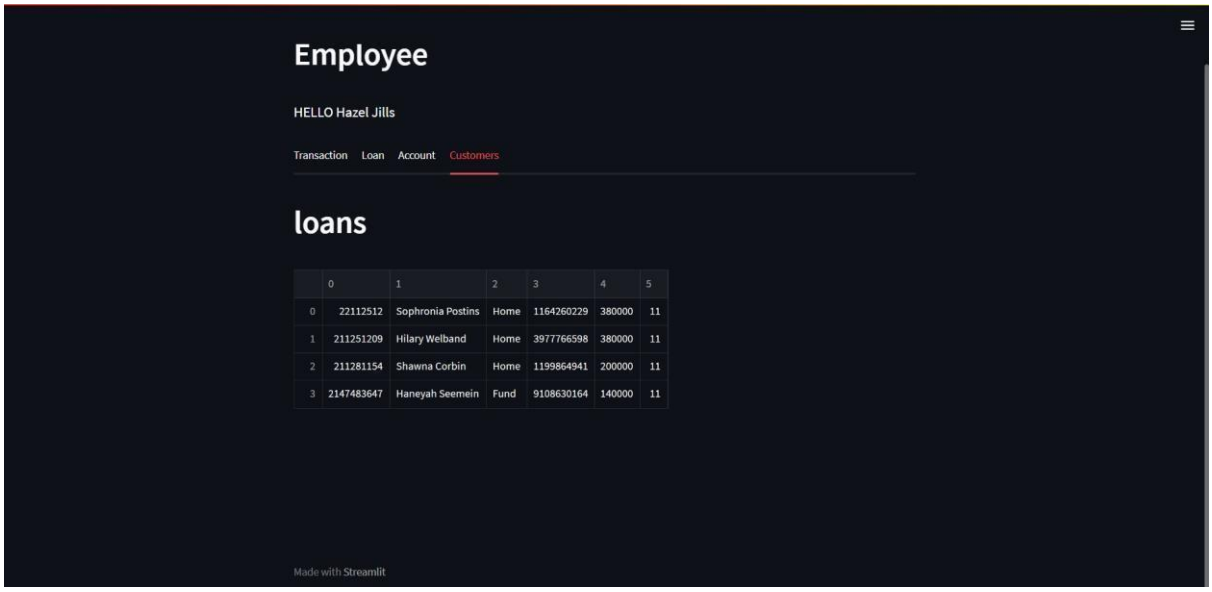
Loan



Account

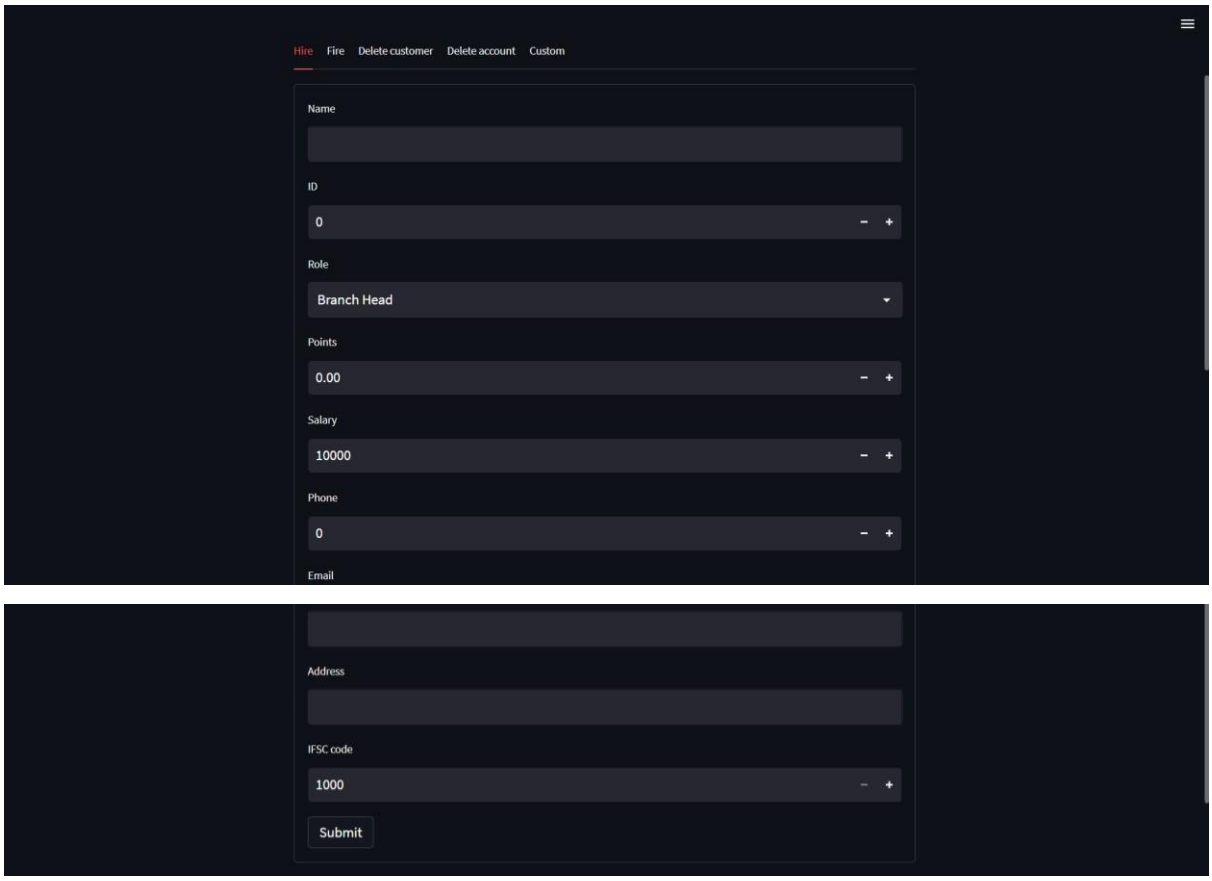


Customers

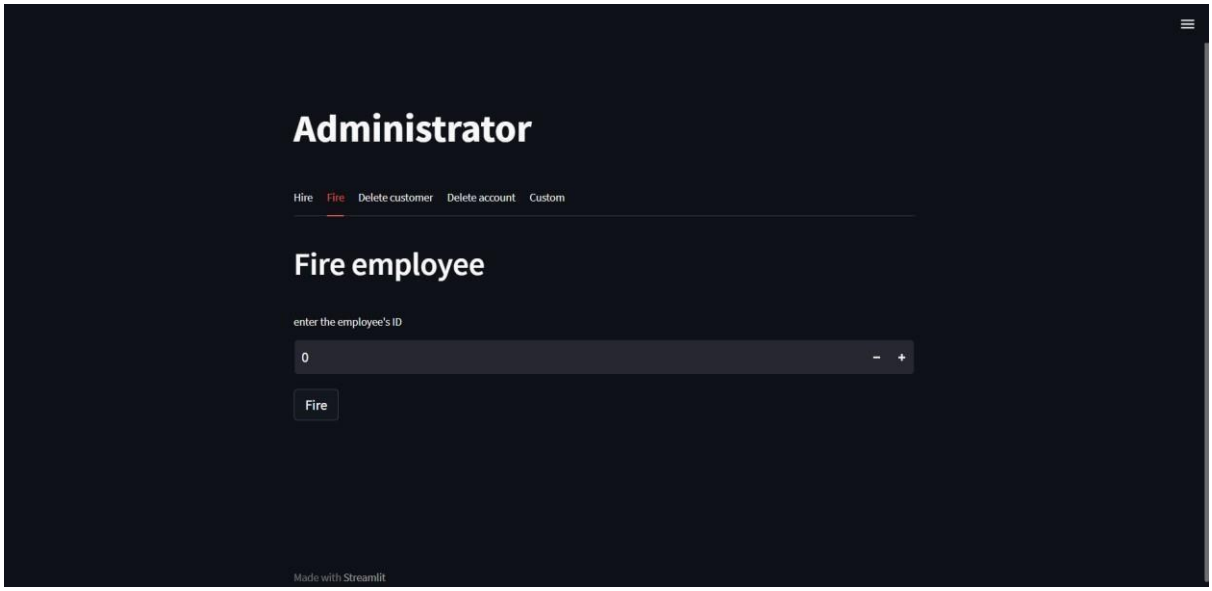


Admin’s Interface

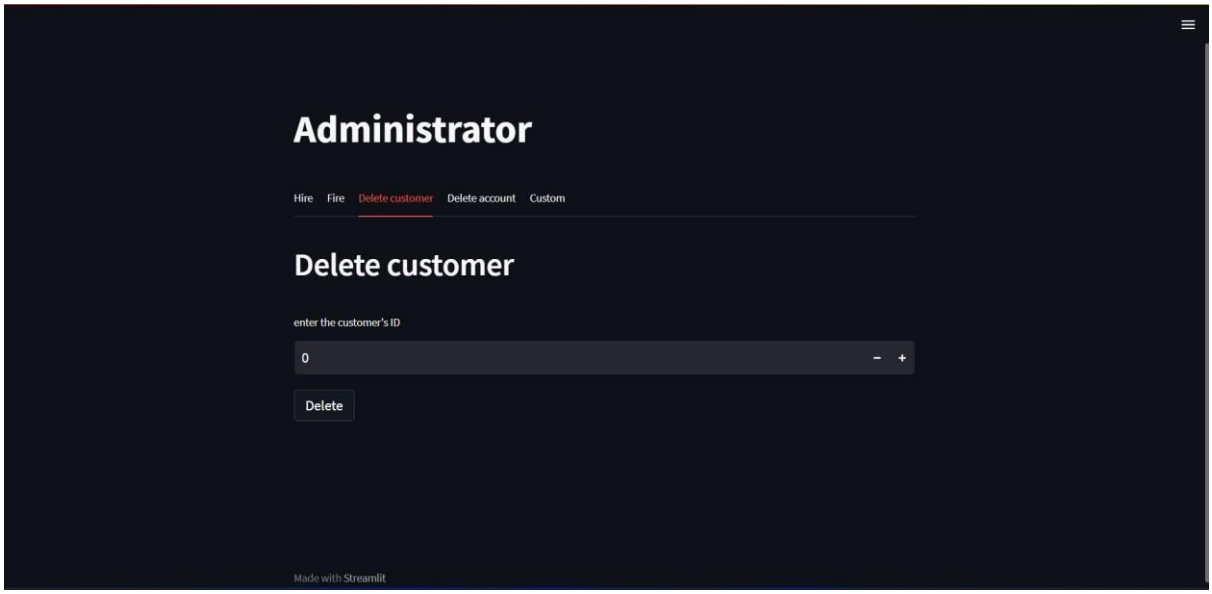
Hire



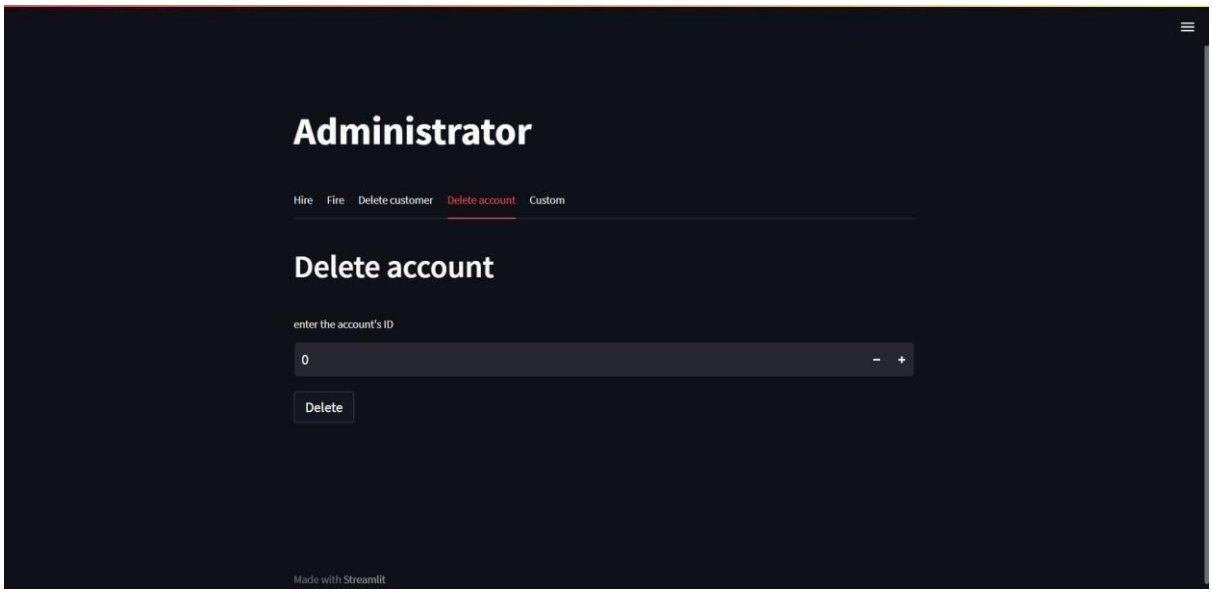
Fire



Delete customer



Delete account



Custom