Insurance Company
Database Management System

Team Members:

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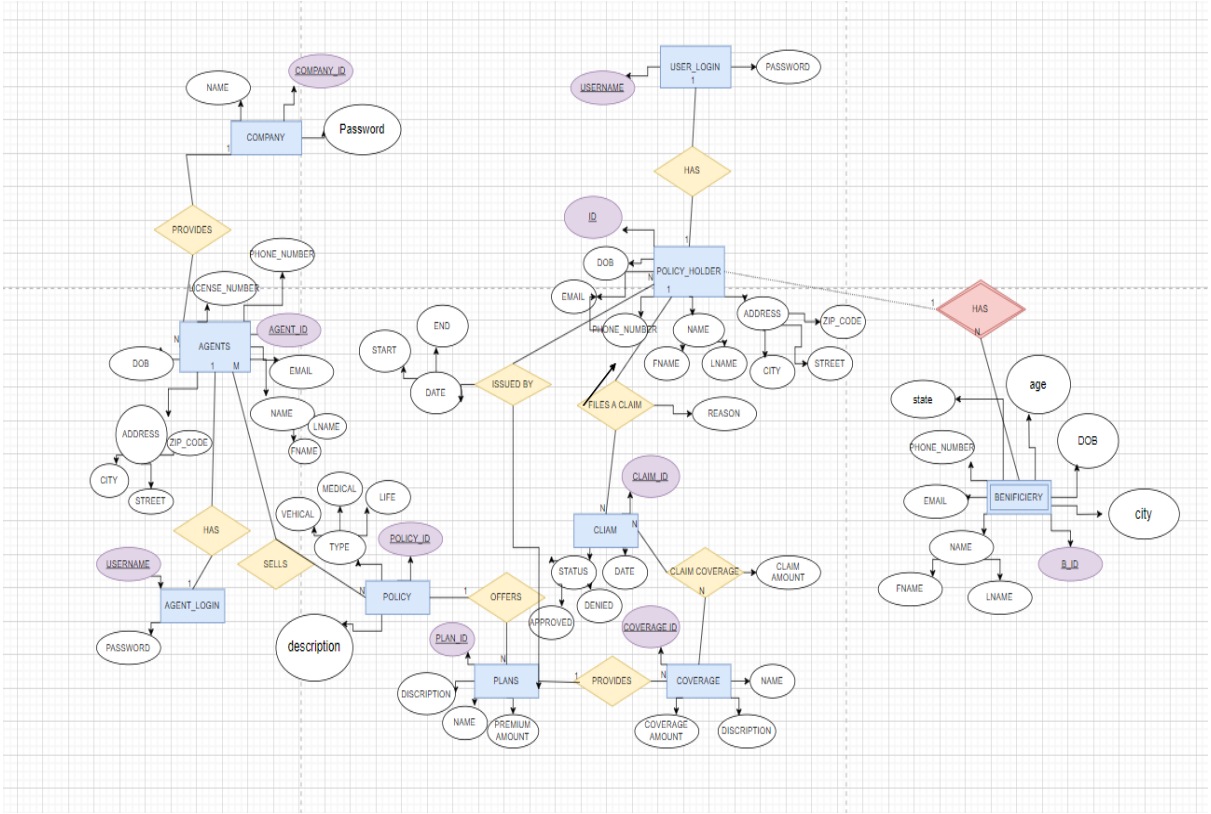
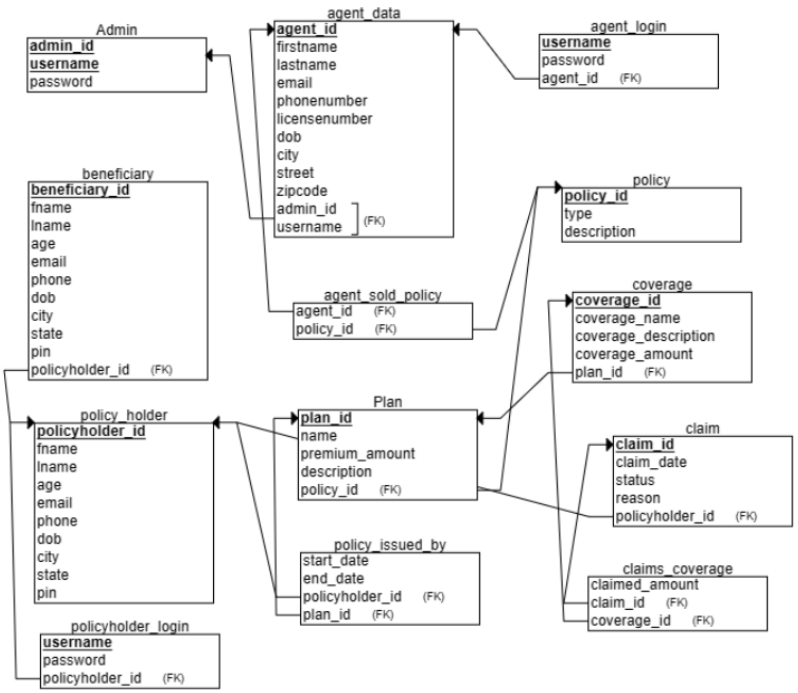
ER Diagram



Relational Schema


Admin
admin_id
username
password
agent_data
agent_id
firstname
lastname
email
phonenumber
licensenumber
dob
city
street
zipcode
admin_id
username
(FK)
agent_login
username
password
agent_id (FK)
beneficiary
beneficiary_id
fname
lname
age
email
phone
dob
city
state
pin
policyholder_id (FK)
policy
policy_id
type
description
agent_sold_policy
agent_id (FK)
policy_id (FK)
coverage
coverage_id
coverage_name
coverage_description
coverage_amount
plan_id (FK)
policy_holder
policyholder_id
fname
lname
age
email
phone
dob
city
state
pin
Plan
plan_id
name
premium_amount
description
policy_id (FK)
claim
claim_id
claim_date
status
reason
policyholder_id (FK)
policy_issued_by
start_date
end_date
policyholder_id (FK)
plan_id (FK)
claims_coverage
claimed_amount
claim_id (FK)
coverage_id (FK)
policyholder_login
username
password
policyholder_id (FK)

MINI PROJECT USER REQUIREMENT SPECIFICATION

Purpose of project:

The purpose of an insurance company database catering to vehicle, medical, and life insurance policies with diverse plans and coverages is to efficiently manage and organise critical data related to policyholders, policies, claims, and financial transactions. It serves as the digital backbone of the insurance operations, supporting functions such as underwriting, premium calculations, claims processing, and customer service. By centralising and structuring data, the database enhances the company's ability to assess risk, customise policies, and provide timely and accurate services to policyholders. Moreover, it plays a crucial role in ensuring regulatory compliance, data security, and effective decision-making, ultimately contributing to the company's mission of offering reliable financial protection to its customers.

Scope of project:

The scope of the insurance company database is comprehensive, covering a wide range of functionalities within the insurance domain. It includes the storage and management of policyholder information, policy details, coverage options, claims data, premium payments, and related financial records. This scope extends to supporting the intricacies of different insurance types, including vehicle, medical, and life insurance, each with its unique parameters and requirements. Additionally, the database must handle various plans and coverages, allowing for flexibility in policy customization. Scalability and adaptability are essential, as the database must accommodate evolving business needs, changing regulations, and advancements in data management technology.

Project Overview:

The insurance company database is the backbone of our operations, seamlessly connecting the complex web of policyholders, insurance products, and claims processes. In an era driven by data, it plays a pivotal role in efficiently managing vast amounts of information. From documenting policyholder details and coverage options to tracking claims and financial transactions, this database ensures the accuracy and accessibility of critical data. In the dynamic landscape of vehicle, medical, and life insurance, it's the linchpin that allows us to offer tailored plans with precision. Scalable and adaptable, it evolves with our business, accommodating changing customer needs, regulatory demands, and technological advancements. With robust security measures in place, it safeguards sensitive data and ensures compliance with industry standards. In essence, our insurance company database is the engine that powers our commitment to providing reliable and responsive financial protection to policyholders, solidifying our place as a trusted partner in safeguarding their futures.

Major project functionalities:

Policy Administration: This functionality is the heart of the database system. It allows the insurance company to create, manage, and maintain various insurance policies. For instance, it enables the creation of policies for vehicle, life, and medical insurance. Within each of these insurance types, the system permits the customization of policies to suit individual needs. Policies can have different durations, coverage amounts, and terms, depending on the customer's preferences and requirements. Policy administration also includes features like policy issuance, modification, renewal, and cancellation, providing flexibility for policyholders to manage their coverage effectively.

Plan and Coverage Customization: Within each policy type, there are various plans and coverages available. This functionality allows policyholders to select from a menu of options to build a policy that aligns precisely with their needs. For example, in a medical insurance policy, a policyholder might choose between different plans that offer varying levels of coverage for hospitalization, doctor visits, or prescription medications. The system manages these choices and ensures that the policyholder receives the appropriate coverage based on their selections.

Claims Management: This crucial functionality handles the entire claims process. When a policyholder needs to make a claim, the system guides them through the process, collecting the necessary information and documentation. It then assesses the claim against the policy's terms and conditions, automating much of the evaluation process. Claims can be related to vehicle accidents, medical expenses, or life insurance payouts, each requiring different documentation and procedures. The system ensures that the correct procedures are followed and that legitimate claims are processed promptly.

Premium Payments: To ensure the continuity of coverage, policyholders need to pay their premiums regularly. The premium payment functionality allows policyholders to make payments conveniently through various methods, such as online payments, direct debit, or credit card payments. The system tracks payment histories, reducing the risk of policy lapses due to missed payments.

Beneficiary Management: This feature manages beneficiary information, a critical aspect of life insurance policies. Policyholders can designate one or more beneficiaries who will receive the policy's benefits in case of the policyholder's death. The system securely stores beneficiary details, ensuring that the right individuals receive the intended benefits. It also allows policyholders to update beneficiary information as needed, accommodating life changes like marriages, divorces, or the birth of children.

User-Friendly Interface:

A user-friendly interface is essential for all these functionalities. An intuitive interface ensures that both insurance company staff and policyholders can interact with the system easily. It includes dashboards, forms, and online tools that simplify policy management, claims filing, premium payments, and beneficiary updates.

System Features and Functional Requirements :

1. The Insurance Company offers 3 different types of policies which include
   Vehicle insurance , Life insurance , Medical insurance.
   The company provides multiple agents who sell the above mentioned insurance policies.
   The entities involved are -:
   Insurance Company,Agents,Policy.

2. Each policy offers many plans based on different premium amount and benefits each of these provide different forms of coverage .
   The entities involved are -:
   Policy,Plan,Coverage.

3. Each Policy holder can buy different types of policies and choose a suitable plan for the policy that they buy .
   Each policy holder can file a claim based on their need and this claim will be fulfilled if it meets the requirements of the coverage .
   The policy holder will get to know if the claim is approved or denied or pending based upon the status of the claim.
   Claims can be related to vehicle accidents, medical expenses, or life insurance payouts, each requiring different documentation and procedures

   The entities involved are-:
   Policy,Plan,Policy holder, Claims,Coverage.

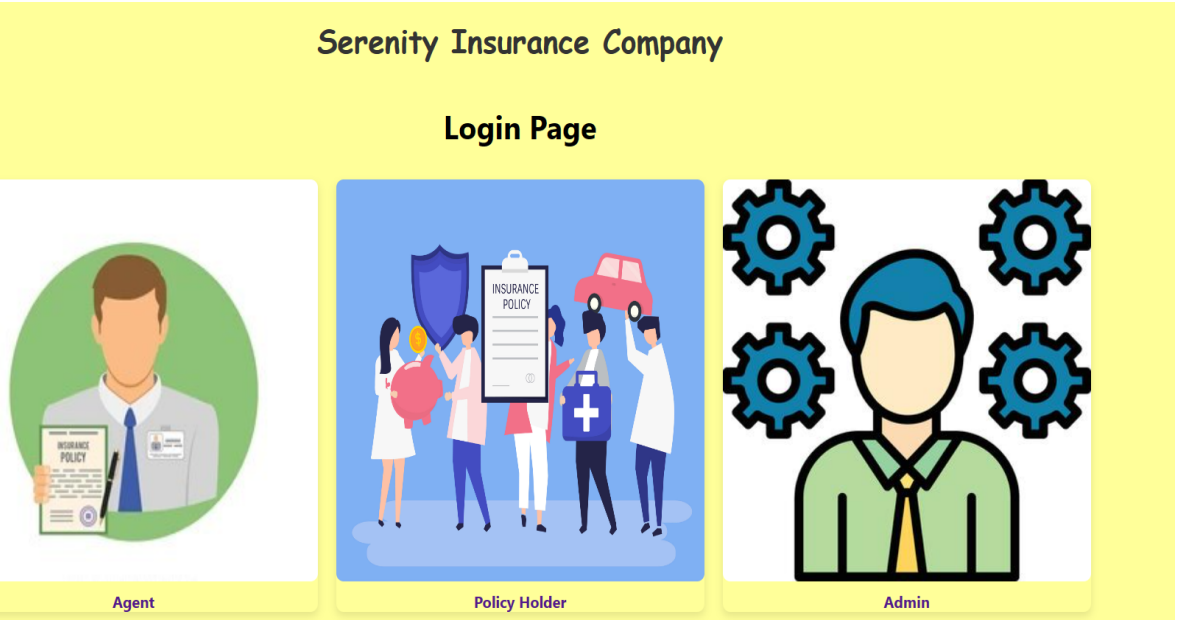
4. Each policy holder can make a premium payment for the policy that they bought using different methods such as net-banking , credit card, debit card , cash.

   The system tracks payment histories, reducing the risk of policy lapses due to missed payments.
   The entities involved are-:
   Policy holder, Premium payment

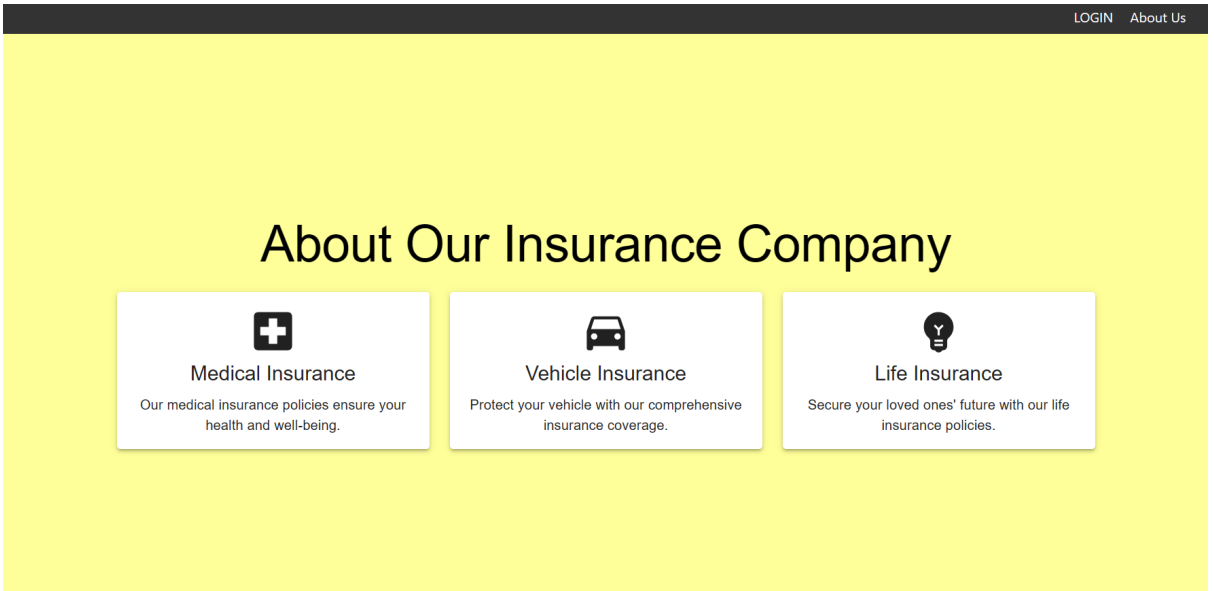
5. Each policy holder can have multiple beneficiaries , these beneficiaries benefit from the claims made by the policy holder.
   It also allows policyholders to update beneficiary information as needed, accommodating life changes like marriages, divorces, or the birth of children.
   The entities involved are-:
   Beneficiary , Policy holder

6. Sign-up/Login -There will be a prompt given where in they can choose if they are an agent or a user who wants to buy a policy .An account is created for user/Agent if they are signing in and their details are stored .
   The entities involved are-:
   Agent_login, User_login

Home page:-



About us:-

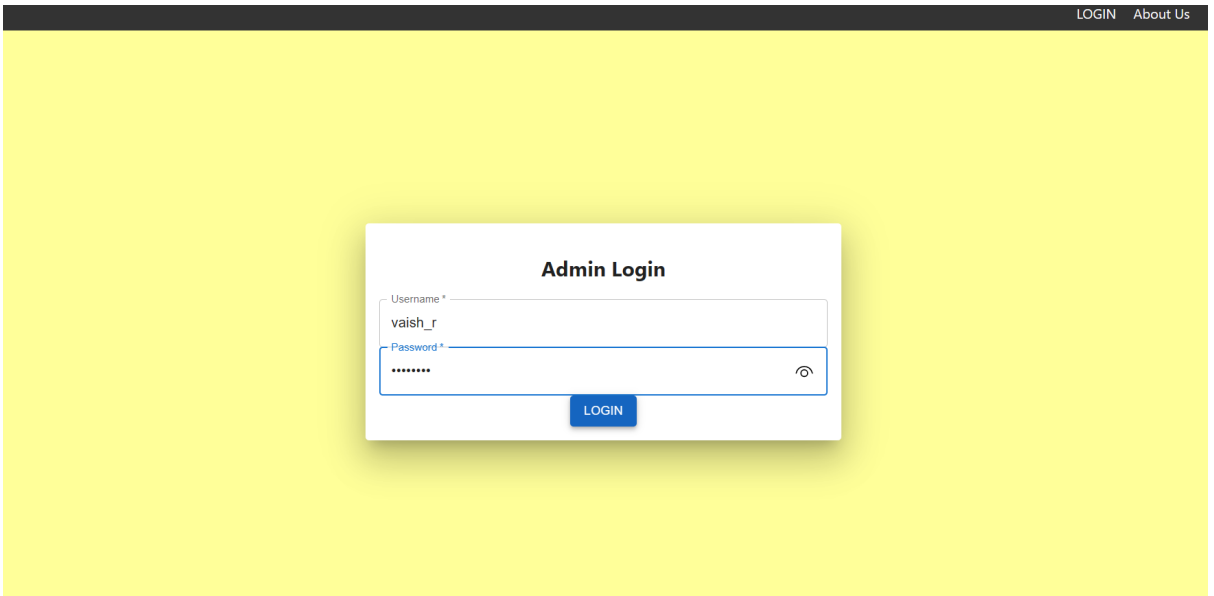


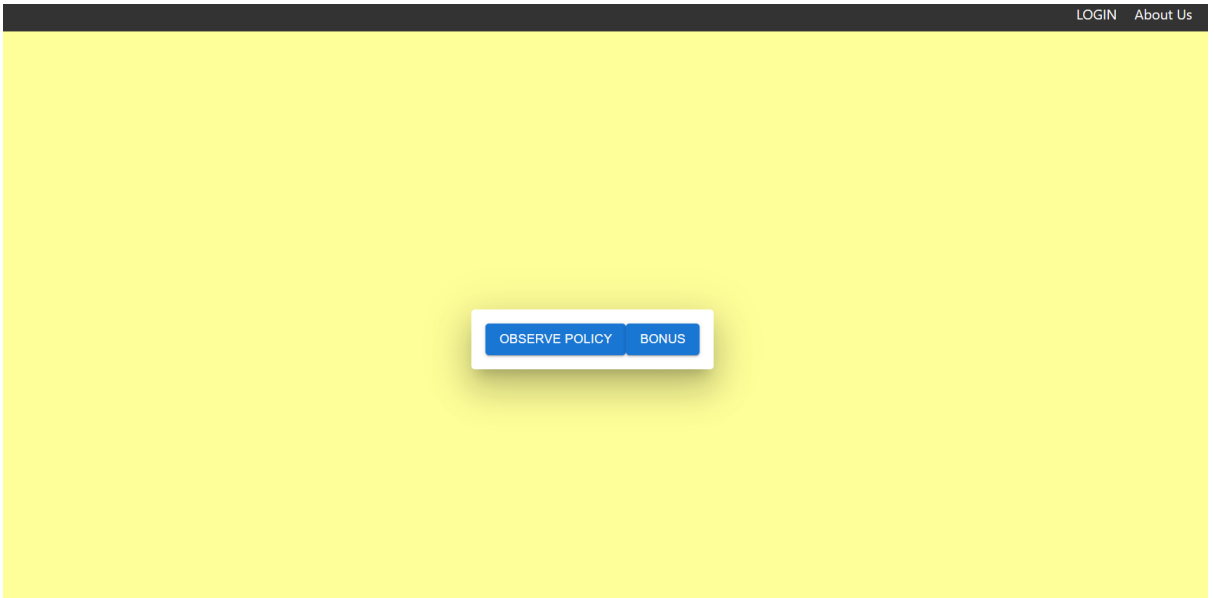
ADMIN-
Admin Login:-

SQL QUERY-

```
CREATE ROLE 'Admin_role';
GRANT ALL PRIVILEGES ON insurance_db.* TO 'Admin_role';
CREATE USER 'vaish_r'@'localhost' IDENTIFIED BY 'vaish123';
GRANT Admin_role TO 'vaish_r'@'localhost';
```

GUI-



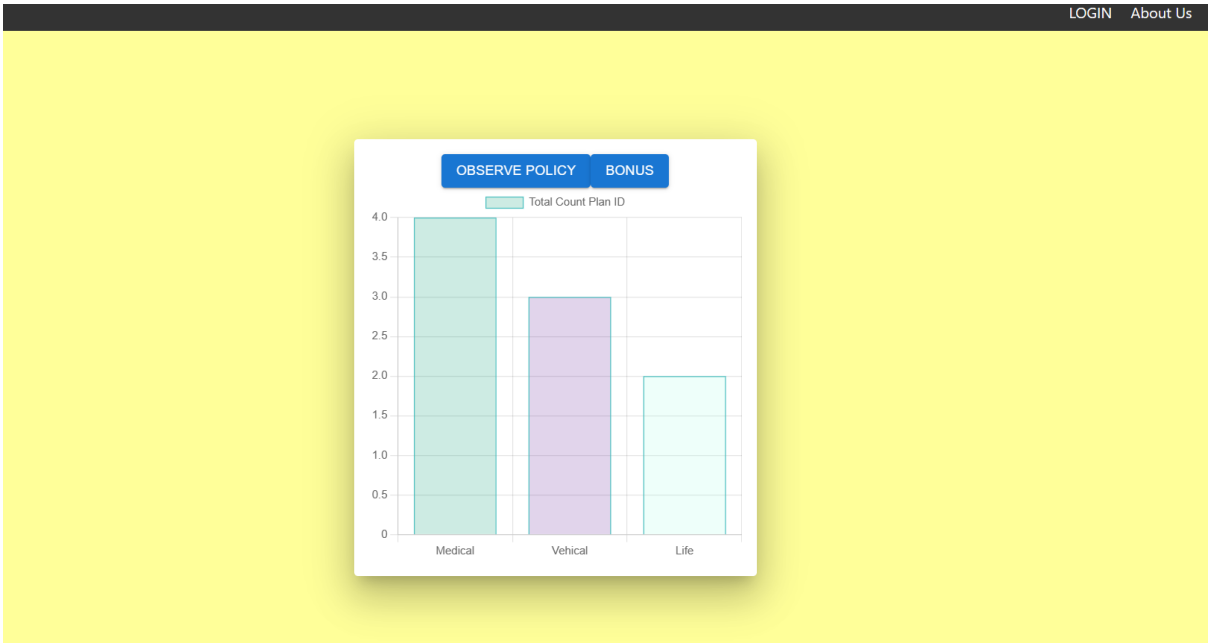


TO OBSERVE THE POLICY SALE ON ADMIN SIDE-

SQL QUERY:

```
`SELECT
  policy_id,
  SUM(count_plan_id) AS total_count_plan_id,
  MAX(test1.policy_type) AS policy_type
FROM
  (
    SELECT
      plan_id,
      COUNT(plan_id) AS count_plan_id,
      MAX(test.policy_id) AS policy_id,
      MAX(test.policy_type) AS policy_type
    FROM
      (
        SELECT
          pib.plan_id,
          pib.policyholder_id,
          p.type AS policy_type,
          p.policy_id,
          pl.name AS plan_name
        FROM
          policy_issued_by AS pib
          JOIN plan AS pl ON pib.plan_id = pl.plan_id
          JOIN policy AS p ON pl.policy_id = p.policy_id
      ) AS test
    GROUP BY
      plan_id
  ) AS test1
GROUP BY
  policy_id`
```

GUI:

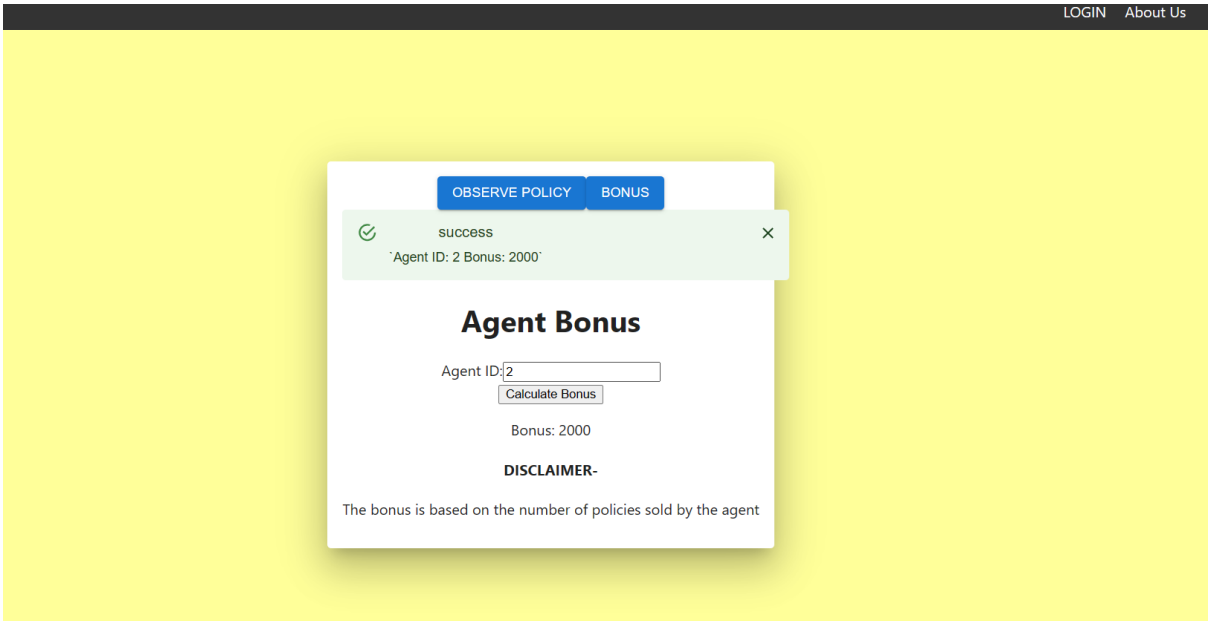


AGENT BONUS -

<u>SQL QUERY-</u>

```
CREATE PROCEDURE CalculateBonus(IN agent_username VARCHAR(255), OUT
bonus_amount INT)
BEGIN
  DECLARE agent_id INT;
  DECLARE sold_policies_count INT;

  SELECT agent_id INTO agent_id
  FROM agent_data
  WHERE agent_data.username = agent_username;

  SELECT COUNT(*) INTO sold_policies_count
  FROM agent_sold_policy
  WHERE agent_id = agent_id;

  SET bonus_amount = sold_policies_count * 1000;

END //
DELIMITER ;
CALL CalculateBonusForAgent(2);
```

<u>GUI -</u>



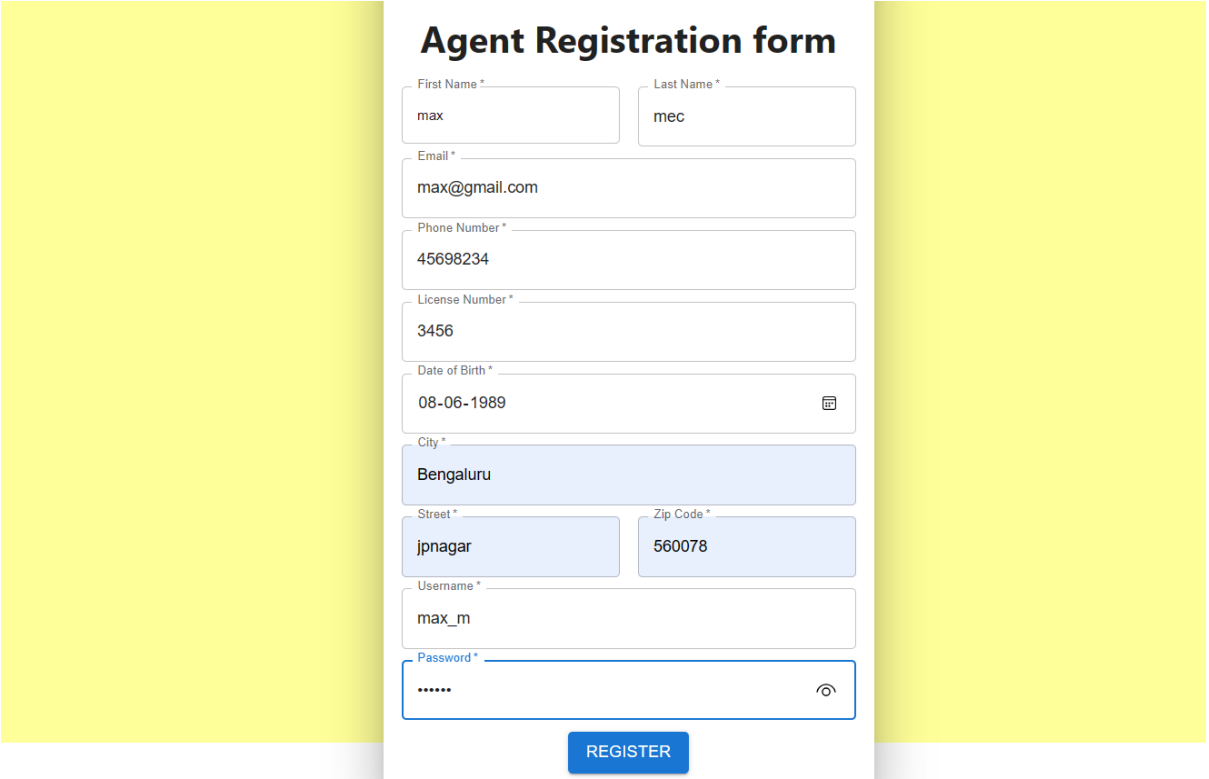
Agent Register:

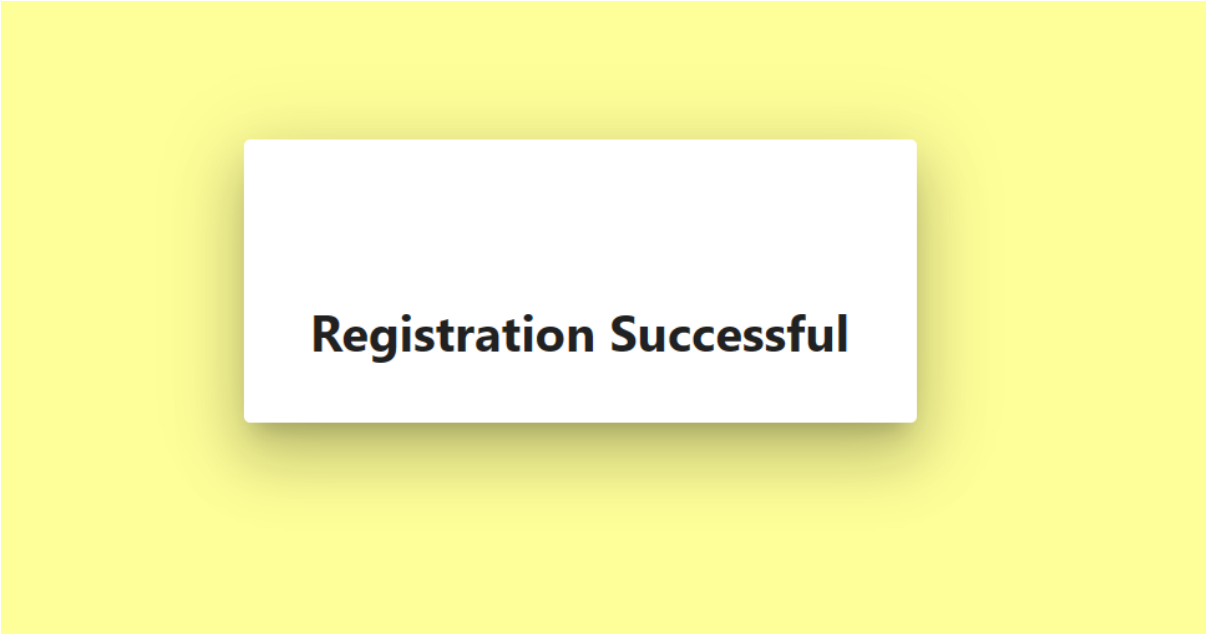
SQL Query:

INSERT INTO agent_data (firstname,lastname,email,phonenumber,licensenumber,dob,city,street,zipcode) VALUES (max,mec,max@gmail.com,45698234,3456,08-06-1989,Bengaluru,jpnagar,560078);

```
INSERT INTO agent_login (username, password,agent_id) VALUES
(max_m,max123,5)
```

GUI:






```
mysql> select * from agent_data;
+----------+-----------+----------+----------------+-------------+---------------+------------+-----------+---------+---------+
| agent_id | firstname | lastname | email          | phonenumber | licensenumber | dob        | city      | street  | zipcode |
+----------+-----------+----------+----------------+-------------+---------------+------------+-----------+---------+---------+
|        1 | jhon      | brown    | jhon@gmail.com | 85768586    | 568456        | 1989-10-24 | Bengaluru | jpnagar | 560078  |
|        2 | prarthana | bhat     | bhat@gmail.com | 56798       | 4567          | 1997-06-19 | Bengaluru | jpnagar | 560078  |
|        3 | srinika   | sai      | sai@gmail.com  | 34567845    | 3456          | 1989-06-15 | Bengaluru | jpnagar | 560078  |
|        4 | sirisha   | c        | siri@gmail.com | 56789034    | 4567          | 1986-06-12 | Bengaluru | jpnagar | 560078  |
|        5 | max       | mec      | max@gmail.com  | 45698234    | 3456          | 1989-06-08 | Bengaluru | jpnagar | 560078  |
+----------+-----------+----------+----------------+-------------+---------------+------------+-----------+---------+---------+
5 rows in set (0.00 sec)
```

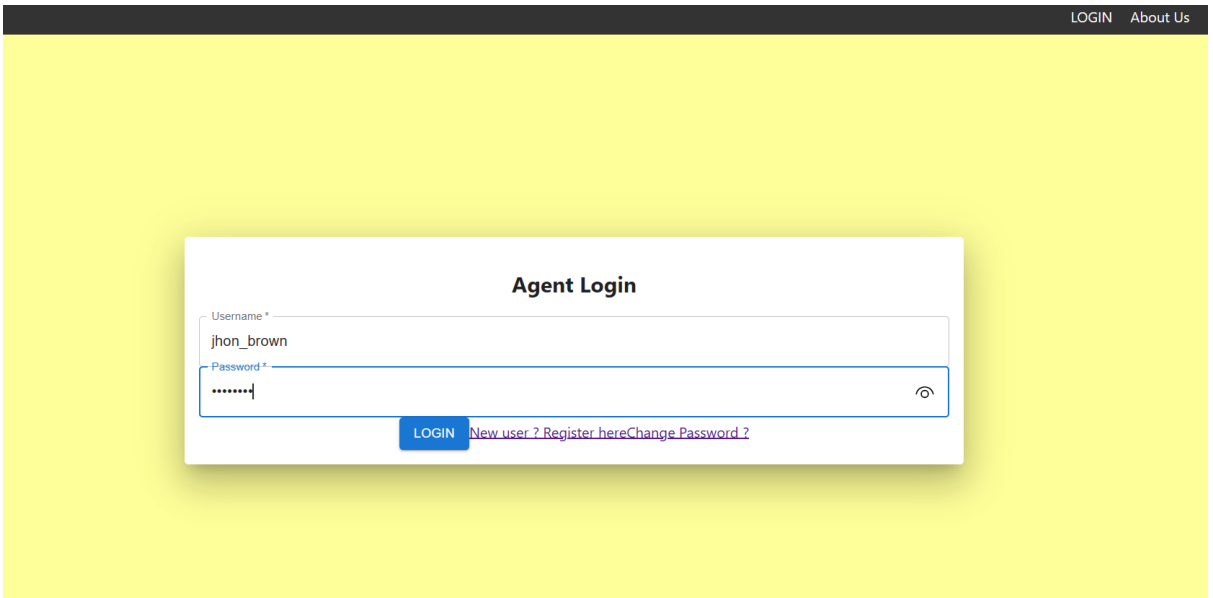
```
mysql> select * from agent_login;
+----------+------------+----------+
| agent_id | username   | password |
+----------+------------+----------+
|        1 | jhon_brown | brown123 |
|        5 | max_m      | max123   |
|        2 | prarth     | p123     |
|        4 | sirisha_c  | siri123  |
|        3 | sri_sai    | sri123   |
+----------+------------+----------+
5 rows in set (0.00 sec)
```

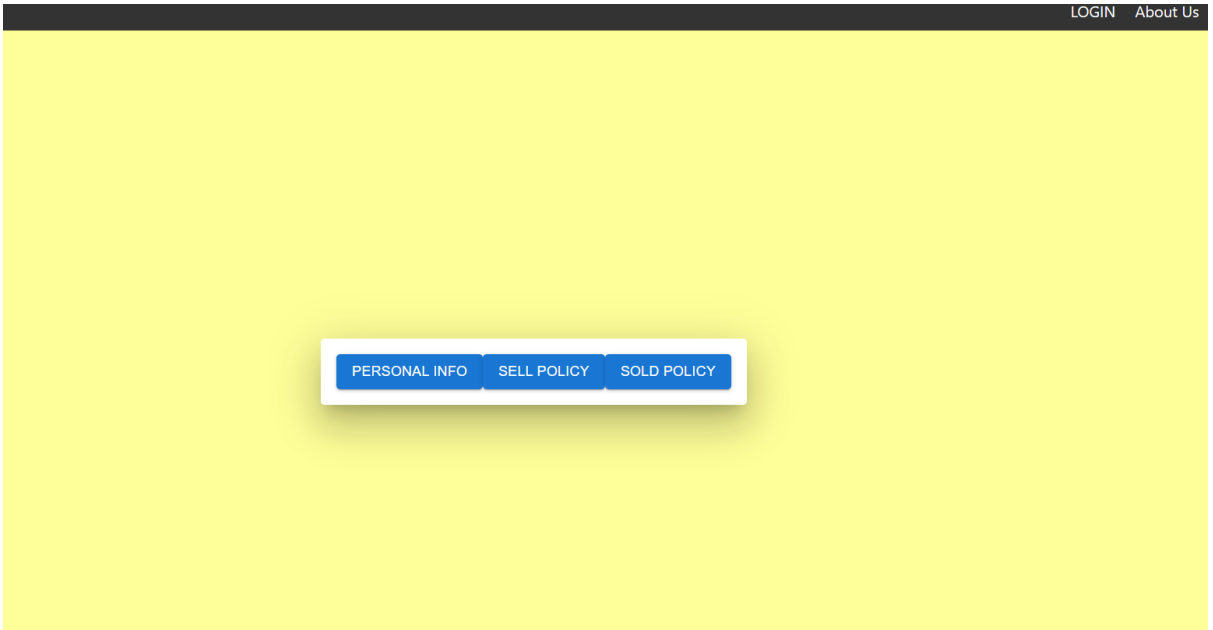
Agent Login:

SQL Query:

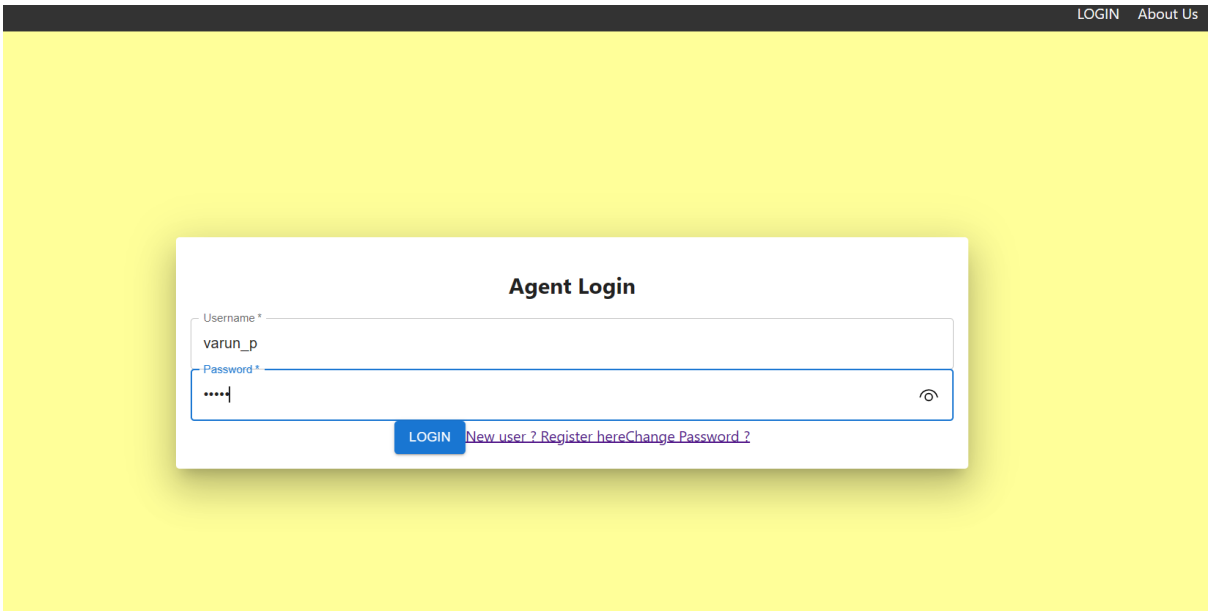
```
SELECT * FROM agent_login WHERE username =john_brown;
```

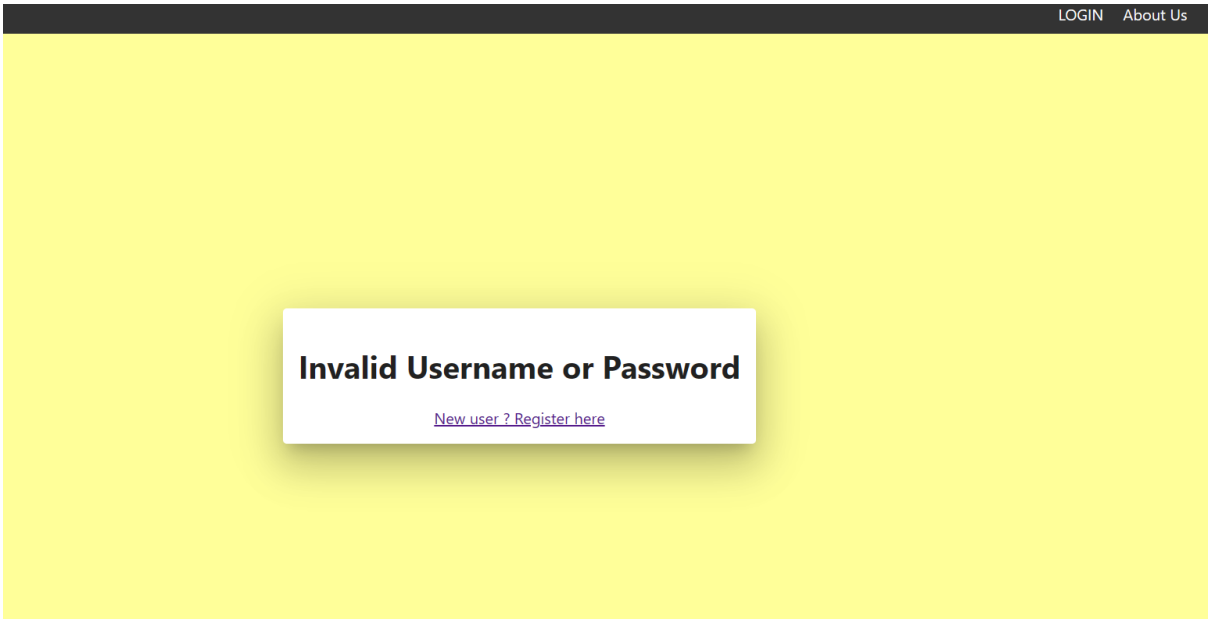
GUI-





INVALID LOGIN-



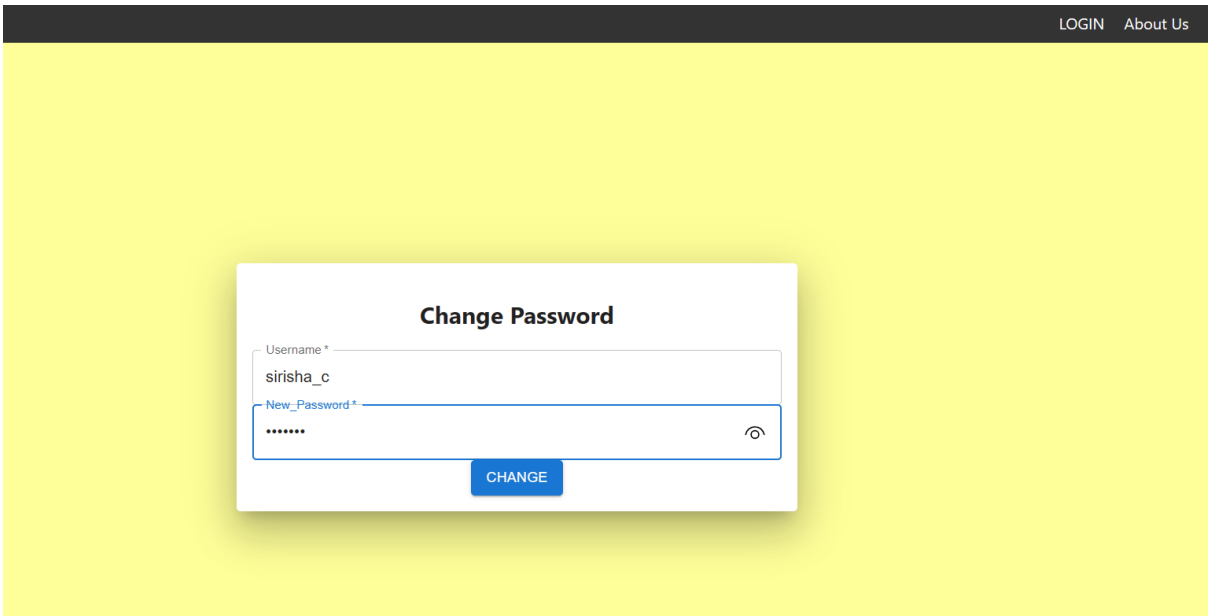


CHANGE PASSWORD-

SQL QUERY-

UPDATE agent_login SET password = "sirisha_c" WHERE username = s123;

GUI -



Before change-

```
mysql> select * from agent_login;
+----------+------------+----------+
| agent_id | username   | password |
+----------+------------+----------+
|        1 | jhon_brown | brown123 |
|        5 | max_m      | max123   |
|        2 | prarth     | p123     |
|        4 | sirisha_c  | siri123  |
|        3 | sri_sai    | sri123   |
+----------+------------+----------+
5 rows in set (0.00 sec)
```

After change-

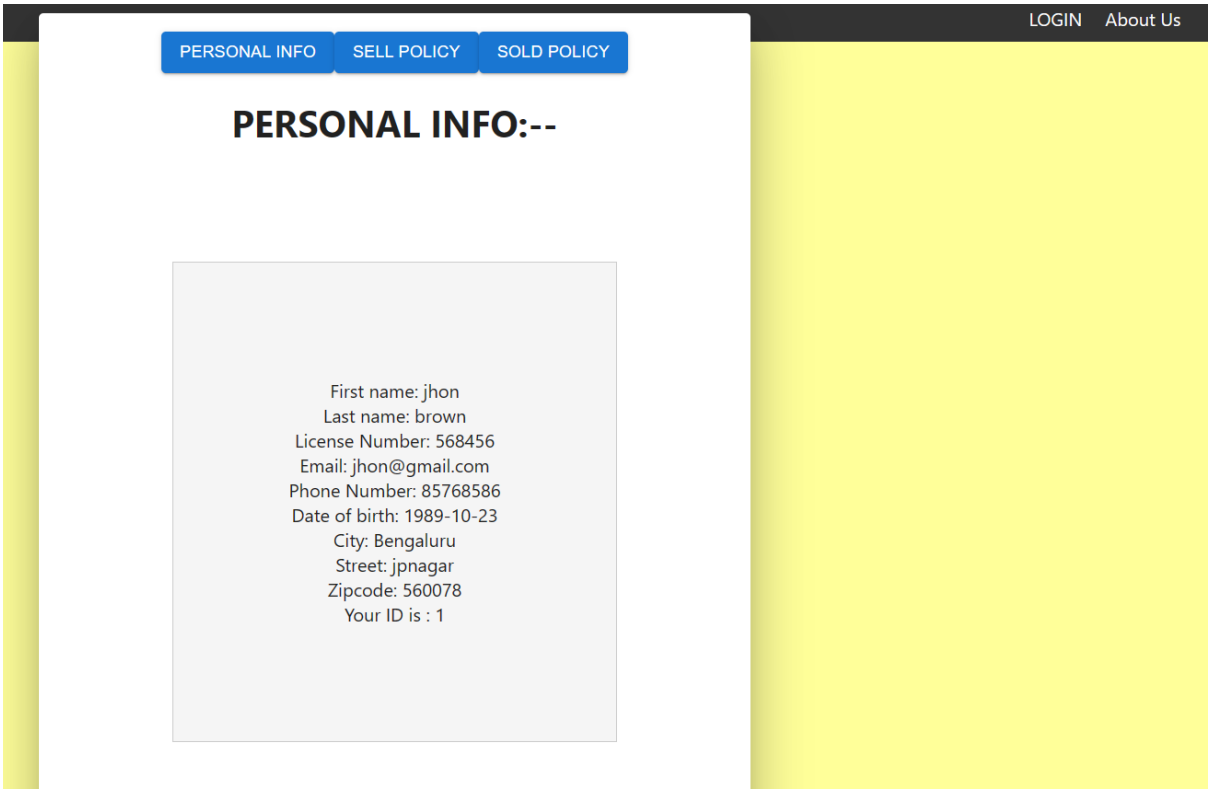
```
mysql> select * from agent_login;
+----------+------------+----------+
| agent_id | username   | password |
+----------+------------+----------+
|        1 | jhon_brown | brown123 |
|        5 | max_m      | max123   |
|        2 | prarth     | p123     |
|        4 | sirisha_c  | s123     |
|        3 | sri_sai    | sri123   |
+----------+------------+----------+
5 rows in set (0.00 sec)
```

PERSONAL INFO:

SQL QUERY:

```
SELECT * FROM agent_data NATURAL JOIN agent_login WHERE username
=john_brown;
```

GUI :

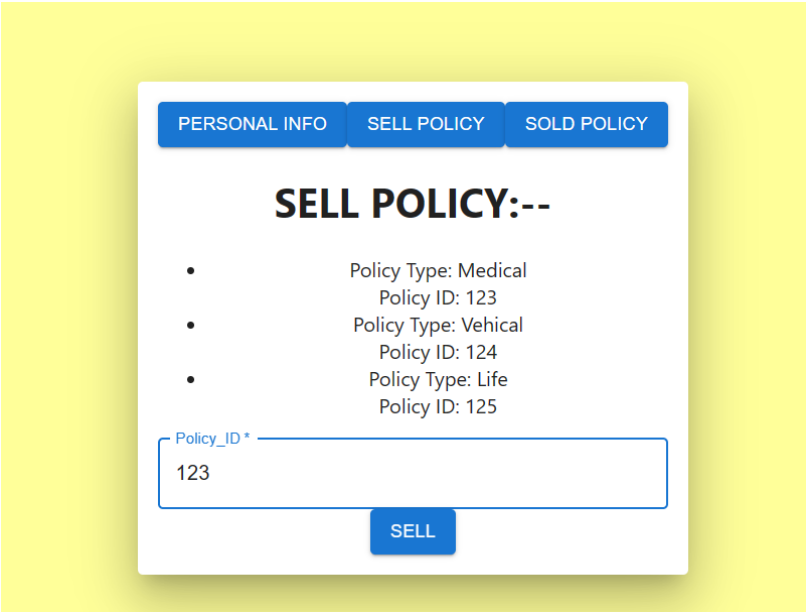


SELL POLICY:

SQL QUERY:

SELECT agent_id FROM agent_login WHERE username = “jhon_brown”;
INSERT INTO agent_sold_policy (agent_id, policy_id) values(1,123);

GUI:

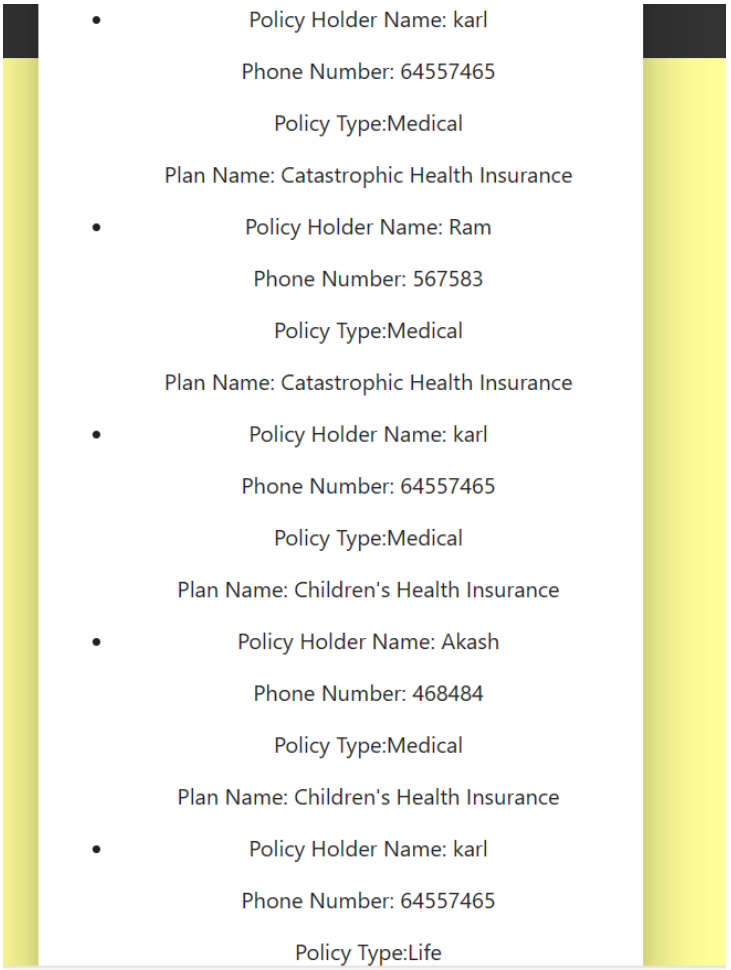


SOLD POLICY:

<u>SQL QUERY:(Nested query)</u>

```
SELECT ph.fname AS policyholder_name, ph.phone, po.name AS plan_name, pl.type AS
policy_type
        FROM (
          SELECT pib.policyholder_id, pib.plan_id, p.policy_id
          FROM policy_issued_by AS pib
          JOIN plan AS p ON pib.plan_id = p.plan_id
          JOIN agent_sold_policy AS asp ON p.policy_id = asp.policy_id
          WHERE asp.agent_id = ?
        ) AS policy_ids
        JOIN policy_holder AS ph ON policy_ids.policyholder_id = ph.policyholder_id
        JOIN plan AS po ON policy_ids.plan_id = po.plan_id
        JOIN policy AS pl ON policy_ids.policy_id = pl.policy_id;
```

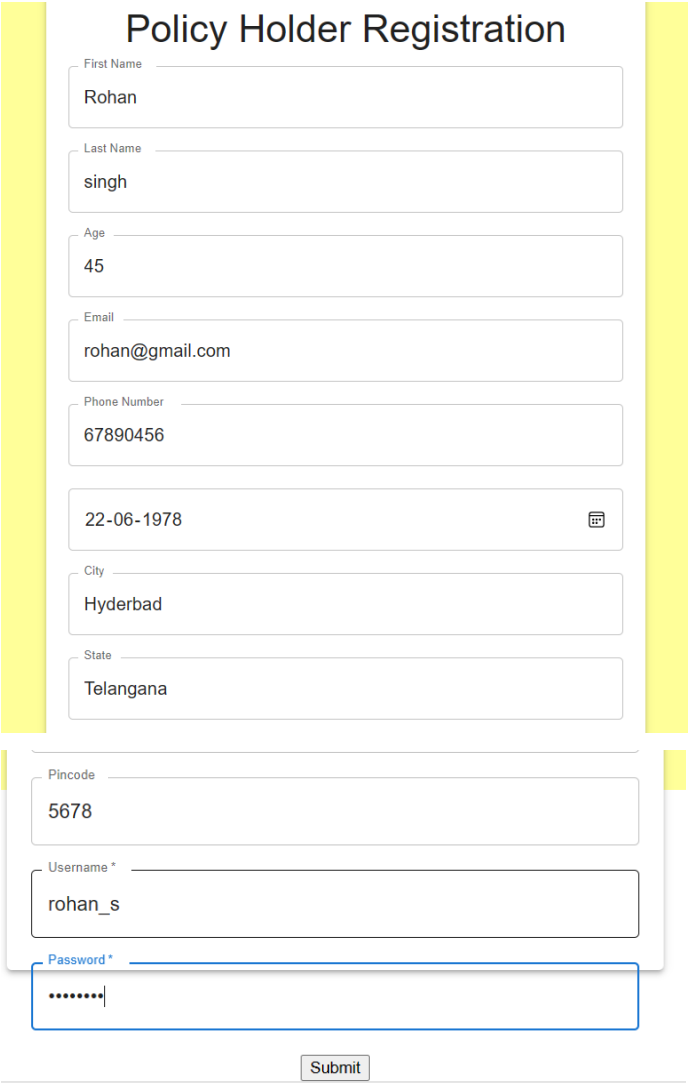
<u>GUI -</u>



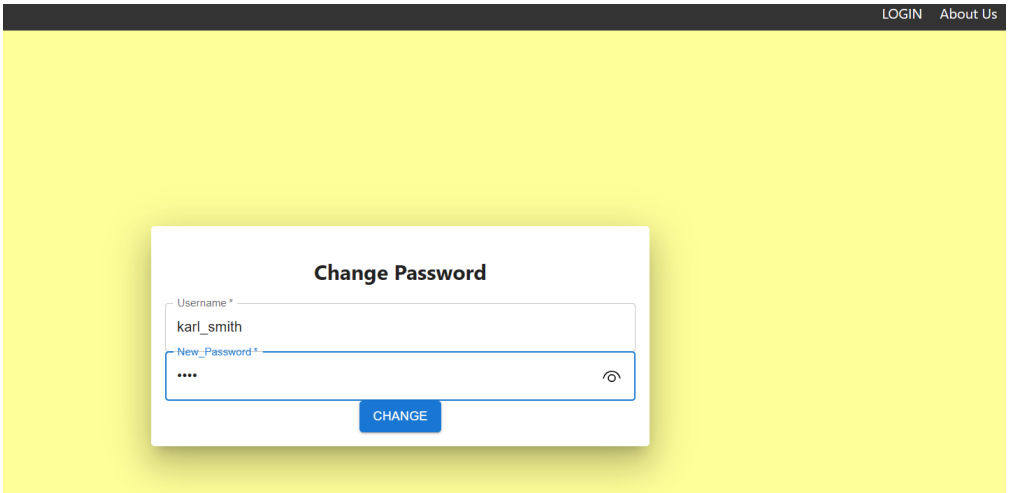
POLICY HOLDER:

Policy holder Register is same as Agent Register.

<u>GUI:</u>



Policy holder Change Password is same as Agent Change Password.

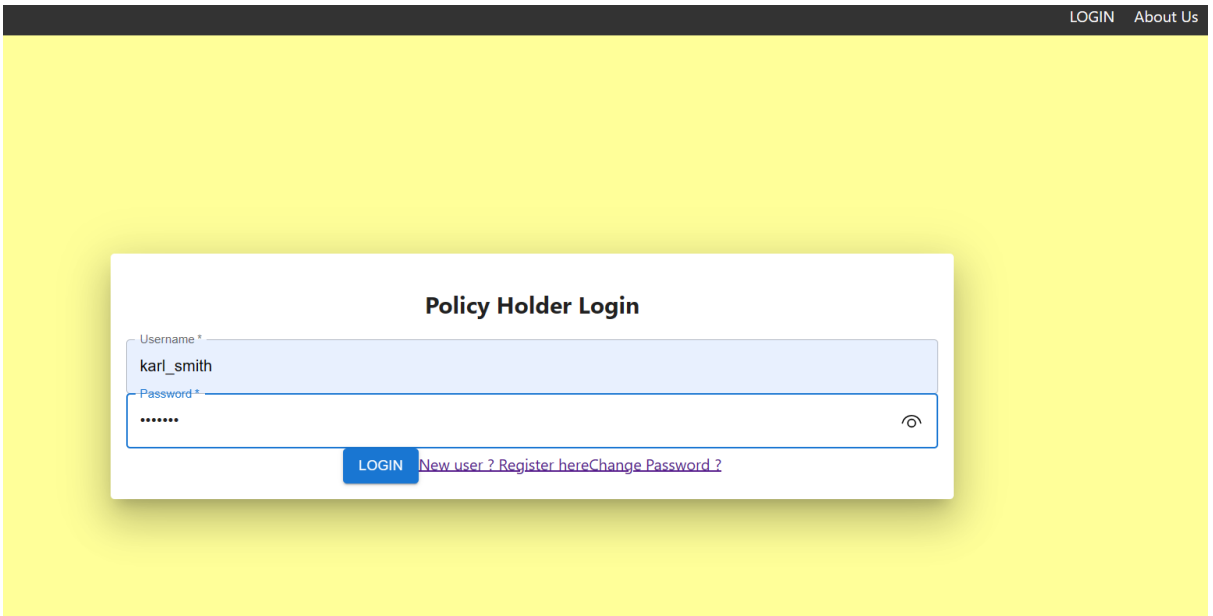


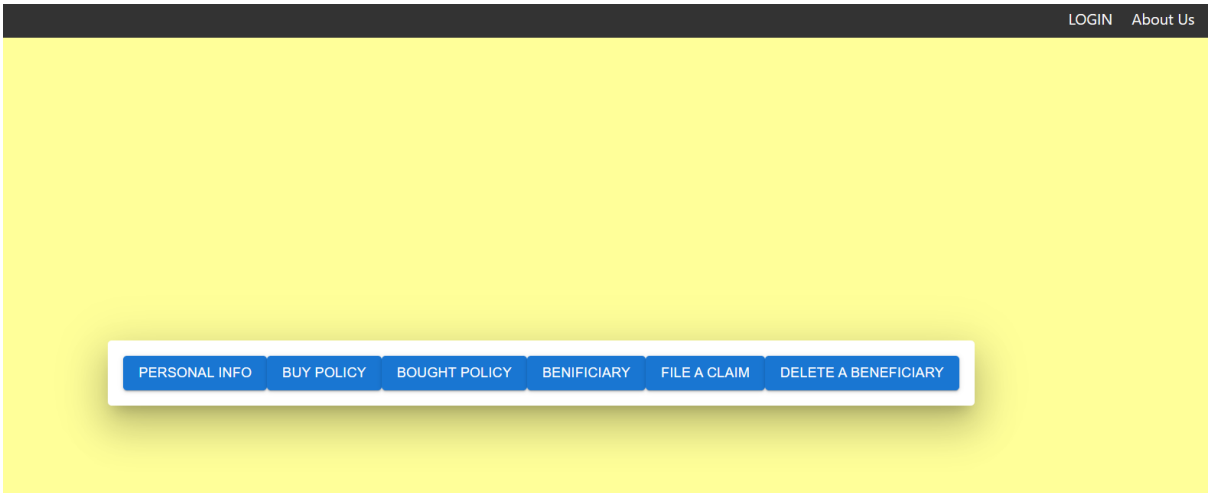
POLICY HOLDER LOGIN:

SQL QUERY:

SELECT * FROM policyholder_login WHERE username = karl_smith;

GUI-





BUY POLICY:

SQL QUERY:

```
SELECT plan.* FROM policy JOIN plan ON policy.policy_id =
plan.policy_id WHERE policy.type = "Vehicle";

SELECT plan_id from plan where name="Commercial Auto Insurance";
```

INSERT INTO policy_issued_by (plan_id,policyholder_id,start_date,end_date) VALUES (262,13,23-11-2023,22-11-2025);

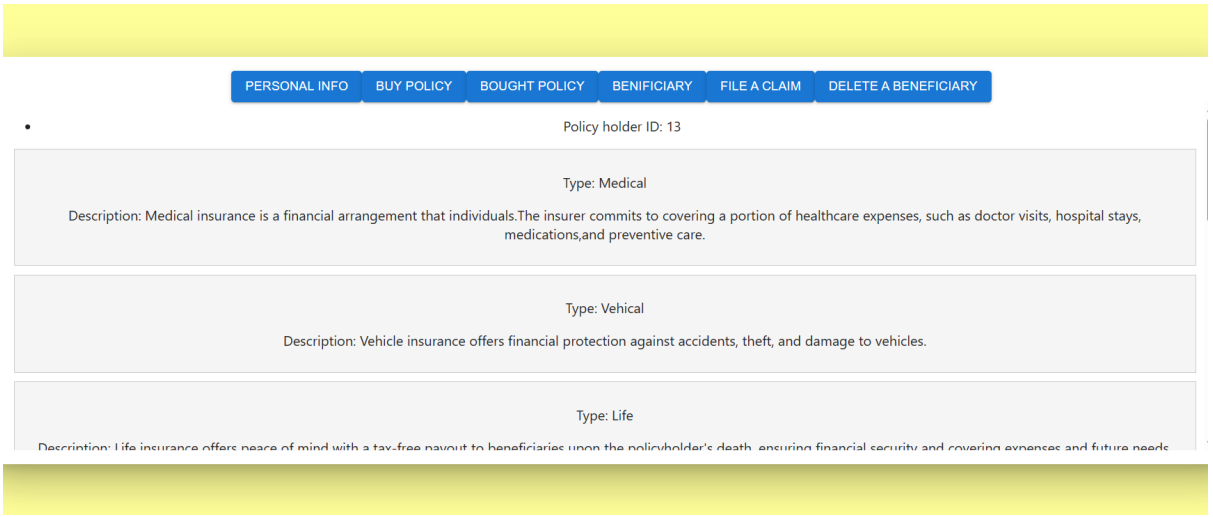
Function to calculate the end - date:

```
CREATE FUNCTION end_date_plan(start_date DATE)
   RETURNS DATE
   DETERMINISTIC
BEGIN
   DECLARE result_date DATE;
   SET result_date = DATE_ADD(start_date, INTERVAL 2 YEAR);
   RETURN result_date;
END;
```

Internally the queries are like as shown bellow

```
//NESTED QUERY
app.post('/choose_plan', (req, res) => {
  const { policy_type } = req.body;

  if (!policy_type) {
    return res.status(400).json({ error: 'Missing policy_type' });
  }

  const selectQuery = `
    SELECT * FROM plan
    WHERE policy_id IN (
      SELECT policy_id FROM policy
      WHERE type = ?
    )`;

  db.query(selectQuery, [policy_type], (err, result) => {
    if (err) {
      res.status(500).json({ error: 'Database error' });
    } else {
      console.log('JSON Object sent to the client:', result);
      res.status(200).json(result);
    }
  });
});

app.post('/chosenpolicy_plan', (req, res) => {
  const {selectedType,plantype,startDate,endDate,policyholder_id} = req.body;


  const get_plan_id='SELECT plan_id from plan where name=?';
  db.query(get_plan_id, [plantype], (err, result) => {
    if (err) {
      console.error('Error finding data from the database:', err);
      res.status(500).send(err);
    } else {
      console.log('Data found:', result);
      res.status(200).json({ message: ' successfully' });

      planid=result[0].plan_id;
      const plan_issued = 'INSERT INTO policy_issued_by  (plan_id,policyholder_id,start_date,end_date) VALUES (?, ?, ?,?)';
      db.query(plan_issued, [planid,policyholder_id,startDate,endDate], (err, Result) => {
        if (err) {
          console.error('Error inserting  data:', err);
          res.status(500).send('Error ');
        } else {

          console.log("ok");
        }
      });

    }
  });
```

GUI:



PERSONAL INFO | BUY POLICY | BOUGHT POLICY | BENIFICIARY | FILE A CLAIM | DELETE A BENEFICIARY

Selected Type is: Vehical

Available Plans are:

Plan Name: Liability Insurance

Premium Amount:

Plan Description: It covers bodily injury and property damage liability,ensuring that if you're at fault in an accident,the other party's medical expenses and vehicle repairs are covered.

Plan Name: Commercial Auto Insurance

Premium Amount:

Plan Description: It covers vehicles used for business purposes.It helps businesses maintain financial stability by ensuring that vehicles are safe.

PERSONAL INFO | BUY POLICY | BOUGHT POLICY | BENIFICIARY | FILE A CLAIM | DELETE A BENEFICIARY

SUMMARY :

Selected Policy is: Vehical

Selected Plan is: Commercial Auto Insurance

Start Date: 2023-11-23

End Date: 2025-11-22

CLOSE

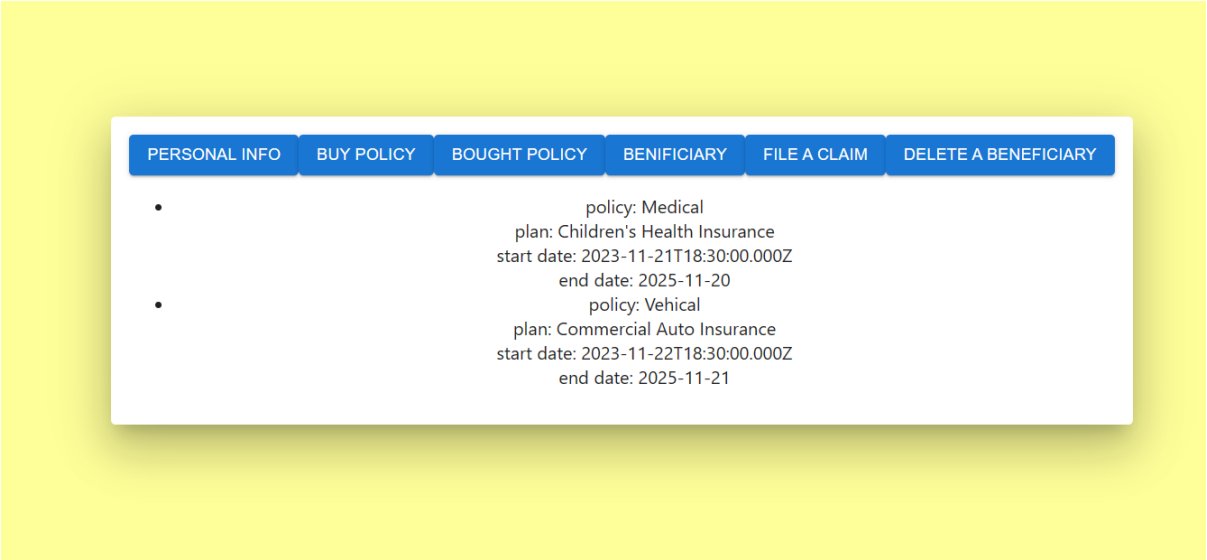
ption: It is often considered by those with auto loans or lea

f their vehicle and the remaining loan or lease

Choose Start Date:

23-11-2023 Submit

AFTER THE POLICY IS BOUGHT -



BOUGHT POLICY:

<u>SQL QUERY:</u>

SELECT pib.*, p.type AS policy_type, pl.name AS plan_name FROM policy_issued_by AS pib JOIN plan AS pl ON pib.plan_id = pl.plan_id JOIN policy AS p ON pl.policy_id = p.policy_id WHERE pib.policyholder_id = 1;

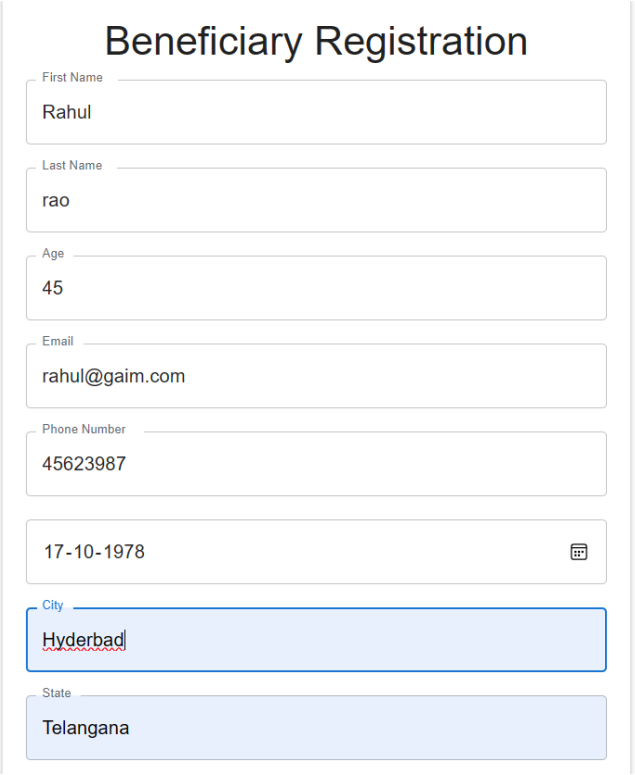
<u>GUI-</u>

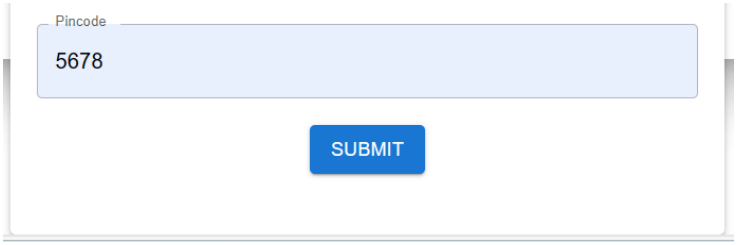
BENEFICIARY:

SQL QUERY:

```
INSERT INTO BENEFICIARY (policyholder_id, fname, lname, age,
email, phone, dob, city, state, pin) VALUES
(Rahul,rao,45,rahul@gmail.com,45623987,17-10-1978,Hyderabad,Telang
ana,5678);
```

GUI:





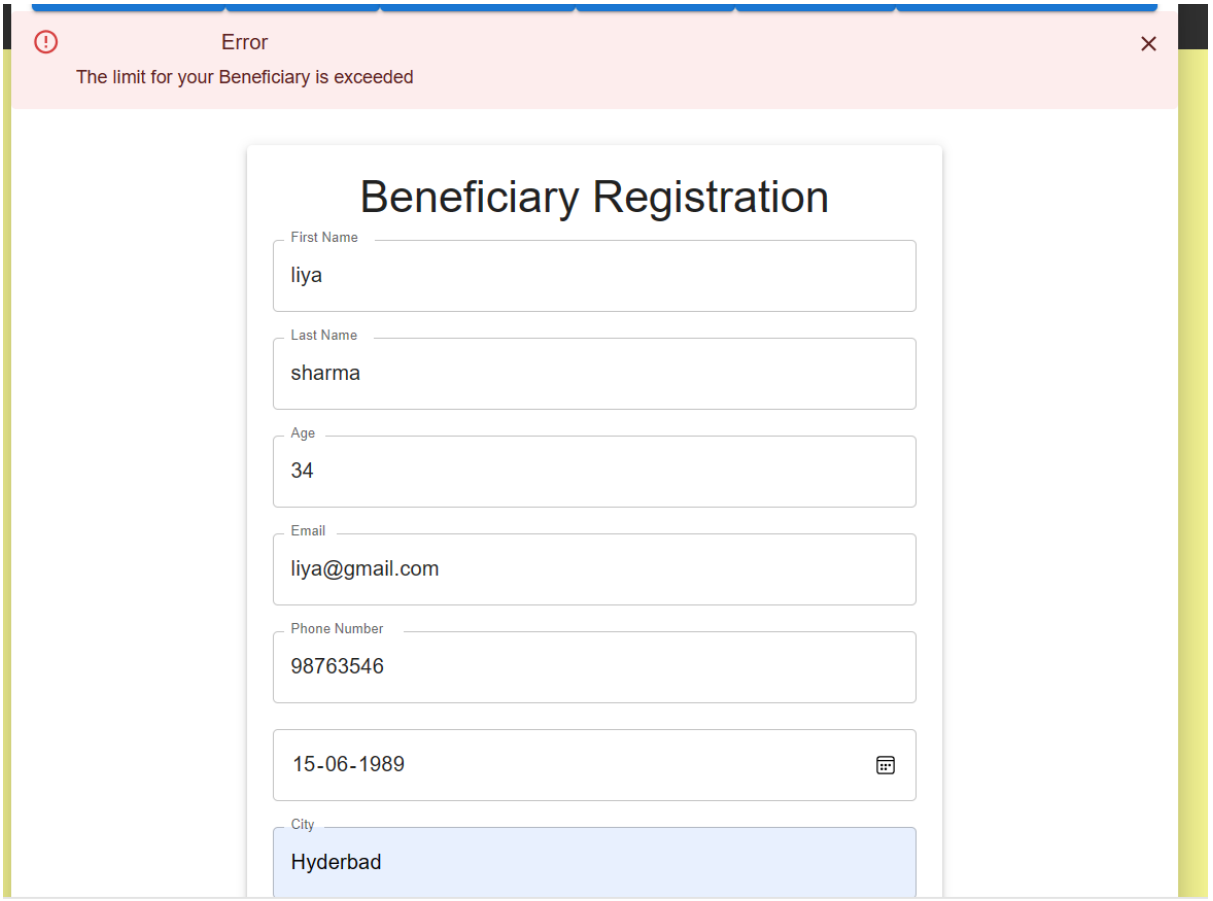

```
mysql> select * from beneficiary;
+----------------+-----------------+--------+--------+------+------------------+----------+------------+-----------+-------+--------+
| beneficiary_id | policyholder_id | fname  | lname  | age  | email            | phone    | dob        | city      | state | pin    |
+----------------+-----------------+--------+--------+------+------------------+----------+------------+-----------+-------+--------+
|              2 |               2 | Akash  | sharma |   35 | akash@gmail.com  |   468484 | 2023-11-09 | Bengaluru | NULL  | 560078 |
|              3 |               2 | abcd   | abcd   |   56 | abc@gmail.com    | 35678798 | 2023-11-09 | Bengaluru | NULL  | 560078 |
|              4 |               2 | pri    | sha    |   76 | pri@gmail.com    |  8758375 | 2023-11-09 | Bengaluru | NULL  | 560078 |
|              5 |               2 | pri    | Nile   |   45 | pri@gmail.com    |     8758 | 2023-11-23 | Bengaluru | NULL  | 560078 |
|              7 |               2 | Madhvi | Sharma |   34 | madhvi@gmail.com |  7568785 | 1989-06-22 | Bengaluru | NULL  | 560078 |
|              8 |              13 | shreya | pal    |   34 | pal@gmail.com    |    45567 | 1989-06-15 | Bengaluru | NULL  | 560078 |
|              9 |               1 | Rahul  | rao    |   45 | rahul@gaim.com   | 45623987 | 1978-10-17 | Hyderbad  | NULL  | 5678   |
+----------------+-----------------+--------+--------+------+------------------+----------+------------+-----------+-------+--------+
7 rows in set (0.00 sec)
```

WHEN THE POLICY HOLDER HAS 5 BENEFICIARY ALREADY
(this is for policy holder with the id 2)

SQL QUERY:

```
select count(beneficiary_id) from BENEFICIARY where
policyholder_id=2;
```

GUI :

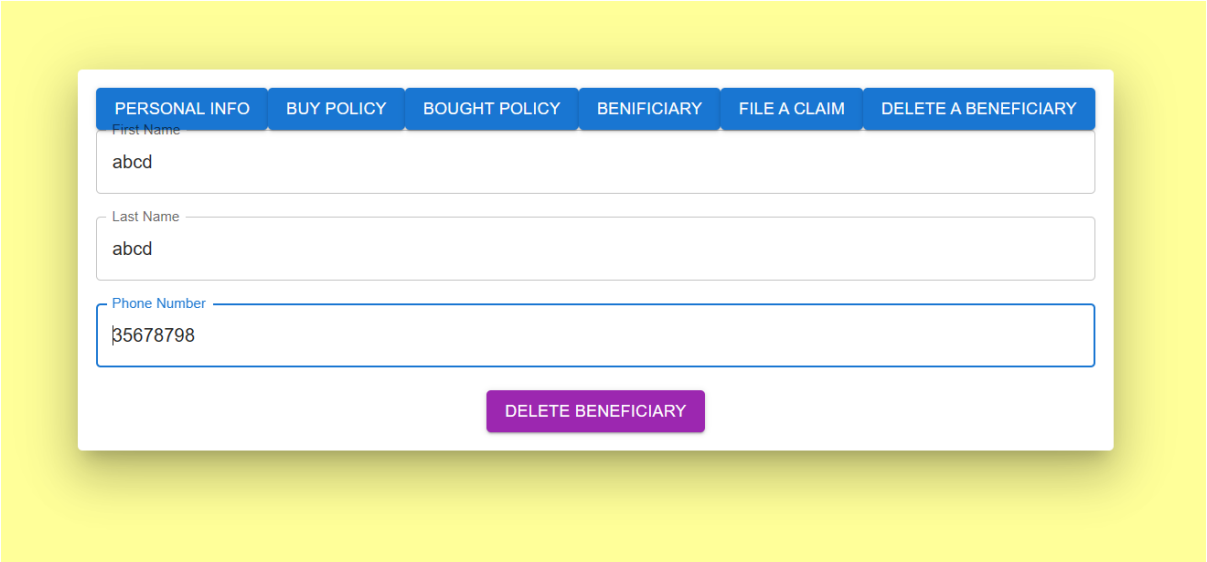


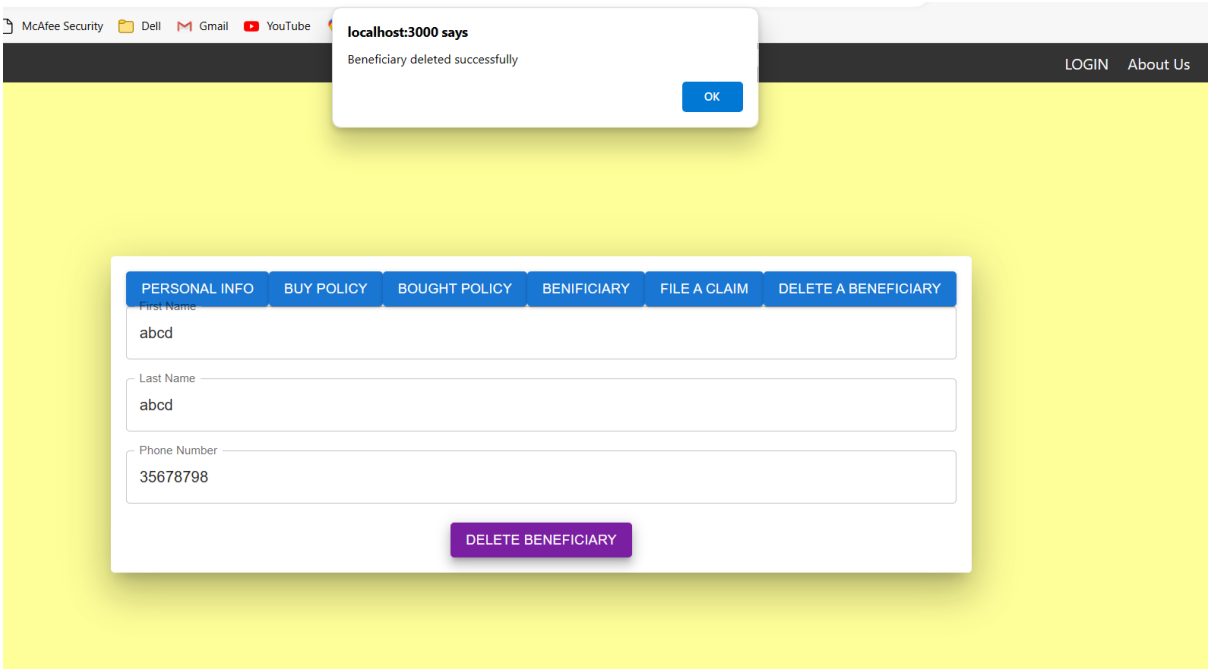
DELETE BENEFICIARY:

SQL QUERY:

DELETE FROM beneficiary WHERE fname = “abcd” AND lname = “abcd” AND phone=35678798 AND policyholder_id = 2;

GUI-





FILE A CLAIM:

<u>SQL QUERY:</u>

SELECT policyholder_id from policyholder_login where username="akash_sharma";
select coverage_id from coverage where (plan_id in (SELECT plan_id from policy_issued_by where policyholder_id=13)) and (coverage_name="Property Damage Liability") and (coverage_amount>="4250")
INSERT into claim (claim_date, status, reason, policyholder_id) values("22-11-2023","Accepted","car accident",13);
INSERT INTO claims_coverage (claim_id, coverage_id, claimed_amount) VALUES (21,118, 4250);

Internally Queries work like this:

server1.js | Buypolicy.js U | Benificiary.js U

backend > server1.js > app.post('/make_claim') callback

```javascript
app.post('/make_claim', (req, res) => {
  const { reason, date, claimed_amount, username, category } = req.body;

  const findQuery = 'SELECT policyholder_id from policyholder_login where username=?';
  db.query(findQuery, [username], (err, result) => {
    if (err) {
      console.error('Error querying the database:', err);
      //res.status(500).json({ error: 'Database error' });
    } else {
      console.log('Data queried from the database:', result);

      if (result.length === 0) {
        //res.status(404).json({ error: 'User not found' });
      } else {
        const policyholderId = result[0].policyholder_id;
        const selectSQL = 'SELECT plan_id from policy_issued_by where policyholder_id=?';
        db.query(selectSQL, [policyholderId], (err, result1) => {
          if (err) {
            console.error('Error querying policy data:', err);
            //res.status(500).json({ error: 'Database error' });
          } else {
            const planID = result1.map(item => item.plan_id);
            console.log(planID)
            const coveragesql = 'select coverage_id from coverage where (plan_id in (?)) and (coverage_name=?) and (coverage_amount>=?)';
            db.query(coveragesql, [planID, category, claimed_amount], (err, result2) => {
              if (err) {
                console.error('Error querying the database:', err);
                //res.status(500).json({ error: 'Database error' });
              } else {
                const coverageID = result2.map(item => item.coverage_id);
                if (result2.length === 0) {
                  const status = 'Rejected';
                  insertClaimAndCoverage(status, policyholderId,date,reason,claimed_amount,coverageID);
                } else {
                  const status = 'Accepted';
                  insertClaimAndCoverage(status, policyholderId,date,reason,claimed_amount,coverageID);
                }
```

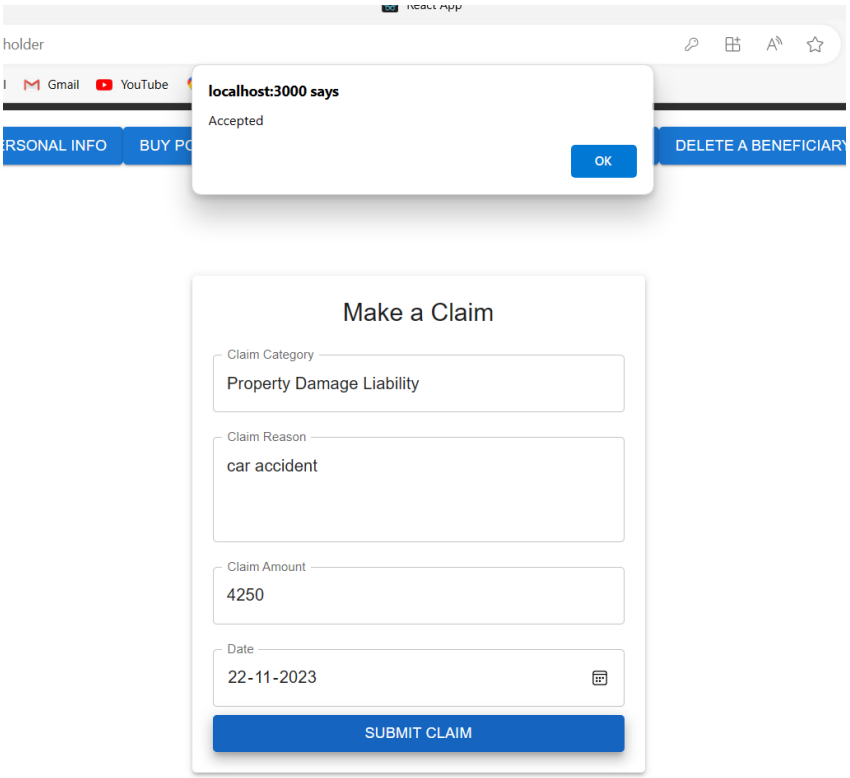
server1.js | Buypolicy.js U | Benificiary.js U

backend > server1.js > app.post('/make_claim') callback

```javascript
                  const status = 'Accepted';
                  insertClaimAndCoverage(status, policyholderId,date,reason,claimed_amount,coverageID);
                }
              }
            });
          }
        });
      }
    }
  });

  function insertClaimAndCoverage(status, policyholderId,date,reason,claimed_amount,coverageID) {
    const insertClaim = 'INSERT into claim (claim_date, status, reason, policyholder_id) values(?,?,?,?)';
    db.query(insertClaim, [date, status, reason, policyholderId], (err, result3) => {
      if (err) {
        console.error('Error querying the database:', err);
        //res.status(500).json({ error: 'Database error' });
      } else {
        console.log('Data inserted from the database:', result3);

        const claimID = result3.insertId;

        const claimrelation = 'INSERT INTO claims_coverage (claim_id, coverage_id, claimed_amount) VALUES (?,?, ?)';
        db.query(claimrelation, [claimID, coverageID, claimed_amount], (err, result4) => {
          if (err) {
            console.error('Error querying the database:', err);
           // res.status(500).json({ error: 'Database error' });
          } else {
            console.log('Data inserted from the database:', result4);
          }
        });
      }
    });

    // Send the response outside the nested callbacks
    res.status(200).json({ success: status });
  }
```

GUI:

Valid claim-



Invalid claim-