LOAN MANAGEMENT SYSTEM

My SQL Project

INTRODUCTION TO MY SQL

MySQL is an open-source relational database management system (RDBMS) that uses SQL(Structured Query Language) for managing data. It is known for its speed, reliability, and ease of use, making it popular for web applications, enterprise solutions, and data-driven applications. MySQL supports features like transactions, indexing, replication, and stored procedures, and it integrates well with programming languages like Python, Java, and PHP. It is widely used in platforms such as Wordpress, e-commerce systems, and cloud applications.

KEY FEATURES

High Performance, Scalability, Replication & Clustering, Security Features, Cross-Platform Support, Integration

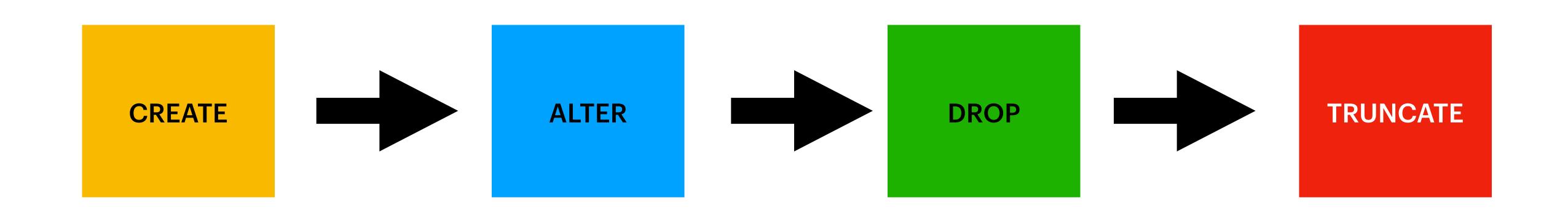
SQL STATEMENTS

An SQL statement is a command used to interact with a relational database to perform tasks like retrieving, inserting, updating, deleting, or managing data structures.

- DDL Data Definition Language
- DML Data Manipulation Language
- DCL Data Control Language
- DQL Data Query Language
- TCL Transaction Control Language

Data Definition Language

DDL (Data Definition Language) statements are used in SQL to define and manage database structures such as tables, schemas, indexes, and constraints. These statements do not manipulate data but rather define its structure.



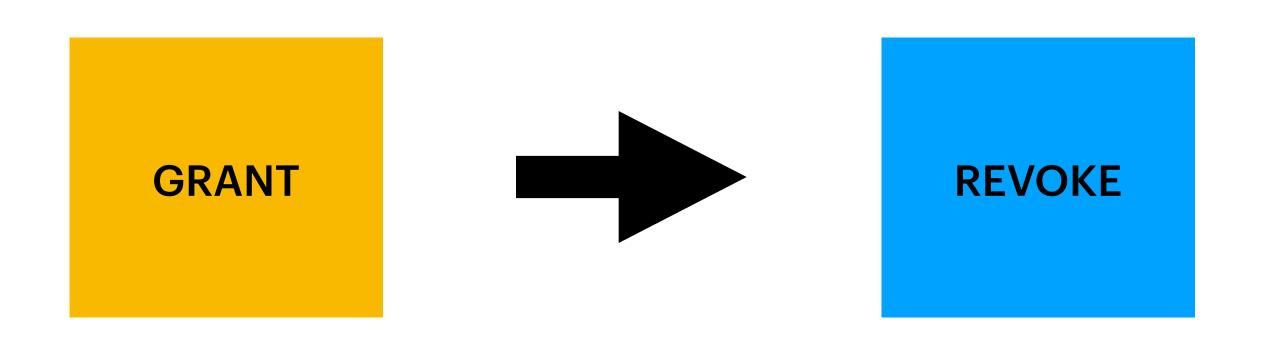
Data Manipulation Language

DML statements in SQL are used to manipulate and manage data stored in database tables. These statements allow users to insert, update, delete, and retrieve data.



Data Control Language

DCL statements in SQL are used to control access and permissions for database users. These statements help in securing data by granting or revoking privileges.



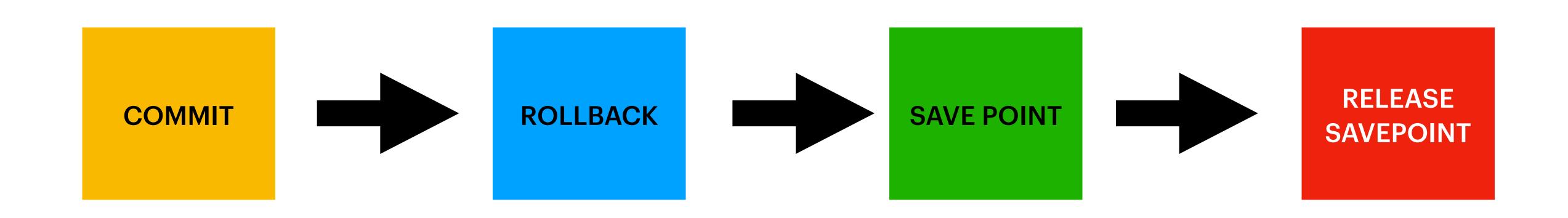
Data Query Language

DQL is used to retrieve data from a database using the SELECT statement. It allows users to perform queries to fetch specific data based on conditions.

SELECT

Transaction Control Language

TCL statements in SQL are used to manage transactions in a database. Transactions are sequences of SQL operations that should be executed as a single unit. TCL ensures data integrity by committing or rolling back changes based on success or failure.



PROJECT INTRODUCTION

LOAN MANAGEMENT SYSTEM

- The Loan Management System (LMS) is a database-driven application designed to manage the complete loan lifecycle efficiently. It allows users to apply for loans, process approvals, track repayments, and generate financial reports. The system ensures accuracy in interest calculations, EMI tracking, and penalty management for delayed payments.
- By utilising SQL for data management, the system provides a structured approach to handling loan applications, borrower details, and repayment schedules. It also enhances security through role-based access control, ensuring that only authorised users can manage loan records. This project aims to streamline loan processing, minimise manual errors, and improve financial decision-making for lenders and borrowers alike.

DATA SET

The Loan Management System dataset is a structured collection of data that stores and manages loan-related information, including borrower details, loan applications, approvals, repayments, and financial transactions. It provides a well organised database schema that helps in efficient data handling, loan tracking, and financial reporting.

- Customer income status
- Loan status
- Customer info
- Country state
- Region info

CREATING DATABASE

Creating database as "Project", to use the database and set the auto commit "off" to start the transaction.

```
create database project;
use project;
set autocommit = off;
start transaction;
```

TABLE IMPORT AND SET CRITERIA

After importing customer income data ,set the criteria based on the applicant income, in this project we implement "case-end statement" achieve the criteria.

```
-- Import table from sheet 1- customer income status
select * from customer_income;
select count(*) from customer_income;
-- set customer criteria based on applicant income
/* • Applicant income >15,000 = grade a
   • Applicant income >9,000 = grade b
   • Applicant income >5000 = middle class customer

    Otherwise low class

   (Create this as new table)*/
create table Pro
select *, case
when Applicant_income > 15000 then "Grade A"
when Applicant_income > 9000 then "Grade B"
when Applicant_income > 5000 then "Middle_class_customer"
else "Low class"
end as Grades
from customer_income;
```

| | Loan_ID | Customer_ID | Applicant_income | Coapplican_income | Property_Area | Loan_Status | Grades |
|---|----------|-------------|------------------|-------------------|---------------|-------------|-----------------------|
| • | LP001002 | IP43001 | 5849 | 0 | Urban | Υ | Middle_class_customer |
| | LP001003 | IP43002 | 4583 | 1508 | Rural | N | Low class |
| | LP001005 | IP43003 | 3000 | 0 | Urban | Υ | Low class |
| | LP001006 | IP43004 | 2583 | 2358 | Urban | Υ | Low class |
| | LP001008 | IP43005 | 6000 | 0 | Urban | Υ | Middle_class_customer |
| | LP001011 | IP43006 | 5417 | 4196 | Urban | Υ | Middle_class_customer |
| | LP001013 | IP43007 | 2333 | 1516 | Urban | Υ | Low class |
| | LP001014 | IP43008 | 3036 | 2504 | Semiurban | N | Low class |
| | LP001018 | IP43009 | 4006 | 1526 | Urban | Υ | Low class |
| | LP001020 | IP43010 | 12841 | 10968 | Semiurban | N | Grade B |
| | LP001024 | IP43011 | 3200 | 700 | Urban | Υ | Low class |
| | LP001027 | IP43012 | 2500 | 1840 | Urban | Υ | Low class |
| | LP001028 | IP43013 | 3073 | 8106 | Urban | Υ | Low class |
| | LP001029 | IP43014 | 1853 | 2840 | Rural | N | Low class |
| | LP001030 | IP43015 | 1299 | 1086 | Urban | Υ | Low class |
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SET CRITERIA BASED ON INCOME AND AREA

Then Calculate the monthly interest percentage based on income and area by using "case-end statement".

```
-- Monthly interest percentage
/* • Applicant income <5000 rural=3%
   • Applicant income <5000 semi rural=3.5%
   • Applicant income <5000 urban=5%
   • Applicant income <5000 semi urban= 2.5%
    Otherwise =7% */
create table Pro1
select *,case
when Applicant_income <5000 then
case
when Property_Area = "rural" then 3
when Property_Area = "semi_rural" then 3.5
when Property_Area = "urban" then 5
when Property Area = "semi urban" then 2.5
else 7
end
end as int_per
from customer_income;
```

CRITERIA BASED ON INCOME AND AREA

| | Loan_ID | Customer_ID | Applicant_income | Coapplican_income | Property_Area | Loan_Status | int_per |
|-----|----------|-------------|------------------|-------------------|---------------|-------------|---------|
| • | LP001002 | IP43001 | 5849 | 0 | Urban | Υ | 7.0 |
| | LP001003 | IP43002 | 4583 | 1508 | Rural | N | 3.0 |
| | LP001005 | IP43003 | 3000 | 0 | Urban | Υ | 5.0 |
| | LP001006 | IP43004 | 2583 | 2358 | Urban | Υ | 5.0 |
| | LP001008 | IP43005 | 6000 | 0 | Urban | Υ | 7.0 |
| | LP001011 | IP43006 | 5417 | 4196 | Urban | Υ | 7.0 |
| | LP001013 | IP43007 | 2333 | 1516 | Urban | Y | y p |
| | LP001014 | IP43008 | 3036 | 2504 | Semiurban | N | 7.0 |
| | LP001018 | IP43009 | 4006 | 1526 | Urban | Y | 5.0 |
| | LP001020 | IP43010 | 12841 | 10968 | Semiurban | N | 7.0 |
| | LP001024 | IP43011 | 3200 | 700 | Urban | Υ | 5.0 |
| Pro | 13 × | TD 40040 | 2522 | 10.40 | | ** | - ^ |

TRIGGER

A trigger in SQL is a special stored procedure that automatically executes in response to certain events (INSERT, UPDATE, DELETE) on a table. Triggers help enforce business rules, maintain data integrity, and automate processes in a Loan Management System (LMS.

- ROW LEVEL TRIGGER
- STATEMENT LEVEL TRIGGER

In SQL, triggers are classified based on when and why they execute. They help automate tasks, maintain data consistency, and enforce business rules in a Loan Management System (LMS)

- BEFORE TRIGGER
- AFTER TRIGGER

SET TRIGGERS

- Create a table to get the status of loan and Cibil score. Before insert the value into the table, initialise the "before insertion trigger" and set the criteria condition inside the trigger.
- Once the value is inserted, trigger automatically get fired and then it check for condition depends on that it will change the value on the specified column.

```
-- Primary Table
create table loan_status_copy
(loan_id varchar(50), customer_id varchar(50), loan_amount varchar(50),
loan_amount_term int, cibil_score int,
primary key (loan_id));

-- Secondary Table
create table loan_remark (
Loan_id varchar(50), Loan_amount varchar(50),
Cibil_Score int, Cibil_Score_status varchar (50),
primary key (loan_id));
```

ROW AND STATEMENT LEVEL TRIGGERS

- Create row level trigger for loan amt
- Create statement level trigger for cibil score

```
delimiter //
create trigger Cibil_score before insert on
loan_status_copy for each row
begin
if new.Loan_amount is null then set new.Loan_amount = "Loan is still processing";
end if ;
insert into loan_remark (loan_id,loan_amount,cibil_score,cibil_score_status)
values (new.loan_id,new.loan_amount,new.cibil_score,
case
when new.cibil_score > 900 then "High cibil score"
when new.cibil_score > 750 then "no penalty"
when new.cibil_score > 0 then "Penalty customers"
else "Loan cannot apply"
end );
end //
delimiter;
```

TRIGGER OUTPUT

| Re | sult Grid | Filter Rows: | | Edit: 🕍 🏗 Export/Import: 🖫 🖝 Wrap Cell Content: 🏗 |
|----------|-------------|--------------------------|-------------|---|
| | Loan_id | Loan_amount | Cibil_Score | Cibil_Score_status |
| • | LP001002 | Loan is still processing | 303 | Penalty customers |
| | LP001003 | 128 | 920 | High cibil score |
| | LP001005 | 66 | 606 | Penalty customers |
| | LP001006 | 120 | 851 | no penalty |
| | LP001008 | 141 | 420 | Penalty customers |
| | LP001011 | 267 | 173 | Penalty customers |
| | LP001013 | 95 | 650 | Penalty customers |
| | LP001014 | 158 | 471 | Penalty customers |
| | LP001018 | 168 | 863 | no penalty |
| | n_remark 16 | | | |

ALTER AND CREATE NEW TABLE WITH BELOW DATA

After execution and insertion, we modify datatype of loan. amount into int and join two tables, remove customers with "rejected" and "loan still processing" statuses, modify the data type of the loan amount column, and create a new table based on the loan status table.

```
-- Then delete the reject and loan still processing customers

delete from loan_remark where loan_amount = "Loan is still processing" or

Cibil_Score_status = "loan cannot apply";

-- Update loan as integers

alter table loan_remark modify loan_amount int;

create table customer_interest_analysis as

select loan_id, loan_amount, int_per,

ROUND((int_per / 100) * loan_amount, 0) as monthly_int,

ROUND(((int_per / 100) * loan_amount) * 12, 0) as annual_int

from Amount;
```

CUSTOMER ANALYSIS TABLE

Rejected and Loan still processing status are deleted and monthly and annual interest field has been added.

| Re | sult Grid | ₹ Filter Ro | ws: | Export: | Wrap | Cell Content: | <u>‡A</u> |
|------|-----------|-------------|-------------|--------------------|---------|---------------|------------|
| | Loan_id | loan_amount | Cibil_Score | Cibil_Score_status | int_per | monthly_int | annual_int |
| | LP001005 | 66 | 606 | Penalty customers | 5.0 | 3 | 40 |
| | LP001006 | 120 | 851 | no penalty | 5.0 | 6 | 72 |
| | LP001008 | 141 | 420 | Penalty customers | 7.0 | 10 | 118 |
| | LP001011 | 267 | 173 | Penalty customers | 7.0 | 19 | 224 |
| | LP001013 | 95 | 650 | Penalty customers | 5.0 | 5 | 57 |
| | LP001014 | 158 | 471 | Penalty customers | 7.0 | 11 | 133 |
| | LP001018 | 168 | 863 | no penalty | 5.0 | 8 | 101 |
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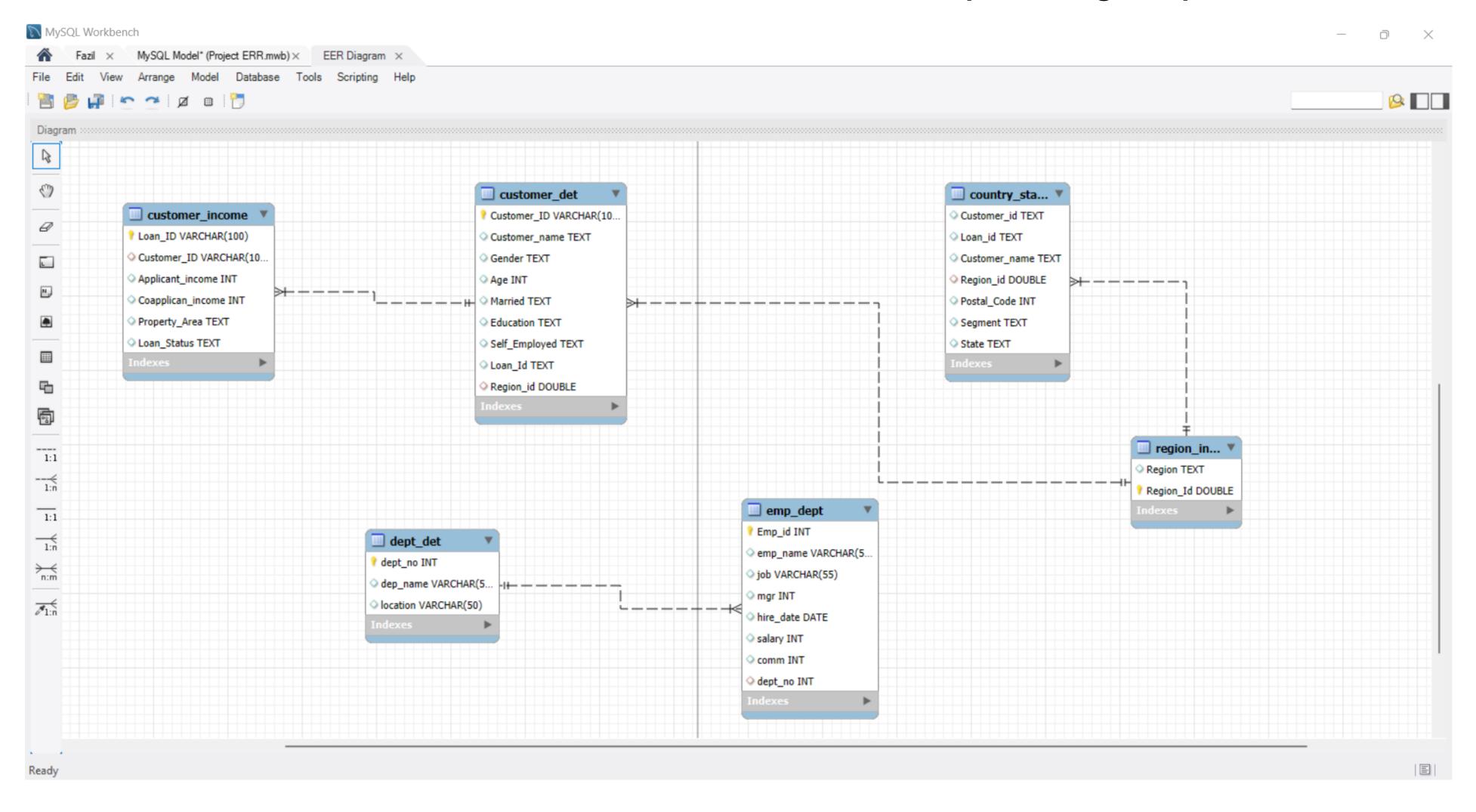
FOREIGN KEY

A foreign key in SQL is used to link two tables. It creates a relationship between the column(s) in one table (the child) and the primary key in another table (the parent). This helps maintain referential integrity.

```
-- foreign key
alter table customer_income add constraint customer_foreign_key foreign key(customer_id)
references customer_det(customer_id) on delete cascade;
alter table country_state add constraint country_region_fk foreign key(region_id)
references region_info(region_id) on update cascade;
alter table customer_det add constraint customer_region_fk foreign key (region_id)
references region_info(region_id) on update cascade;
```

ENTITY-RELATIONSHIP DIAGRAM

An ER (Entity-Relationship) diagram describes the structure of a database in terms of entities, attributes, and relationships. When translating an ER diagram into SQL, you create CREATE TABLE statements that reflect those entities, their attributes (columns), and the relationships (foreign keys).



UPDATE CUSTOMER INFO

Update some customers info like gender and age using case end statement.

```
update customer_det set gender = case
when customer_id = "IP43006" then "Female"
when customer_id = "IP43016" then "Female"
when customer_id = "IP43018" then "Male"
when customer_id = "IP43038" then "Male"
when customer_id = "IP43508" then "Female"
when customer_id = "IP43577" then "Female"
when customer_id = "IP43589" then "Female"
when customer_id = "IP43593" then "Female"
else gender
end,
age = case
when customer_id = "IP43007" then 45
when customer_id = "IP43009" then 32
else age
end;
```

OUTPUT FOR UPDATED DATA

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|-----|--------------|-----------------|--------|-----|---------|---------------|---------------|----------|-----------|
| | Customer_ID | Customer_name | Gender | Age | Married | Education | Self_Employed | Loan_Id | Region_id |
| • | IP43001 | Claire Gute | Male | 50 | No | Graduate | No | LP001002 | 13.2 |
| | IP43002 | Darrin Van Huff | Male | 66 | Yes | Graduate | No | LP001003 | 13.2 |
| | IP43003 | Sean O'Donnell | Male | 20 | Yes | Graduate | Yes | LP001005 | 13.2 |
| | IP43004 | Brosina Hoffman | Male | 46 | Yes | Not Graduate | No | LP001006 | 13.2 |
| | IP43005 | Andrew Allen | Male | 18 | No | Graduate | No | LP001008 | 13.2 |
| | IP43006 | Irene Maddox | Female | 66 | Yes | Graduate | Yes | LP001011 | 13.2 |
| | IP43007 | Harold Pawlan | Male | 45 | Yes | Not Graduate | No | LP001013 | 13.3 |
| cus | tomer_det 23 | Κ | | | | | •• | | |

A Stored Procedure in SQL is a predefined set of SQL statements that can be executed as a single unit. It helps automate processes like loan approvals, repayments, and financial calculations in a Loan Management System (LMS).

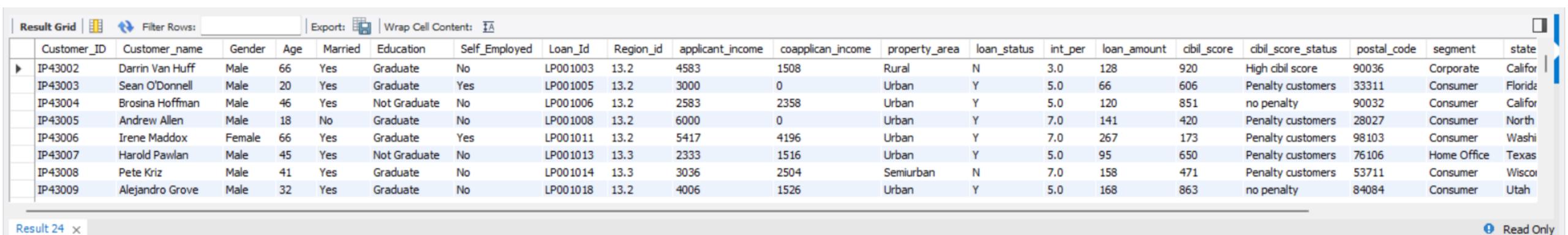
Benefits of Using Stored Procedures

- Automation: Reduces manual effort in loan processing
- Efficiency: Optimised execution for complex operations
- Security: Limits direct database access to users
- Reusability: Can be used multiple times without rewriting SQL queries

INPUT - 1

```
-- Sheet 4 and 5- country state and region
-- Join all the 5 tables without repeating the fields - output 1
select c.*,
A.applicant_income, A.coapplican_income, A.property_area, A.loan_status,
A.int_per, A.loan_amount, A.cibil_score, A.cibil_score_status,
s.postal_code, s.segment, s.state,
i.monthly_int, i.annual_int,
r.region
from customer_det c
inner join Amount A on c.loan_id = A.loan_id
inner join country_state s on c.loan_id = s.loan_id
inner join customer_interest_analysis i on c.loan_id = i.loan_id
inner join region_info r on c.region_id = r.region_id;
select*from customer_det;
```

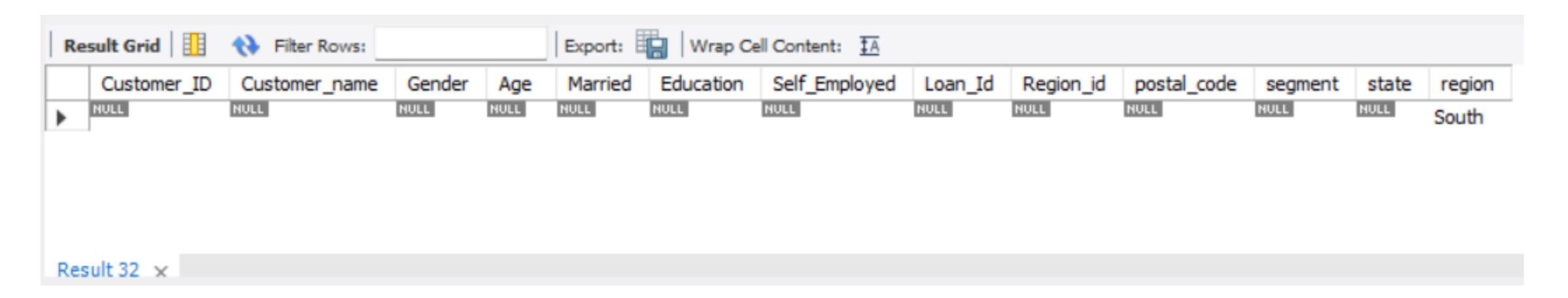
Output - 1



INPUT - 2

```
-- Find the mismatch details using joins - output 2
select c.*, s.postal_code, s.segment, s.state, r.region
from region_info r
left join customer_det c on r.region_id = c.region_id
left join country_state s on r.region_id = s.region_id
where c.region_id is null;
```

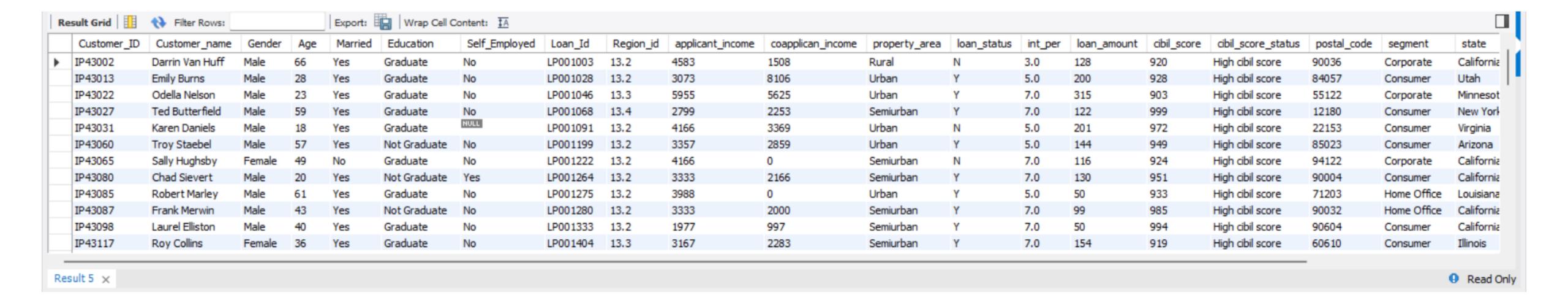
OUTPUT - 2



INPUT - 3

```
-- Filter high cibil score - output 3
select c.*,
A.applicant_income, A.coapplican_income, A.property_area, A.loan_status,
A.int_per, A.loan_amount, A.cibil_score, A.cibil_score_status,
s.postal_code, s.segment, s.state,
i.monthly_int, i.annual_int,
r.region
from customer_det c
inner join Amount A on c.loan_id = A.loan_id
inner join country_state s on c.loan_id = s.loan_id
inner join customer_interest_analysis i on c.loan_id = i.loan_id
inner join region_info r ON c.region_id = r.region_id
where A.cibil_score_status = 'High cibil score';
```

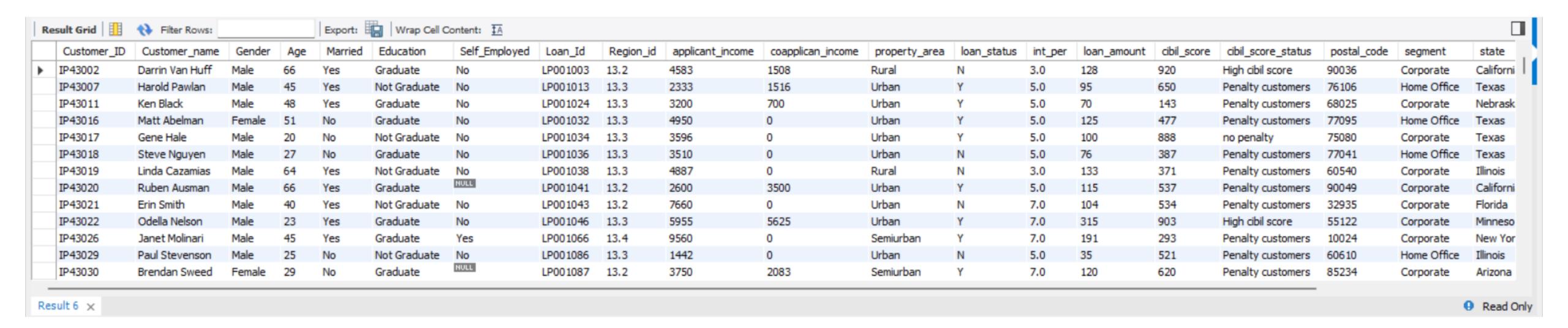
Output - 3



INPUT - 4

```
-- Filter home office and corporate - output 4
SELECT c.*,
A.applicant_income, A.coapplican_income, A.property_area, A.loan_status,
A.int_per, A.loan_amount, A.cibil_score, A.cibil_score_status,
s.postal_code, s.segment, s.state,
i.monthly_int, i.annual_int,
r.region
from customer_det c
inner join Amount A on c.loan_id = A.loan_id
inner join country_state s on c.loan_id = s.loan_id
inner join customer_interest_analysis i on c.loan_id = i.loan_id
inner join region_info r on c.region_id = r.region_id
where s.segment in ('home office','corporate');
```

Output - 4



Store all the outputs as procedure

Final Output

| Customer_ID | Customer_name | Gender | Age | Married | Education | Self_Employed | Loan_Id | Region_id | applicant_income | coapplican_income | property_area | loan_status | int_per | loan_amount | cibil_score | cibil_score_status | postal_code | segment | state |
|-------------|-----------------|--------|-----|---------|--------------|---------------|----------|-----------|------------------|-------------------|---------------|-------------|---------|-------------|-------------|--------------------|-------------|-------------|----------|
| IP43002 | Darrin Van Huff | Male | 66 | Yes | Graduate | No | LP001003 | 13.2 | 4583 | 1508 | Rural | N | 3.0 | 128 | 920 | High cibil score | 90036 | Corporate | Californ |
| IP43007 | Harold Pawlan | Male | 45 | Yes | Not Graduate | No | LP001013 | 13.3 | 2333 | 1516 | Urban | Υ | 5.0 | 95 | 650 | Penalty customers | 76106 | Home Office | Texas |
| IP43011 | Ken Black | Male | 48 | Yes | Graduate | No | LP001024 | 13.3 | 3200 | 700 | Urban | Υ | 5.0 | 70 | 143 | Penalty customers | 68025 | Corporate | Nebras |
| IP43016 | Matt Abelman | Female | 51 | No | Graduate | No | LP001032 | 13.3 | 4950 | 0 | Urban | Υ | 5.0 | 125 | 477 | Penalty customers | 77095 | Home Office | Texas |
| IP43017 | Gene Hale | Male | 20 | No | Not Graduate | No | LP001034 | 13.3 | 3596 | 0 | Urban | Υ | 5.0 | 100 | 888 | no penalty | 75080 | Corporate | Texas |
| IP43018 | Steve Nguyen | Male | 27 | No | Graduate | No | LP001036 | 13.3 | 3510 | 0 | Urban | N | 5.0 | 76 | 387 | Penalty customers | 77041 | Home Office | Texas |
| IP43019 | Linda Cazamias | Male | 64 | Yes | Not Graduate | No | LP001038 | 13.3 | 4887 | 0 | Rural | N | 3.0 | 133 | 371 | Penalty customers | 60540 | Corporate | Illinois |
| IP43020 | Ruben Ausman | Male | 66 | Yes | Graduate | NULL | LP001041 | 13.2 | 2600 | 3500 | Urban | Υ | 5.0 | 115 | 537 | Penalty customers | 90049 | Corporate | Californ |
| IP43021 | Erin Smith | Male | 40 | Yes | Not Graduate | No | LP001043 | 13.2 | 7660 | 0 | Urban | N | 7.0 | 104 | 534 | Penalty customers | 32935 | Corporate | Florida |
| IP43022 | Odella Nelson | Male | 23 | Yes | Graduate | No | LP001046 | 13.3 | 5955 | 5625 | Urban | Υ | 7.0 | 315 | 903 | High cibil score | 55122 | Corporate | Minnes |

THANKYOU