Big Data for Managers & Analytics

Submitted To:

Prof. Amarnath Mitra

Report on Project on Database Management using MySQL

Topic: Financial Database

Submitted by:

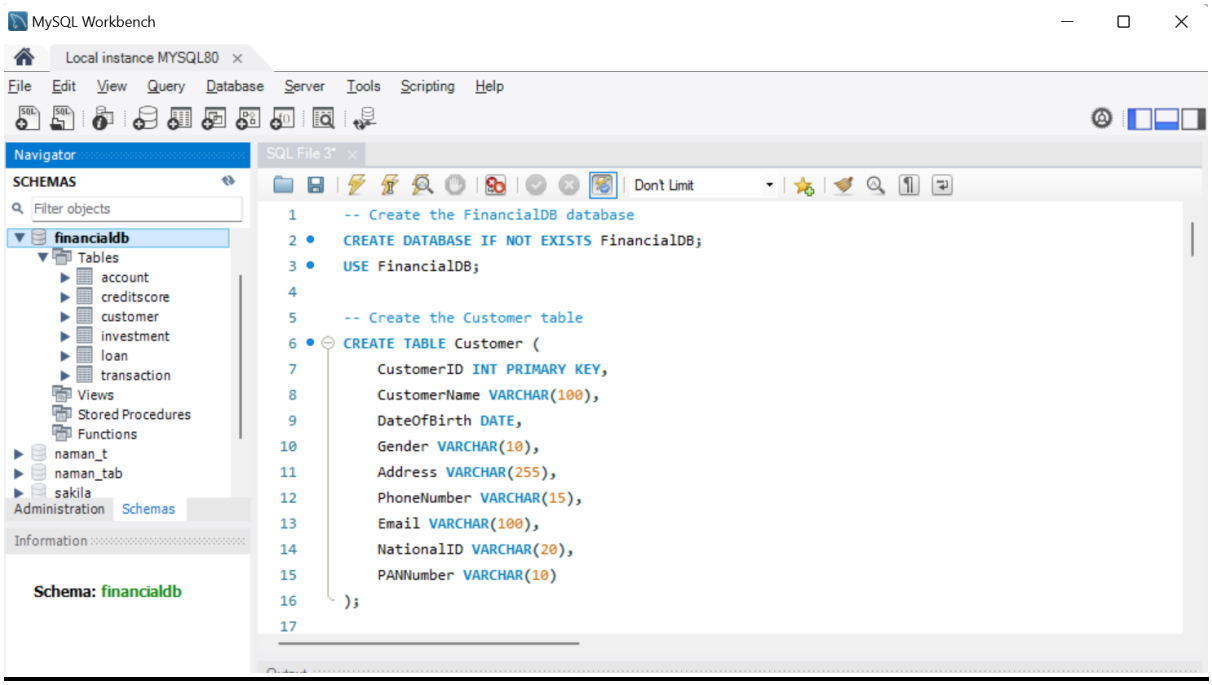
Naman Agarawal (064030)

Database

This schema “the FinancialDB” database is to maintain a comprehensive and organized repository of financial data for customers, including their accounts, credit scores, investments, loans, and transaction histories. This database aims to facilitate efficient management, analysis, and reporting of financial information, enabling better decision-making and customer service for financial institutions.

Description of Each Table in FinancialDB

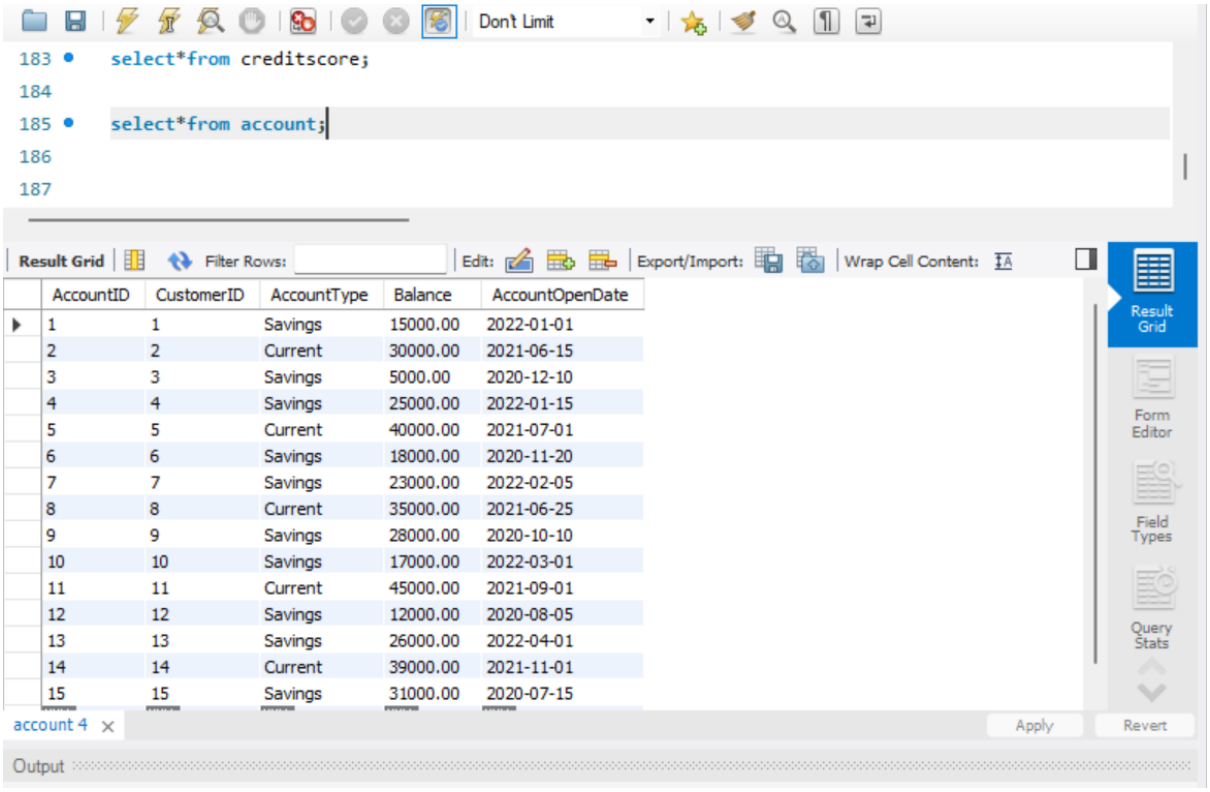
1. **Account**: Stores detailed information about each customer's bank account, including account type, balance, and associated customer ID.
2. **CreditScore**: Records the credit scores of customers, tracking their financial reliability and risk profile over time.
3. **Customer**: Contains personal and contact information for each customer, serving as the central entity to which all financial activities are linked.
4. **Investment**: Holds data related to customer investments, including types of investments, amounts invested, and performance metrics.
5. **Loan**: Tracks information about loans taken by customers, including loan amount, interest rate, payment schedule, and status.
6. **Transaction**: Captures the details of all financial transactions, such as deposits, withdrawals, and transfers, for each customer account.



Tables

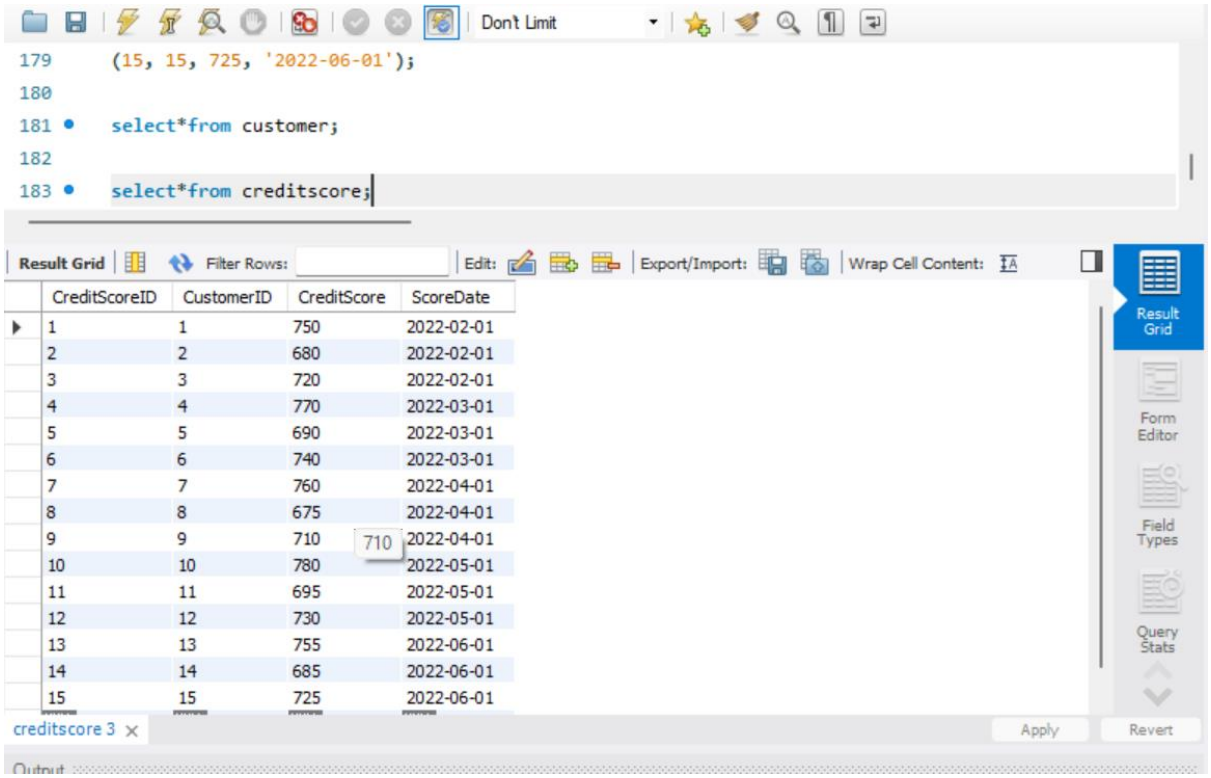
The database consists of six tables, each serving a specific role and these tables are interconnected, with **Account** being the central entity, linking to **Credit Score, Customer, Investment, Loan, and Transaction.**

- **Account:** This table stores information about each customer's bank account, including details like account number, type of account (savings, checking, etc.), current balance, and the date the account was opened.



AccountID	CustomerID	AccountType	Balance	AccountOpenDate
1	1	Savings	15000.00	2022-01-01
2	2	Current	30000.00	2021-06-15
3	3	Savings	5000.00	2020-12-10
4	4	Savings	25000.00	2022-01-15
5	5	Current	40000.00	2021-07-01
6	6	Savings	18000.00	2020-11-20
7	7	Savings	23000.00	2022-02-05
8	8	Current	35000.00	2021-06-25
9	9	Savings	28000.00	2020-10-10
10	10	Savings	17000.00	2022-03-01
11	11	Current	45000.00	2021-09-01
12	12	Savings	12000.00	2020-08-05
13	13	Savings	26000.00	2022-04-01
14	14	Current	39000.00	2021-11-01
15	15	Savings	31000.00	2020-07-15

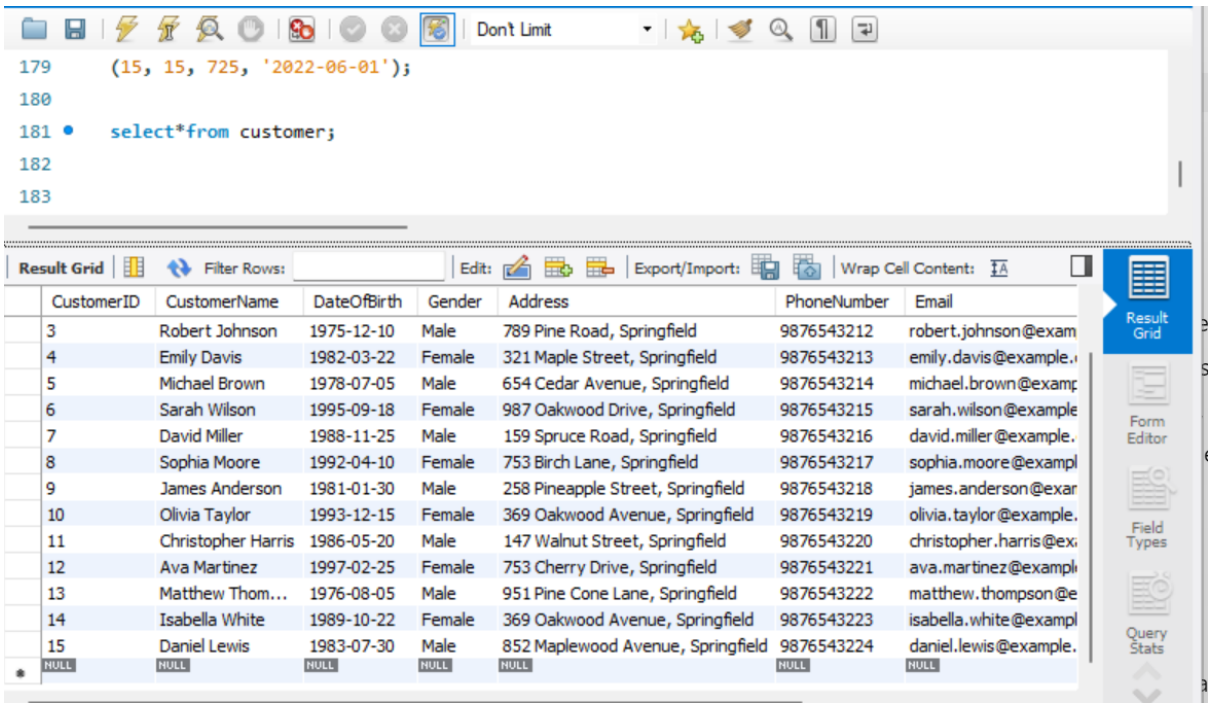
- **CreditScore:** This table maintains a record of the customers' credit scores, along with the date when each score was recorded, helping to assess creditworthiness and track changes over time.



```
179     (15, 15, 725, '2022-06-01');
180
181 •   select*from customer;
182
183 •   select*from creditscore;
```

CreditScoreID	CustomerID	CreditScore	ScoreDate
1	1	750	2022-02-01
2	2	680	2022-02-01
3	3	720	2022-02-01
4	4	770	2022-03-01
5	5	690	2022-03-01
6	6	740	2022-03-01
7	7	760	2022-04-01
8	8	675	2022-04-01
9	9	710	2022-04-01
10	10	780	2022-05-01
11	11	695	2022-05-01
12	12	730	2022-05-01
13	13	755	2022-06-01
14	14	685	2022-06-01
15	15	725	2022-06-01

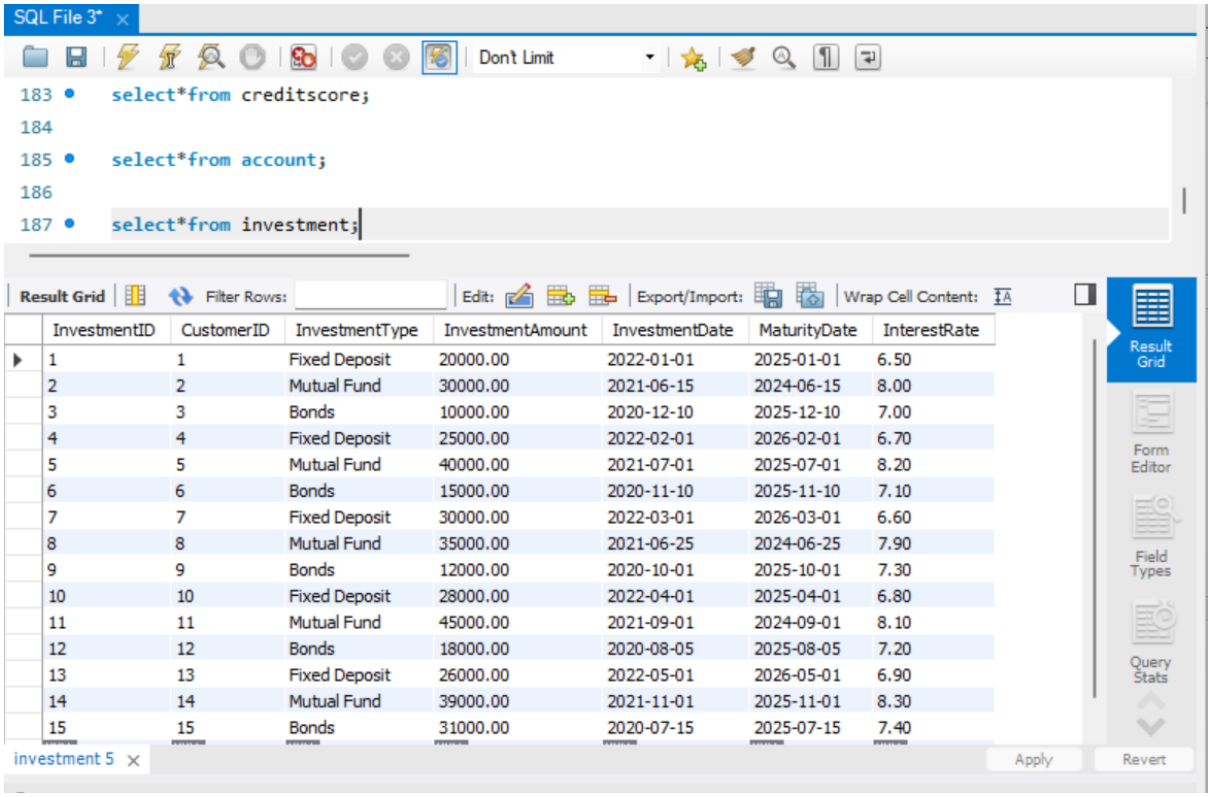
- **Customer:** This table contains key personal information for each customer, such as name, address, contact details, and customer ID, which uniquely identifies each customer across the database.



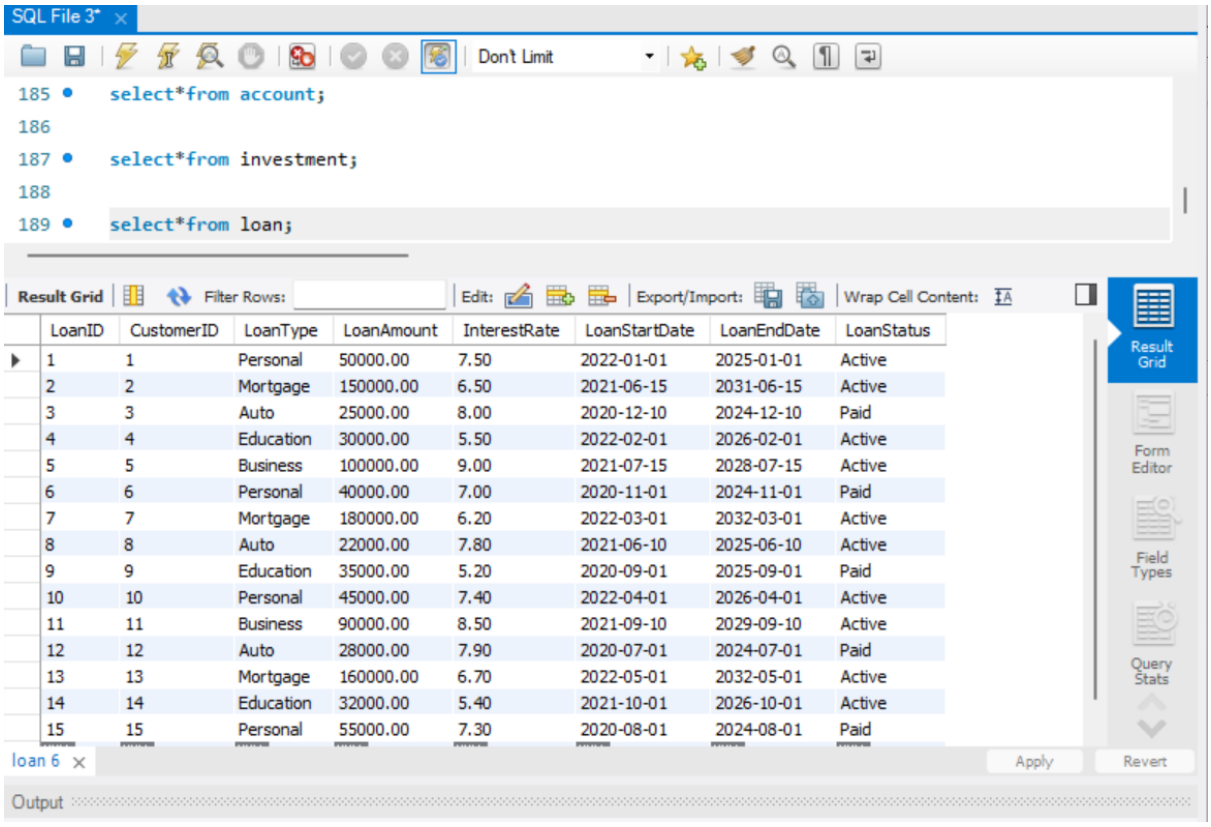
```
179     (15, 15, 725, '2022-06-01');
180
181 •   select*from customer;
182
183
```

CustomerID	CustomerName	DateOfBirth	Gender	Address	PhoneNumber	Email
3	Robert Johnson	1975-12-10	Male	789 Pine Road, Springfield	9876543212	robert.johnson@exam
4	Emily Davis	1982-03-22	Female	321 Maple Street, Springfield	9876543213	emily.davis@example.
5	Michael Brown	1978-07-05	Male	654 Cedar Avenue, Springfield	9876543214	michael.brown@examp
6	Sarah Wilson	1995-09-18	Female	987 Oakwood Drive, Springfield	9876543215	sarah.wilson@example
7	David Miller	1988-11-25	Male	159 Spruce Road, Springfield	9876543216	david.miller@example.
8	Sophia Moore	1992-04-10	Female	753 Birch Lane, Springfield	9876543217	sophia.moore@exampl
9	James Anderson	1981-01-30	Male	258 Pineapple Street, Springfield	9876543218	james.anderson@exar
10	Olivia Taylor	1993-12-15	Female	369 Oakwood Avenue, Springfield	9876543219	olivia.taylor@example.
11	Christopher Harris	1986-05-20	Male	147 Walnut Street, Springfield	9876543220	christopher.harris@ex
12	Ava Martinez	1997-02-25	Female	753 Cherry Drive, Springfield	9876543221	ava.martinez@exampl
13	Matthew Thom...	1976-08-05	Male	951 Pine Cone Lane, Springfield	9876543222	matthew.thompson@e
14	Isabella White	1989-10-22	Female	369 Oakwood Avenue, Springfield	9876543223	isabella.white@exampl
15	Daniel Lewis	1983-07-30	Male	852 Maplewood Avenue, Springfield	9876543224	daniel.lewis@example.

- **Investment:** This table records customer investment activities, including details of the types of investments (stocks, bonds, mutual funds), investment dates, amounts, and current value of investments.



- **Loan:** This table holds data on loans issued to customers, including loan type (personal, home, auto, etc.), principal amount, interest rate, repayment schedule, and current loan status.



- **Transaction:** This table logs all financial transactions made by customers, such as deposits, withdrawals, transfers, and payments, including transaction dates, amounts, and associated account numbers.

```
187 • select*from investment;
188
189 • select*from loan;
190
191 • select*from transaction;
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

TransactionID	AccountID	TransactionType	TransactionAmount	TransactionDate	Description
1	1	Deposit	5000.00	2022-02-01	Monthly Salary
2	2	Withdrawal	1000.00	2022-02-05	ATM Withdrawal
3	3	Deposit	2000.00	2022-02-10	Freelance Income
4	4	Deposit	3000.00	2022-03-01	Dividend Payment
5	5	Withdrawal	1500.00	2022-03-05	Grocery Shopping
6	6	Deposit	4000.00	2022-03-10	Rent Payment
7	7	Withdrawal	1200.00	2022-03-15	Electricity Bill
8	8	Deposit	2500.00	2022-04-01	Bonus Payment
9	9	Withdrawal	1800.00	2022-04-05	Car Maintenance
10	10	Deposit	6000.00	2022-04-10	Consultancy Fee
11	11	Withdrawal	1100.00	2022-04-15	Online Shopping
12	12	Deposit	7000.00	2022-05-01	Part-time Job Inc...
13	13	Withdrawal	900.00	2022-05-05	Dining Out
14	14	Deposit	8000.00	2022-05-10	Contract Payment
15	15	Withdrawal	1600.00	2022-05-15	Travel Expenses

transaction 7 | Apply | Revert

Output

1. **Application Table**: Records each loan application, detailing the amount requested, type of loan, status, and the date it was submitted.

```
277 • select * from application;
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

ApplicationID	CustomerID	LoanAmount	LoanType	ApplicationStatus	ApplicationDate
1	1	50000.00	Personal	Approved	2023-01-15
2	2	150000.00	Mortgage	Pending	2023-02-10
3	3	30000.00	Auto	Rejected	2023-03-05
4	4	200000.00	Mortgage	Approved	2023-04-20
5	5	80000.00	Personal	Approved	2023-05-15
6	6	25000.00	Auto	Pending	2023-06-18
7	7	60000.00	Personal	Rejected	2023-07-22
8	8	120000.00	Mortgage	Approved	2023-08-12
9	9	45000.00	Auto	Pending	2023-09-14
10	10	90000.00	Personal	Rejected	2023-10-16
11	11	55000.00	Personal	Approved	2023-11-18
12	12	300000.00	Mortgage	Pending	2023-12-20
13	13	70000.00	Auto	Rejected	2024-01-21
14	14	140000.00	Mortgage	Approved	2024-02-22
15	15	75000.00	Personal	Pending	2024-03-23

Stress Testing

Stress testing of database using the CRUD operations:

- **Create:** Used to insert new records.
- **Read:** Used to retrieve and view data.
- **Update:** Used to modify existing data.
- **Delete:** Used to remove data.

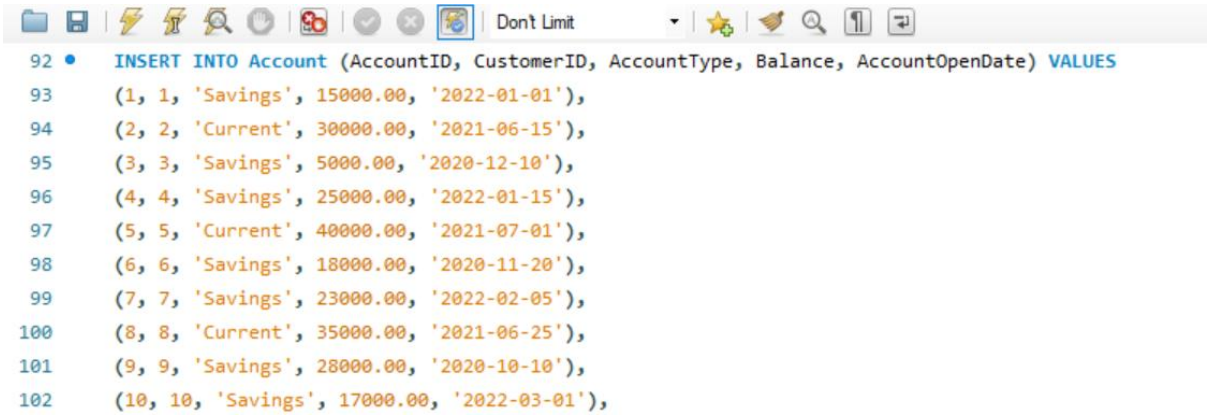
Create Operation:

Inserting into Account Table:

INSERT INTO Account (AccountID, CustomerID, AccountType, Balance, AccountOpenDate)

VALUES

(1, 1, 'Savings', 15000.00, '2022-01-01'),



Inserting into Credit Score Table:

INSERT INTO CreditScore (CreditScoreID, CustomerID, CreditScore, ScoreDate)

VALUES

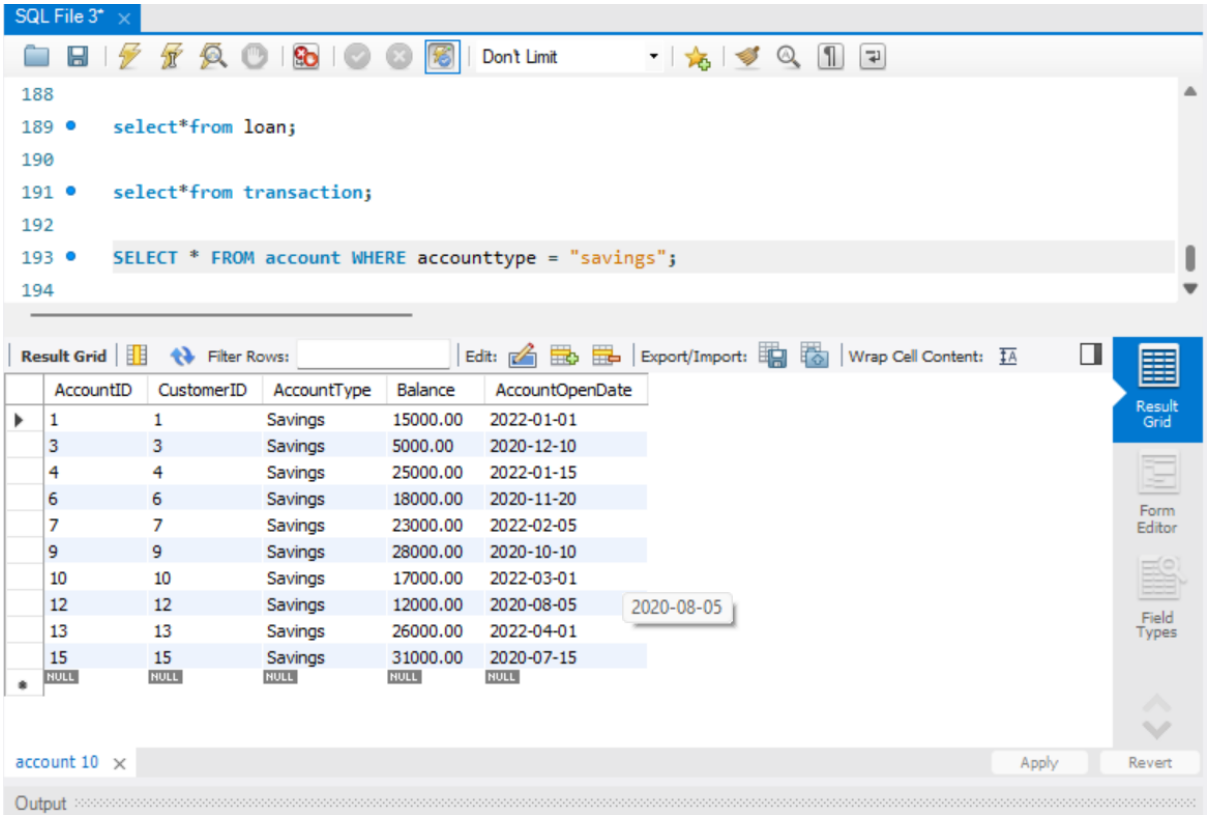
(1, 1, 750, '2022-02-01'),

```
INSERT INTO CreditScore (CreditScoreID, CustomerID, CreditScore, ScoreDate) VALUES
(1, 1, 750, '2022-02-01'),
(2, 2, 680, '2022-02-01'),
(3, 3, 720, '2022-02-01'),
(4, 4, 770, '2022-03-01'),
(5, 5, 690, '2022-03-01'),
(6, 6, 740, '2022-03-01'),
(7, 7, 760, '2022-04-01'),
(8, 8, 675, '2022-04-01'),
(9, 9, 710, '2022-04-01'),
(10, 10, 780, '2022-05-01'),
```

Read (Select) Operation: -

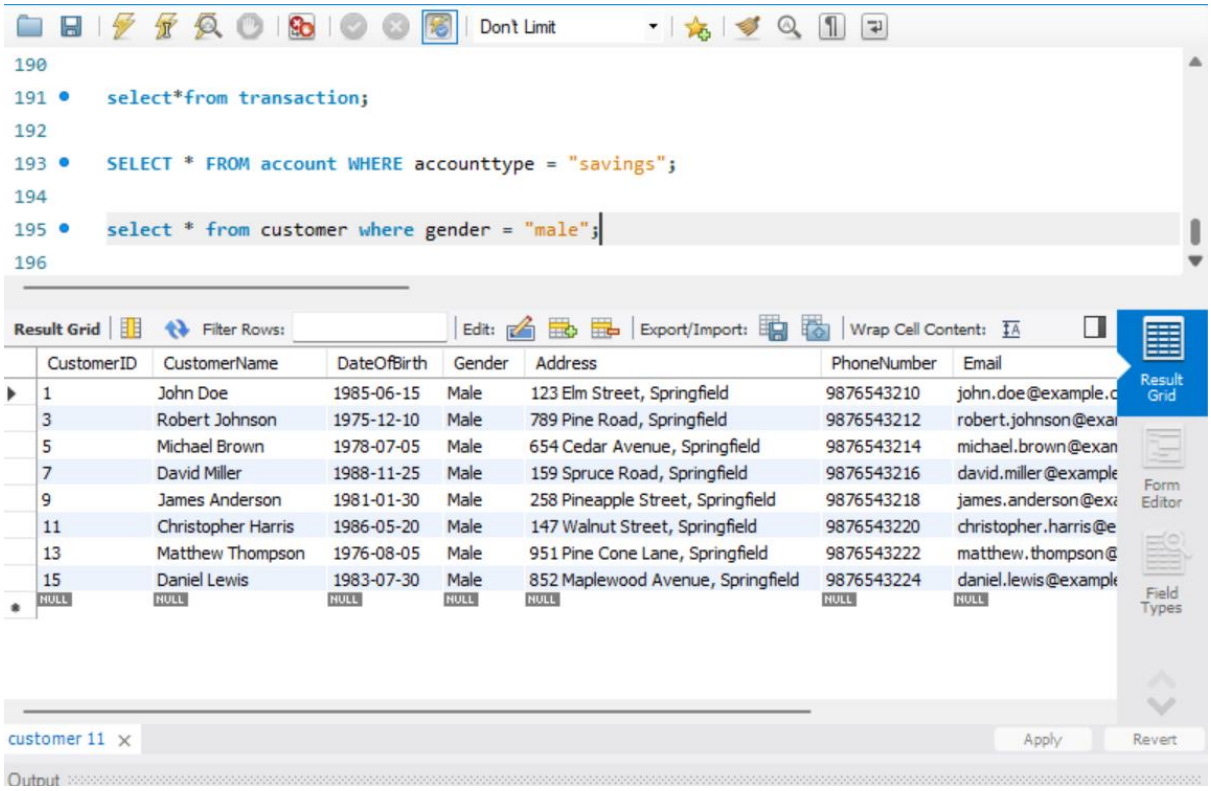
Retrieving from Account Table where account type is Savings:

SELECT * FROM account WHERE accounttype = "savings";



Retrieving from Customer where gender is Male:

select * from customer where gender = "male";



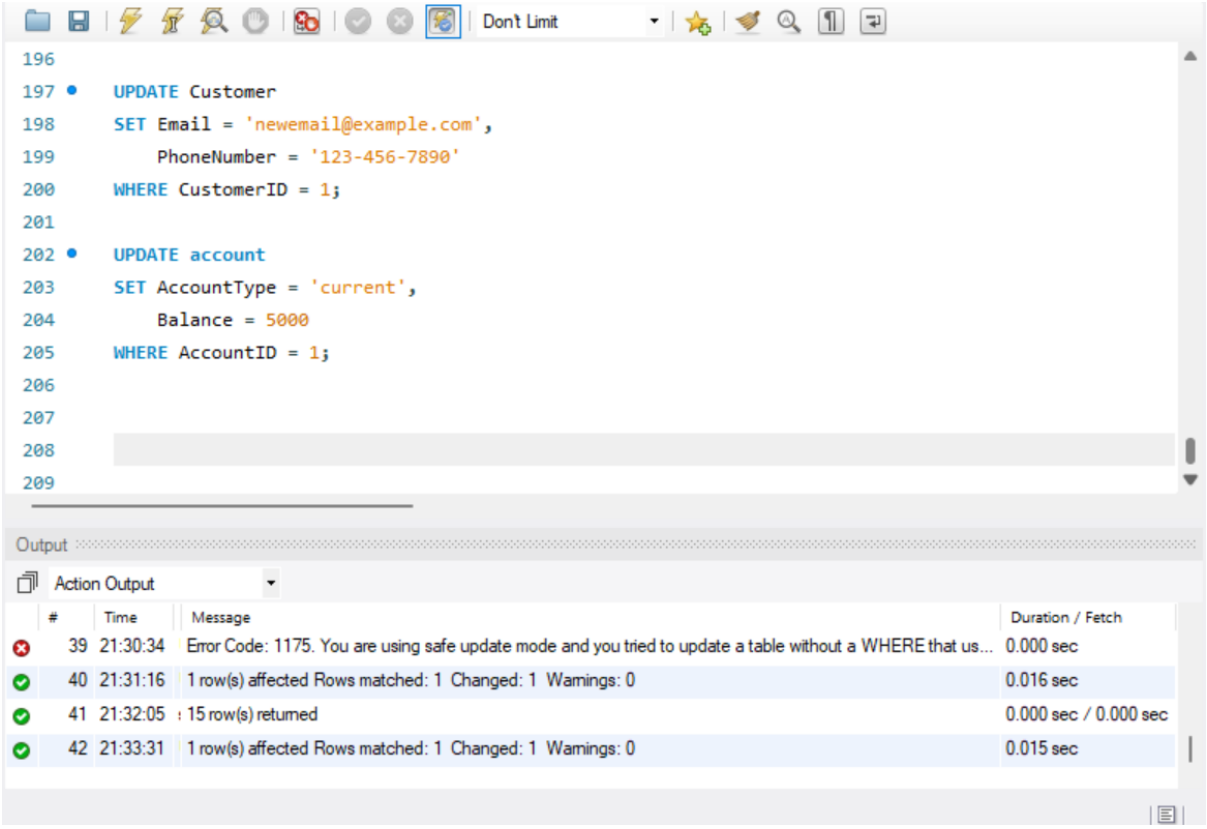
Update Operation:

Updating From Customer Table:

```
UPDATE Customer
SET Email = 'newemail@example.com',
PhoneNumber = '123-456-7890'
WHERE CustomerID = 1;
```

Updating From Account Table:

```
 UPDATE account
SET AccountType = 'current',
    Balance = 5000
WHERE AccountID = 1;
```



Delete Operation:

Deleting from Loan Table:

Delete from Loan where LoanId = 1;

Deleting From Application Table:

Delete from Application where Applicationid = 1;

```
299     Where applicationid = "10";
300
301
302
303
304 •   Delete from Loan where LoanId = 1 ;
305 •   Delete from Application where Applicationid = 1;
306
307
308
309
310
311
312
313
```

Context Help | Snippets

Output

Action Output

#	Time	Action	Message	Duration / Fetch
53	03:01:48	Delete from Application where Applicationid = 10	Error Code: 1451. Cannot delete or update a parent row: a foreign key constraint fails ...	0.016 sec
54	03:02:00	Delete from Loan where LoanId = 1	0 row(s) affected	0.000 sec
55	03:02:00	Delete from Application where Applicationid = 1	1 row(s) affected	0.000 sec