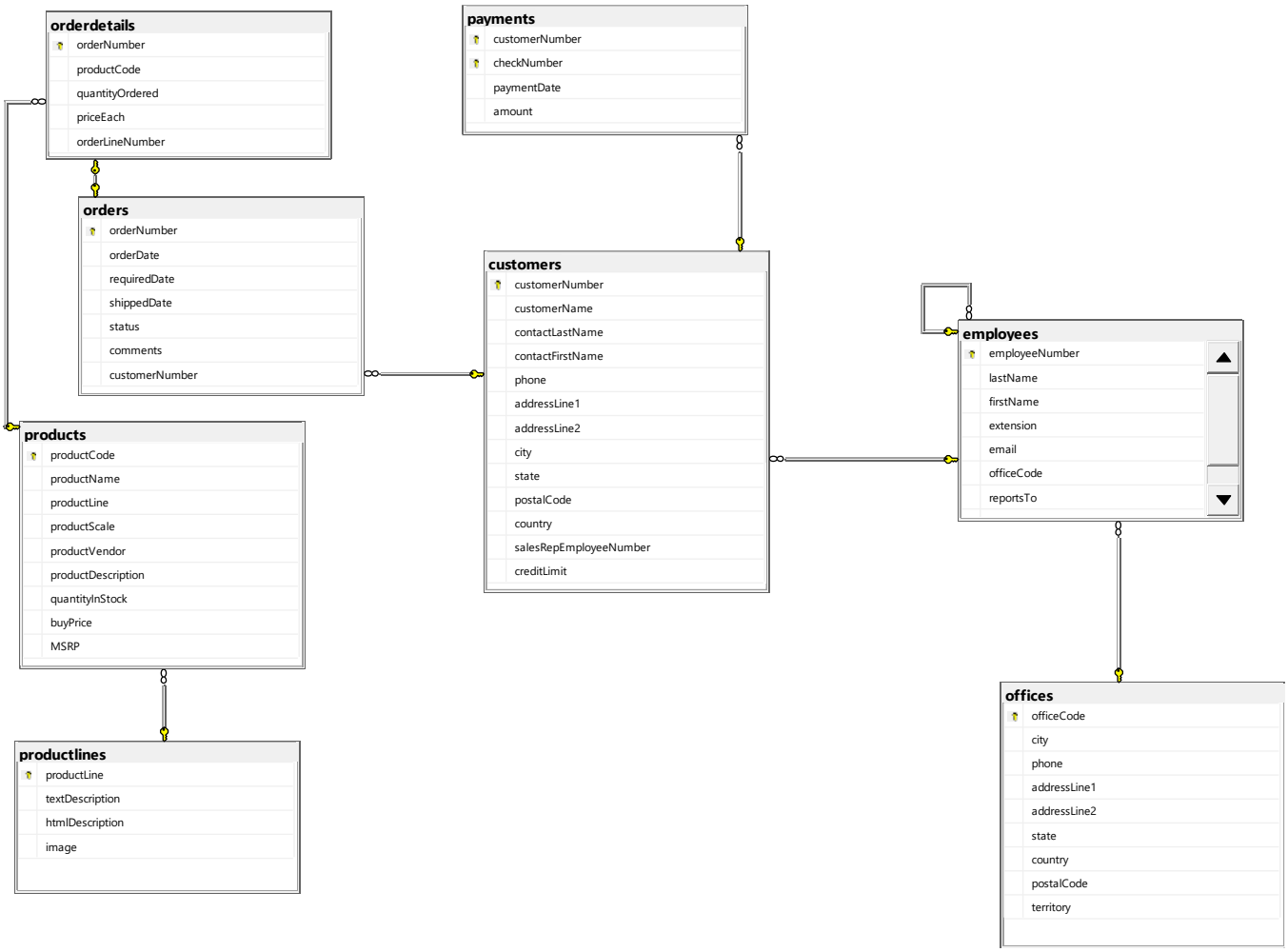
1. ER Diagram Design

Database Name: MotorsCertification



2. Table Design and Data Insertion

--(i) Creating orderdetails table

```
CREATE TABLE orderdetails (
    orderNumber INT PRIMARY KEY,
    productCode VARCHAR(50),
    quantityOrdered INT,
    priceEach FLOAT,
    orderLineNumber SMALLINT,
    FOREIGN KEY (orderNumber) REFERENCES orders(orderNumber),
    FOREIGN KEY (productCode) REFERENCES products(productCode)
```

```
);

--      index for orderdetails table
CREATE UNIQUE INDEX idx_orderdetails_orderNumber ON orderdetails(orderNumber);
CREATE INDEX idx_orderdetails_productCode ON orderdetails(productCode);
```

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```
--    index for 'products' table
CREATE UNIQUE INDEX idx_products_productCode ON products(productCode);
CREATE INDEX idx_products_productLine ON products(productLine);


-- Creating orderdetails table
CREATE TABLE orderdetails (
    orderNumber INT PRIMARY KEY,
    productCode VARCHAR(50),
    quantityOrdered INT,
    priceEach FLOAT,
    orderLineNumber SMALLINT,
    FOREIGN KEY (orderNumber) REFERENCES orders(orderNumber),
    FOREIGN KEY (productCode) REFERENCES products(productCode)
);

--      index for orderdetails table
CREATE UNIQUE INDEX idx_orderdetails_orderNumber ON orderdetails(orderNumber);
CREATE INDEX idx_orderdetails_productCode ON orderdetails(productCode);
```

```
--(ii)    Creating customers table
CREATE TABLE customers (
   customerNumber INT PRIMARY KEY,
   customerName VARCHAR(50),
   contactLastName VARCHAR(50),
   contactFirstName VARCHAR(50),
   phone VARCHAR(50),
   addressLine1 VARCHAR(50),
   addressLine2 VARCHAR(50),
   city VARCHAR(50),
   state VARCHAR(50),
   postalCode VARCHAR(15),
   country VARCHAR(50),
   salesRepEmployeeNumber INT,
   creditLimit FLOAT,
   FOREIGN KEY (salesRepEmployeeNumber) REFERENCES employees(employeeNumber)
```

);

-- index for customers table

CREATE UNIQUE INDEX idx_customers_customerNumber ON customers(customerNumber);

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```sql
-- Creating customers table
CREATE TABLE customers (
    customerNumber INT PRIMARY KEY,
    customerName VARCHAR(50),
    contactLastName VARCHAR(50),
    contactFirstName VARCHAR(50),
    phone VARCHAR(50),
    addressLine1 VARCHAR(50),
    addressLine2 VARCHAR(50),
    city VARCHAR(50),
    state VARCHAR(50),
    postalCode VARCHAR(15),
    country VARCHAR(50),
    salesRepEmployeeNumber INT,
    creditLimit FLOAT,
    FOREIGN KEY (salesRepEmployeeNumber) REFERENCES employees(employeeNumber)
);

--  index for customers table
CREATE UNIQUE INDEX idx_customers_customerNumber ON customers(customerNumber);
```

-- (iii) Creating payments table

CREATE TABLE payments (

customerNumber INT,

checkNumber VARCHAR(50),

paymentDate DATE,

amount FLOAT,

PRIMARY KEY (customerNumber, checkNumber),

FOREIGN KEY (customerNumber) REFERENCES customers(customerNumber)

);

-- index for payments table

CREATE UNIQUE INDEX idx_payments_customerNumber_checkNumber ON payments(customerNumber, checkNumber);

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```sql
-- Creating payments table
CREATE TABLE payments (
    customerNumber INT,
    checkNumber VARCHAR(50),
    paymentDate DATE,
    amount FLOAT,
    PRIMARY KEY (customerNumber, checkNumber),
    FOREIGN KEY (customerNumber) REFERENCES customers(customerNumber)
);

--     index for payments table
CREATE UNIQUE INDEX idx_payments_customerNumber_checkNumber ON payments(customerNumber, checkNumber);
```

```sql
--(iv)   Creating products table
CREATE TABLE products (
   productCode VARCHAR(50) PRIMARY KEY,
   productName VARCHAR(100),
   productLine VARCHAR(50),
   productScale VARCHAR(50),
   productVendor VARCHAR(50),
   productDescription TEXT,
   quantityInStock SMALLINT,
   buyPrice FLOAT,
   MSRP FLOAT,
   FOREIGN KEY (productLine) REFERENCES productlines(productLine)
);
--   index for 'products' table
CREATE UNIQUE INDEX idx_products_productCode ON products(productCode);
CREATE INDEX idx_products_productLine ON products(productLine);
```

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```sql
-- Creating products table
CREATE TABLE products (
    productCode VARCHAR(50) PRIMARY KEY,
    productName VARCHAR(100),
    productLine VARCHAR(50),
    productScale VARCHAR(50),
    productVendor VARCHAR(50),
    productDescription TEXT,
    quantityInStock SMALLINT,
    buyPrice FLOAT,
    MSRP FLOAT,
    FOREIGN KEY (productLine) REFERENCES productlines(productLine)
);

--    index for 'products' table
CREATE UNIQUE INDEX idx_products_productCode ON products(productCode);
CREATE INDEX idx_products_productLine ON products(productLine);
```

-- (v) Creating employees table

```sql
CREATE TABLE employees (
   employeeNumber INT PRIMARY KEY,
   lastName VARCHAR(50),
   firstName VARCHAR(50),
   extension VARCHAR(10),
   email VARCHAR(100),
   officeCode VARCHAR(10),
   reportsTo INT,
   jobTitle VARCHAR(50),
   FOREIGN KEY (reportsTo) REFERENCES employees(employeeNumber),
   FOREIGN KEY (officeCode) REFERENCES offices(officeCode)
);
-- index for employees table
CREATE UNIQUE INDEX idx_employees_employeeNumber ON employees(employeeNumber);
CREATE INDEX idx_employees_reportsTo ON employees(reportsTo);
CREATE INDEX idx_employees_officeCode ON employees(officeCode);
```

```
MotorCertificatio...M4PD5\BIASON (61))*
CREATE INDEX idx_orderdetails_productCode ON orderdetails(productCode);


-- Creating employees table
CREATE TABLE employees (
    employeeNumber INT PRIMARY KEY,
    lastName VARCHAR(50),
    firstName VARCHAR(50),
    extension VARCHAR(10),
    email VARCHAR(100),
    officeCode VARCHAR(10),
    reportsTo INT,
    jobTitle VARCHAR(50),
    FOREIGN KEY (reportsTo) REFERENCES employees(employeeNumber),
    FOREIGN KEY (officeCode) REFERENCES offices(officeCode)
);

--  index for employees table
CREATE UNIQUE INDEX idx_employees_employeeNumber ON employees(employeeNumber);
CREATE INDEX idx_employees_reportsTo ON employees(reportsTo);
CREATE INDEX idx_employees_officeCode ON employees(officeCode);
```

--(vi) Creating offices table

CREATE TABLE offices (

officeCode VARCHAR(10) PRIMARY KEY,

city VARCHAR(50),

phone VARCHAR(50),

addressLine1 VARCHAR(100),

addressLine2 VARCHAR(100),

state VARCHAR(50),

country VARCHAR(50),

postalCode VARCHAR(15),

territory VARCHAR(50)

);

-- index for offices table

CREATE UNIQUE INDEX idx_offices_officeCode ON offices(officeCode);

```
MotorCertificatio...M4PD5\BIASON (61))*

-- Creating offices table
CREATE TABLE offices (
    officeCode VARCHAR(10) PRIMARY KEY,
    city VARCHAR(50),
    phone VARCHAR(50),
    addressLine1 VARCHAR(100),
    addressLine2 VARCHAR(100),
    state VARCHAR(50),
    country VARCHAR(50),
    postalCode VARCHAR(15),
    territory VARCHAR(50)
);
--   index for offices table
CREATE UNIQUE INDEX idx_offices_officeCode ON offices(officeCode);
```

--(vii) Creating orders table

```
CREATE TABLE orders (
   orderNumber INT PRIMARY KEY,
   orderDate DATE,
   requiredDate DATE,
   shippedDate DATE,
   status VARCHAR(50),
   comments TEXT,
   customerNumber INT,
   FOREIGN KEY (customerNumber) REFERENCES customers(customerNumber)
);
--    index for 'orders' table
CREATE UNIQUE INDEX idx_orders_orderNumber ON orders(orderNumber);
CREATE INDEX idx_orders_customerNumber ON orders(customerNumber);
```

-- (viii) Creating productlines table

```
CREATE TABLE productlines (
   productLine VARCHAR(50) PRIMARY KEY,
   textDescription VARCHAR(4000),
   htmlDescription TEXT NULL,
   image VARBINARY(MAX) NULL
```

);

```
-- Creating productlines table
CREATE TABLE productlines (
    productLine VARCHAR(50) PRIMARY KEY,
    textDescription VARCHAR(4000),
    htmlDescription TEXT NULL,
    image VARBINARY(MAX) NULL
);

EXEC sp_help productlines
```

4. Delete the columns in productlines which are useless that do not infer anything.

SELECT * FROM productlines; -- viewing the productlines table first

-- In my case, columns 'htmlDescription' and 'image' are not important since they have no values/items.

-- Deleting 'htmlDescription' and 'image'

ALTER TABLE productlines

DROP COLUMN htmlDescription, image;

-- verifying if the dropped columns are removed

SELECT * FROM productlines;

5. Use a select statement to verify all insertions as well as updates.

-- Verifying data in 'orderdetails' table

SELECT * FROM orderdetails;

-- Verifying data in 'employees' table

SELECT * FROM employees;

```
-- Verifying data in 'payments' table

SELECT * FROM payments;


-- Verifying data in 'products' table

SELECT * FROM products;


-- Verifying data in 'customers' table

SELECT * FROM customers;


-- Verifying data in 'offices' table

SELECT * FROM offices;


-- Verifying data in 'orders' table

SELECT * FROM orders;
```

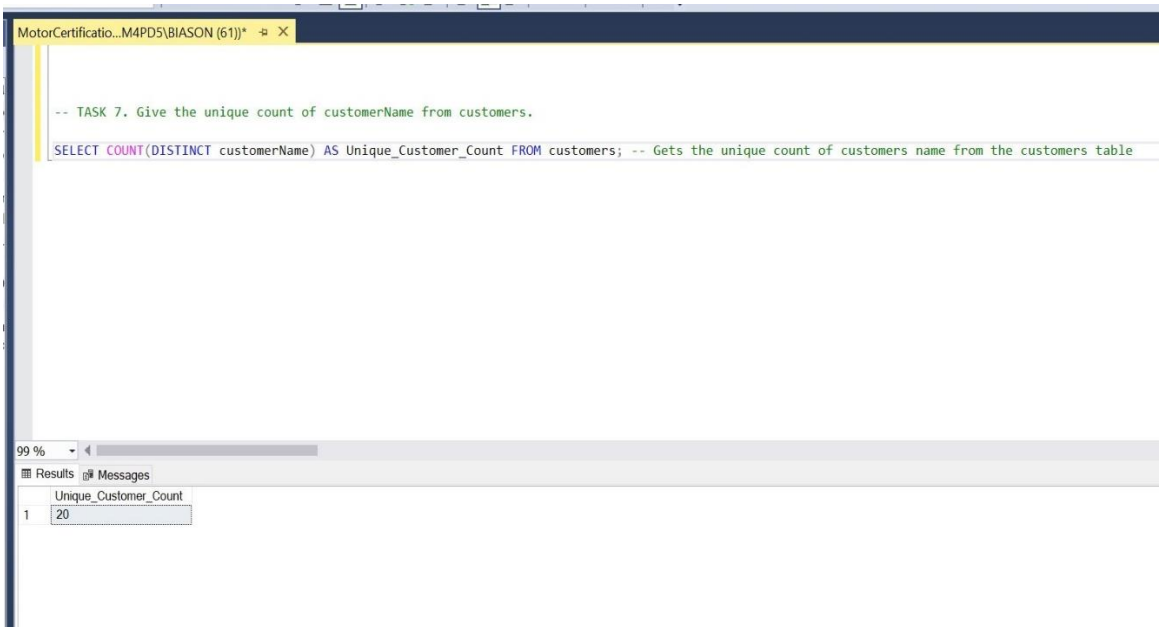
6. Find out the highest and the lowest amount.

```
-- Find the highest amount in the 'payments' table

SELECT MAX(amount) AS HighestAmount FROM payments;


-- Find the lowest amount in the 'payments' table

SELECT MIN(amount) AS LowestAmount FROM payments;
```

7. Give the unique count of customerName from customers.

-- TASK 7. Give the unique count of customerName from customers.

SELECT COUNT(DISTINCT customerName) AS Unique_Customer_Count FROM customers;
-- Gets the unique count of customers name from the customers table



8. Create a view from customers and payments named cust_payment and select customerName, amount, contactLastName, contactFirstName who have paid. Truncate and Drop the view after operation.

-- Create a view named 'cust_payment'

CREATE VIEW cust_payment AS

SELECT cst.customerName, py.amount, cst.contactLastName, cst.contactFirstName

FROM customers cst

JOIN payments py ON cst.customerNumber = py.customerNumber;

-- Select from the view to verify

SELECT * FROM cust_payment;

-- Truncate and drop the view after operation

DROP VIEW cust_payment;

9. Create a stored procedure on products which displays productLine for Classic Cars.

-- TASK 9. Creating a Stored Procedure for products

-- Create a stored procedure to display productLine for Classic Cars

CREATE PROCEDURE GetClassicCars

AS

BEGIN

SELECT productLine

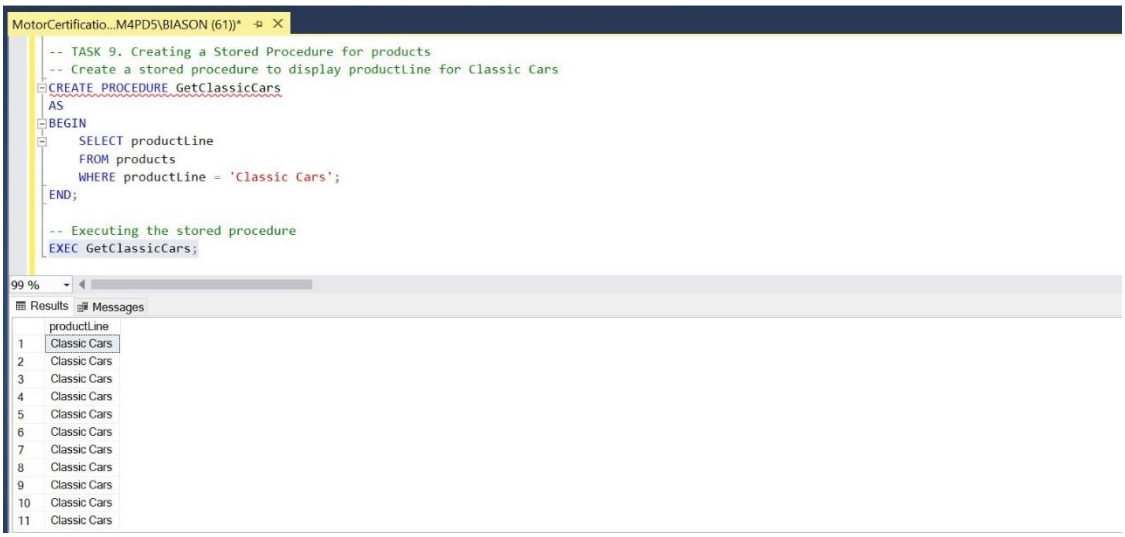
FROM products

WHERE productLine = 'Classic Cars';

END;

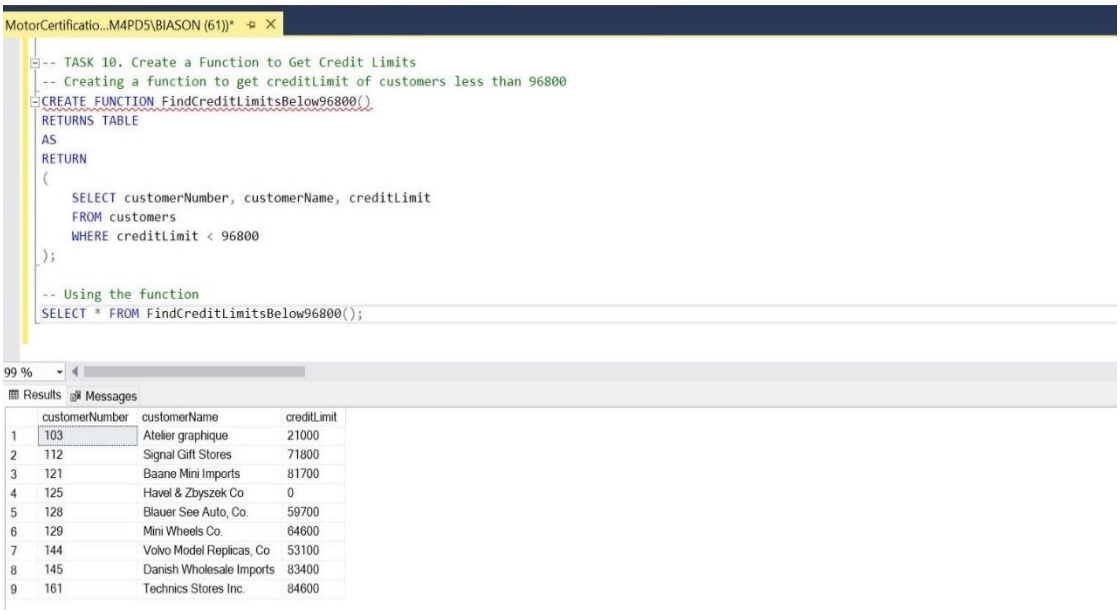
-- Executing the stored procedure

EXEC GetClassicCars;



10.Create a function to get the creditLimit of customers less than 96800

```
-- Creating a function to get creditLimit of customers less than 96800
CREATE FUNCTION FindCreditLimitsBelow96800()
RETURNS TABLE
AS
RETURN
(
   SELECT customerNumber, customerName, creditLimit
   FROM customers
   WHERE creditLimit < 96800
);

-- Using the function
SELECT * FROM FindCreditLimitsBelow96800();
```



	customerNumber	customerName	creditLimit
1	103	Atelier graphique	21000
2	112	Signal Gift Stores	71800
3	121	Baane Mini Imports	81700
4	125	Havel & Zbyszek Co	0
5	128	Blauer See Auto, Co.	59700
6	129	Mini Wheels Co.	64600
7	144	Volvo Model Replicas, Co	53100
8	145	Danish Wholesale Imports	83400
9	161	Technics Stores Inc.	84600

-- TASK 11. Create Trigger to store transaction record for employee table which displays employeeNumber, lastName, FirstName

-- and office code upon insertion

-- Creating a trigger for insertion on the employees table

CREATE TRIGGER trig_InsertEmployee

AFTER INSERT

ON employees

FOR EACH Row

BEGIN

-- Assuming there is a table named 'employeeTransactions' to store employee transaction records

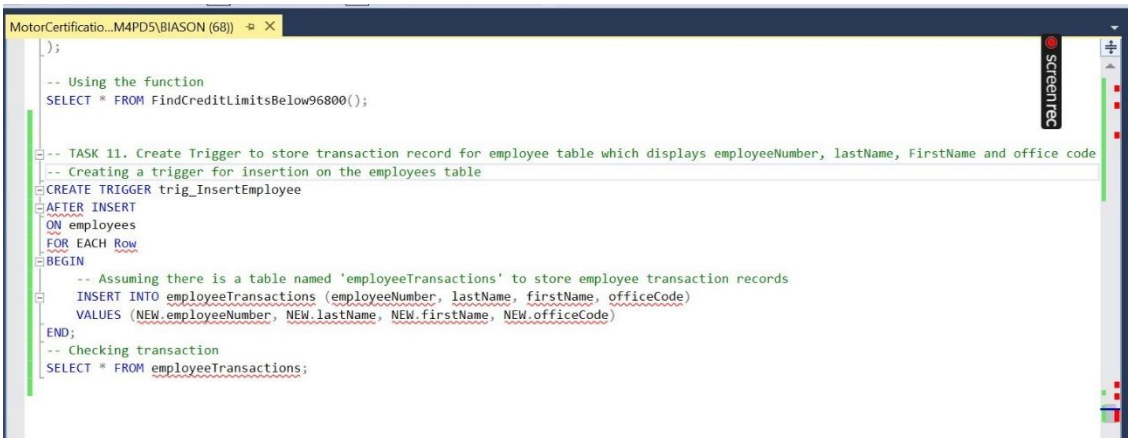
INSERT INTO employeeTransactions (employeeNumber, lastName, firstName, officeCode)

VALUES (NEW.employeeNumber, NEW.lastName, NEW.firstName, NEW.officeCode)

END;

-- Checking transaction

SELECT * FROM employeeTransactions;



-- TASK 12. Create a Trigger to display customer number if the amount is greater than 10,000

CREATE TRIGGER log_high_transaction

AFTER INSERT ON trsansactions

FOR EACH ROW

-- Assuming there is a table 'high_vallu_transactions' that stores customer transaction greater than 10000

BEGIN

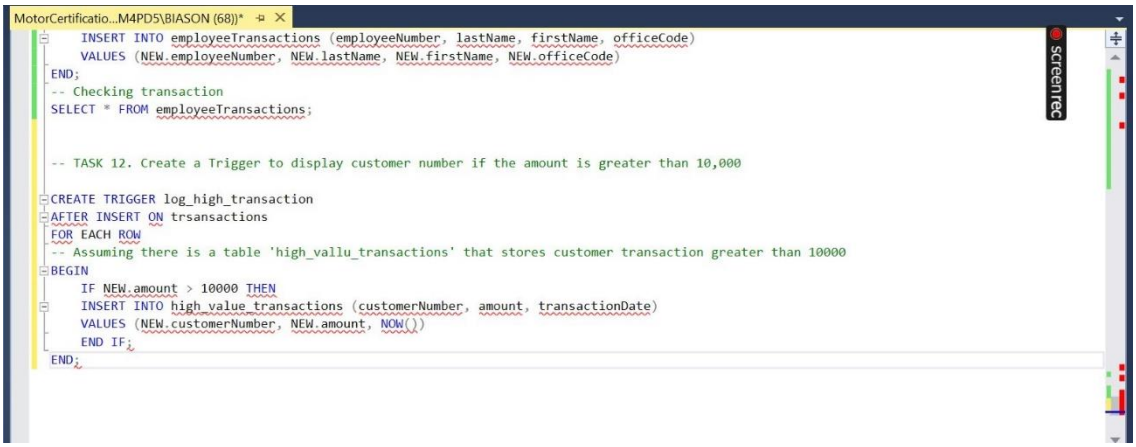
IF NEW.amount > 10000 THEN

INSERT INTO high_value_transactions (customerNumber, amount, transactionDate)

VALUES (NEW.customerNumber, NEW.amount, NOW())

END IF;

END;



TASK 13. Create Users, Roles and Logins according to 3 Roles: Admin, HR, and Employee. Admin can view full database and has full access, HR can view and access only employee and offices table. Employee can view all tables only.

-- Creating Roles

CREATE ROLE admin_role;

CREATE ROLE hr_role;

CREATE ROLE employee_role;

-- Granting privileges to roles

-- admin privileges

GRANT SELECT, INSERT, UPDATE, DELETE ON DATABASE::MotorCertification TO admin_role;

-- hr privileges

GRANT SELECT, INSERT, UPDATE, DELETE ON employees TO hr_role;

GRANT SELECT, INSERT, UPDATE, DELETE ON offices TO hr_role;

-- employee privileges

GRANT SELECT ON customers TO employee_role;

GRANT SELECT ON employees TO employee_role;

GRANT SELECT ON offices TO employee_role;

GRANT SELECT ON productlines TO employee_role;

GRANT SELECT ON products TO employee_role;

GRANT SELECT ON orders TO employee_role;

GRANT SELECT ON payments TO employee_role;

--creating logins

CREATE LOGIN admin_role WITH PASSWORD = 'AdminStrong@123';

CREATE LOGIN hr_role WITH PASSWORD = 'hR@123';

CREATE LOGIN employee_role WITH PASSWORD = 'emPloyee@123';

-- creating users for each login in the database

CREATE USER admin_user FOR LOGIN admin_login;

CREATE USER hr_user FOR LOGIN hr_login;

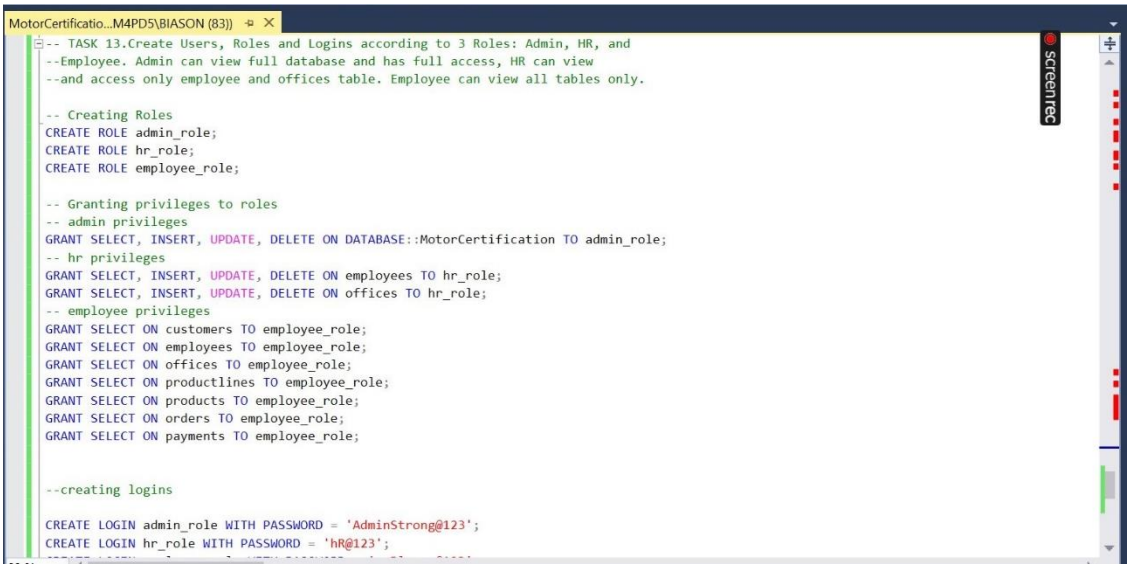
CREATE USER employee_user FOR LOGIN employee_login;

-- assigning roles to users

ALTER ROLE admin_role ADD MEMBER admin_user;

ALTER ROLE hr_role ADD MEMBER hr_user;

ALTER ROLE employee_role ADD MEMBER employee_user;



```
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GRANT SELECT ON productlines TO employee_role;
GRANT SELECT ON products TO employee_role;
GRANT SELECT ON orders TO employee_role;
GRANT SELECT ON payments TO employee_role;


--creating logins

CREATE LOGIN admin_role WITH PASSWORD = 'AdminStrong@123';
CREATE LOGIN hr_role WITH PASSWORD = 'hR@123';
CREATE LOGIN employee_role WITH PASSWORD = 'emPloyee@123';

-- creating users for each login in the database
CREATE USER admin_user FOR LOGIN admin_login;
CREATE USER hr_user FOR LOGIN hr_login;
CREATE USER employee_user FOR LOGIN employee_login;

-- assigning roles to users
ALTER  ROLE admin_role ADD MEMBER admin_user;
ALTER ROLE hr_role ADD MEMBER hr_user;
ALTER ROLE employee_role ADD MEMBER employee_user;
```
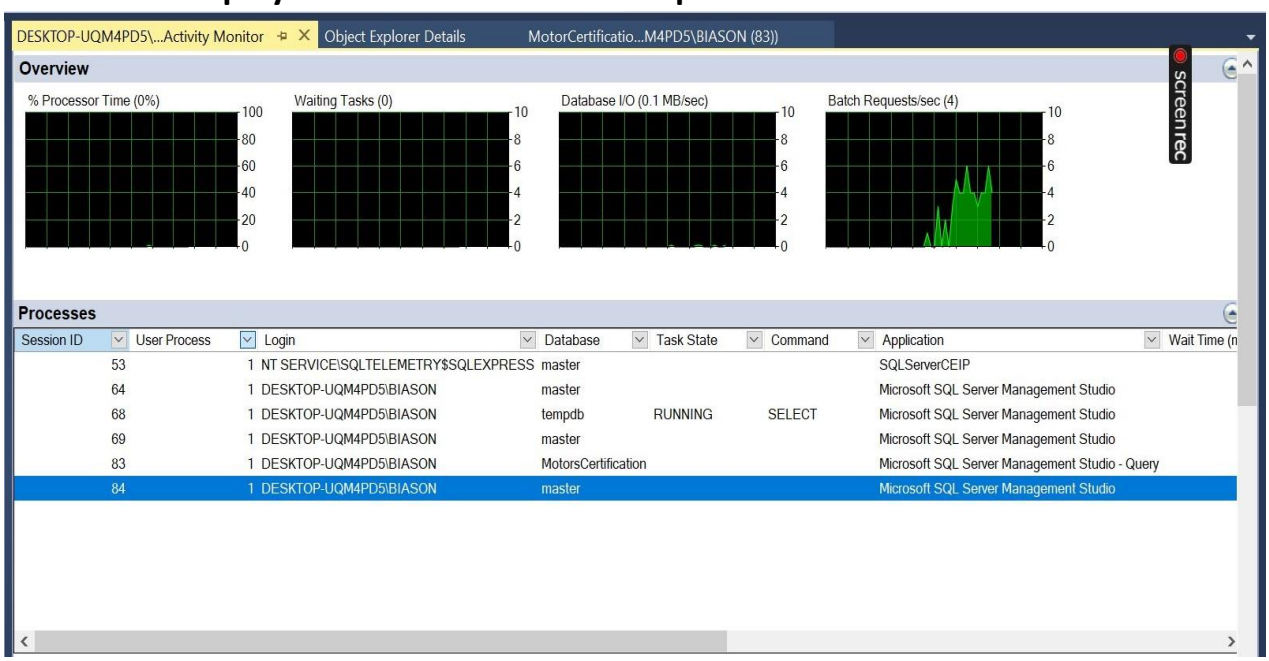
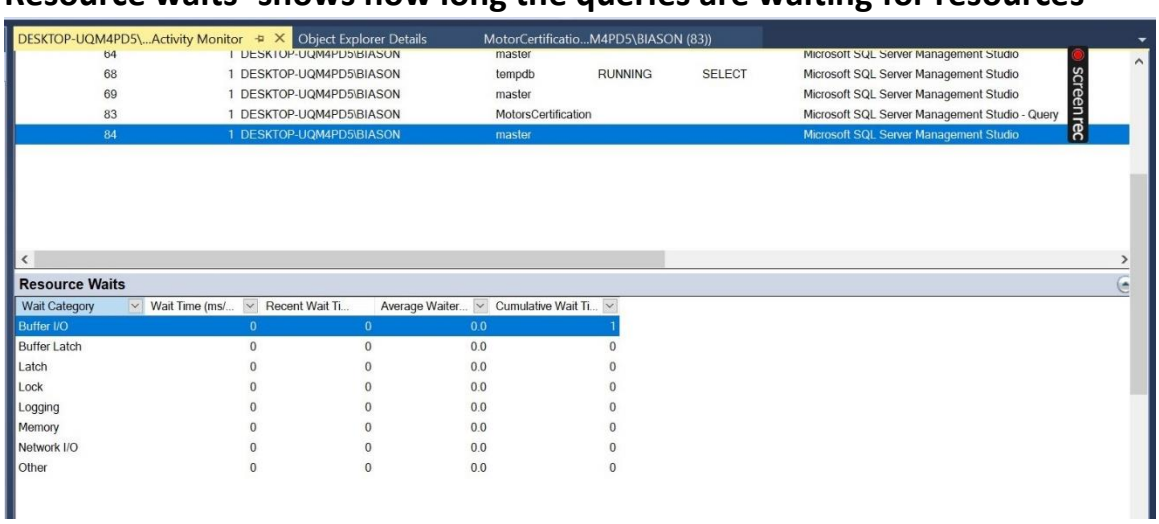

TASK 15. Open Activity Monitor and list down some minor observations including Processes, Resource Waits, and Active Expensive Queries.

(i) Processes- Displays the active sessions and processes



(ii) Resource waits- shows how long the queries are waiting for resources



(iii) Active Expensive Queries- Shows queries that are currently running and are resource intensive.

- **In my case there are no active expensive queries there are only recent expensive queries**