Big data Management

Assignment 3

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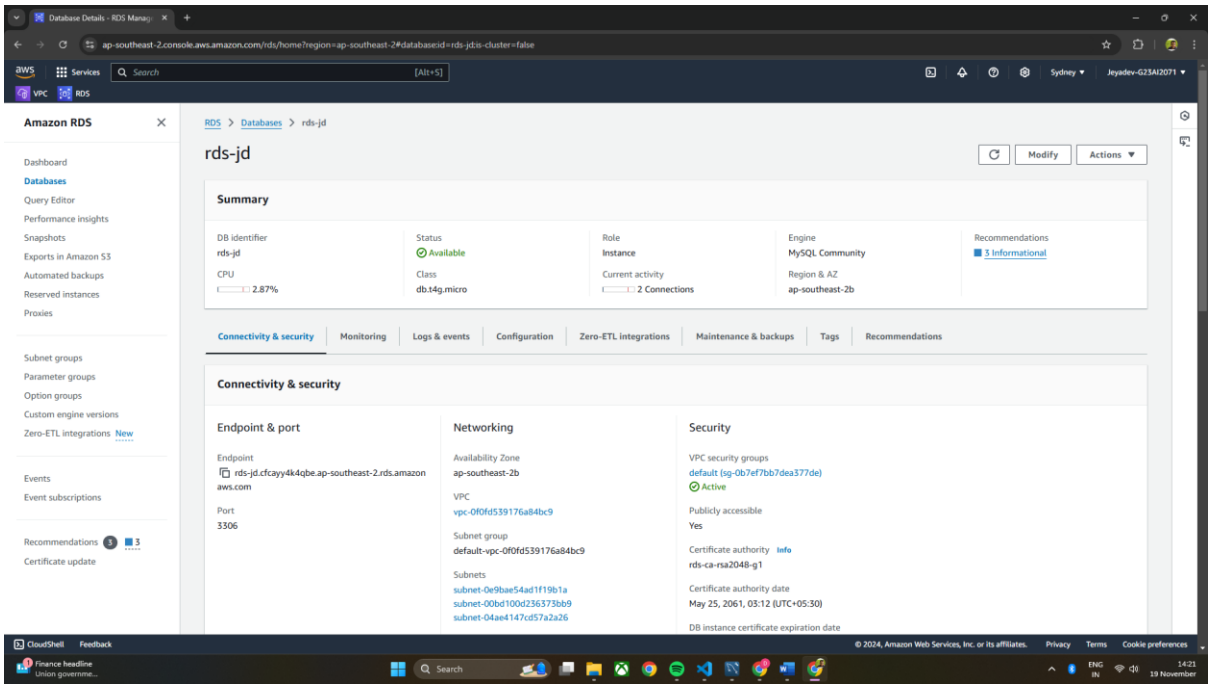
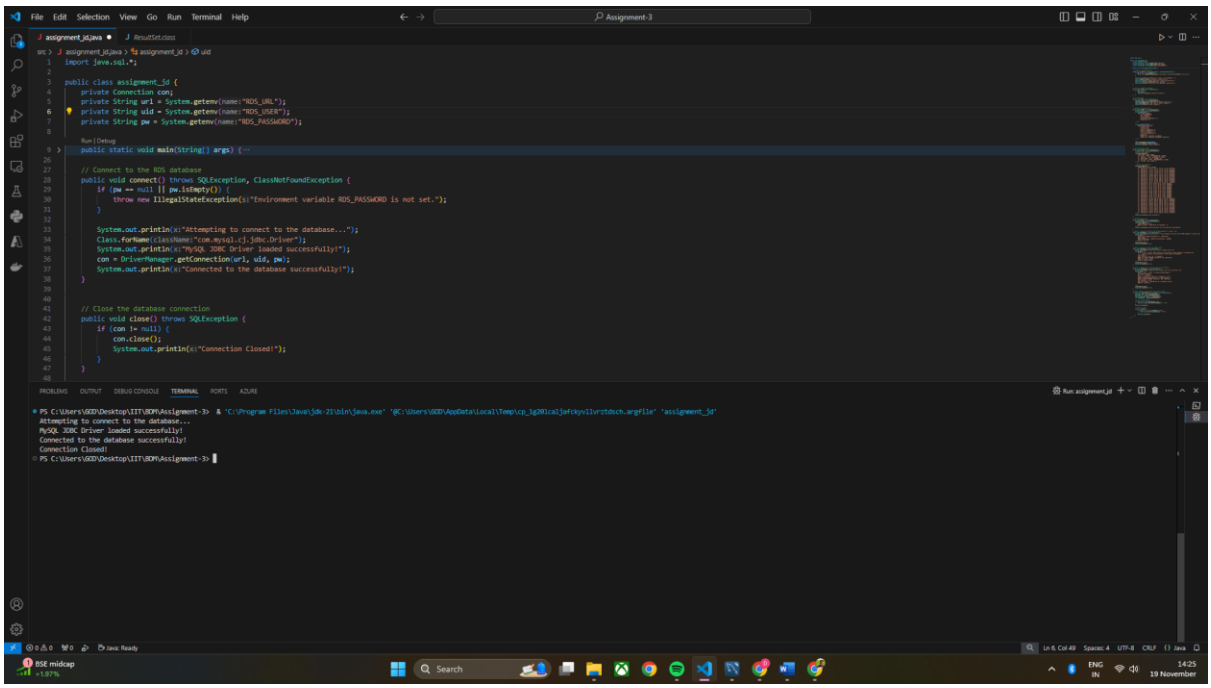
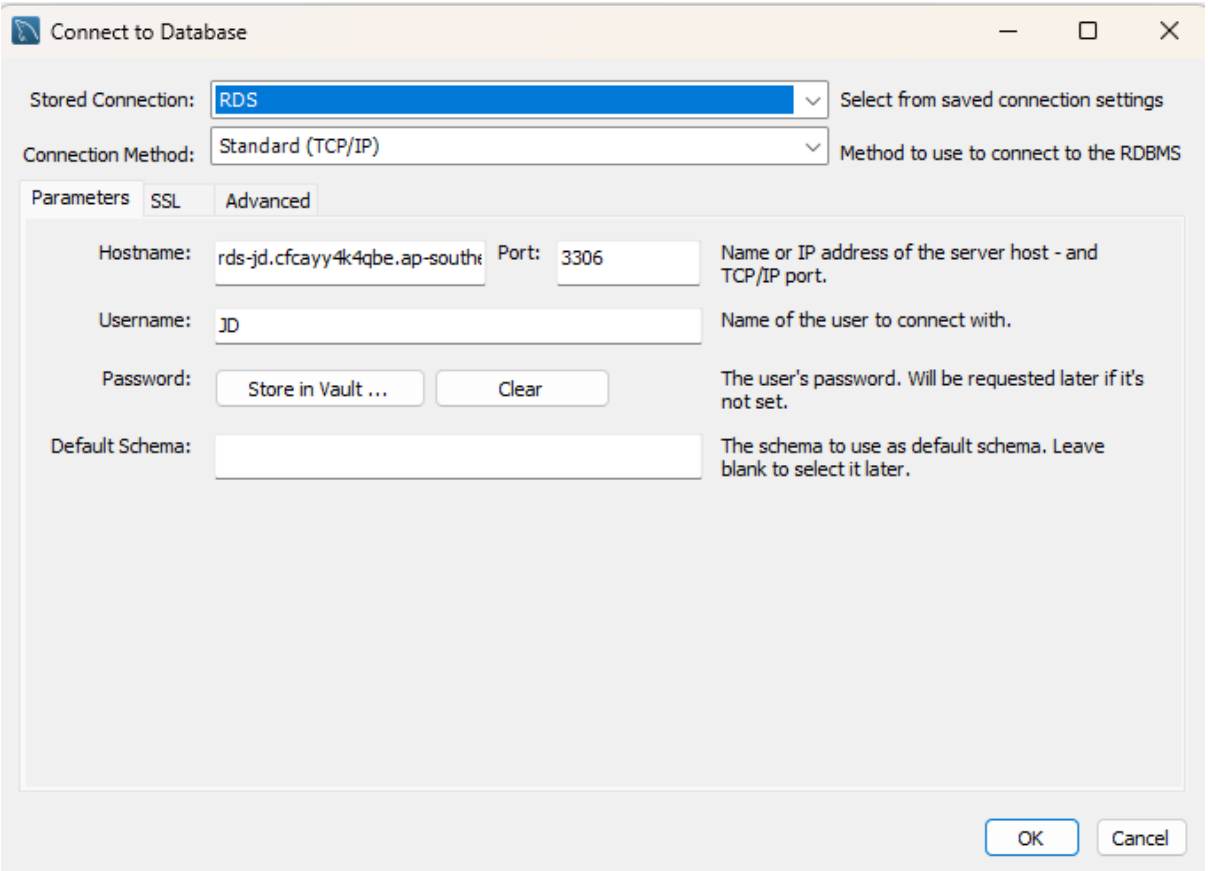
RDS Setup



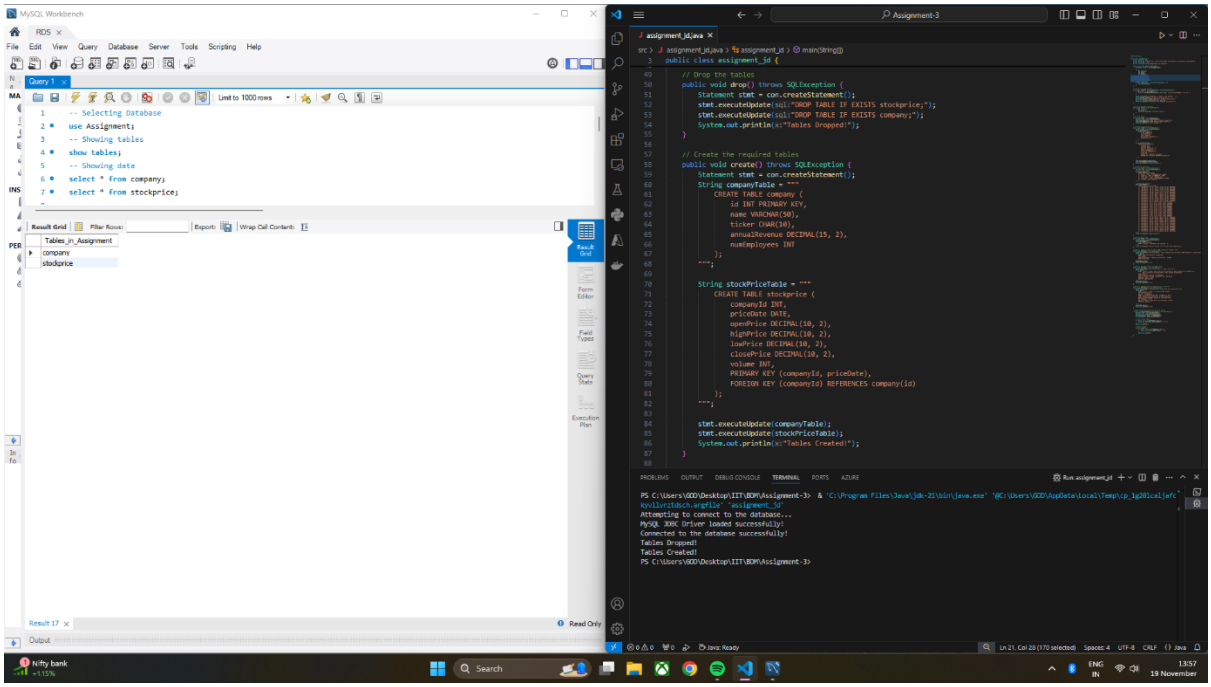
Connecting to RDS VIA JAVA

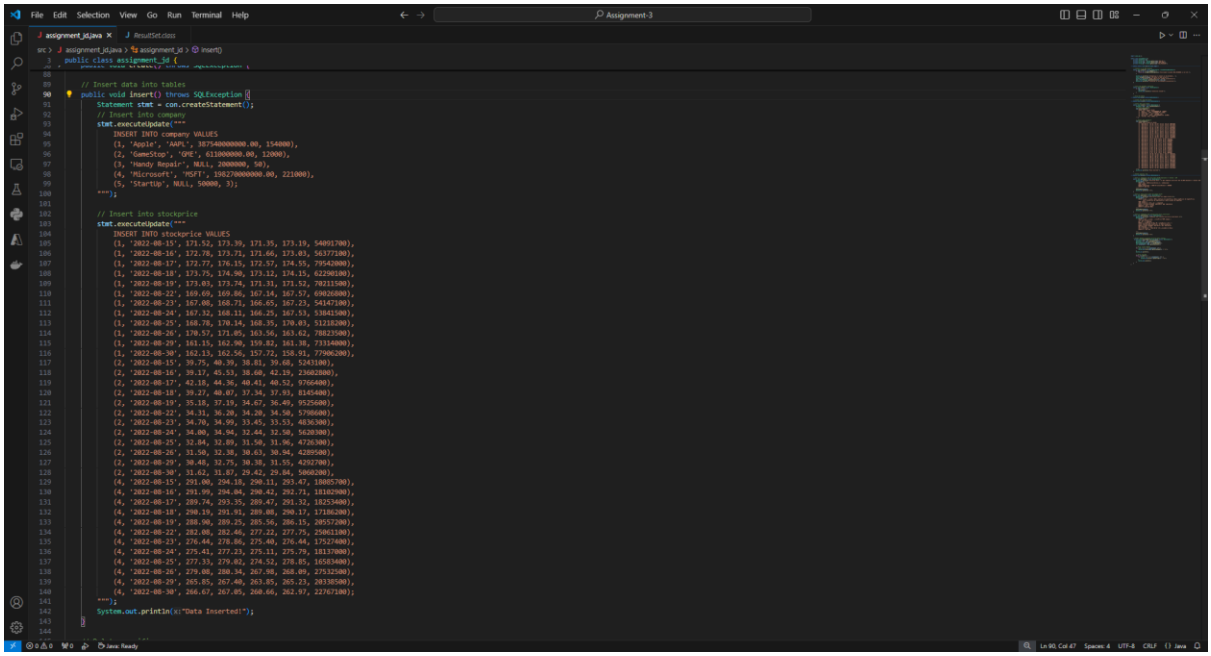


Connecting to RDS VIA MYSQL Workbench

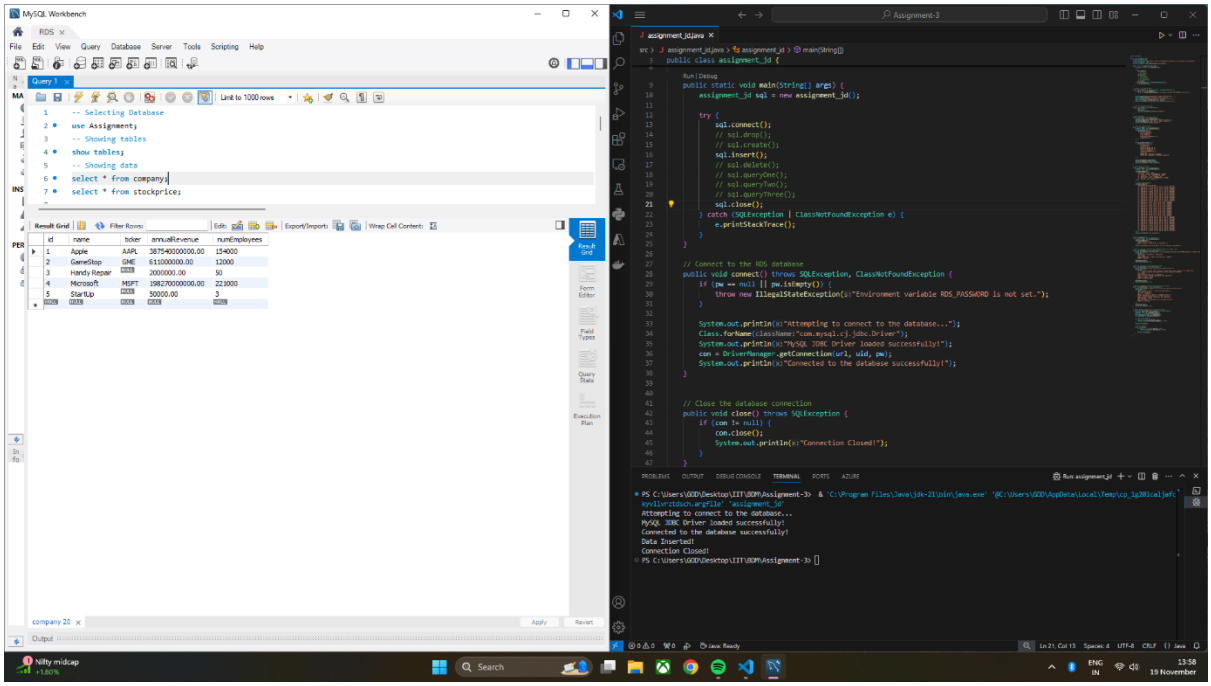


Creating Table and Inserting data





```
// Insert data into tables
public void insert() throws SQLException {
    Statement stmt = con.createStatement();
    // Insert into company
    stmt.executeUpdate("""
        INSERT INTO company VALUES
        (1, 'Apple', 'AAPL', 3875400000000.00, 154000),
        (2, 'GameStop', 'GME', 611000000.00, 12000),
        (3, 'Handy Repair', NULL, 2000000, 50),
        (4, 'Microsoft', 'MSFT', 1982700000000.00, 221000),
        (5, 'StartUp', NULL, 50000, 3);
    """);

    // Insert into stockprice
    stmt.executeUpdate("""
        INSERT INTO stockprice VALUES
        (1, '2022-08-15', 171.52, 173.39, 171.35, 173.19, 54091700),
        (1, '2022-08-16', 172.78, 173.71, 171.66, 173.03, 56377100),
        (1, '2022-08-17', 172.77, 176.15, 172.57, 174.55, 79542000),
        (1, '2022-08-18', 173.75, 174.90, 173.12, 174.15, 62290100),
        (1, '2022-08-19', 173.03, 173.74, 171.31, 171.52, 70215500),
        (1, '2022-08-22', 169.69, 169.86, 167.14, 167.57, 69026800),
        (1, '2022-08-23', 167.08, 168.71, 166.65, 167.23, 54147100),
        (1, '2022-08-24', 167.32, 168.11, 166.25, 167.53, 53043100),
        (1, '2022-08-25', 168.78, 170.14, 168.35, 170.03, 51218200),
        (1, '2022-08-26', 170.57, 171.05, 163.56, 163.62, 78823500),
        (1, '2022-08-29', 161.15, 162.90, 159.82, 161.38, 73314000),
        (1, '2022-08-30', 162.13, 162.56, 157.72, 158.91, 77906200),
        (2, '2022-08-15', 39.75, 40.39, 38.81, 39.68, 5243100),
        (2, '2022-08-16', 39.17, 45.53, 38.68, 42.19, 23682800),
        (2, '2022-08-17', 42.18, 44.36, 40.41, 40.52, 9766400),
        (2, '2022-08-18', 39.27, 40.07, 37.34, 37.93, 8145400),
        (2, '2022-08-19', 35.18, 37.19, 34.67, 36.49, 9525600),
        (2, '2022-08-22', 34.31, 36.20, 34.20, 34.50, 5790600),
        (2, '2022-08-23', 34.70, 34.99, 33.45, 33.53, 4836300),
        (2, '2022-08-24', 34.00, 34.94, 32.44, 32.50, 5620300),
        (2, '2022-08-25', 32.84, 32.89, 31.50, 31.96, 4726500),
        (2, '2022-08-26', 31.50, 32.38, 30.63, 30.94, 4289500),
        (2, '2022-08-29', 30.48, 32.75, 30.38, 31.55, 4292700),
        (2, '2022-08-30', 31.62, 31.87, 29.42, 29.84, 5068200),
        (4, '2022-08-15', 291.00, 294.18, 290.11, 293.47, 18085700),
        (4, '2022-08-16', 291.99, 294.04, 290.42, 292.71, 18102900),
        (4, '2022-08-17', 289.74, 293.35, 289.47, 291.32, 18253400),
        (4, '2022-08-18', 290.19, 291.91, 289.80, 290.17, 17186200),
        (4, '2022-08-19', 288.90, 289.25, 285.56, 286.15, 20557200),
        (4, '2022-08-22', 282.08, 282.46, 277.22, 277.75, 25061300),
        (4, '2022-08-23', 276.44, 278.86, 275.40, 276.44, 17527400),
        (4, '2022-08-24', 275.41, 277.23, 275.11, 275.79, 18137000),
        (4, '2022-08-25', 277.33, 279.02, 274.52, 278.85, 16583400),
        (4, '2022-08-26', 279.08, 280.34, 267.98, 268.09, 27532500),
        (4, '2022-08-29', 265.85, 267.40, 263.85, 265.23, 20338500),
        (4, '2022-08-30', 266.67, 267.85, 260.66, 262.97, 22767100);
    """);
    System.out.println(x:"Data Inserted!");
}
```

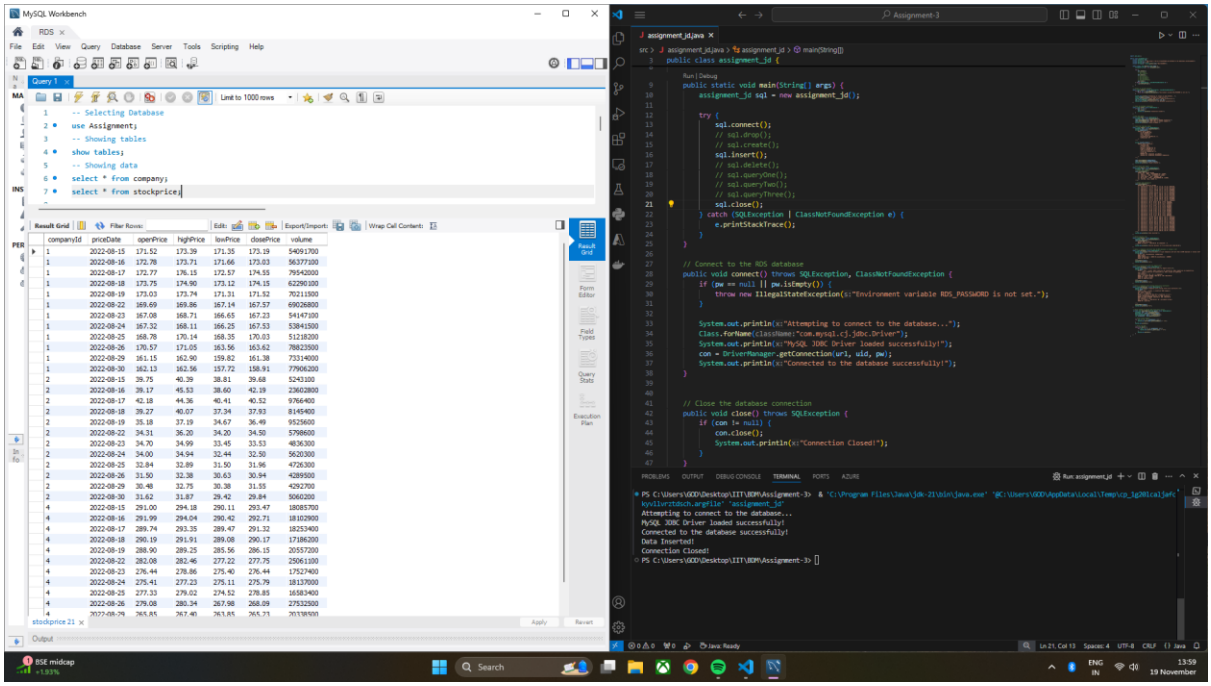


```
-- Selecting Database
use Assignment;
-- Showing tables
show tables;
-- Showing data
select * from company;
select * from stockprice;
```

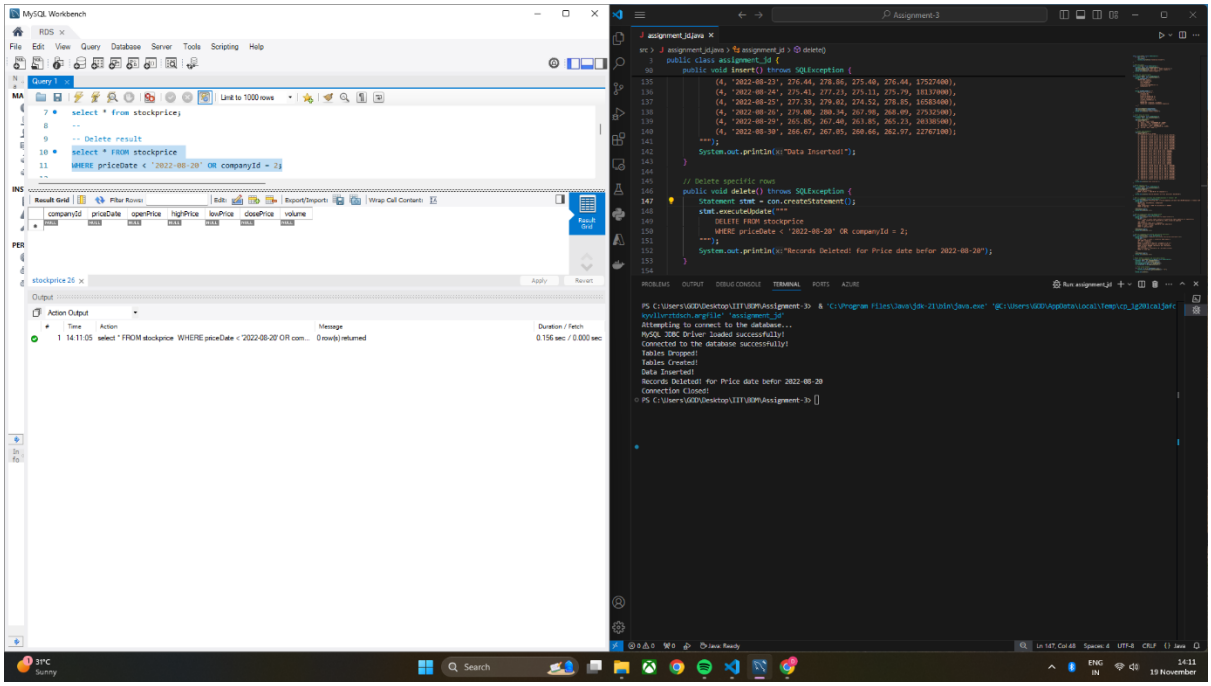
id	name	ticker	annualRevenue	numEmployees
1	Apple	AAPL	3875400000000.00	154000
2	GameStop	GME	611000000.00	12000
3	Handy Repair	NULL	2000000.00	50
4	Microsoft	MSFT	1982700000000.00	221000
5	StartUp	NULL	50000.00	3

```
public static void main(String[] args) {
    assignment_jd sql = new assignment_jd();

    try {
        sql.connect();
        // sql.drop();
        // sql.create();
        sql.insert();
        // sql.delete();
        // sql.queryOne();
        // sql.queryTwo();
        // sql.queryThree();
        sql.close();
    } catch (SQLException | ClassNotFoundException e) {
        e.printStackTrace();
    }
}

// Connect to the RDS database
public void connect() throws SQLException, ClassNotFoundException {
    if (pw == null || pw.isEmpty()) {
        throw new IllegalStateException(s:"Environment variable RDS_PASSWORD is not set.");
    }

    System.out.println(x:"Attempting to connect to the database...");
    Class.forName(className:"com.mysql.cj.jdbc.Driver");
    System.out.println(x:"MySQL JDBC Driver loaded successfully!");
    con = DriverManager.getConnection(url, uid, pw);
    System.out.println(x:"Connected to the database successfully!");
}


// Close the database connection
public void close() throws SQLException {
    if (con != null) {
        con.close();
        System.out.println(x:"Connection Closed!");
    }
}
```

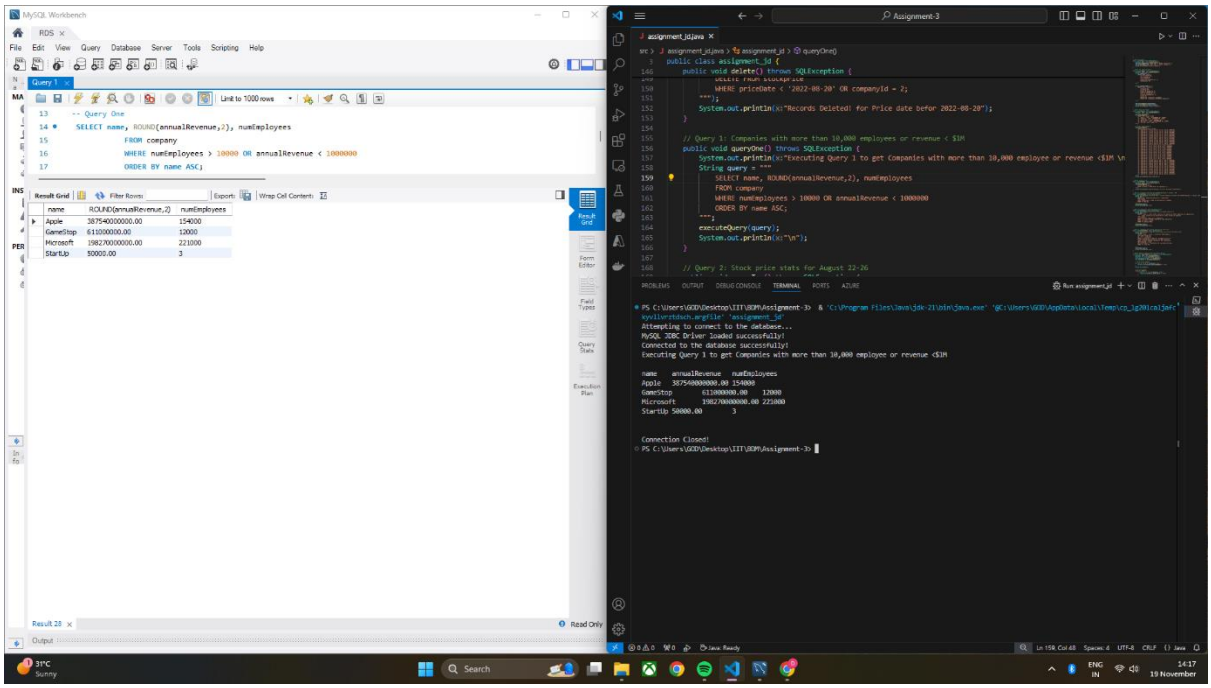
```
PS C:\Users\GCD\Desktop\IIT\BSM\Assignment-3> & 'C:\Program Files\Java\jdk-21\bin\java.exe' '@C:\Users\GCD\AppData\Local\Temp\cp_1g201cal3efkyvllvrrtdsch.argfile' 'assignment_jd'
Attempting to connect to the database...
MySQL JDBC Driver loaded successfully!
Connected to the database successfully!
Data Inserted!
Connection Closed!
PS C:\Users\GCD\Desktop\IIT\BSM\Assignment-3>
```



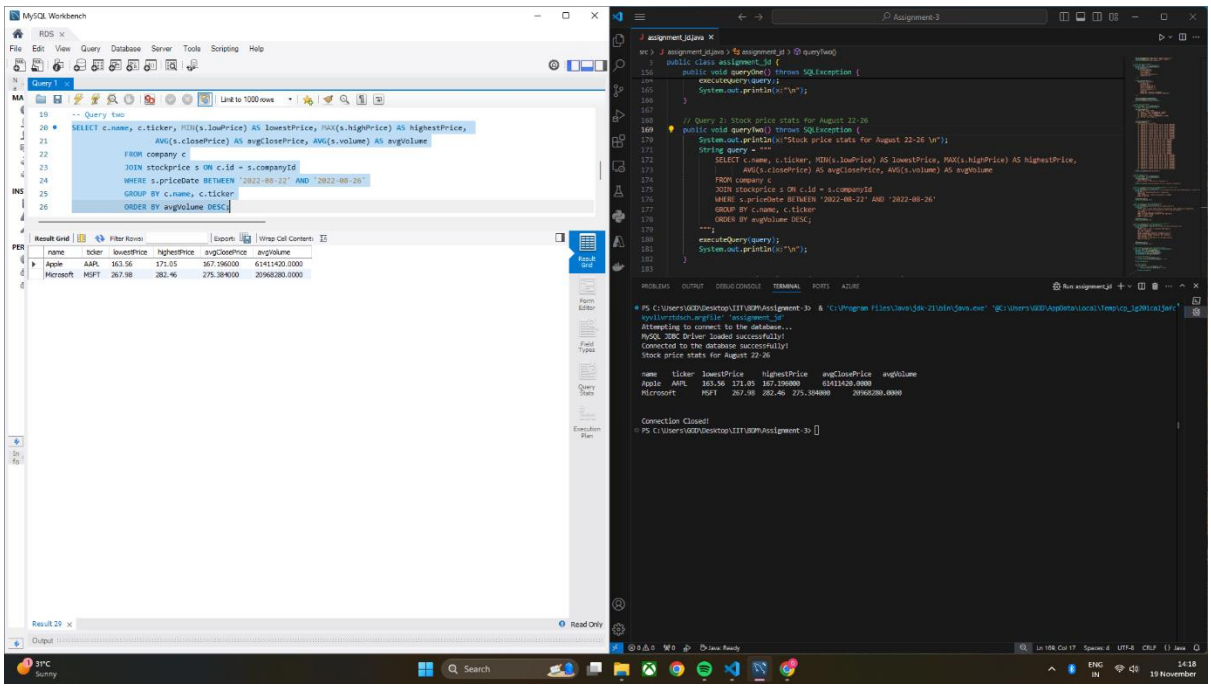
Deleting Specific Data



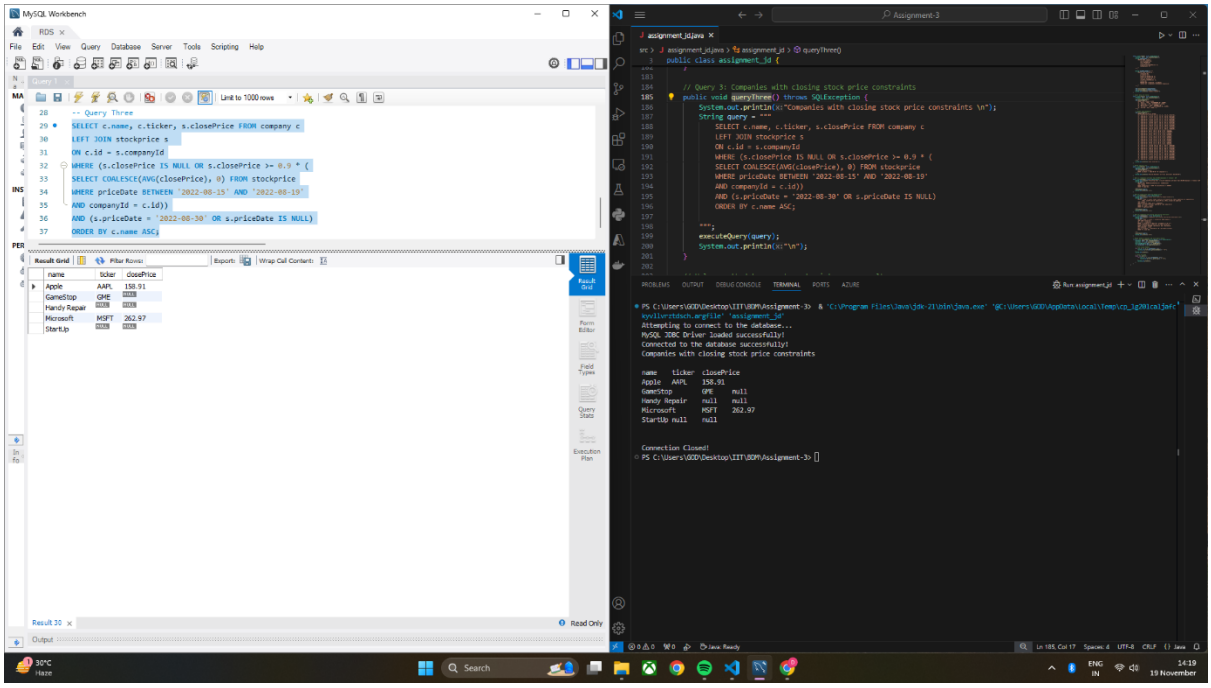
Query 1



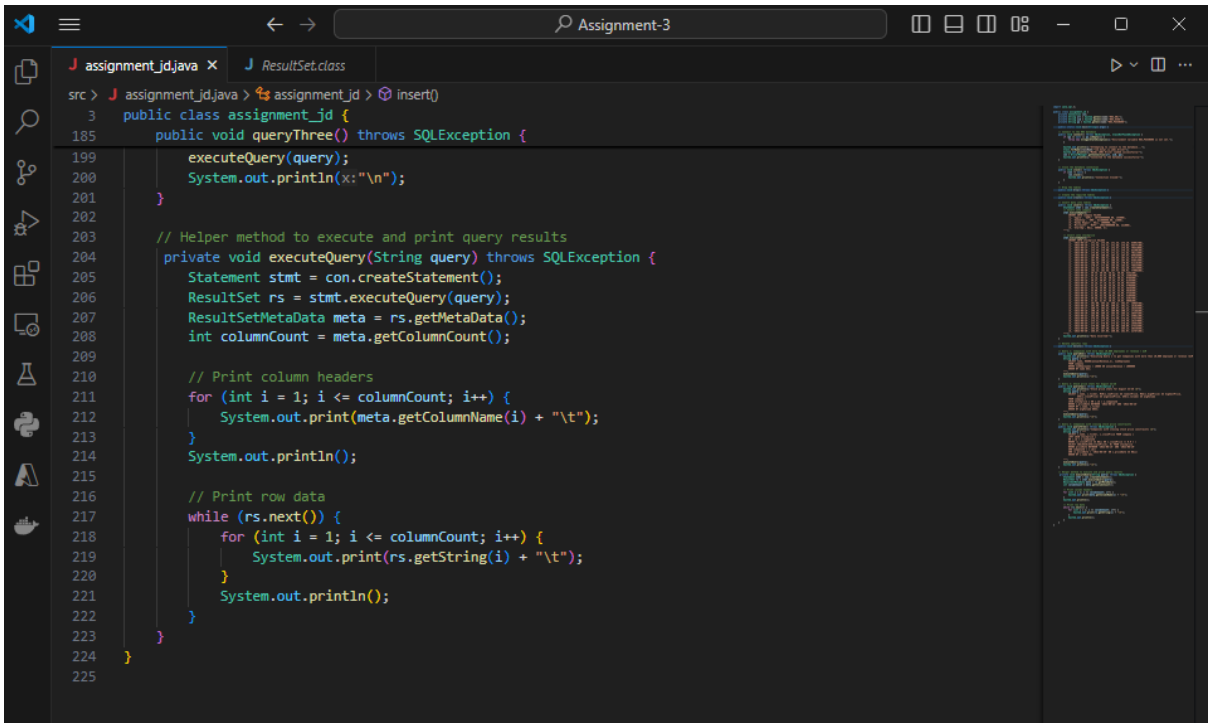
Query 2



Query 3



Helper Class



Code :-

```
import java.sql.*;
public class assignment_jd {
    private Connection con;
    private String url = System.getenv("RDS_URL");
    private String uid = System.getenv("RDS_USER");
    private String pw = System.getenv("RDS_PASSWORD");
    public static void main(String[] args) {
        assignment_jd sql = new assignment_jd();
        try {
            sql.connect();
            sql.drop();
            sql.create();
            sql.insert();
            sql.delete();
            sql.queryOne();
            sql.queryTwo();
            sql.queryThree();
            sql.close();
        } catch (SQLException | ClassNotFoundException e) {
            e.printStackTrace();
        } }
    // Connect to the RDS database
    public void connect() throws SQLException, ClassNotFoundException {
        if (pw == null || pw.isEmpty()) {
            throw new IllegalStateException("Environment variable RDS_PASSWORD is not set.");}
        System.out.println("Attempting to connect to the database...");
        Class.forName("com.mysql.cj.jdbc.Driver");
        System.out.println("MySQL JDBC Driver loaded successfully!");
        con = DriverManager.getConnection(url, uid, pw);
        System.out.println("Connected to the database successfully!");}
```

```
// Close the database connection
public void close() throws SQLException {
    if (con != null) {
        con.close();
        System.out.println("Connection Closed!");}}
// Drop the tables
public void drop() throws SQLException {
    Statement stmt = con.createStatement();
    stmt.executeUpdate("DROP TABLE IF EXISTS stockprice;");
    stmt.executeUpdate("DROP TABLE IF EXISTS company;");
    System.out.println("Tables Dropped!"); }
// Create the required tables
public void create() throws SQLException {
    Statement stmt = con.createStatement();
    String companyTable = """
        CREATE TABLE company (
            id INT PRIMARY KEY,
            name VARCHAR(50),
            ticker CHAR(10),
            annualRevenue DECIMAL(15, 2),
            numEmployees INT);""";
    String stockPriceTable = """
        CREATE TABLE stockprice (
            companyId INT,
            priceDate DATE,
            openPrice DECIMAL(10, 2),
            highPrice DECIMAL(10, 2),
            lowPrice DECIMAL(10, 2),
            closePrice DECIMAL(10, 2),
            volume INT,
            PRIMARY KEY (companyId, priceDate),
```

```
            FOREIGN KEY (companyId) REFERENCES company(id));""";
        stmt.executeUpdate(companyTable);
        stmt.executeUpdate(stockPriceTable);
        System.out.println("Tables Created!"); }
    // Insert data into tables
    public void insert() throws SQLException {
        Statement stmt = con.createStatement();
        // Insert into company
        stmt.executeUpdate("""
            INSERT INTO company VALUES
            (1, 'Apple', 'AAPL', 387540000000.00, 154000),
            (2, 'GameStop', 'GME', 611000000.00, 12000),
            (3, 'Handy Repair', NULL, 2000000, 50),
            (4, 'Microsoft', 'MSFT', 198270000000.00, 221000),
            (5, 'StartUp', NULL, 50000, 3);""");
        // Insert into stockprice
        stmt.executeUpdate("""
            INSERT INTO stockprice VALUES
            (1, '2022-08-15', 171.52, 173.39, 171.35, 173.19, 54091700),
            (1, '2022-08-16', 172.78, 173.71, 171.66, 173.03, 56377100),
            (1, '2022-08-17', 172.77, 176.15, 172.57, 174.55, 79542000),
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            (1, '2022-08-23', 167.08, 168.71, 166.65, 167.23, 54147100),
            (1, '2022-08-24', 167.32, 168.11, 166.25, 167.53, 53841500),
            (1, '2022-08-25', 168.78, 170.14, 168.35, 170.03, 51218200),
            (1, '2022-08-26', 170.57, 171.05, 163.56, 163.62, 78823500),
            (1, '2022-08-29', 161.15, 162.90, 159.82, 161.38, 73314000),
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            (2, '2022-08-15', 39.75, 40.39, 38.81, 39.68, 5243100),
```

```
        (2, '2022-08-16', 39.17, 45.53, 38.60, 42.19, 23602800),
        (2, '2022-08-17', 42.18, 44.36, 40.41, 40.52, 9766400),
        (2, '2022-08-18', 39.27, 40.07, 37.34, 37.93, 8145400),
        (2, '2022-08-19', 35.18, 37.19, 34.67, 36.49, 9525600),
        (2, '2022-08-22', 34.31, 36.20, 34.20, 34.50, 5798600),
        (2, '2022-08-23', 34.70, 34.99, 33.45, 33.53, 4836300),
        (2, '2022-08-24', 34.00, 34.94, 32.44, 32.50, 5620300),
        (2, '2022-08-25', 32.84, 32.89, 31.50, 31.96, 4726300),
        (2, '2022-08-26', 31.50, 32.38, 30.63, 30.94, 4289500),
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        (4, '2022-08-15', 291.00, 294.18, 290.11, 293.47, 18085700),
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        (4, '2022-08-19', 288.90, 289.25, 285.56, 286.15, 20557200),
        (4, '2022-08-22', 282.08, 282.46, 277.22, 277.75, 25061100),
        (4, '2022-08-23', 276.44, 278.86, 275.40, 276.44, 17527400),
        (4, '2022-08-24', 275.41, 277.23, 275.11, 275.79, 18137000),
        (4, '2022-08-25', 277.33, 279.02, 274.52, 278.85, 16583400),
        (4, '2022-08-26', 279.08, 280.34, 267.98, 268.09, 27532500),
        (4, '2022-08-29', 265.85, 267.40, 263.85, 265.23, 20338500),
        (4, '2022-08-30', 266.67, 267.05, 260.66, 262.97, 22767100); """);
    System.out.println("Data Inserted!");}
// Delete specific rows
public void delete() throws SQLException {
    Statement stmt = con.createStatement();
    stmt.executeUpdate("""
        DELETE FROM stockprice WHERE priceDate < '2022-08-20' OR companyId = 2; """);
    System.out.println("Records Deleted! for Price date befor 2022-08-20"); }
// Query 1: Companies with more than 10,000 employees or revenue < $1M
```

```
    public void queryOne() throws SQLException {
        System.out.println("Executing Query 1 to get Companies with more than 10,000 employee or revenue <$1M \n");
        String query = """
            SELECT name, ROUND(annualRevenue,2), numEmployees FROM company
            WHERE numEmployees > 10000 OR annualRevenue < 1000000
            ORDER BY name ASC; """;
        executeQuery(query);
        System.out.println("\n");}
    // Query 2: Stock price stats for August 22-26
    public void queryTwo() throws SQLException {
        System.out.println("Stock price stats for August 22-26 \n");
        String query = """
            SELECT c.name, c.ticker, MIN(s.lowPrice) AS lowestPrice, MAX(s.highPrice) AS highestPrice,  AVG(s.closePrice) AS avgClosePrice, AVG(s.volume) AS avgVolume FROM company c JOIN stockprice s ON c.id = s.companyId WHERE s.priceDate BETWEEN '2022-08-22' AND '2022-08-26' GROUP BY c.name, c.ticker ORDER BY avgVolume DESC; """;
        executeQuery(query);
        System.out.println("\n"); }
    // Query 3: Companies with closing stock price constraints
    public void queryThree() throws SQLException {
        System.out.println("Companies with closing stock price constraints \n");
        String query = """
            SELECT c.name, c.ticker, s.closePrice FROM company c LEFT JOIN stockprice s
            ON c.id = s.companyId WHERE (s.closePrice IS NULL OR s.closePrice >= 0.9 * (
            SELECT COALESCE(AVG(closePrice), 0) FROM stockprice WHERE priceDate BETWEEN '2022-08-15' AND '2022-08-19' AND companyId = c.id)) AND (s.priceDate = '2022-08-30' OR s.priceDate IS NULL) ORDER BY c.name ASC; """;
        executeQuery(query);
        System.out.println("\n");}
    // Helper method to execute and print query results
     private void executeQuery(String query) throws SQLException {
        Statement stmt = con.createStatement();
```

```
        ResultSet rs = stmt.executeQuery(query);
        ResultSetMetaData meta = rs.getMetaData();
        int columnCount = meta.getColumnCount();
        // Print column headers
        for (int i = 1; i <= columnCount; i++) {
            System.out.print(meta.getColumnName(i) + "\t");
        }
        System.out.println();
        // Print row data
        while (rs.next()) {
            for (int i = 1; i <= columnCount; i++) {
                System.out.print(rs.getString(i) + "\t");
            }
            System.out.println();
        }
    }
}
```