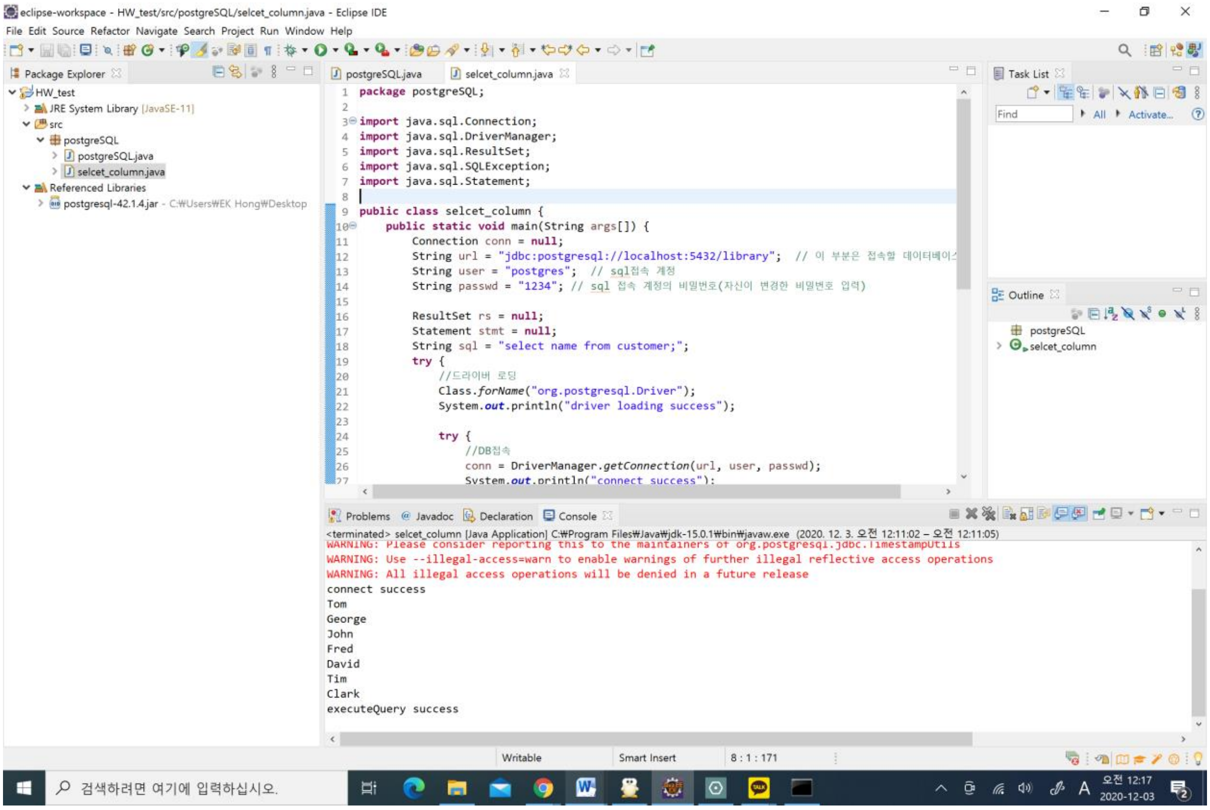
# 과제3

# 『JDBC』

◆ JDBC를 이용하여 다음의 쿼리의 결과를 응용프로그램 단계에서 출력한다.

✓ 특정 테이블의 특정 컬럼만 조회하는 select문 1개

◆ 예) SELECT ename, deptno FROM emp;



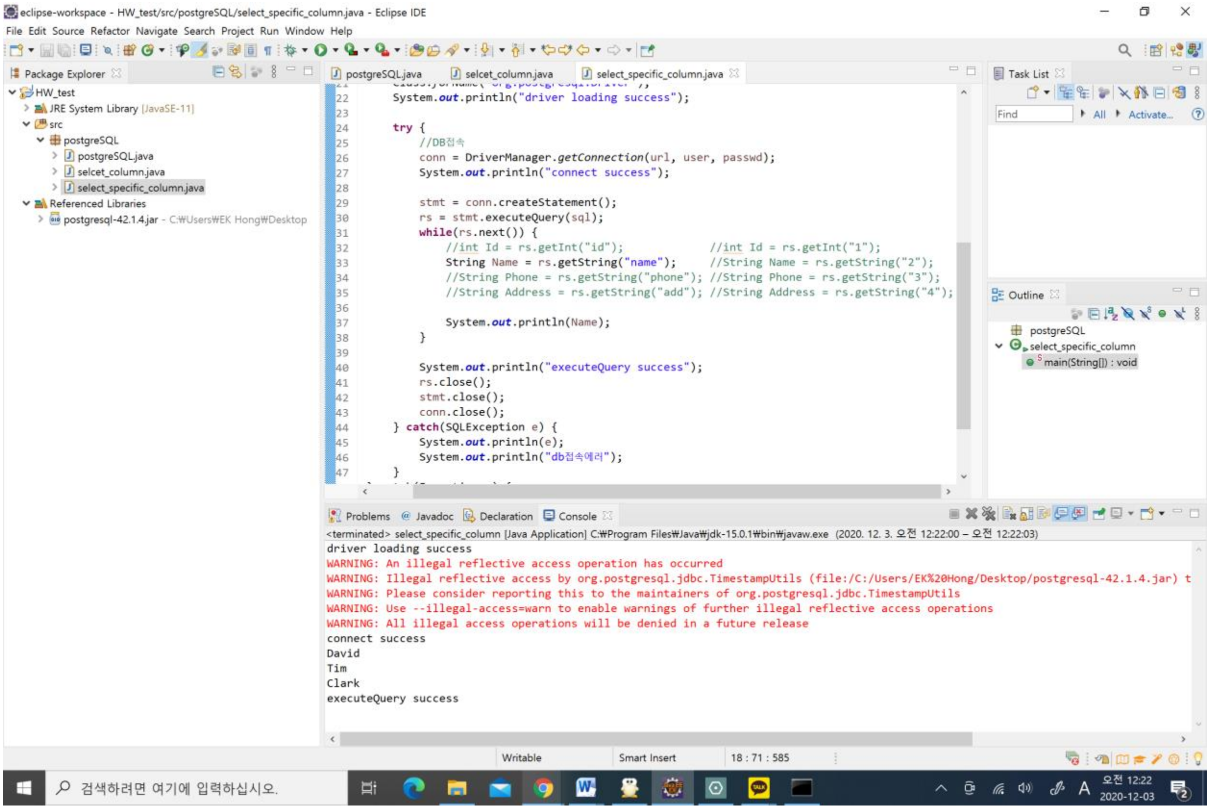
```java
package postgreSQL;

import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.sql.Statement;

public class selcet_column {
    public static void main(String args[]) {
        Connection conn = null;
        String url = "jdbc:postgresql://localhost:5432/library";  // 이 부분은 접속할 데이터베이
        String user = "postgres";  // sql접속 계정
        String passwd = "1234"; // sql 접속 계정의 비밀번호(자신이 변경한 비밀번호 입력)

        ResultSet rs = null;
        Statement stmt = null;
        String sql = "select name from customer;";
        try {
            //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try {
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");
```

<terminated> selcet_column [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe (2020. 12. 3. 오전 12:11:02 – 오전 12:11:05)

```
WARNING: Please consider reporting this to the maintainers of org.postgresql.jdbc.TimestampUtils
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
Tom
George
John
Fred
David
Tim
Clark
executeQuery success
```

✓ 특정 테이블의 특정 조건의 특정 컬럼만 조회하는 select문 1개

- ◆ 예) SELECT ename FROM emp WHERE ename = 'TOM';


eclipse-workspace - HW_test/src/postgreSQL/select_specific_column.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
HW_test
JRE System Library [JavaSE-11]
src
postgreSQL
postgreSQLjava
selcet_column.java
select_specific_column.java
Referenced Libraries
postgresql-42.1.4.jar - C:₩Users₩EK Hong₩Desktop
postgreSQL.java
selcet_column.java
select_specific_column.java
Task List
Find
All
Activate...
Outline
postgreSQL
select_specific_column
main(String[]) : void
Problems
Javadoc
Declaration
Console
Writable
Smart Insert
18 : 71 : 585
검색하려면 여기에 입력하십시오.
오전 12:22
2020-12-03

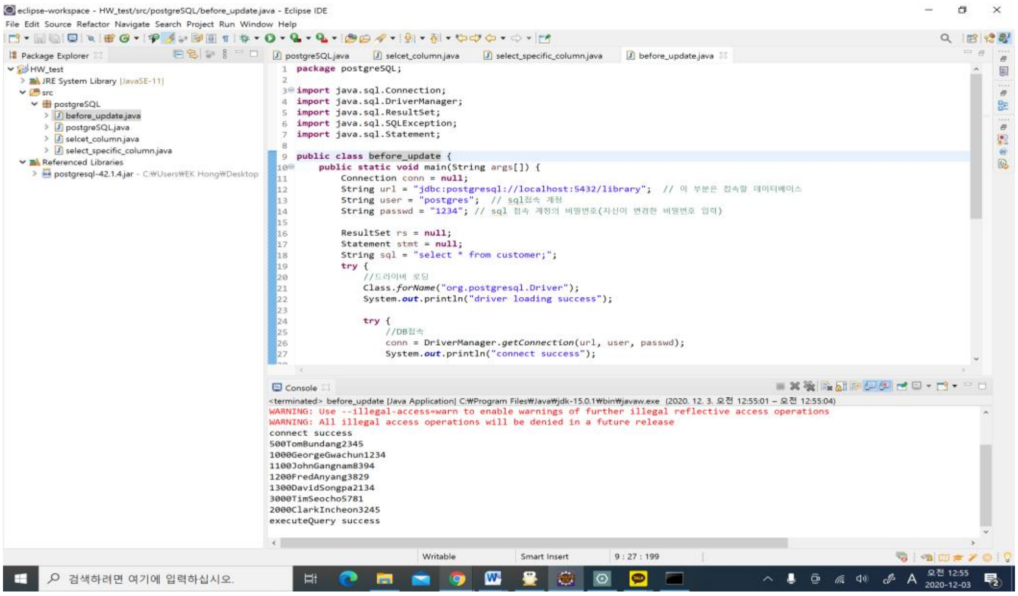
```java
        System.out.println("driver loading success");

        try {
            //DB접속
            conn = DriverManager.getConnection(url, user, passwd);
            System.out.println("connect success");

            stmt = conn.createStatement();
            rs = stmt.executeQuery(sql);
            while(rs.next()) {
                //int Id = rs.getInt("id");            //int Id = rs.getInt("1");
                String Name = rs.getString("name");    //String Name = rs.getString("2");
                //String Phone = rs.getString("phone"); //String Phone = rs.getString("3");
                //String Address = rs.getString("add"); //String Address = rs.getString("4");

                System.out.println(Name);
            }

            System.out.println("executeQuery success");
            rs.close();
            stmt.close();
            conn.close();
        } catch(SQLException e) {
            System.out.println(e);
            System.out.println("db접속에러");
        }
```

```
<terminated> select_specific_column [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe (2020. 12. 3. 오전 12:22:00 – 오전 12:22:03)
driver loading success
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.postgresql.jdbc.TimestampUtils (file:/C:/Users/EK%20Hong/Desktop/postgresql-42.1.4.jar) t
WARNING: Please consider reporting this to the maintainers of org.postgresql.jdbc.TimestampUtils
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
David
Tim
Clark
executeQuery success
```

✓ 특정 조건(where)에 대한 update, delete문 각 1개씩

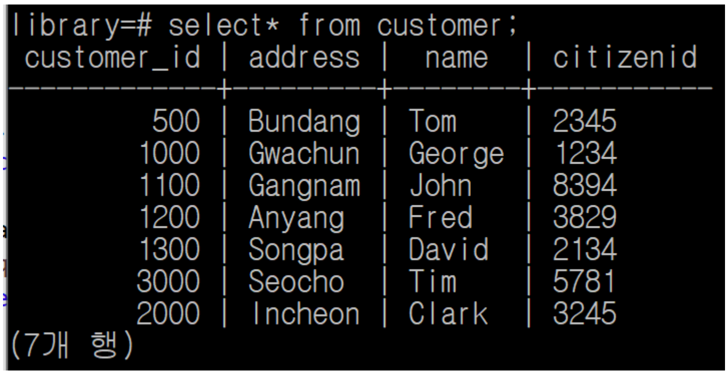
- ◆ 예) UPDATE emp SET sal = 0, deptno=30 WHERE empno=7788;

1.Update전


eclipse-workspace - HW_test/src/postgreSQL/before_update.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
HW_test
JRE System Library [JavaSE-11]
src
postgreSQL
before_update.java
postgreSQL.java
selcet_column.java
select_specific_column.java
Referenced Libraries
postgresql-42.1.4.jar - C:₩Users₩EK Hong₩Desktop
postgreSQL.java
selcet_column.java
select_specific_column.java
before_update.java
Console
Writable
Smart Insert
9 : 27 : 199
검색하려면 여기에 입력하십시오.
오전 12:55
2020-12-03

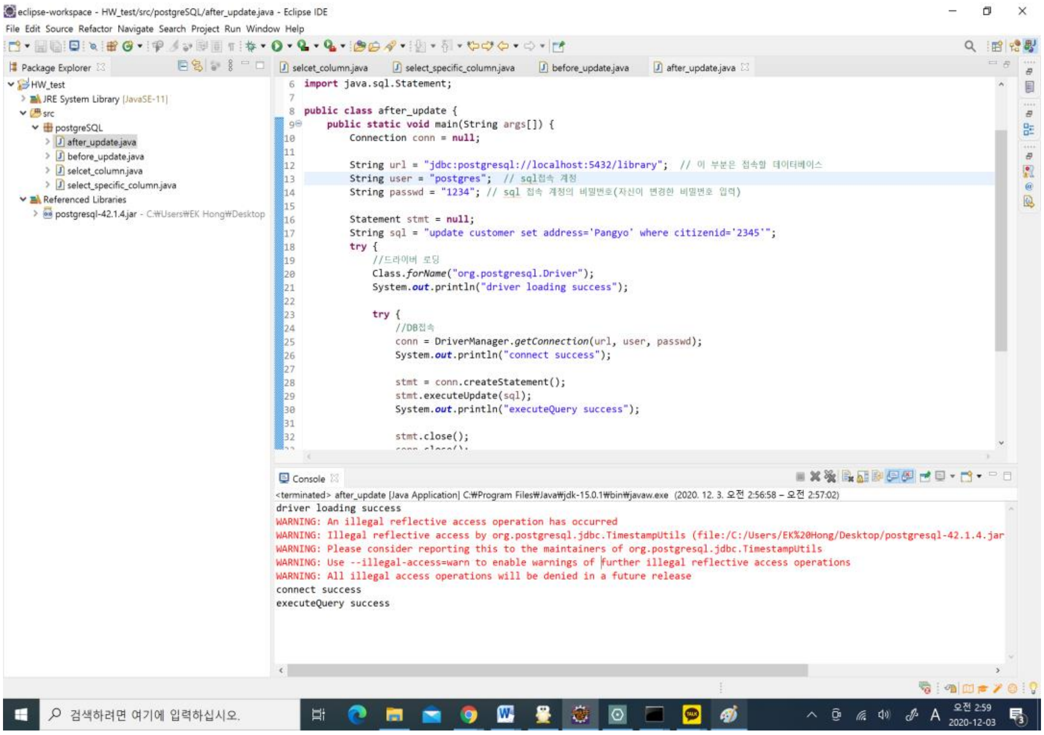
```java
package postgreSQL;

import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.sql.Statement;

public class before_update {
    public static void main(String args[]) {
        Connection conn = null;
        String url = "jdbc:postgresql://localhost:5432/library";  // 이 부분은 접속할 데이터베이스
        String user = "postgres";  // sql접속 계정
        String passwd = "1234"; // sql 접속 계정의 비밀번호(자신이 변경한 비밀번호 입력)

        ResultSet rs = null;
        Statement stmt = null;
        String sql = "select * from customer;";
        try {
            //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try {
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");
```

```
<terminated> before_update [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe (2020. 12. 3. 오전 12:55:01 – 오전 12:55:04)
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
500TomBundang2345
1000GeorgeGwachun1234
1100JohnGangnam8394
1200FredAnyang3829
1300DavidSongpa2134
3000TimSeocho5781
2000ClarkIncheon3245
executeQuery success
```



```
library=# select* from customer;
 customer_id | address  |  name  | citizenid
-------------+----------+--------+-----------
         500 | Bundang  | Tom    | 2345
        1000 | Gwachun  | George | 1234
        1100 | Gangnam  | John   | 8394
        1200 | Anyang   | Fred   | 3829
        1300 | Songpa   | David  | 2134
        3000 | Seocho   | Tim    | 5781
        2000 | Incheon  | Clark  | 3245
(7개 행)
```

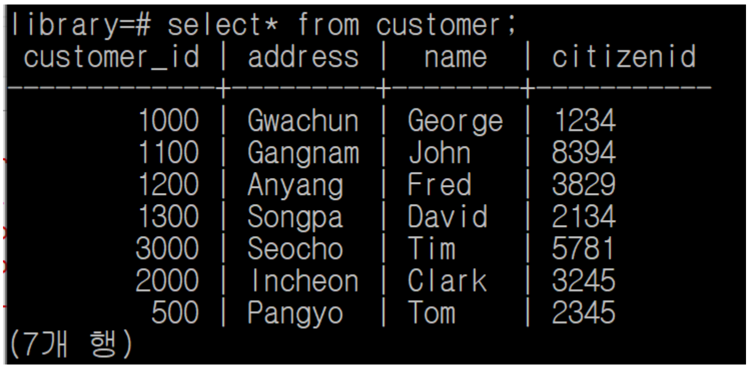
2.Update후



eclipse-workspace - HW_test/src/postgreSQL/after_update.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
HW_test
JRE System Library [JavaSE-11]
src
postgreSQL
after_update.java
before_update.java
selcet_column.java
select_specific_column.java
Referenced Libraries
postgresql-42.1.4.jar - C:₩Users₩EK Hong₩Desktop
selcet_column.java
select_specific_column.java
before_update.java
after_update.java
Console
검색하려면 여기에 입력하십시오.
오전 2:59
2020-12-03

```java
import java.sql.Statement;

public class after_update {
    public static void main(String args[]) {
        Connection conn = null;

        String url = "jdbc:postgresql://localhost:5432/library";  // 이 부분은 접속할 데이터베이스
        String user = "postgres";  // sql접속 계정
        String passwd = "1234"; // sql 접속 계정의 비밀번호(자신이 변경한 비밀번호 입력)

        Statement stmt = null;
        String sql = "update customer set address='Pangyo' where citizenid='2345'";
        try {
            //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try {
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");

                stmt = conn.createStatement();
                stmt.executeUpdate(sql);
                System.out.println("executeQuery success");

                stmt.close();
                conn.close();
```

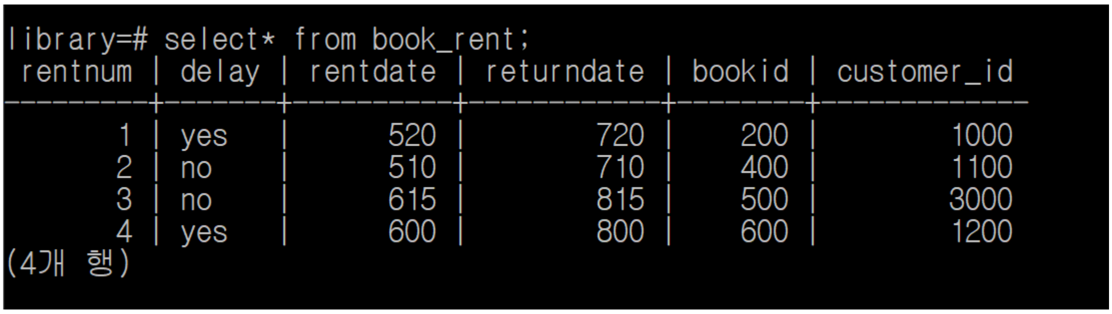
```
<terminated> after_update [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe  (2020. 12. 3. 오전 2:56:58 – 오전 2:57:02)
driver loading success
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.postgresql.jdbc.TimestampUtils (file:/C:/Users/EK%20Hong/Desktop/postgresql-42.1.4.jar
WARNING: Please consider reporting this to the maintainers of org.postgresql.jdbc.TimestampUtils
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
executeQuery success
```



```
library=# select* from customer;
 customer_id | address  |  name  | citizenid
-------------+----------+--------+-----------
        1000 | Gwachun  | George | 1234
        1100 | Gangnam  | John   | 8394
        1200 | Anyang   | Fred   | 3829
        1300 | Songpa   | David  | 2134
        3000 | Seocho   | Tim    | 5781
        2000 | Incheon  | Clark  | 3245
         500 | Pangyo   | Tom    | 2345
(7개 행)
```

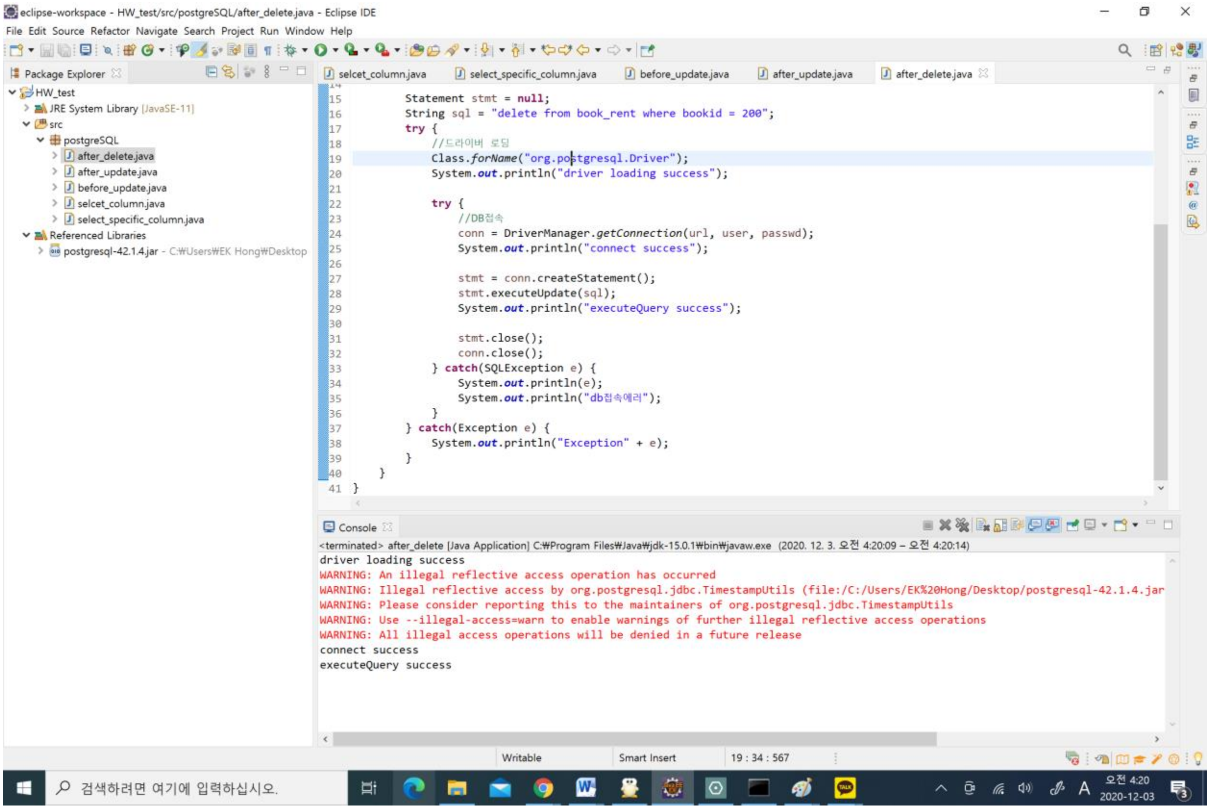
예) DELETE FROM dept WHERE deptno=100;

1.DELETE 전



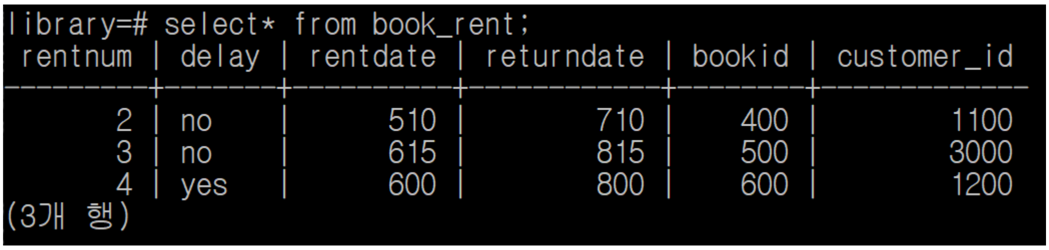
```
library=# select* from book_rent;
 rentnum | delay | rentdate | returndate | bookid | customer_id
---------+-------+----------+------------+--------+-------------
       1 | yes   |      520 |        720 |    200 |        1000
       2 | no    |      510 |        710 |    400 |        1100
       3 | no    |      615 |        815 |    500 |        3000
       4 | yes   |      600 |        800 |    600 |        1200
(4개 행)
```

2.DELETE 후


eclipse-workspace - HW_test/src/postgreSQL/after_delete.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
HW_test
JRE System Library [JavaSE-11]
src
postgreSQL
after_delete.java
after_update.java
before_update.java
selcet_column.java
select_specific_column.java
Referenced Libraries
postgresql-42.1.4.jar - C:₩Users₩EK Hong₩Desktop
selcet_column.java
select_specific_column.java
before_update.java
after_update.java
after_delete.java
Console
Writable
Smart Insert
19 : 34 : 567
검색하려면 여기에 입력하십시오.
오전 4:20
2020-12-03

```java
        Statement stmt = null;
        String sql = "delete from book_rent where bookid = 200";
        try {
            //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try {
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");

                stmt = conn.createStatement();
                stmt.executeUpdate(sql);
                System.out.println("executeQuery success");

                stmt.close();
                conn.close();
            } catch(SQLException e) {
                System.out.println(e);
                System.out.println("db접속에러");
            }
        } catch(Exception e) {
            System.out.println("Exception" + e);
        }
    }
}
```

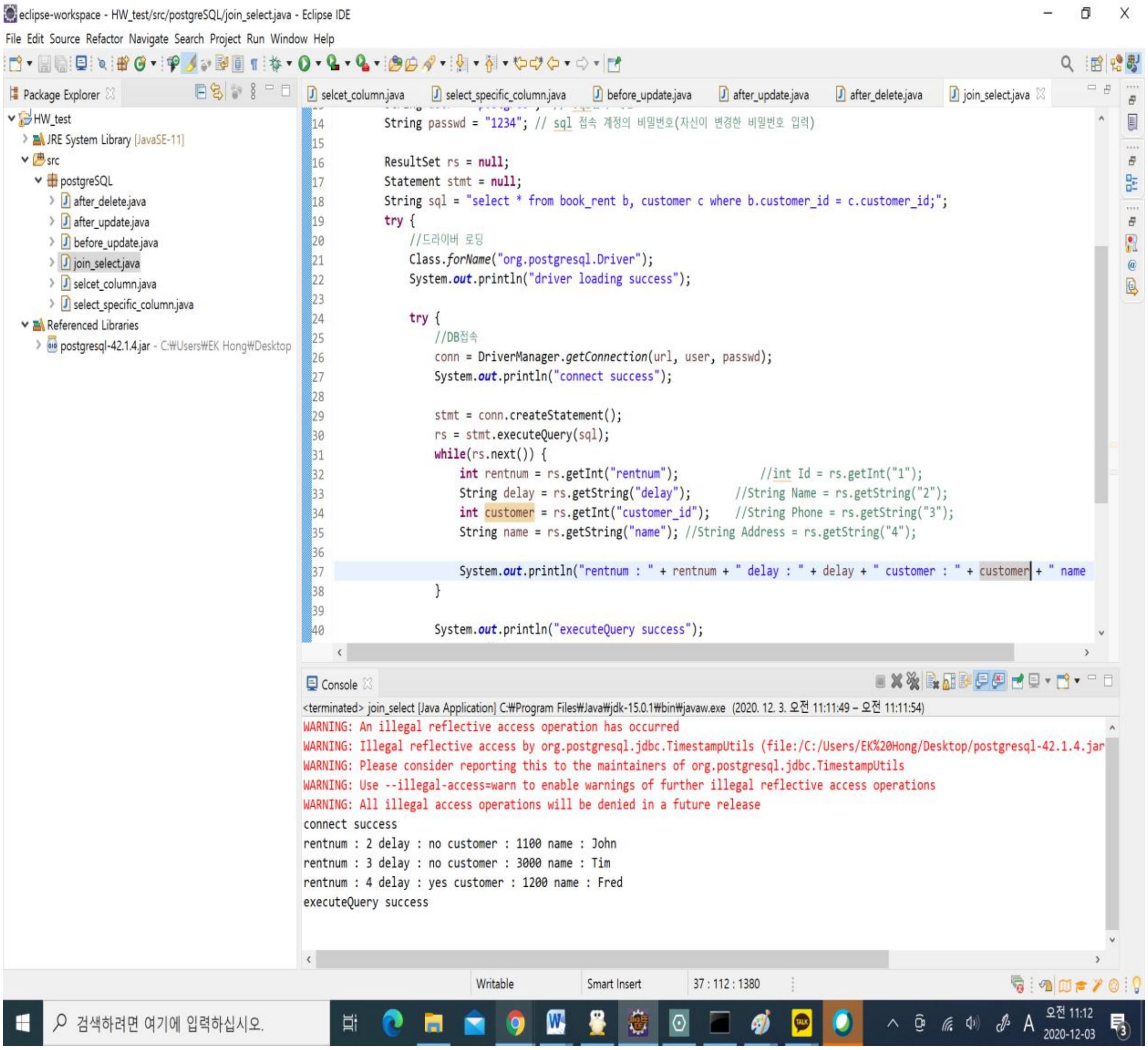
```
<terminated> after_delete [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe (2020. 12. 3. 오전 4:20:09 – 오전 4:20:14)
driver loading success
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.postgresql.jdbc.TimestampUtils (file:/C:/Users/EK%20Hong/Desktop/postgresql-42.1.4.jar
WARNING: Please consider reporting this to the maintainers of org.postgresql.jdbc.TimestampUtils
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
executeQuery success
```



```
library=# select* from book_rent;
 rentnum | delay | rentdate | returndate | bookid | customer_id
---------+-------+----------+------------+--------+-------------
       2 | no    |      510 |        710 |    400 |        1100
       3 | no    |      615 |        815 |    500 |        3000
       4 | yes   |      600 |        800 |    600 |        1200
(3개 행)
```

✓ Join을 이용한 select문 1개

- 예) SELECT * FROM emp e, dept d WHERE e.deptno=d.deptno
  AND d.deptno = 20;

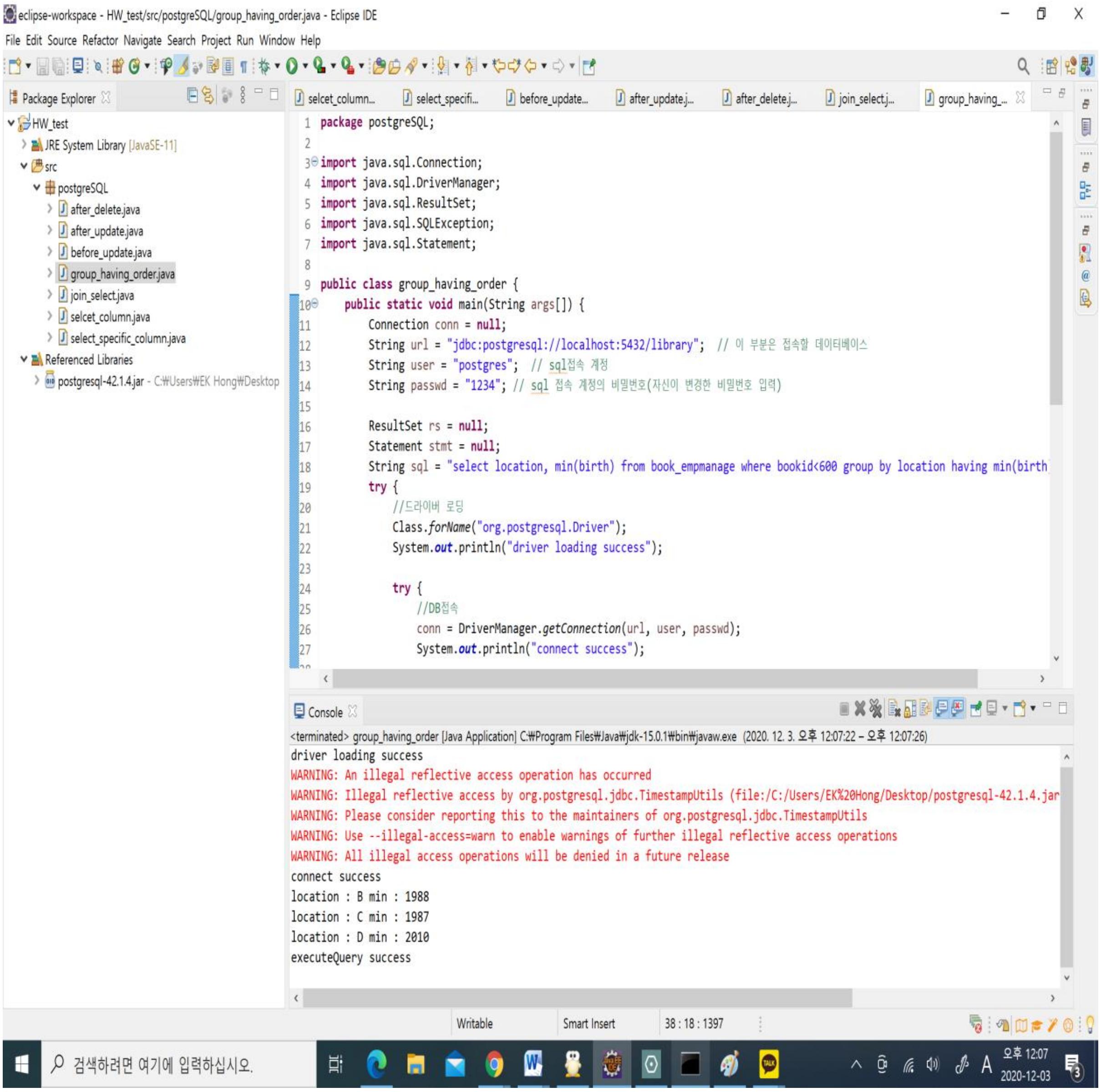

eclipse-workspace - HW_test/src/postgreSQL/join_select.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
HW_test
JRE System Library [JavaSE-11]
src
postgreSQL
after_delete.java
after_update.java
before_update.java
join_select.java
selcet_column.java
select_specific_column.java
Referenced Libraries
postgresql-42.1.4.jar - C:₩Users₩EK Hong₩Desktop
selcet_column.java
select_specific_column.java
before_update.java
after_update.java
after_delete.java
join_select.java
Console
Writable
Smart Insert
37 : 112 : 1380
검색하려면 여기에 입력하십시오.
오전 11:12
2020-12-03

```java
        String passwd = "1234"; // sql 접속 계정의 비밀번호(자신이 변경한 비밀번호 입력)

        ResultSet rs = null;
        Statement stmt = null;
        String sql = "select * from book_rent b, customer c where b.customer_id = c.customer_id;";
        try {
            //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try {
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");

                stmt = conn.createStatement();
                rs = stmt.executeQuery(sql);
                while(rs.next()) {
                    int rentnum = rs.getInt("rentnum");           //int Id = rs.getInt("1");
                    String delay = rs.getString("delay");       //String Name = rs.getString("2");
                    int customer = rs.getInt("customer_id");    //String Phone = rs.getString("3");
                    String name = rs.getString("name"); //String Address = rs.getString("4");

                    System.out.println("rentnum : " + rentnum + " delay : " + delay + " customer : " + customer + " name
                }

                System.out.println("executeQuery success");
```

```
<terminated> join_select [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe (2020. 12. 3. 오전 11:11:49 – 오전 11:11:54)
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.postgresql.jdbc.TimestampUtils (file:/C:/Users/EK%20Hong/Desktop/postgresql-42.1.4.jar
WARNING: Please consider reporting this to the maintainers of org.postgresql.jdbc.TimestampUtils
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
rentnum : 2 delay : no customer : 1100 name : John
rentnum : 3 delay : no customer : 3000 name : Tim
rentnum : 4 delay : yes customer : 1200 name : Fred
executeQuery success
```

집계함수와 group by, having, order by를 이용한 select문 1개

- 예) SELECT deptno, avg(sal) FROM emp WHERE deptno > 10 GROUP BY deptno HAVING avg(sal) > 1500;

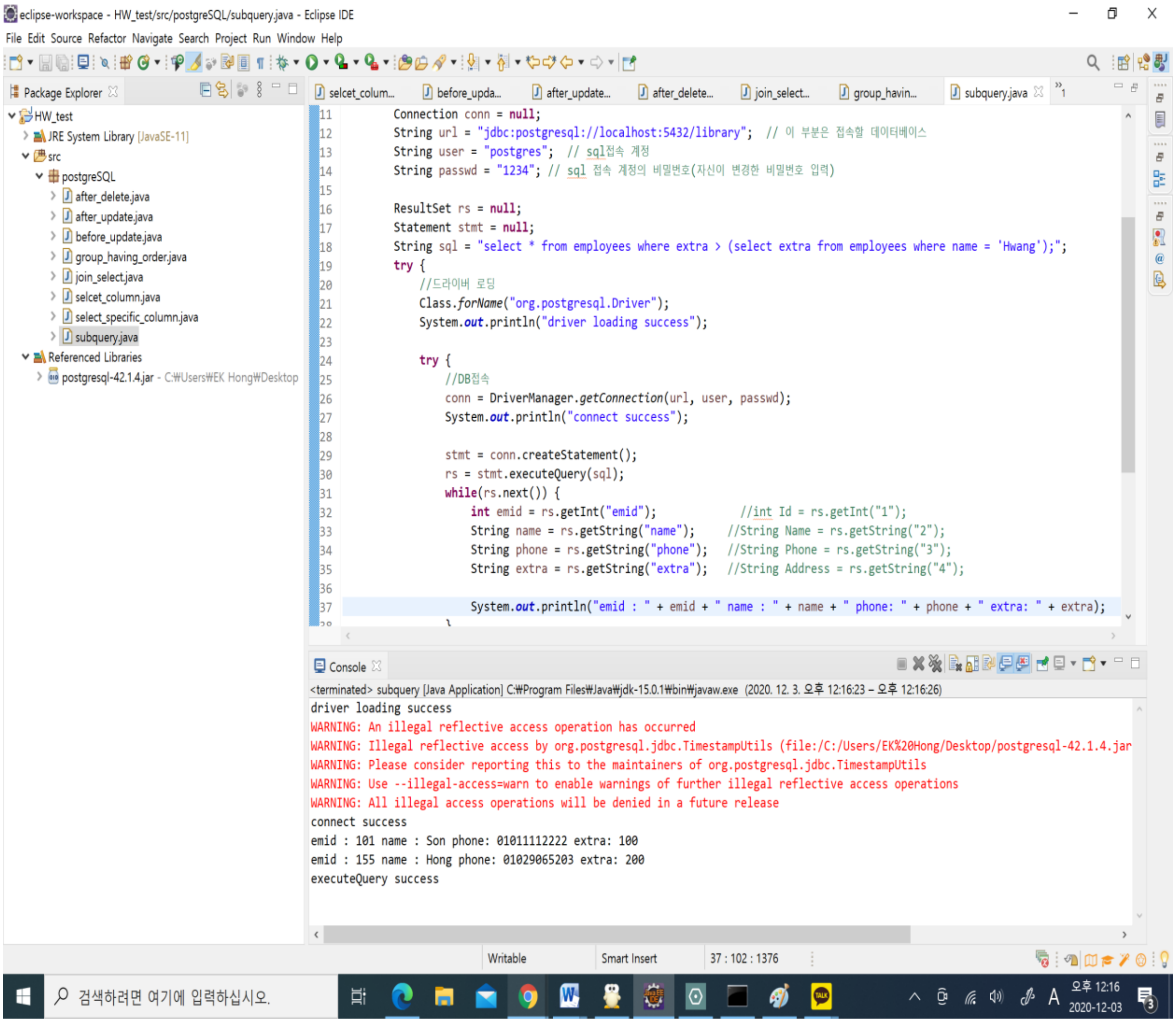


```java
package postgreSQL;

import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.sql.Statement;

public class group_having_order {
    public static void main(String args[]) {
        Connection conn = null;
        String url = "jdbc:postgresql://localhost:5432/library";  // 이 부분은 접속할 데이터베이스
        String user = "postgres";  // sql접속 계정
        String passwd = "1234"; // sql 접속 계정의 비밀번호(자신이 변경한 비밀번호 입력)

        ResultSet rs = null;
        Statement stmt = null;
        String sql = "select location, min(birth) from book_empmanage where bookid<600 group by location having min(birth
        try {
            //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try {
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");
```

```
<terminated> group_having_order [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe  (2020. 12. 3. 오후 12:07:22 – 오후 12:07:26)
driver loading success
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.postgresql.jdbc.TimestampUtils (file:/C:/Users/EK%20Hong/Desktop/postgresql-42.1.4.jar
WARNING: Please consider reporting this to the maintainers of org.postgresql.jdbc.TimestampUtils
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
location : B min : 1988
location : C min : 1987
location : D min : 2010
executeQuery success
```

subquery를 이용한 select문 1개

- ◆ 예) SELECT * FROM emp WHERE sal > (SELECT sal FROM emp WHERE ename = 'WARD');

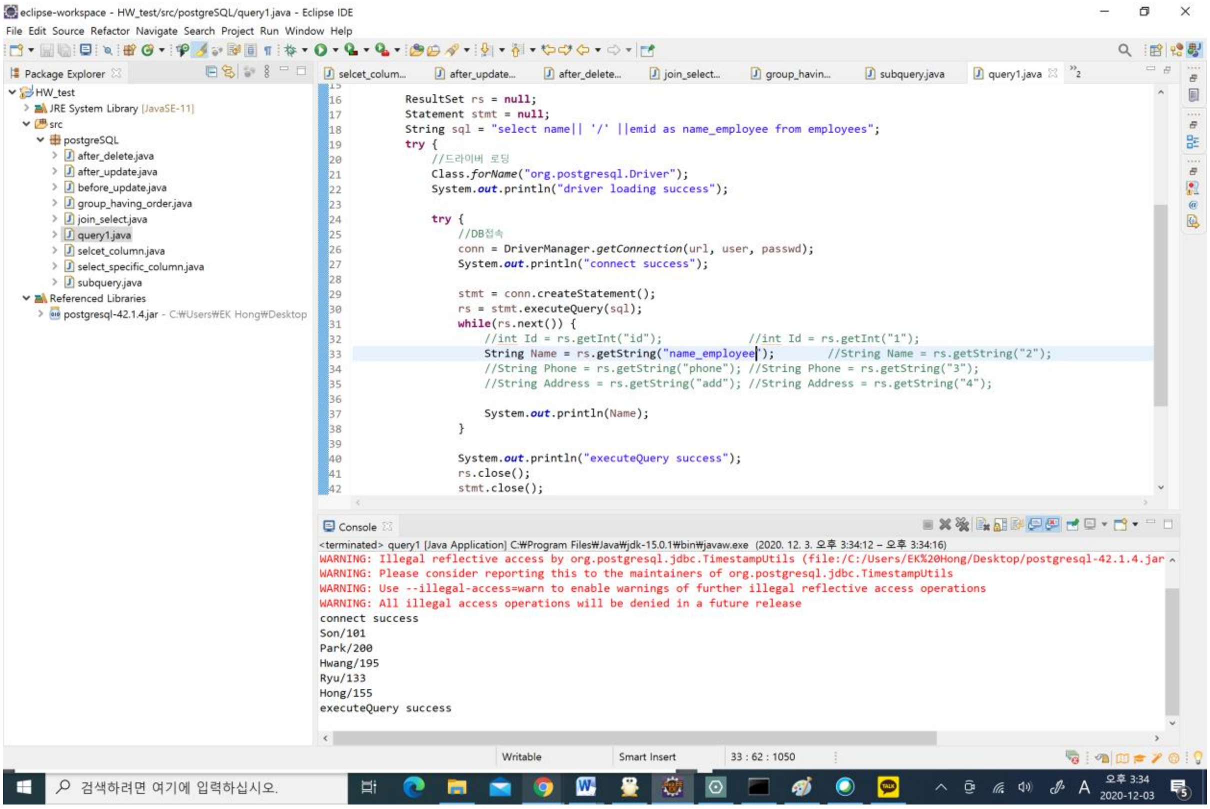


```
        Connection conn = null;
        String url = "jdbc:postgresql://localhost:5432/library";  // 이 부분은 접속할 데이터베이스
        String user = "postgres";  // sql접속 계정
        String passwd = "1234"; // sql 접속 계정의 비밀번호(자신이 변경한 비밀번호 입력)

        ResultSet rs = null;
        Statement stmt = null;
        String sql = "select * from employees where extra > (select extra from employees where name = 'Hwang');";
        try {
            //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try {
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");

                stmt = conn.createStatement();
                rs = stmt.executeQuery(sql);
                while(rs.next()) {
                    int emid = rs.getInt("emid");             //int Id = rs.getInt("1");
                    String name = rs.getString("name");     //String Name = rs.getString("2");
                    String phone = rs.getString("phone");   //String Phone = rs.getString("3");
                    String extra = rs.getString("extra");   //String Address = rs.getString("4");

                    System.out.println("emid : " + emid + " name : " + name + " phone: " + phone + " extra: " + extra);
                }
```

```
<terminated> subquery [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe  (2020. 12. 3. 오후 12:16:23 – 오후 12:16:26)
driver loading success
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.postgresql.jdbc.TimestampUtils (file:/C:/Users/EK%20Hong/Desktop/postgresql-42.1.4.jar
WARNING: Please consider reporting this to the maintainers of org.postgresql.jdbc.TimestampUtils
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
emid : 101 name : Son phone: 01011112222 extra: 100
emid : 155 name : Hong phone: 01029065203 extra: 200
executeQuery success
```

과제2에서 사용한 자유 쿼리문 5개

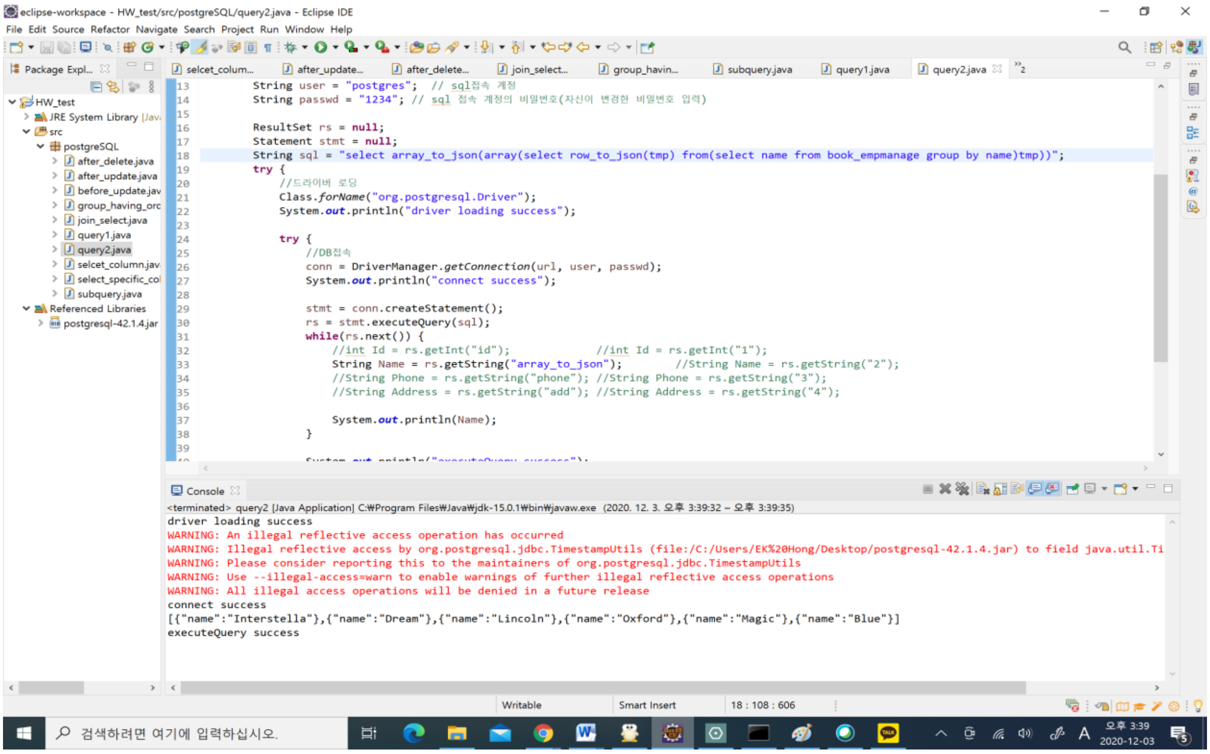
1. query1



```java
        ResultSet rs = null;
        Statement stmt = null;
        String sql = "select name|| '/' ||emid as name_employee from employees";
        try {
            //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try {
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");

                stmt = conn.createStatement();
                rs = stmt.executeQuery(sql);
                while(rs.next()) {
                    //int Id = rs.getInt("id");              //int Id = rs.getInt("1");
                    String Name = rs.getString("name_employee");        //String Name = rs.getString("2");
                    //String Phone = rs.getString("phone"); //String Phone = rs.getString("3");
                    //String Address = rs.getString("add"); //String Address = rs.getString("4");

                    System.out.println(Name);
                }

                System.out.println("executeQuery success");
                rs.close();
                stmt.close();
```

```
<terminated> query1 [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe  (2020. 12. 3. 오후 3:34:12 – 오후 3:34:16)
WARNING: Illegal reflective access by org.postgresql.jdbc.TimestampUtils (file:/C:/Users/EK%20Hong/Desktop/postgresql-42.1.4.jar
WARNING: Please consider reporting this to the maintainers of org.postgresql.jdbc.TimestampUtils
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
Son/101
Park/200
Hwang/195
Ryu/133
Hong/155
executeQuery success
```

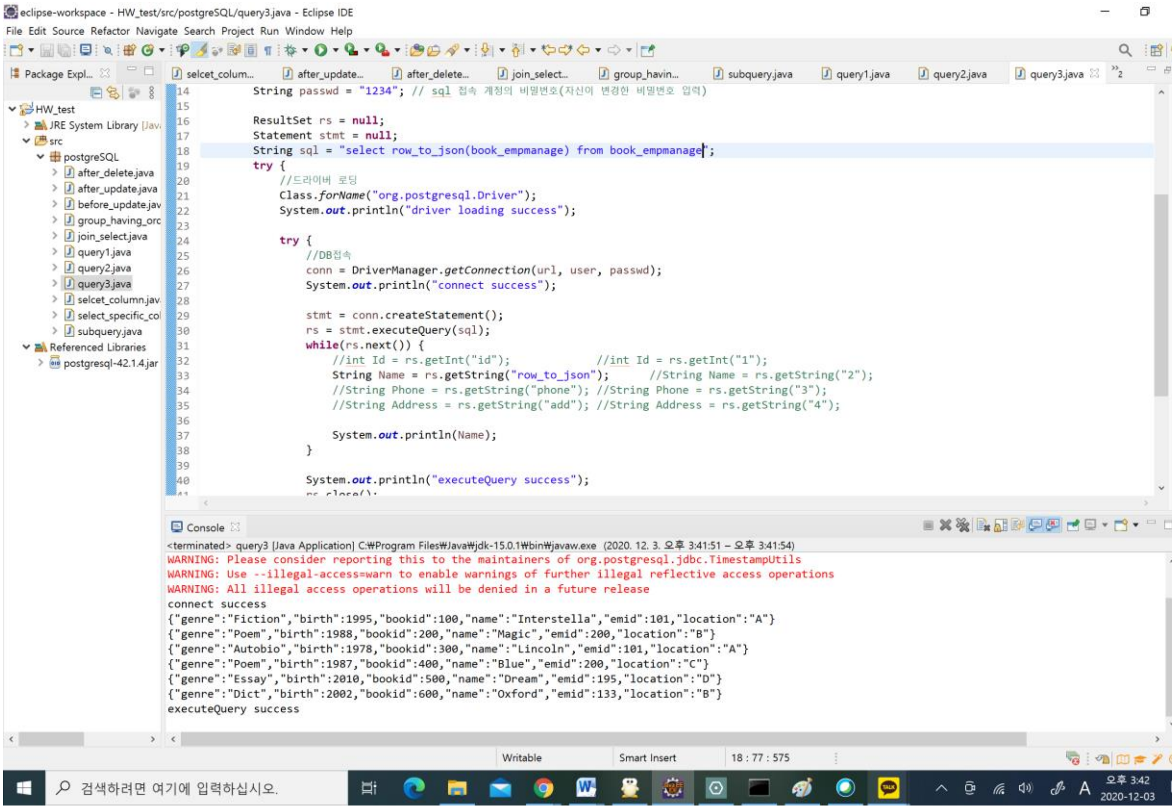
2. query2



```
        String user = "postgres";  // sql접속 계정
        String passwd = "1234"; // sql 접속 계정의 비밀번호(자신이 변경한 비밀번호 입력)

        ResultSet rs = null;
        Statement stmt = null;
        String sql = "select array_to_json(array(select row_to_json(tmp) from(select name from book_empmanage group by name)tmp))";
        try {
            //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try {
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");

                stmt = conn.createStatement();
                rs = stmt.executeQuery(sql);
                while(rs.next()) {
                    //int Id = rs.getInt("id");             //int Id = rs.getInt("1");
                    String Name = rs.getString("array_to_json");        //String Name = rs.getString("2");
                    //String Phone = rs.getString("phone"); //String Phone = rs.getString("3");
                    //String Address = rs.getString("add"); //String Address = rs.getString("4");

                    System.out.println(Name);
                }

                System.out.println("executeQuery success");
```

```
<terminated> query2 [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe  (2020. 12. 3. 오후 3:39:32 – 오후 3:39:35)
driver loading success
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.postgresql.jdbc.TimestampUtils (file:/C:/Users/EK%20Hong/Desktop/postgresql-42.1.4.jar) to field java.util.Ti
WARNING: Please consider reporting this to the maintainers of org.postgresql.jdbc.TimestampUtils
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
[{"name":"Interstella"},{"name":"Dream"},{"name":"Lincoln"},{"name":"Oxford"},{"name":"Magic"},{"name":"Blue"}]
executeQuery success
```

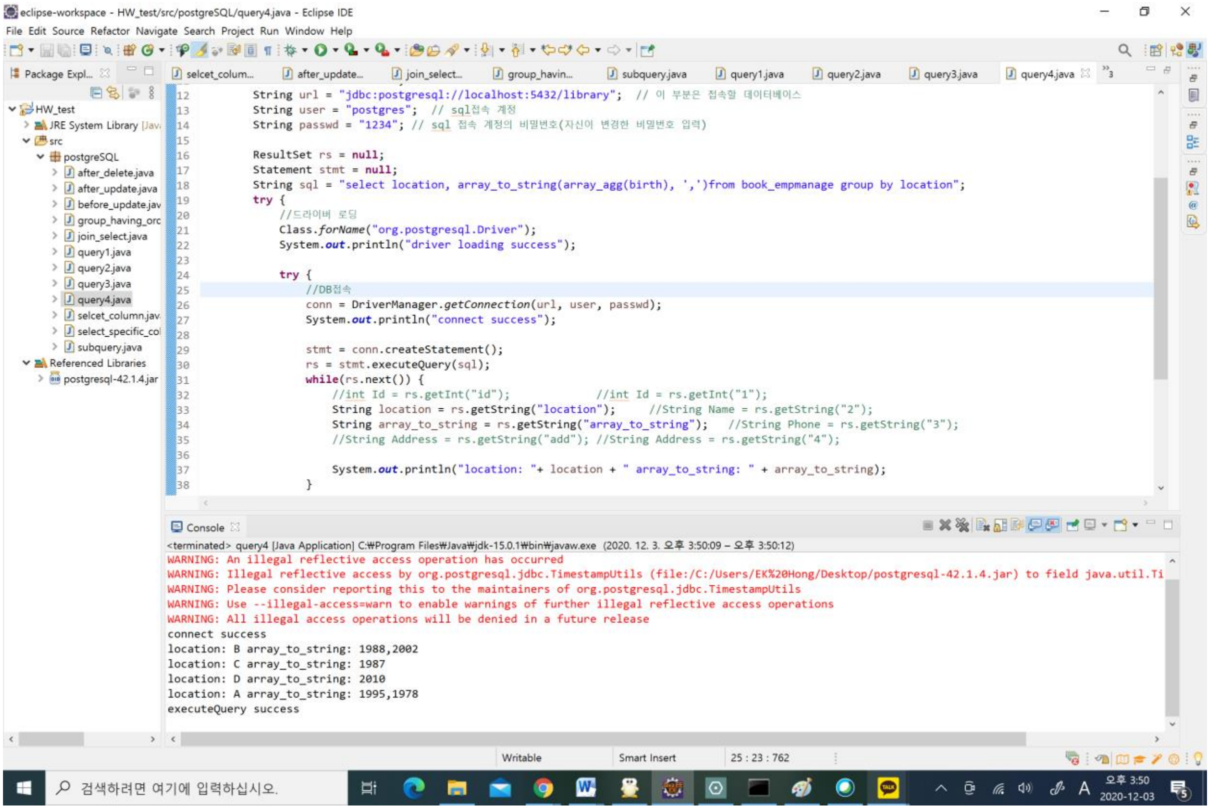
3. query3



```
        String passwd = "1234"; // sql 접속 계정의 비밀번호(자신이 변경한 비밀번호 입력)

        ResultSet rs = null;
        Statement stmt = null;
        String sql = "select row_to_json(book_empmanage) from book_empmanage";
        try {
            //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try {
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");

                stmt = conn.createStatement();
                rs = stmt.executeQuery(sql);
                while(rs.next()) {
                    //int Id = rs.getInt("id");             //int Id = rs.getInt("1");
                    String Name = rs.getString("row_to_json");      //String Name = rs.getString("2");
                    //String Phone = rs.getString("phone"); //String Phone = rs.getString("3");
                    //String Address = rs.getString("add"); //String Address = rs.getString("4");

                    System.out.println(Name);
                }

                System.out.println("executeQuery success");
                rs.close();
```

```
<terminated> query3 [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe  (2020. 12. 3. 오후 3:41:51 – 오후 3:41:54)
WARNING: Please consider reporting this to the maintainers of org.postgresql.jdbc.TimestampUtils
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
{"genre":"Fiction","birth":1995,"bookid":100,"name":"Interstella","emid":101,"location":"A"}
{"genre":"Poem","birth":1988,"bookid":200,"name":"Magic","emid":200,"location":"B"}
{"genre":"Autobio","birth":1978,"bookid":300,"name":"Lincoln","emid":101,"location":"A"}
{"genre":"Poem","birth":1987,"bookid":400,"name":"Blue","emid":200,"location":"C"}
{"genre":"Essay","birth":2010,"bookid":500,"name":"Dream","emid":195,"location":"D"}
{"genre":"Dict","birth":2002,"bookid":600,"name":"Oxford","emid":133,"location":"B"}
executeQuery success
```

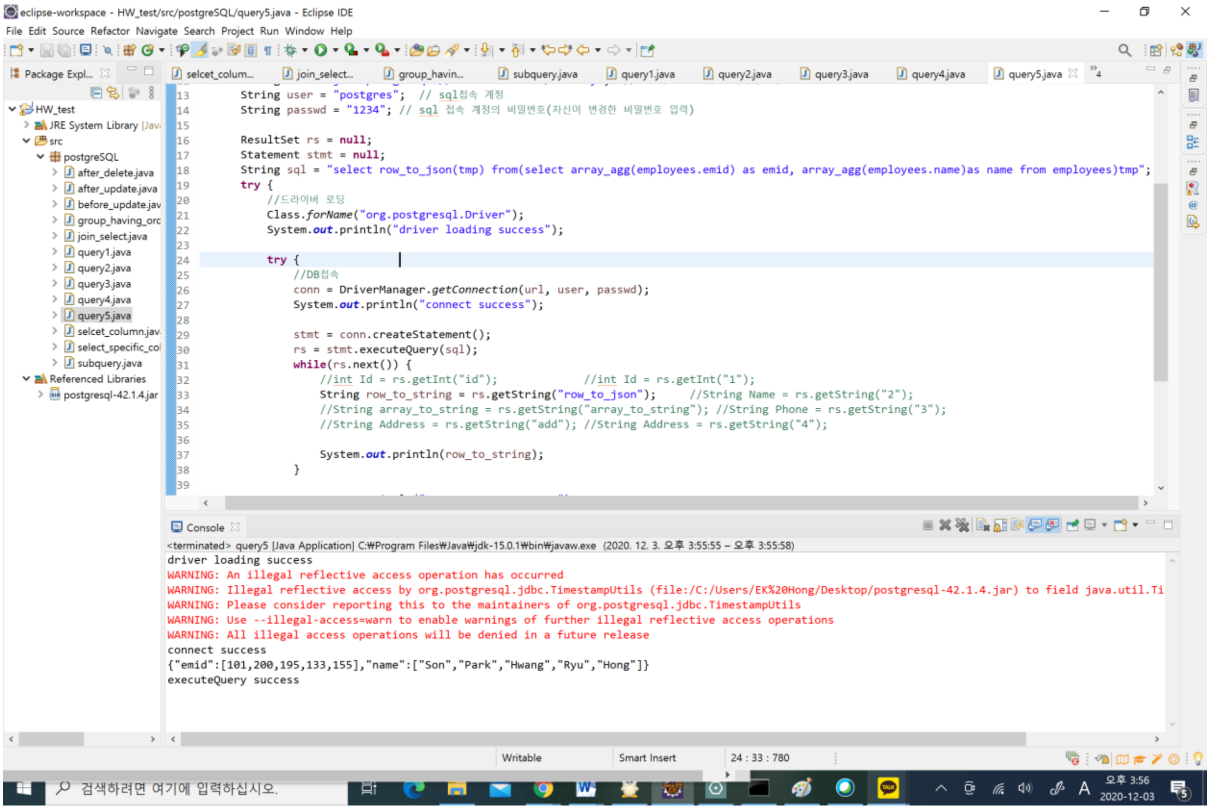
4. query4



```
        String url = "jdbc:postgresql://localhost:5432/library";  // 이 부분은 접속할 데이터베이스
        String user = "postgres";  // sql접속 계정
        String passwd = "1234"; // sql 접속 계정의 비밀번호(자신이 변경한 비밀번호 입력)

        ResultSet rs = null;
        Statement stmt = null;
        String sql = "select location, array_to_string(array_agg(birth), ',')from book_empmanage group by location";
        try {
            //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try {
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");

                stmt = conn.createStatement();
                rs = stmt.executeQuery(sql);
                while(rs.next()) {
                    //int Id = rs.getInt("id");             //int Id = rs.getInt("1");
                    String location = rs.getString("location");     //String Name = rs.getString("2");
                    String array_to_string = rs.getString("array_to_string");   //String Phone = rs.getString("3");
                    //String Address = rs.getString("add"); //String Address = rs.getString("4");

                    System.out.println("location: "+ location + " array_to_string: " + array_to_string);
                }
```

```
<terminated> query4 [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe  (2020. 12. 3. 오후 3:50:09 – 오후 3:50:12)
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.postgresql.jdbc.TimestampUtils (file:/C:/Users/EK%20Hong/Desktop/postgresql-42.1.4.jar) to field java.util.Ti
WARNING: Please consider reporting this to the maintainers of org.postgresql.jdbc.TimestampUtils
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
location: B array_to_string: 1988,2002
location: C array_to_string: 1987
location: D array_to_string: 2010
location: A array_to_string: 1995,1978
executeQuery success
```

5. query5



```
        String user = "postgres";  // sql접속 계정
        String passwd = "1234"; // sql 접속 계정의 비밀번호(자신이 변경한 비밀번호 입력)

        ResultSet rs = null;
        Statement stmt = null;
        String sql = "select row_to_json(tmp) from(select array_agg(employees.emid) as emid, array_agg(employees.name)as name from employees)tmp";
        try {
            //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try {
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");

                stmt = conn.createStatement();
                rs = stmt.executeQuery(sql);
                while(rs.next()) {
                    //int Id = rs.getInt("id");             //int Id = rs.getInt("1");
                    String row_to_string = rs.getString("row_to_json");     //String Name = rs.getString("2");
                    //String array_to_string = rs.getString("array_to_string"); //String Phone = rs.getString("3");
                    //String Address = rs.getString("add"); //String Address = rs.getString("4");

                    System.out.println(row_to_string);
                }

```

```
<terminated> query5 [Java Application] C:₩Program Files₩Java₩jdk-15.0.1₩bin₩javaw.exe  (2020. 12. 3. 오후 3:55:55 – 오후 3:55:58)
driver loading success
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.postgresql.jdbc.TimestampUtils (file:/C:/Users/EK%20Hong/Desktop/postgresql-42.1.4.jar) to field java.util.Ti
WARNING: Please consider reporting this to the maintainers of org.postgresql.jdbc.TimestampUtils
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
connect success
{"emid":[101,200,195,133,155],"name":["Son","Park","Hwang","Ryu","Hong"]}
executeQuery success
```

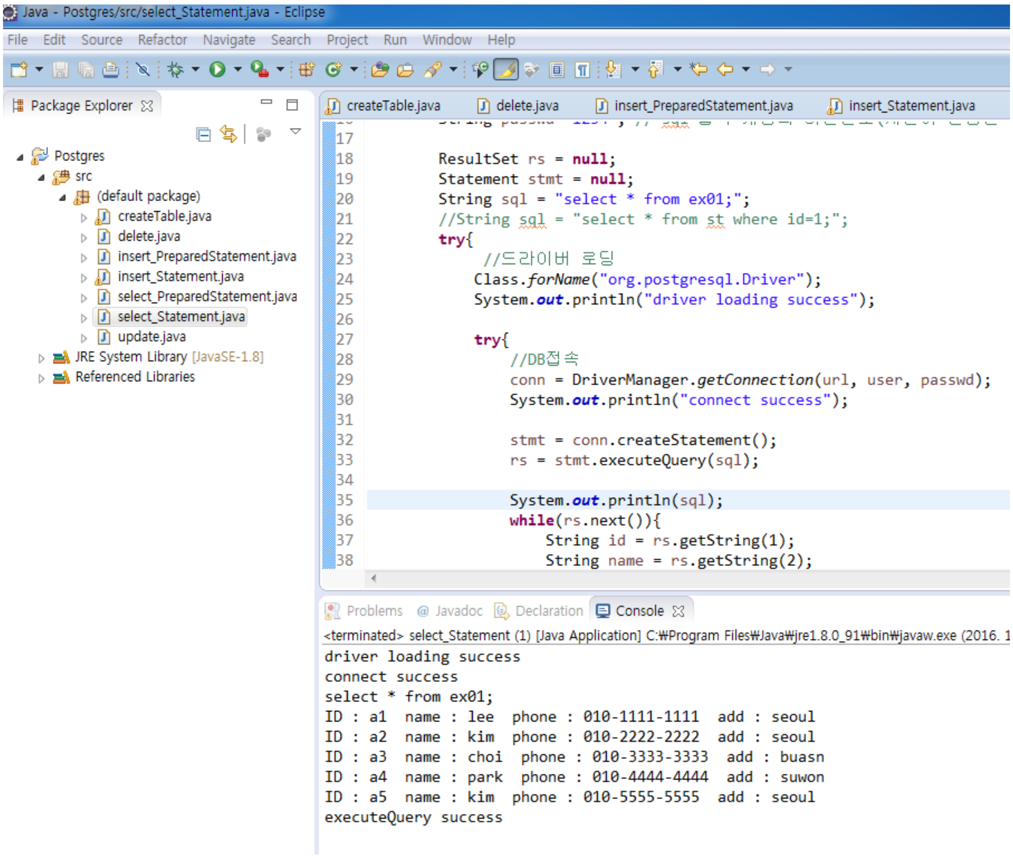
◆ 제출할 결과물

✓ 보고서와 소스코드 둘 다 제출

◆ 위 고려사항들을 구현한 소스코드 압축해서 제출

● C:₩Users₩자신의계정₩workspace₩프로젝트파일 ← 여기에 있는 프로젝트파일 (압축하여 제출)

◆ 보고서에 각각 문제 마다 다음과 같이 캡쳐 이미지 첨부할 것 (각 문제마다 모두)


Java - Postgres/src/select_Statement.java - Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
Postgres
src
(default package)
createTable.java
delete.java
insert_PreparedStatement.java
insert_Statement.java
select_PreparedStatement.java
select_Statement.java
update.java
JRE System Library [JavaSE-1.8]
Referenced Libraries
createTable.java
delete.java
insert_PreparedStatement.java
insert_Statement.java
Problems
Javadoc
Declaration
Console

```java

        ResultSet rs = null;
        Statement stmt = null;
        String sql = "select * from ex01;";
        //String sql = "select * from st where id=1;";
        try{
             //드라이버 로딩
            Class.forName("org.postgresql.Driver");
            System.out.println("driver loading success");

            try{
                //DB접속
                conn = DriverManager.getConnection(url, user, passwd);
                System.out.println("connect success");

                stmt = conn.createStatement();
                rs = stmt.executeQuery(sql);

                System.out.println(sql);
                while(rs.next()){
                    String id = rs.getString(1);
                    String name = rs.getString(2);
```

<terminated> select_Statement (1) [Java Application] C:₩Program Files₩Java₩jre1.8.0_91₩bin₩javaw.exe (2016. 1

```
driver loading success
connect success
select * from ex01;
ID : a1  name : lee  phone : 010-1111-1111  add : seoul
ID : a2  name : kim  phone : 010-2222-2222  add : seoul
ID : a3  name : choi  phone : 010-3333-3333  add : buasn
ID : a4  name : park  phone : 010-4444-4444  add : suwon
ID : a5  name : kim  phone : 010-5555-5555  add : seoul
executeQuery success
```