

Report

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Github:

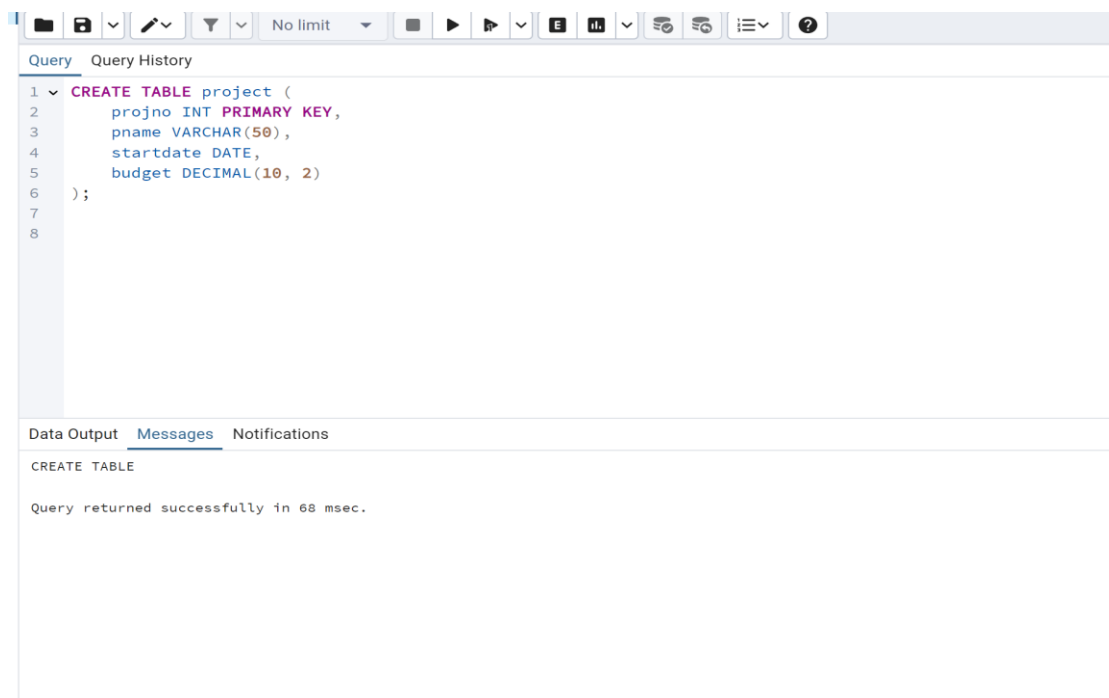
<https://github.com/Apricity123456/DatabaseLabs-Isep>

LAB1:

Exercise1 and 2 have already done in the class ,so I have uploaded the sql file to Github.

Exercise 3:

3.1



The screenshot shows a SQL query editor interface. At the top, there is a toolbar with various icons for file operations, query execution, and settings. Below the toolbar, the main area displays a SQL query:

```
1 CREATE TABLE project (  
2   projno INT PRIMARY KEY,  
3   pname VARCHAR(50),  
4   startdate DATE,  
5   budget DECIMAL(10, 2)  
6 );  
7  
8
```

 The query is numbered 1 through 8. Below the query editor, there are tabs for 'Data Output', 'Messages', and 'Notifications'. The 'Messages' tab is currently selected, showing the message: 'CREATE TABLE' and 'Query returned successfully in 68 msec.'

Welcome lab/postgres@PostgreSQL 17* X

lab/postgres@PostgreSQL 17

Query Query History

```
1 -- CREATE TABLE project (  
2 --   projno INT PRIMARY KEY,  
3 --   pname VARCHAR(50),  
4 --   startdate DATE,  
5 --   budget DECIMAL(10, 2)  
6 -- );  
7  
8 -- INSERT INTO project VALUES  
9 (1, 'Blockchain Explorer', '2025-01-10', 20000),  
10 (2, 'AI Chatbot', '2025-02-01', 30000),  
11 (3, 'Mobile App', '2025-03-15', 15000),  
12 (4, 'Data Analytics', '2025-04-01', 25000);  
13
```

Data Output Messages Notifications

INSERT 0 4

Query returned successfully in 31 msec.

Total rows: Query complete 00:00:00.031

✓ Query returned successfully in 31 msec. X

CRLF Ln 13, Col 1

3.2

Welcome lab/postgres@PostgreSQL 17* X

lab/postgres@PostgreSQL 17

Query Query History

```
5 -- budget DECIMAL(10, 2)  
6 -- );  
7  
8 -- INSERT INTO project VALUES  
9 (1, 'Blockchain Explorer', '2025-01-10', 20000),  
10 (2, 'AI Chatbot', '2025-02-01', 30000),  
11 (3, 'Mobile App', '2025-03-15', 15000),  
12 (4, 'Data Analytics', '2025-04-01', 25000);  
13  
14 -- CREATE TABLE project_emp (  
15 --   empno INT,  
16 --   projno INT,  
17 --   PRIMARY KEY (empno, projno),  
18 --   FOREIGN KEY (empno) REFERENCES emp(empno),  
19 --   FOREIGN KEY (projno) REFERENCES project(projno)  
20 -- );  
21
```

Data Output Messages Notifications

CREATE TABLE

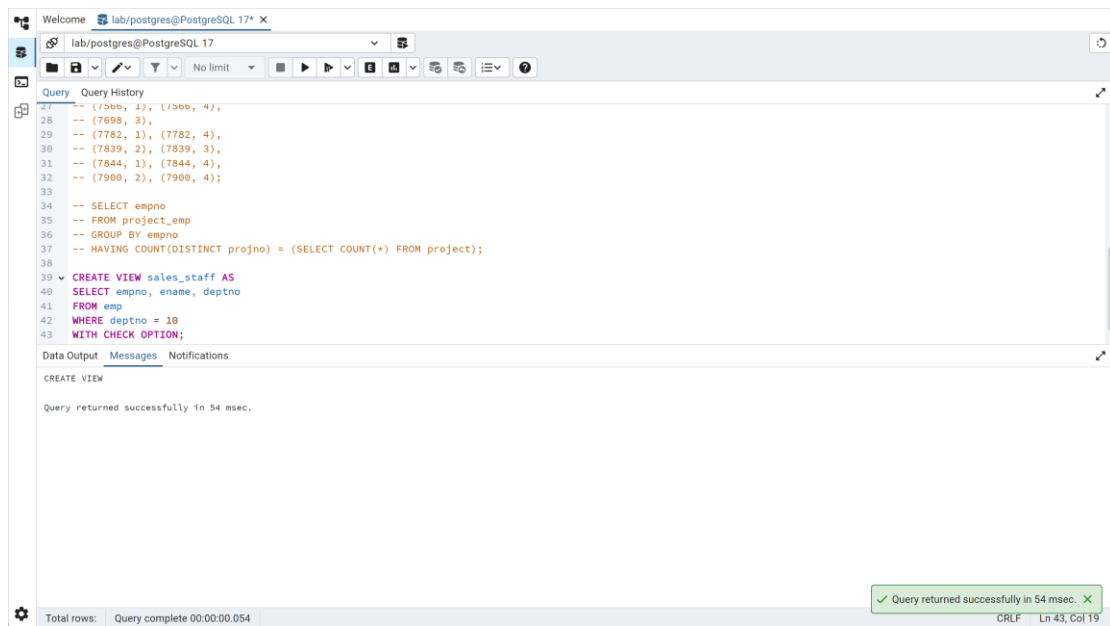
Query returned successfully in 42 msec.

Total rows: Query complete 00:00:00.042

✓ Query returned successfully in 42 msec. X

CRLF Ln 21, Col 1

3.4

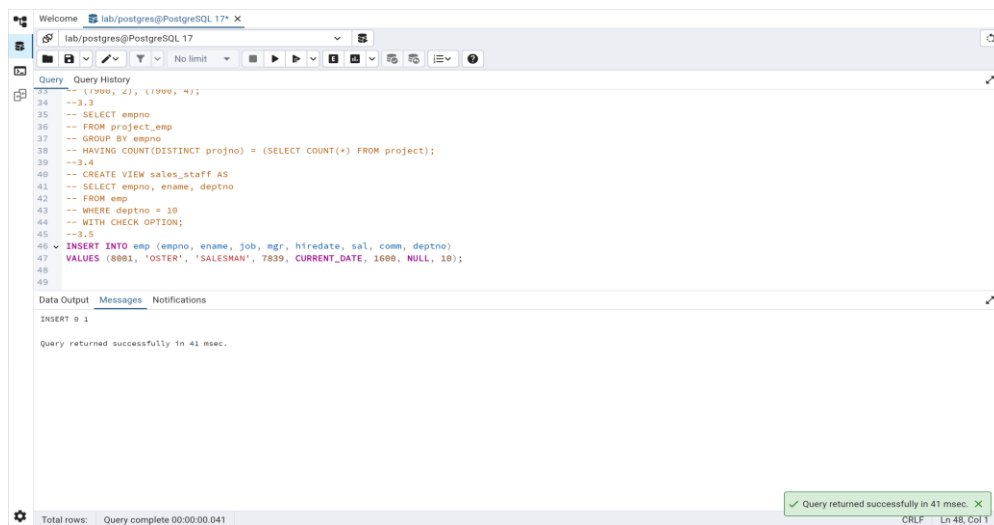


The screenshot shows a PostgreSQL query editor interface. The query window contains the following SQL code:

```
27 -- (7566, 1), (7566, 4),
28 -- (7698, 3),
29 -- (7782, 1), (7782, 4),
30 -- (7839, 2), (7839, 3),
31 -- (7844, 1), (7944, 4),
32 -- (7988, 2), (7988, 4);
33
34 -- SELECT empno
35 -- FROM project_emp
36 -- GROUP BY empno
37 -- HAVING COUNT(DISTINCT projno) = (SELECT COUNT(*) FROM project);
38
39 CREATE VIEW sales_staff AS
40 SELECT empno, ename, deptno
41 FROM emp
42 WHERE deptno = 10
43 WITH CHECK OPTION;
```

The Data Output pane shows the message: "CREATE VIEW". The status bar at the bottom indicates "Query returned successfully in 54 msec." and "Total rows: Query complete 00:00:00.054". A green notification box at the bottom right says "Query returned successfully in 54 msec."

3.5



The screenshot shows a PostgreSQL query editor interface. The query window contains the following SQL code:

```
33 -- (7988, 2), (7988, 4);
34 --3,3
35 -- SELECT empno
36 -- FROM project_emp
37 -- GROUP BY empno
38 -- HAVING COUNT(DISTINCT projno) = (SELECT COUNT(*) FROM project);
39 --3,4
40 -- CREATE VIEW sales_staff AS
41 -- SELECT empno, ename, deptno
42 -- FROM emp
43 -- WHERE deptno = 10
44 -- WITH CHECK OPTION;
45 --3,5
46 INSERT INTO emp (empno, ename, job, mgr, hiredate, sal, comm, deptno)
47 VALUES (8001, 'OSTER', 'SALESMAN', 7839, CURRENT_DATE, 1600, NULL, 10);
48
49
```

The Data Output pane shows the message: "INSERT 0 1". The status bar at the bottom indicates "Query returned successfully in 41 msec." and "Total rows: Query complete 00:00:00.041". A green notification box at the bottom right says "Query returned successfully in 41 msec."

3.6

Welcome lab/postgres@PostgreSQL 17* X

lab/postgres@PostgreSQL 17

Query Query History

```

37 -- LAUNCH BY empno
38 -- HAVING COUNT(DISTINCT projno) = (SELECT COUNT(*) FROM project);
39 --3.4
40 -- CREATE VIEW sales_staff AS
41 -- SELECT empno, ename, deptno
42 -- FROM emp
43 -- WHERE deptno = 10
44 -- WITH CHECK OPTION;
45 --3.5
46 -- INSERT INTO emp (empno, ename, job, mgr, hiredate, sal, comm, deptno)
47 -- VALUES (8001, 'OSTER', 'SALESMAN', 7839, CURRENT_DATE, 1000, NULL, 10);
48 --3.6
49 -- SELECT empno, COUNT(*) AS project_count
50 -- FROM project_emp
51 -- GROUP BY empno
52 -- HAVING COUNT(*) >= 2;
53

```

Data Output Messages Notifications

Showing rows: 1 to 8 Page No: 1 of 1

empno	project_count
7839	2
7369	4
7499	2
7900	2
7782	2
7844	2
7566	2
7521	2

Total rows: 8 Query complete 00:00:00.060

Successfully run. Total query runtime: 60 msec. 8 rows affected.

3.7.1

Welcome lab/postgres@PostgreSQL 17* X

lab/postgres@PostgreSQL 17

Query Query History

```

57 -- VALUES (8001, 'OSTER', 'SALESMAN', 7839, CURRENT_DATE, 1000, NULL, 10);
58 --3.6
59 -- SELECT empno, COUNT(*) AS project_count
60 -- FROM project_emp
61 -- GROUP BY empno
62 -- HAVING COUNT(*) >= 2;
63
64 --3.7
65 -- SELECT empno
66 -- FROM project_emp
67 -- WHERE projno = 1
68 -- INTERSECT
69 -- SELECT empno
70 -- FROM project_emp
71 -- WHERE projno = 2;
72

```

Data Output Messages Notifications

Showing rows: 1 to 2 Page No: 1 of 1

empno
7369
7499

Total rows: 2 Query complete 00:00:00.051

Successfully run. Total query runtime: 51 msec. 2 rows affected.

3.7.2

Welcome lab/postgres@PostgreSQL 17* X

lab/postgres@PostgreSQL 17

Query Query History

```

55 -- SELECT empno
56 -- FROM project_emp
57 -- WHERE projno = 1
58 -- INTERSECT
59 -- SELECT empno
60 -- FROM project_emp
61 -- WHERE projno = 2;
62 --3.7.2
63
64 SELECT empno
65 FROM project_emp
66 WHERE projno = 3
67 EXCEPT
68 SELECT empno
69 FROM project_emp
70 WHERE projno = 4;
71

```

Data Output Messages Notifications

Showing rows: 1 to 3 Page No: 1 of 1

empno
1
2
3

Total rows: 3 Query complete 00:00:00.047

Successfully run. Total query runtime: 47 msec. 3 rows affected. X

CRLF Ln 71, Col 1

3.8

Welcome lab/postgres@PostgreSQL 17* X

lab/postgres@PostgreSQL 17

Query Query History

```

69 -- FROM project_emp
70 -- WHERE projno = 4;
71 --3.8
72 SELECT projno, empno, sal
73 FROM (
74     SELECT pe.projno, e.empno, e.sal,
75            RANK() OVER (PARTITION BY pe.projno ORDER BY e.sal DESC) AS rk
76     FROM project_emp pe
77     JOIN emp e ON pe.empno = e.empno
78 ) sub
79 WHERE rk <= 3;
80
81
82
83
84
85

```

Data Output Messages Notifications

Showing rows: 1 to 12 Page No: 1 of 1

projno	empno	sal
1	1	7566
1	2	7566
1	3	7566
2	1	7782
2	2	7782
2	3	7782
3	1	7499
3	2	7499
3	3	7499
4	1	7839
4	2	7839
4	3	7839
5	1	7499
5	2	7499
5	3	7499
6	1	7521
6	2	7521
6	3	7521
7	1	7839
7	2	7839
7	3	7839
8	1	7698
8	2	7698
8	3	7698
9	1	7521
9	2	7521
9	3	7521
10	1	7566
10	2	7566
10	3	7566

Total rows: 12 Query complete 00:00:00.045

Successfully run. Total query runtime: 45 msec. 12 rows affected. X

CRLF Ln 80, Col 1

3.9.1

Welcome lab/postgres@PostgreSQL 17* X

lab/postgres@PostgreSQL 17

Query History

```
-- run project_emp
-- WHERE projno = 4;
--3.8
-- SELECT projno, empno, sal
-- FROM (
--   SELECT pe.projno, e.empno, e.sal,
--          RANK() OVER (PARTITION BY pe.projno ORDER BY e.sal DESC) AS rk
--   FROM project_emp pe
--   JOIN emp e ON pe.empno = e.empno
-- ) sub
-- WHERE rk <= 3;
--3.9.1
81 SELECT empno,
82        ROUND(COUNT(*) * 100.0 / (SELECT COUNT(*) FROM project), 2) AS percent_projects
83 FROM project_emp
84 GROUP BY empno;
85
```

Data Output Messages Notifications

Showing rows: 1 to 9 Page No: 1 of 1

empno	percent_projects
1	7839 50.00
2	7698 25.00
3	7369 100.00
4	7499 50.00
5	7900 50.00
6	7782 50.00
7	7844 50.00
8	7566 50.00
9	7521 50.00

Total rows: 9 Query complete 00:00:00.097

Successfully run. Total query runtime: 97 msec. 9 rows affected. X

CRLF Ln 85, Col 1

3.9.2

Welcome lab/postgres@PostgreSQL 17* X

lab/postgres@PostgreSQL 17

Query History

```
-- run project_emp
-- WHERE projno = 4;
--3.8
-- SELECT projno, empno, sal
-- FROM (
--   SELECT pe.projno, e.empno, e.sal,
--          RANK() OVER (PARTITION BY pe.projno ORDER BY e.sal DESC) AS rk
--   FROM project_emp pe
--   JOIN emp e ON pe.empno = e.empno
-- ) sub
-- WHERE rk <= 3;
--3.9.1
81 SELECT empno,
82        ROUND(COUNT(*) * 100.0 / (SELECT COUNT(*) FROM project), 2) AS percent_projects
83 FROM project_emp
84 GROUP BY empno;
85
--3.9.2
87 SELECT empno,
88        ROUND(COUNT(*) * 100.0 / (SELECT COUNT(*) FROM project), 2) AS percent_projects,
89        CASE
90          WHEN COUNT(*) = 0 THEN 'Empty'
91          WHEN COUNT(*) * 100.0 / (SELECT COUNT(*) FROM project) <= 50 THEN 'Small'
92          WHEN COUNT(*) * 100.0 / (SELECT COUNT(*) FROM project) <= 80 THEN 'Medium'
93          WHEN COUNT(*) * 100.0 / (SELECT COUNT(*) FROM project) < 100 THEN 'Large'
94          ELSE 'Total'
95        END AS scope_size
96 FROM project_emp
97 GROUP BY empno;
98
```

Data Output Messages Notifications

Showing rows: 1 to 9 Page No: 1 of 1

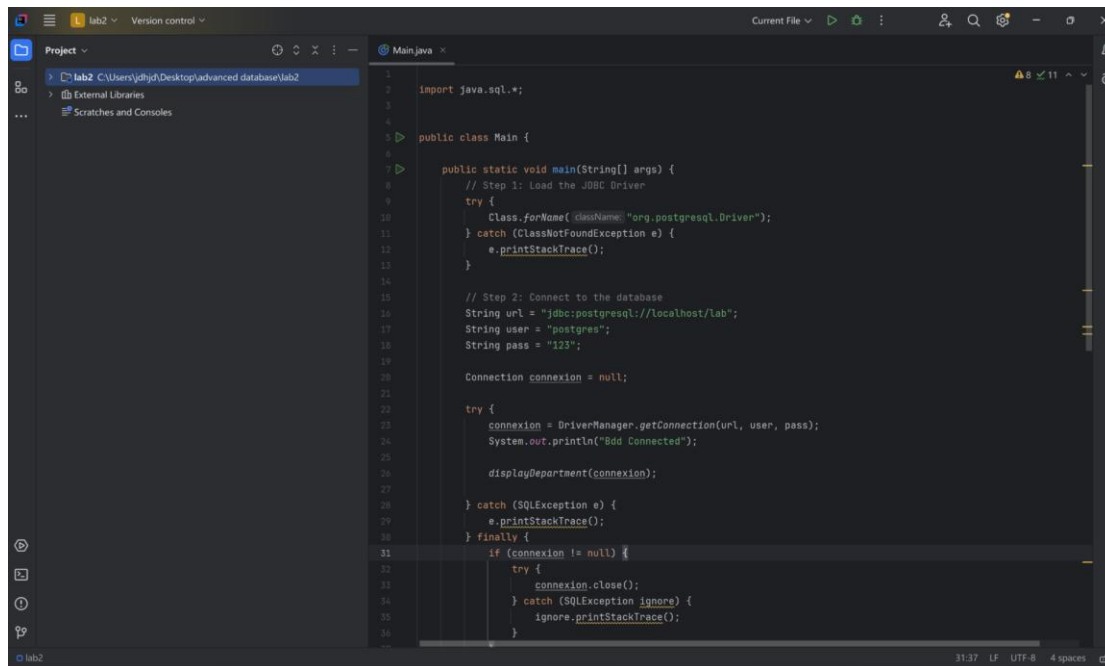
empno	percent_projects	scope_size
1	7839 50.00	Small
2	7698 25.00	Small
3	7369 100.00	Total
4	7499 50.00	Small
5	7900 50.00	Small
6	7782 50.00	Small
7	7844 50.00	Small
8	7566 50.00	Small
9	7521 50.00	Small

Total rows: 9 Query complete 00:00:00.046

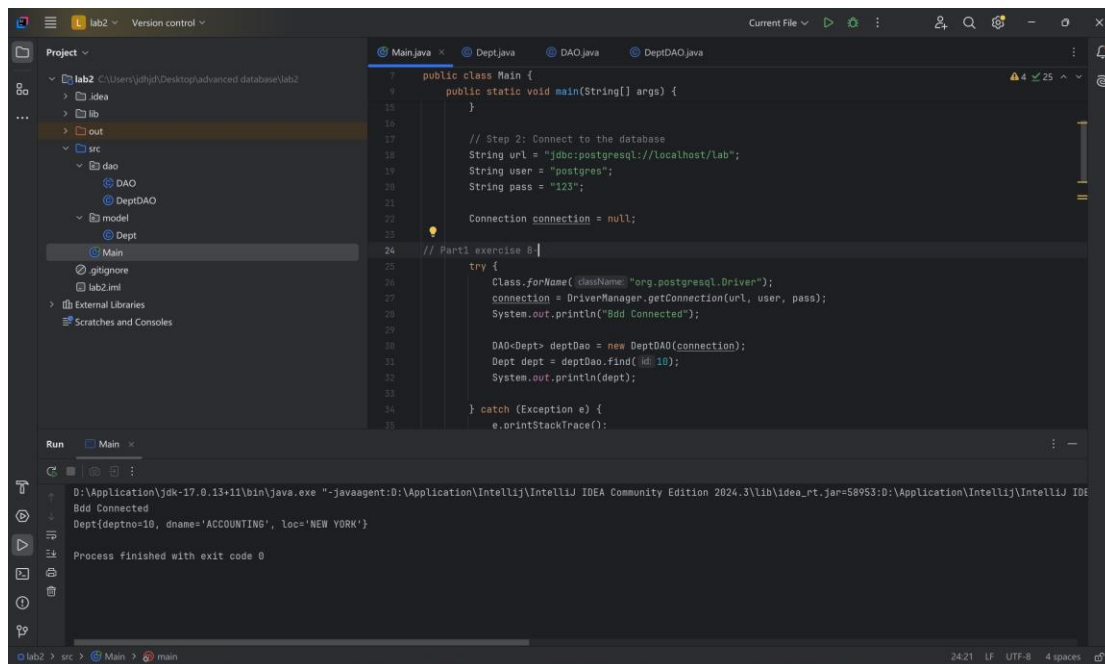
Successfully run. Total query runtime: 46 msec. 9 rows affected. X

CRLF Ln 98, Col 1

Lab2 this part has already done in the class. I will upload it to github.



```
1 import java.sql.*;
2
3
4
5 public class Main {
6
7     public static void main(String[] args) {
8         // Step 1: Load the JDBC Driver
9         try {
10             Class.forName("org.postgresql.Driver");
11         } catch (ClassNotFoundException e) {
12             e.printStackTrace();
13         }
14
15         // Step 2: Connect to the database
16         String url = "jdbc:postgresql://localhost/lab";
17         String user = "postgres";
18         String pass = "123";
19
20         Connection connexion = null;
21
22         try {
23             connexion = DriverManager.getConnection(url, user, pass);
24             System.out.println("Bdd Connected");
25
26             displayDepartment(connexion);
27
28         } catch (SQLException e) {
29             e.printStackTrace();
30         } finally {
31             if (connexion != null) {
32                 try {
33                     connexion.close();
34                 } catch (SQLException ignore) {
35                     ignore.printStackTrace();
36                 }
37             }
38         }
39     }
40 }
```



```
7 public class Main {
8     public static void main(String[] args) {
9
10         // Step 2: Connect to the database
11         String url = "jdbc:postgresql://localhost/lab";
12         String user = "postgres";
13         String pass = "123";
14
15         Connection connexion = null;
16
17         // Part1 exercise 8
18         try {
19             Class.forName("org.postgresql.Driver");
20             connexion = DriverManager.getConnection(url, user, pass);
21             System.out.println("Bdd Connected");
22
23             DAO<Dept> deptDao = new DeptDAO(connexion);
24             Dept dept = deptDao.find(10);
25             System.out.println(dept);
26
27         } catch (Exception e) {
28             e.printStackTrace();
29         }
30     }
31 }
```

Run Main

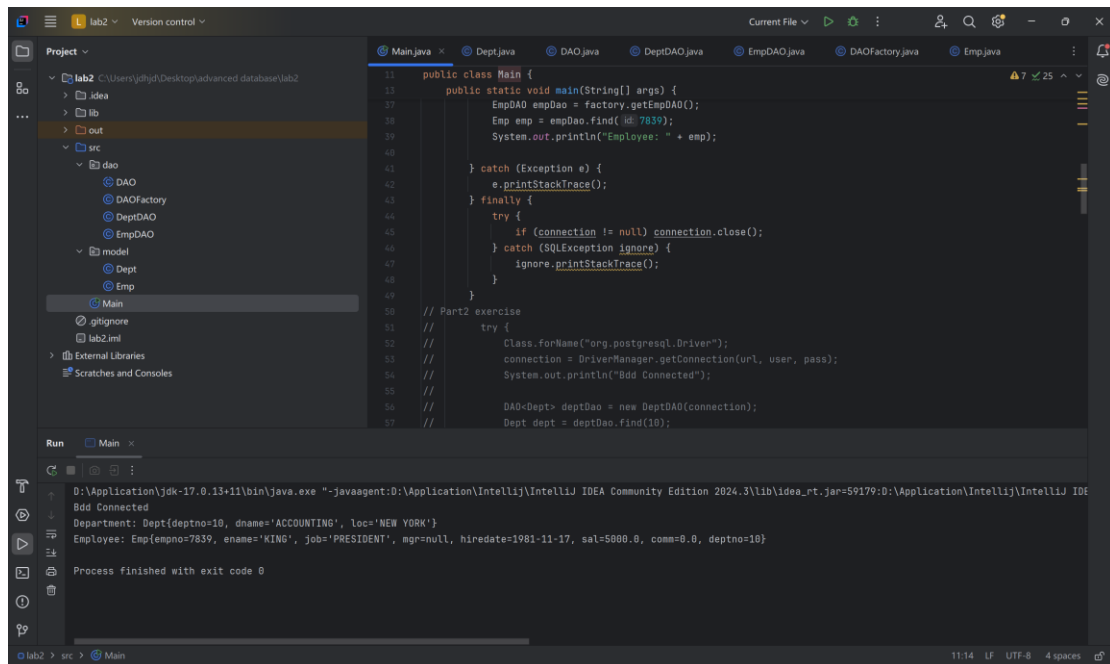
D:\Application\jdk-17.0.13\bin\java.exe -javaagent:D:\Application\IntelliJ\IntelliJ IDEA Community Edition 2024.3\lib\idea_rt.jar=S8953:0:D:\Application\IntelliJ\IntelliJ IDE

Bdd Connected

Dept{deptno=10, dname='ACCOUNTING', loc='NEW YORK'}

Process finished with exit code 0

Exercise III.1 & Exercise III.2



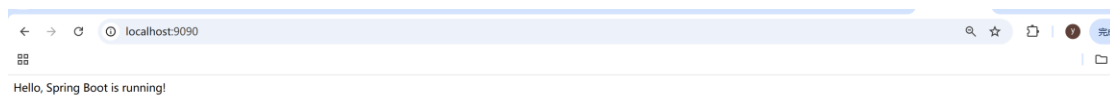
The screenshot shows the IntelliJ IDEA IDE with the following components:

- Project View:** A tree structure on the left showing the project 'lab2' with subdirectories 'idea', 'lib', 'out', 'src', 'dao', 'model', and 'Main'. The 'Main' class is selected.
- Code Editor:** The 'Main.java' file is open, showing the following code:

```
11 public class Main {
12     public static void main(String[] args) {
13         EmpDAO empDao = factory.getEmpDAO();
14         Emp emp = empDao.find(7839);
15         System.out.println("Employee: " + emp);
16     }
17     catch (Exception e) {
18         e.printStackTrace();
19     }
20     finally {
21         try {
22             if (connection != null) connection.close();
23         } catch (SQLException ignore) {
24             ignore.printStackTrace();
25         }
26     }
27 }
// Part2 exercise
try {
    Class.forName("org.postgresql.Driver");
    connection = DriverManager.getConnection(url, user, pass);
    System.out.println("Bdd Connected");
    DAO<Dept> deptDao = new DeptDAO(connection);
    Dept dept = deptDao.find(10);
}
```
- Run Console:** The output of the program is displayed, showing the connection status and the employee details:

```
D:\Application\jdk-17.0.13\bin\java.exe -javaagent:D:\Application\IntelliJ\IntelliJ IDEA Community Edition 2024.3\lib\idea_rt.jar=59179:D:\Application\IntelliJ\IntelliJ IDE
Bdd Connected
Department: Dept{deptno=10, dname='ACCOUNTING', loc='NEW YORK'}
Employee: Emp{empno=7839, ename='KING', job='PRESIDENT', mgr=null, hiredate=1981-11-17, sal=5000.0, comm=0.0, deptno=10}
Process finished with exit code 0
```

Exercise III.3



Exercise III.4

```
localhost:9090/emps
完成更新
所有书签

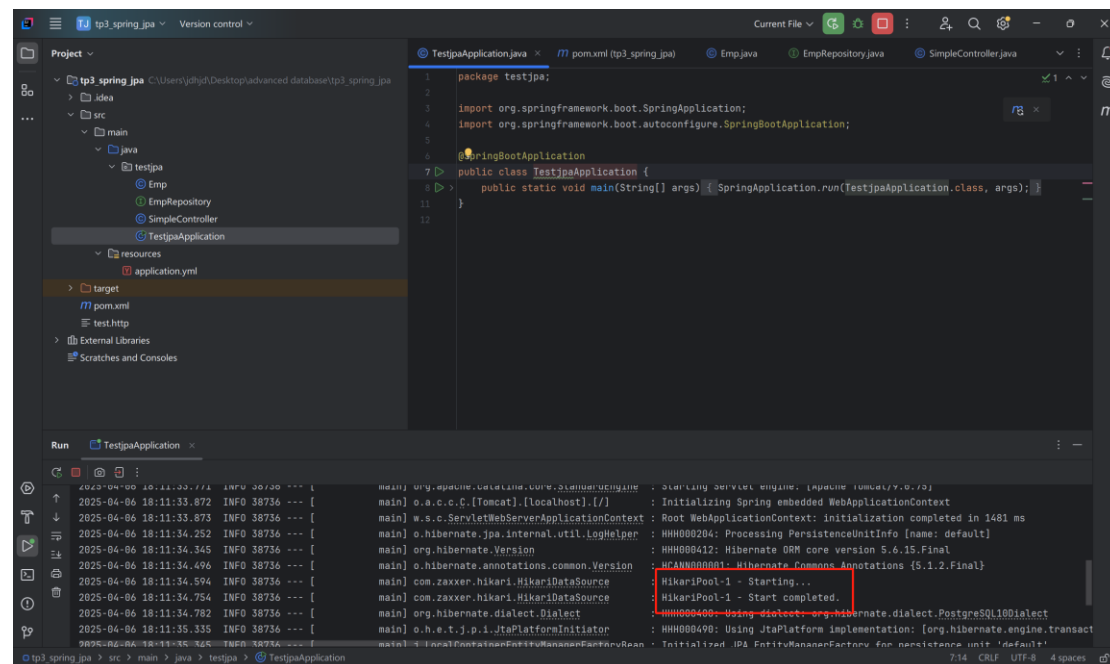
[
  {
    "empno": 7369,
    "ename": "SMITH",
    "job": "CLERK",
    "mgr": 7902,
    "hiredate": "1980-12-16T23:00:00.000+00:00",
    "sal": 800,
    "comm": 0,
    "deptno": 20
  },
  {
    "empno": 7499,
    "ename": "ALLEN",
    "job": "SALESMAN",
    "mgr": 7698,
    "hiredate": "1981-02-19T23:00:00.000+00:00",
    "sal": 1600,
    "comm": 300,
    "deptno": 30
  },
  {
    "empno": 7521,
    "ename": "WARD",
    "job": "SALESMAN",
    "mgr": 7698,
    "hiredate": "1981-02-21T23:00:00.000+00:00",
    "sal": 1250,
    "comm": 500,
    "deptno": 30
  },
  {
    "empno": 7566,
    "ename": "JONES",
    "job": "MANAGER",
    "mgr": 7839,
    "hiredate": "1981-04-01T22:00:00.000+00:00",
    "sal": 2975,
    "comm": 0,
    "deptno": 20
  },
  {
    "empno": 7654,
    "ename": "MARTIN",
    "job": "SALESMAN",
    "mgr": 7698,
    "hiredate": "1981-09-27T23:00:00.000+00:00",
    "sal": 1250,
    "comm": 1400,
    "deptno": 30
  },
  {
    "empno": 7698,
    "ename": "BLAKE",
    "job": "MANAGER",
    "mgr": 7839,
    "hiredate": "1981-04-30T22:00:00.000+00:00",
    "sal": 2850,
    "comm": 0
  }
]
```

Part4 Exercise III.5

```
完成更新

[
  {
    "empno": 7369,
    "ename": "SMITH",
    "job": "CLERK",
    "mgr": 7902,
    "hiredate": "1980-12-16T23:00:00.000+00:00",
    "sal": 800,
    "comm": 0,
    "deptno": 20
  },
  {
    "empno": 7499,
    "ename": "ALLEN",
    "job": "SALESMAN",
    "mgr": 7698,
    "hiredate": "1981-02-19T23:00:00.000+00:00",
    "sal": 1600,
    "comm": 300,
    "deptno": 30
  },
  {
    "empno": 7521,
    "ename": "WARD",
    "job": "SALESMAN",
    "mgr": 7698,
    "hiredate": "1981-02-21T23:00:00.000+00:00",
    "sal": 1250,
    "comm": 500,
    "deptno": 30
  },
  {
    "empno": 7566,
    "ename": "JONES",
    "job": "MANAGER",
    "mgr": 7839,
    "hiredate": "1981-04-01T22:00:00.000+00:00",
    "sal": 2975,
    "comm": 0,
    "deptno": 20
  },
  {
    "empno": 7654,
    "ename": "MARTIN",
    "job": "SALESMAN",
    "mgr": 7698,
    "hiredate": "1981-09-27T23:00:00.000+00:00",
    "sal": 1250,
    "comm": 1400,
    "deptno": 30
  },
  {
    "empno": 7698,
    "ename": "BLAKE",
    "job": "MANAGER",
    "mgr": 7839,
    "hiredate": "1981-04-30T22:00:00.000+00:00",
    "sal": 2850,
    "comm": 0
  }
]
```

Part IV : Connections Pool (Bonus)



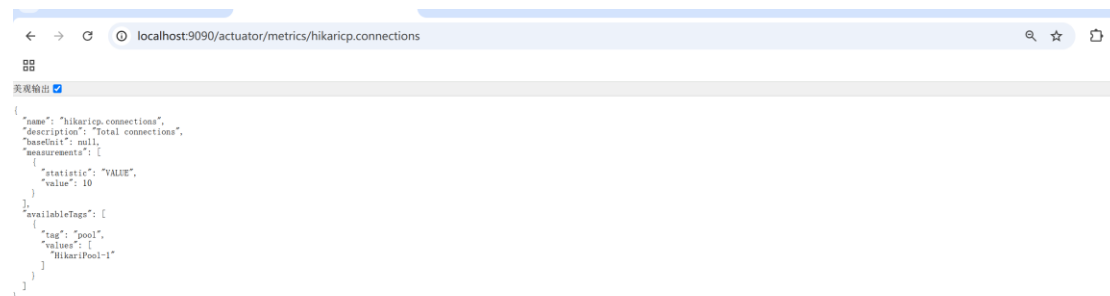
```
package testjpa;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication
public class TestJpaApplication {
    public static void main(String[] args) { SpringApplication.run(TestJpaApplication.class, args); }
}
```

Run TestJpaApplication

```
2025-04-06 18:11:33.771 INFO 38736 --- [main] org.springframework.boot.SpringApplication : Starting Servlet engine: [Apache Tomcat/9.0.70]
2025-04-06 18:11:33.872 INFO 38736 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-04-06 18:11:33.873 INFO 38736 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 1481 ms
2025-04-06 18:11:34.252 INFO 38736 --- [main] o.hibernate.jpa.internal.util.LogHelper : HHH000204: Processing PersistenceUnitInfo [name: default]
2025-04-06 18:11:34.345 INFO 38736 --- [main] org.hibernate.Version : HHH000412: Hibernate ORM core version 5.6.15.Final
2025-04-06 18:11:34.496 INFO 38736 --- [main] o.hibernate.annotations.common.Version : HHN00000001: Hibernate Commons Annotations {5.1.2.Final}
2025-04-06 18:11:34.594 INFO 38736 --- [main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Starting...
2025-04-06 18:11:34.754 INFO 38736 --- [main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Start completed.
2025-04-06 18:11:34.782 INFO 38736 --- [main] org.hibernate.dialect.Dialect : HHH000406: Using dialect: org.hibernate.dialect.PostgreSQL100Dialect
2025-04-06 18:11:35.335 INFO 38736 --- [main] o.h.e.t.j.p.i.JtaPlatformInitiator : HHH000490: Using JtaPlatform implementation: [org.hibernate.engine.transaction.jta.platform.internal.NoJtaPlatform]
2025-04-06 18:11:35.335 INFO 38736 --- [main] org.hibernate.jpa.internal.util.LogHelper : HHH000000: Initializing JPA EntityManagerFactory for persistence unit 'default'
```



```
localhost:9090/actuator/metrics/hikaricp.connections

{
  "name": "hikaricp.connections",
  "description": "Total connections",
  "baseUnit": "count",
  "measurements": [
    {
      "statistic": "VALUE",
      "value": 10
    }
  ],
  "availableTags": [
    {
      "tag": "pool",
      "values": [
        "HikariPool-1"
      ]
    }
  ]
}
```

```

{
  "empno": 7369,
  "ename": "SMITH",
  "job": "CLERK",
  "mgr": 7902,
  "hiredate": "1980-12-16T23:00:00.000+00:00",
  "sal": 800,
  "comm": 0,
  "deptno": 20
},
{
  "empno": 7499,
  "ename": "ALLEN",
  "job": "SALESMAN",
  "mgr": 7698,
  "hiredate": "1981-02-19T23:00:00.000+00:00",
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