Exercises: PostgreSQL Basic CRUD

This document defines the **exercise assignments** for the PostgreSQL course @ Software University.

Submit your solutions in the SoftUni Judge Contest.

Important: Throughout the course, you will receive different databases that may have similar names and structures but contain different data specific to each exercise. To ensure proper execution and avoid conflicts, it is crucial to create a new database for each exercise and import the provided file with the corresponding records. By following this approach, you can accurately work on each exercise and avoid any interference or data overlap between different exercises.

*To begin, the initial step is to **generate a database** known as **`softuni_management_db`** and subsequently **launch its query tool**. Then, you need to **download** the file **`02-Exercise-Basic-CRUD-softuni_management_db.sql`** from the course instance and **import it into the query section of your database**. Following the import process, you should **run the queries included in the file**. Once the queries have been executed, it is recommended that you **become familiar with the database schemas and tables** in the **`softuni_management_db`** before proceeding with the following tasks.*

1. Select Cities

Write a SQL query to retrieve **all available information** about the **`"cities"`**, sorted by **`"id"`**.

Submit your query for this task in the Judge system.

Example

id	name	state	area
1	Redmond	Washington	44.640
2	Redmond	Washington	44.640
…	…	…	…
4	Calgary	Canada	820.620
…	…	…	…
12	Bellevue	[null]	97.140
…	…	…	…
62	Sofia	Bulgaria	492.000
63	Sofia	Bulgaria	492.000

2. Concatenate

From the selected already data **combine** the **`"name"`** and **`"state"`**, fields into a **single field** called **`"Cities Information"`**. Rename the **`"area"`** column as **`"Area (km2)"`**.

Submit your query for this task in the Judge system.

Example

Cities Information	Area (km2)
Redmond Washington	44.640
Redmond Washington	44.640
…	…
Edmonds Washington	25.920
Seattle Washington	367.900
Bellevue Washington	97.140
…	…
Sofia Bulgaria	492.000

3. Remove Duplicate Rows

As you can see, the **"cities"** table contains duplicate entries. Write an SQL query to retrieve **DISTINCT** city **"name"**, sorting them in **descending alphabetical order** and **eliminating duplicates**. Do not forget to select the **"area"** column and keep the **name** of the column the **same as in the previous task**.

Submit your query for this task in the Judge system.

Example

name	Area (km2)
Sofia	492.000
Snohomish	9.640
Seattle	367.900
San Francisco	600.590
Sammamish	62.250
…	…
Berlin	891.300
Bellevue	97.140

4. Limit Records

Develop a SQL query that selects from the **"employees"** table **"id"**, **"first_name"**, **"last_name"**, and **"job_title"**. Combine the **"first_name"** and **"last_name"** fields into a single field called **"Full Name"**. Rename the **"id"** column as **"ID"** and the **"job_title"** column as **"Job Title"**. Sort them by the **"first_name"** field in **ascending alphabetical order**. Finally, **LIMIT** the results to **50**.

Submit your query for this task in the Judge system.

Example

ID	Full Name	Job Title
169	Alan Brewer	Scheduling Assistant
30	Alejandro McGuel	Production Technician
154	Alex Nayberg	Production Technician
34	Alice Ciccu	Production Technician
…	…	…
177	Barbara Moreland	Accountant
…	…	…
93	Candy Spoon	Accounts Receivable Specialist
…	…	…
127	Dan Wilson	Database Administrator
…	…	…
101	Dan Bacon	Application Specialist
251	Danielle Tiedt	Production Technician

5. Skip Rows

Create a SQL query that selects the **"employees"** records including their **"id"**, **"first_name"**, **"middle_name"**, **"last_name"**, and **"hire_date"**. Combine the **"first_name"**, **"middle_name"** and **"last_name"**, fields into a single field called **"Full Name"**. Rename the **"hire_date"** column as **"Hire Date"**. Sort the results by the **"Hire Date"** field in **ascending order**. Lastly, **OFFSET** the results by **10** rows.

*** Note that the **OFFSET** clause is **zero-based**, which means it skips the specified number of rows **starting from 0**.

Submit your query for this task in the Judge system.

Example

id	Full Name	Hire Date
10	Jossef H Goldberg	2000-02-24
11	Terri Lee Duffy	2000-03-03
12	Sidney M Higa	2000-03-05
13	Taylor R Maxwell	2000-03-11
14	Jeffrey L Ford	2000-03-23
…	…	…
124	Barbara S Decker	[null]
111	Janeth M Esteves	[null]

6. Find the Addresses

Select **"id"**, **"number"**, **"street"** and **"city_id"** from the **"addresses"** table **WHERE "id"** is **greater than or equal to 20**. Concatenate the **"number"** and **"street"** fields into a single field called **"Address"**.

Submit your query for this task in the Judge system.

Example

id	Address	city_id
20	6118 Grasswood Circle	5
21	620 Woodside Ct.	5
22	6307 Greenbelt Way	5
…	…	…
37	951 Pascalstr	31
38	94 rue Descartes	30
39	1226 Shoe St.	8
40	1399 Firestone Drive	8
…	…	…
290	7230 Vine Maple Street	11
291	163 Nishava Str, ent A, apt. 1	32

7. Positive Even Number

Select **"number"** and **"street"** into one column called **"Address"** as well as **"city_id"**, from the **"addresses"** table where **"city_id"** is a **positive even number**. Order them by the **"city_id"** field in **ascending order**.

Submit your query for this task in the Judge system.

Example

Address	city_id
10203 Acorn Avenue	2
1398 Yorba Linda	4
1619 Stillman Court	4
…	…
1921 Ranch Road	6
9530 Vine Lane	6
…	…
250 Race Court	8
5672 Hale Dr.	8

…	…
1245 Clay Road	10
1748 Bird Drive	10
…	…
94 rue Descartes	30
163 Nishava Str, ent A, apt. 1	32

8. Projects within a Date Range

Select the projects` **"name"** from the **"projects"** table where the **"start_date"** is **greater than or equal** to **'2016-06-01 07:00:00'** and the **"end_date"** is **less than '2023-06-04 00:00:00'**. Then, order the resulting rows in **ascending order** based on the **"start_date"** column.

Submit your query for this task in the Judge system.

Example

name	start_date	end_date
Headlights - Dual-Beam	2016-06-01 07:00:00	2017-07-17 08:00:00
HL Fork	2017-06-01 07:00:00	2018-12-01 00:00:00
Headlights - Weatherproof	2018-06-01 03:00:00	2019-06-09 04:00:00
Cable Lock	2019-06-01 20:00:00	2019-10-10 09:00:00
Minipump	2020-06-01 05:00:00	2023-06-01 10:00:00
Taillight	2020-06-01 21:00:00	2023-06-02 20:00:00
Mountain	2022-06-06 08:00:00	2022-06-12 04:00:00

9. Multiple Conditions

Write an SQL query to select **"number"** and **"street"** from the **"addresses"** table where **"id"** is **BETWEEN 50** and **100 OR "number"** is less than **1000.**

Submit your query for this task in the Judge system.

Example

number	street
108	Lakeside Court
332	Laguna Niguel
620	Woodside Ct.
951	Pascalstr
94	rue Descartes
…	…
591	Merriewood Drive

163	Nishava Str, ent A, apt. 1

10. Set of Values

From the **"employees_projects"** table, select **"employee_id"** and **"project_id"** where **"employee_id"** is **IN** the set of values **(200, 250)** and **"project_id"** is **NOT IN** the set of values **(50, 100)**.

Submit your query for this task in the Judge system.

Example

employee_id	project_id
200	3
200	23
200	37
200	51
250	77
250	114

11. Compare Character Values

Retrieve the **first 20** records of the **"name"** and **"start_date"** columns from the **"projects"** table where the **"name"** is **'Mountain'**, **'Road'**, or **'Touring'** using the **IN** operator.

*** Note that using the PostgreSQL **IN** condition can improve the statement's readability and efficiency.

Submit your query for this task in the Judge system.

Example

name	start_date
Mountain	2002-03-05 00:00:00
Mountain	2006-10-22 19:00:00
Mountain	2002-05-11 09:57:00
Road	2001-09-07 05:00:00
Road	2002-01-08 14:00:00
…	…
Touring	2002-11-11 09:57:00
Touring	2002-11-20 11:57:00
…	…
Touring	2005-05-16 16:34:00
Mountain	2007-06-01 00:00:00

12. Salary

Write a SQL query to find the **"Full Name"**, **"job_title"** and **"salary"** of all employees whose **salary** is **12500, 14000, 23600,** or **25000**. **"Full Name"** is a combination of **"first_name"** and **"last_name"** (separated with a **single space**). Order by **highest salary.**

Submit your query for this task in the Judge system.

Example

Full Name	job_title	salary
David Hamilton	Production Supervisor	25000.000
Thierry D`Hers	Tool Designer	25000.000
Janice Galvin	Tool Designer	25000.000
…	…	…
Scott Wright	Master Scheduler	23600.000
Paul Singh	Production Technician	14000.000
Ivo Salmre	Production Technician	14000.000
…	…	…
Kim Abercrombie	Production Technician	12500.000
…	…	…
Steve Masters	Production Technician	12500.000
Suchitra Mohan	Production Technician	12500.000

13. Missing Value

Develop a SQL query to find the **first 3 employees** with their **"id"**, **"first_name"** and **"last_name"** where the **"middle_name"** is **NULL**.

Submit your query for this task in the Judge system.

Example

id	first_name	last_name
23	David	Johnson
34	Vamsi	Kuppa
53	Tengiz	Kharatishvili

14. INSERT Departments

Write a SQL query to create a few **new records** in the **"departments"** table. You can find the values below:

```
('Finance', 3),
('Information Services', 42),
('Document Control', 90),
('Quality Assurance', 274),
```

```
('Facilities and Maintenance', 218),
('Shipping and Receiving', 85),
('Executive', 109);
```

Submit your query for this task in the Judge system.

Example

id	department	manager_id
1	Engineering	12
2	Tool Design	4
…	…	…
10	Finance	3
11	Information Services	42
12	Document Control	90
13	Quality Assurance	274
…	…	…
15	Shipping and Receiving	85
16	Executive	109

15. New Table

Write a SQL query to **generate a new table** named **"company_chart"** by **inserting data** from the **existing records**. Retrieve the **"Full Name"** column which is a combination of the **"first_name"** and **"last_name"** columns from the **"employees"** table, and also select the **"job_title"** column, which should be renamed as **"Job Title"**. Select the **"department_id"** column and rename it as **"Department ID"**, and select the **"manager_id"** column, which should be renamed as **"Manager ID"**.

Submit your query for this task in the Judge system.

Example

Full Name	Job Title	Department ID	Manager ID
Guy Gilbert	Production Technician	7	16
Kevin Brown	Marketing Assistant	4	6
Roberto Tamburello	Engineering Manager	1	12
Rob Walters	Tool Designer	2	3
Thierry D`Hers	Tool Designer	5	19
…	…	…	…
Martin Kulov	Independent .NET Consultant	6	10
George Denchev	Independent Java Consultant	6	1

16. Update the Project End Date

Retrieve **all projects** without an **"end_date"**, and add **5 months** to their **"start_date"**.

*** Note, you have the option to utilize the commutative pairs **"+ INTERVAL"** to **increase** the **"start_date"** by **5 months** and **determine the date** after this duration.

Submit your query for this task in the Judge system.

Example

Before update

id	name	description	start_date	end_date
1	Classic Vest	Research, design and development of Classic Vest. …	2003-06-01 12:00:00	[null]
2	Cycling Cap	Research, design and development of Cycling Cap. …	2001-09-01 08:00:00	2003-10-01 12:00:00
3	Full-Finger Gloves	Research, design and development of Full-Finger Gloves. …	2002-01-15 10:00:00	2003-06-02 09:00:00
…	…	…	…	…
7	HL Touring Frame	Research, design and development of HL Touring Frame. …	2005-05-16 16:34:00	[null]
8	LL Mountain Frame	Research, design and development of LL Mountain Frame. …	2002-11-20 09:57:00	2003-06-01 16:30:00
…	…	…	…	…
10	LL Touring Frame	Research, design and development of LL Touring Frame. …	2005-08-20 16:34:00	[null]
…	…	…	…	…

After update

id	name	description	start_date	end_date
1	Classic Vest	Research, design and development of Classic Vest. …	2003-06-01 12:00:00	2003-11-01 12:00:00
2	Cycling Cap	Research, design and development of Cycling Cap. …	2001-09-01 08:00:00	2003-10-01 12:00:00
3	Full-Finger Gloves	Research, design and development of Full-Finger Gloves. …	2002-01-15 10:00:00	2003-06-02 09:00:00
…	…	…	…	…
7	HL Touring Frame	Research, design and development of HL Touring Frame. …	2005-05-16 16:34:00	2005-10-16 16:34:00
8	LL Mountain Frame	Research, design and development of LL Mountain Frame. …	2002-11-20 09:57:00	2003-06-01 16:30:00
…	…	…	…	…

10	LL Touring Frame	Research, design and development of LL Touring Frame. …	2005-08-20 16:34:00	2006-01-20 16:34:00
…	…	…	…	…

17. Award Employees with Experience

Get all employees who were hired between January 1, 1998, and January 5, 2000. Increase their "**salary**" by **1500**. Add the prefix "**Senior**" to their "**job_title**".

Submit your query for this task in the Judge system.

Example

Before update

first_name	job_title	salary
Guy	Senior Production Technician	12500.000
Kevin	Senior Marketing Assistant	13500.000
Roberto	Senior Engineering Manager	43300.000
Rob	Senior Tool Designer	29800.000
Thierry	Tool Designer	25000.000
David	Marketing Manager	37500.000

After update

first_name	job_title	salary
Guy	Senior Production Technician	14000.000
Kevin	Senior Marketing Assistant	15000.000
Roberto	Senior Engineering Manager	44800.000
Rob	Senior Tool Designer	31300.000
Thierry	Tool Designer	25000.000
David	Marketing Manager	37500.000

18. Delete Addresses

Delete records from the "**addresses**" table where the "**city_id**" is **(5, 17, 20, 30)**.

Submit your query for this task in the Judge system.

Example

Before delete

id	number	street	city_id
1	108	Lakeside Court	5

2	1343	Prospect St	5
…	…	…	…
37	951	Pascalstr	31
38	94	rue Descartes	30
39	1226	Shoe St.	8
40	1399	Firestone Drive	8
…	…	…	…
54	6	Downshire Way	23
55	1411	Ranch Drive	15
…	…	…	…
62	1825	Corte Del Prado	17
…	…	…	…
72	1061	Buskrik Avenue	3
…	…	…	…
140	25	95th Ave NE	20
…	…	…	…

After delete

id	number	street	city_id
37	951	Pascalstr	31
39	1226	Shoe St.	8
40	1399	Firestone Drive	8
…	…	…	…
54	6	Downshire Way	23
55	1411	Ranch Drive	15
…	…	…	…

72	1061	Buskrik Avenue	3
…	…	…	…

19. Create a View

Create a view named **"view_company_chart"** that selects **"Full Name"** and **"Job Title"** of employees whose **"Manager ID"** is **184**.

Submit your query for this task in the Judge system.

Example

Full Name	Job Title
David Johnson	Production Technician
Garrett Young	Production Technician
Susan Metters	Production Technician
George Li	Production Technician
…	…
John Frum	Production Technician
Jan Miksovsky	Production Technician

20. Create a View with Multiple Tables

Create a view called **"view_addresses"** that selects the **"first_name"** and **"last_name"** as **"Full Name"** and **"department_id"** from the **"employees"** table and the **"number"** and **"street"** as **"Address"** from the **"addresses"** table where the **"address_id"** matches the **"id"** in the **"addresses"** table. Order the results by the **"Address"** column.

Submit your query for this task in the Judge system.

Example

Full Name	department_id	Address
John Wood	4	101 Candy Rd.
Garrett Vargas	3	10203 Acorn Avenue
Carole Poland	7	1061 Buskrik Avenue
…	…	…
Chris Norred	12	1144 Paradise Ct.
…	…	…
Janice Galvin	2	9906 Oak Grove Road
Robert Rounthwaite	7	9964 North Ridge Drive

21. ALTER VIEW

Rename the **"view_addresses"** to a more relevant name, **"view_employee_addresses_info"**.

Submit your query for this task in the Judge system.

22. DROP VIEW

You can **delete** the **"view_company_chart"** since it is no longer necessary.

Submit your query for this task in the Judge system.

23. * UPPER

Modify the **"projects"** table by changing the **"name"** column to its **uppercase** equivalent.

Submit your query for this task in the Judge system.

Example

Before update

id	name	description
1	Classic Vest	Research, design and development of Classic Vest. …
2	Cycling Cap	Research, design and development of Cycling Cap.…
3	Full-Finger Gloves	Research, design and development of Full-Finger Gloves. …
4	Half-Finger Gloves	Research, design and development of Half-Finger Gloves. …
…	…	…

After update

id	name	description
1	CLASSIC VEST	Research, design and development of Classic Vest. …
2	CYCLING CAP	Research, design and development of Cycling Cap.…
3	FULL-FINGER GLOVES	Research, design and development of Full-Finger Gloves. …
4	HALF-FINGER GLOVES	Research, design and development of Half-Finger Gloves. …
…	…	…

24. * SUBSTRING

Create a view called **"view_initials"** that includes the **"first_name"** and **"last_name"** columns from the **"employees"** table. In addition, modify the **"first_name"** column **by extracting the first two characters** and renaming the new column as **"initial"**. Order the results by **"last_name"**.

Submit your query for this task in the Judge system.

Example

initial	last_name
Sy	Abbas
Ki	Abercrombie
Ha	Abolrous
…	…
Da	Bacon
…	…
Jo	Campbell
…	…
Ki	Zimmerman
Mi	Zwilling

25. * LIKE

Write a SQL query that selects the **"name"** and **"start_date"** columns from the **"projects"** table where the **"name"** column starts with the **characters 'MOUNT%'**. The results should be sorted by project **"id"**.

Submit your query for this task in the Judge system.

Example

name	start_date
MOUNTAIN-100	2001-04-14 14:00:00
MOUNTAIN	2002-03-05 00:00:00
MOUNTAIN-300	2002-05-10 07:00:00
MOUNTAIN	2006-10-22 19:00:00
MOUNTAIN	2002-05-11 09:57:00
…	…
MOUNTAIN BOTTLE CAGE	2014-06-01 15:00:00
MOUNTAIN	2022-06-06 08:00:00