**The challenges**

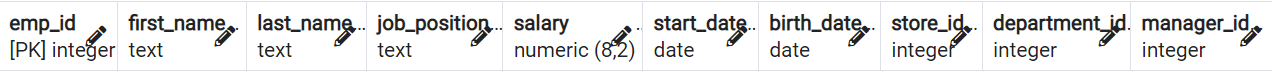
**Task 1**

Difficulty: Moderate

**Task 1.1**

In your company there hasn't been a database table with all the employee information yet.

You need to set up the table called employees in the following way:



There should be NOT NULL constraints for the following columns:

first\_name,

last\_name ,

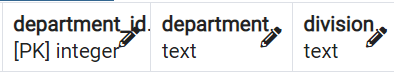
job\_position,

start\_date DATE,

birth\_date DATE

**Task 1.2**

Set up an additional table called departments in the following way:



Additionally no column should allow nulls.

**Task 2**

Difficulty: Moderate

Alter the employees table in the following way:

- Set the column department\_id to not null.

- Add a default value of CURRENT\_DATE to the column start\_date.

- Add the column end\_date with an appropriate data type (one that you think makes sense).

- Add a constraint called birth\_check that doesn't allow birth dates that are in the future.

- Rename the column job\_position to position\_title.

**Task 3**

Difficulty: Moderate

**Task 3.1**

Insert the following values into the *employees*table.

There will be most likely an error when you try to insert the values.

So, try to insert the values and then fix the error.

*Columns:*

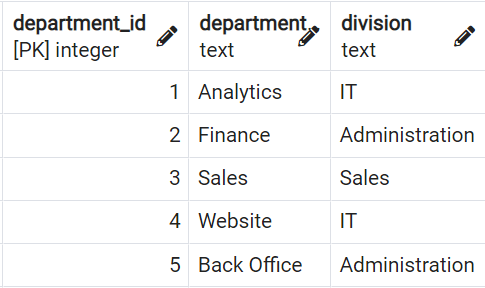
1. (emp\_id,first\_name,last\_name,position\_title,salary,start\_date,birth\_date,store\_id,department\_id,manager\_id,end\_date)

*Values:*

1. (1,'Morrie','Conaboy','CTO',21268.94,'2005-04-30','1983-07-10',1,1,NULL,NULL),
2. (2,'Miller','McQuarter','Head of BI',14614.00,'2019-07-23','1978-11-09',1,1,1,NULL),
3. (3,'Christalle','McKenny','Head of Sales',12587.00,'1999-02-05','1973-01-09',2,3,1,NULL),
4. (4,'Sumner','Seares','SQL Analyst',9515.00,'2006-05-31','1976-08-03',2,1,6,NULL),
5. (5,'Romain','Hacard','BI Consultant',7107.00,'2012-09-24','1984-07-14',1,1,6,NULL),
6. (6,'Ely','Luscombe','Team Lead Analytics',12564.00,'2002-06-12','1974-08-01',1,1,2,NULL),
7. (7,'Clywd','Filyashin','Senior SQL Analyst',10510.00,'2010-04-05','1989-07-23',2,1,2,NULL),
8. (8,'Christopher','Blague','SQL Analyst',9428.00,'2007-09-30','1990-12-07',2,2,6,NULL),
9. (9,'Roddie','Izen','Software Engineer',4937.00,'2019-03-22','2008-08-30',1,4,6,NULL),
10. (10,'Ammamaria','Izhak','Customer Support',2355.00,'2005-03-17','1974-07-27',2,5,3,2013-04-14),
11. (11,'Carlyn','Stripp','Customer Support',3060.00,'2013-09-06','1981-09-05',1,5,3,NULL),
12. (12,'Reuben','McRorie','Software Engineer',7119.00,'1995-12-31','1958-08-15',1,5,6,NULL),
13. (13,'Gates','Raison','Marketing Specialist',3910.00,'2013-07-18','1986-06-24',1,3,3,NULL),
14. (14,'Jordanna','Raitt','Marketing Specialist',5844.00,'2011-10-23','1993-03-16',2,3,3,NULL),
15. (15,'Guendolen','Motton','BI Consultant',8330.00,'2011-01-10','1980-10-22',2,3,6,NULL),
16. (16,'Doria','Turbat','Senior SQL Analyst',9278.00,'2010-08-15','1983-01-11',1,1,6,NULL),
17. (17,'Cort','Bewlie','Project Manager',5463.00,'2013-05-26','1986-10-05',1,5,3,NULL),
18. (18,'Margarita','Eaden','SQL Analyst',5977.00,'2014-09-24','1978-10-08',2,1,6,2020-03-16),
19. (19,'Hetty','Kingaby','SQL Analyst',7541.00,'2009-08-17','1999-04-25',1,2,6,'NULL'),
20. (20,'Lief','Robardley','SQL Analyst',8981.00,'2002-10-23','1971-01-25',2,3,6,2016-07-01),
21. (21,'Zaneta','Carlozzi','Working Student',1525.00,'2006-08-29','1995-04-16',1,3,6,2012-02-19),
22. (22,'Giana','Matz','Working Student',1036.00,'2016-03-18','1987-09-25',1,3,6,NULL),
23. (23,'Hamil','Evershed','Web Developper',3088.00,'2022-02-03','2012-03-30',1,4,2,NULL),
24. (24,'Lowe','Diamant','Web Developper',6418.00,'2018-12-31','2002-09-07',1,4,2,NULL),
25. (25,'Jack','Franklin','SQL Analyst',6771.00,'2013-05-18','2005-10-04',1,2,2,NULL),
26. (26,'Jessica','Brown','SQL Analyst',8566.00,'2003-10-23','1965-01-29',1,1,2,NULL)

**Task 3.2**

Insert the following values into the departments table.



**Task 4**

Difficulty: Moderate

**Task 4.1**

Jack Franklin gets promoted to 'Senior SQL Analyst' and the salary raises to 7200.

Update the values accordingly.

**Task 4.2**

The responsible people decided to rename the position\_title Customer Support to Customer Specialist.

Update the values accordingly.

**Task 4.3**

All SQL Analysts including Senior SQL Analysts get a raise of 6%.

Upate the salaries accordingly.

**Task 4.4**

*Question:*

What is the average salary of a SQL Analyst in the company (excluding Senior SQL Analyst)?

*Answer:*

8834.75

**Task 5**

Difficulty: Advanced

**Task 5.1**

Write a query that adds a column called manager that contains  first\_name and last\_name (in one column) in the data output.

Secondly, add a column called is\_active with 'false' if the employee has left the company already, otherwise the value is 'true'.

**Task 5.2**

Create a view called v\_employees\_info from that previous query.

**Task 6**

Difficulty: Moderate

Write a query that returns the average salaries for each positions with appropriate roundings.

*Question:*

What is the average salary for a Software Engineer in the company.

*Answer:*

6028.00

**Task 7**

Difficulty: Moderate

Write a query that returns the average salaries per division.

*Question:*

What is the average salary in the Sales department?

Answer:

6107.41

**Task 8**

Difficulty: Advanced

**Task 8.1**

Write a query that returns the following:

emp\_id,

first\_name,

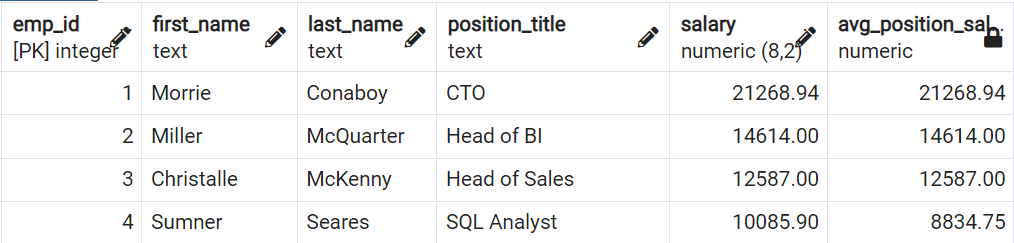
last\_name,

position\_title,

salary

and a column that returns the average salary for every job\_position.

Order the results by the emp\_id.



**Task 8.2**

Difficulty: Advanced to Pro

How many people earn less than there avg\_position\_salary?

Write a query that answers that question.

Ideally the output just shows that number directly.

*Answer:*

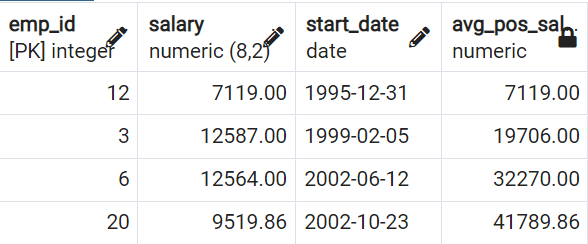
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**Task 9:**

Difficulty: Advanced

Write a query that returns a running total of the salary development ordered by the start\_date.

In your calculation, disregard that fact that people have left the company (write the query as if they were still working for the company).



*Question:*

What was the total salary after 2018-12-31?

*Answer:*

180202.70

**Task 10:**

Difficulty: Pro / Very difficult

Create the same running total but now also considder the fact that people were leaving the company.

*Note:*

This challenge is actually very difficult.

Don't worry if you can't solve it you are not expected to do so.

It is possible to solve the challenge even without the hints.

If you want you can try to solve it using the hints and it is still a difficult challenge.

*Question:*

What was the total salary after 2018-12-31?

*Answer:*

166802.84

*Hint 1:*Use the view v\_employees\_info.

*Hint 2:*Create to separate queries one with all employees and one with the people that have already left

*Hint 3:*In the first query use start\_date and in the second query use end\_date instead of the start\_date

*Hint 4:*Multiply the salary of the second query with (-1).

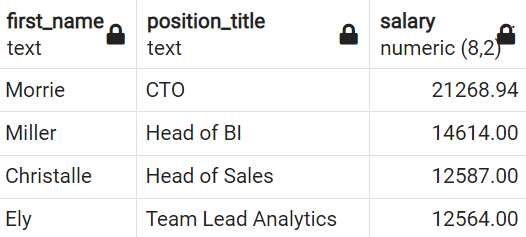
*Hint 5:*Create a subquery from that UNION and use a window function in that to create the running total.

**Task 11**

Difficulty: Advanced to Pro

**Task 11.1**

Write a query that outputs only the top earner per position\_title including first\_name and position\_title and their salary.



*Question:*

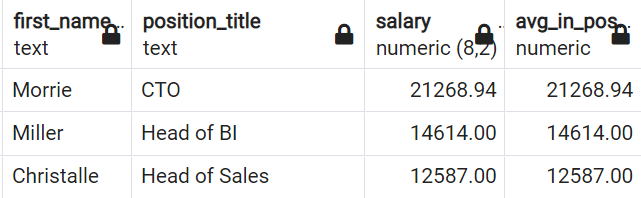
What is the top earner with the position\_title SQL Analyst?

*Answer:*

Sumner with 10085.90

**Task 11.2**

Add also the average salary per position\_title.



**Task 11.3**

Remove those employees from the output of the previous query that have the same salary as the average of their position\_title.

These are the people that are the only ones with their position\_title.

**Task 12**

Difficulty: Pro

Write a query that returns all meaningful aggregations of

- sum of salary,

- number of employees,

- average salary

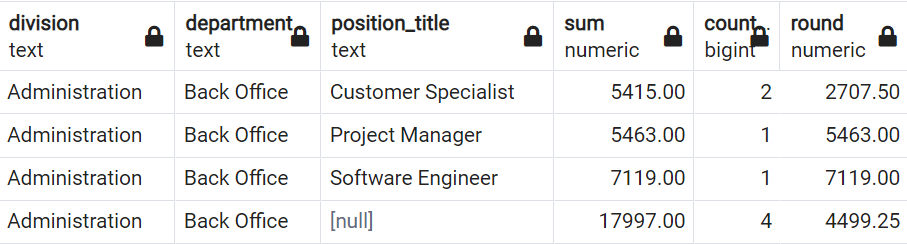
grouped by all meaningful combinations of

- division,

- department,

- position\_title

Consider the levels of hierarchies in a meaningful way.

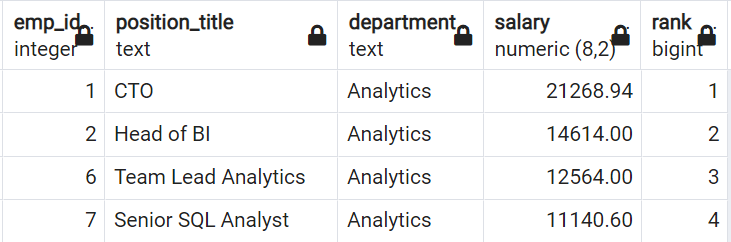


**Task 13**

Difficulty: Advanced to Pro

Write a query that returns all employees (emp\_id) including their position\_title, department their salary and the rank of that salary partitioned by department.

The highest salary per division should have rank 1.



*Question:*

Which employee (emp\_id) is in rank 7 in the department Analytics?

*Answer:*

emp\_id 26

**Task 14**

Difficulty: Pro

Write a query that returns only the top earner of each department including

their emp\_id, position\_title, department and their salary.

*Question:*

Which employee (emp\_id) is the top earner in the department Finance?

*Answer:*

emp\_id 8