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Roll No: 22P-9216
Section: BSCS-6A

Database Systems Lab 4

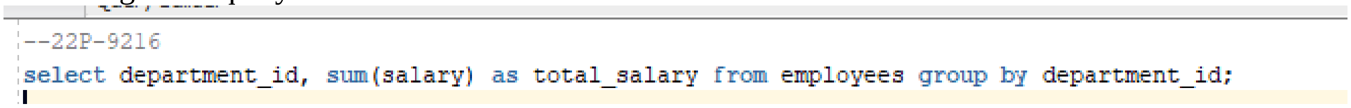
Task 1:

Write a query to display the total salary of each department, grouped by department id.

Ans:

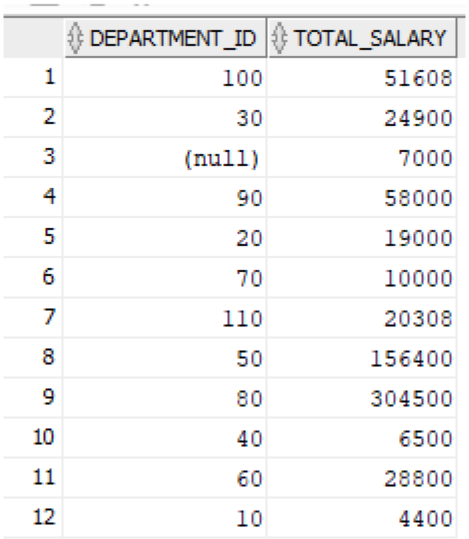
To display the total salary of each department, we use “group by” clause to group according to department_id and to calculate total salary, we use “sum”.

Following is the query:



```
--22P-9216
select department_id, sum(salary) as total_salary from employees group by department_id;
```

Following is the result:



	DEPARTMENT_ID	TOTAL_SALARY
1	100	51608
2	30	24900
3	(null)	7000
4	90	58000
5	20	19000
6	70	10000
7	110	20308
8	50	156400
9	80	304500
10	40	6500
11	60	28800
12	10	4400

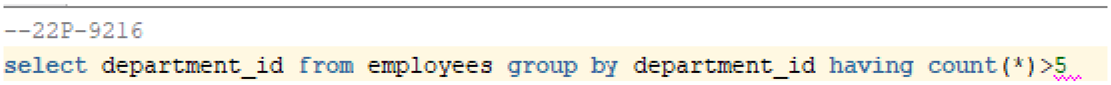
Task 2:

Display the number of employees in each department where the count is more than 5.

Ans:

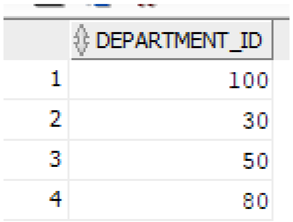
To display the number of employees where count is greater than 5, we use “group by” and “having” clauses.

Following is the query:



```
--22P-9216
select department_id from employees group by department_id having count(*)>5
```

Following is the result:



	DEPARTMENT_ID
1	100
2	30
3	50
4	80

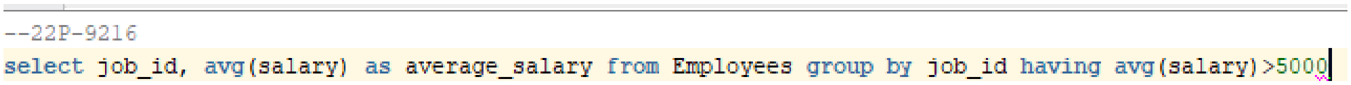
Task 3:

Find the average salary of employees for each job role, but only show job roles where the average salary is greater than 5000.

Ans:

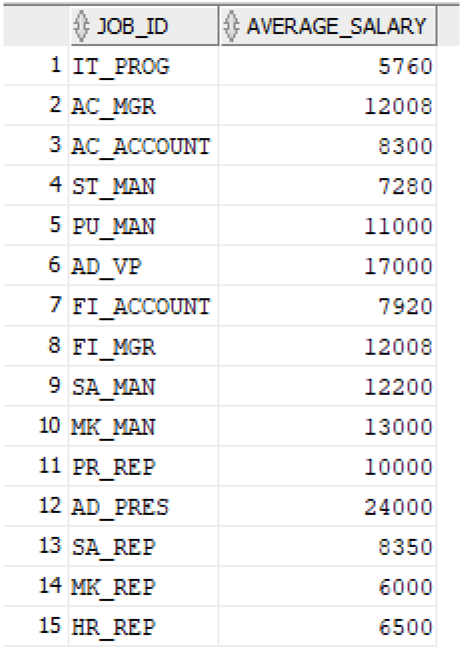
To find the average salary of employees for each job id, we use "group by" and "having" clauses and give condition that average salary must be greater than 5000.

Following is the query:



```
--22P-9216
select job_id, avg(salary) as average_salary from Employees group by job_id having avg(salary)>5000
```

Following is the result:



	JOB_ID	AVERAGE_SALARY
1	IT_PROG	5760
2	AC_MGR	12008
3	AC_ACCOUNT	8300
4	ST_MAN	7280
5	PU_MAN	11000
6	AD_VP	17000
7	FI_ACCOUNT	7920
8	FI_MGR	12008
9	SA_MAN	12200
10	MK_MAN	13000
11	PR_REP	10000
12	AD_PRES	24000
13	SA_REP	8350
14	MK_REP	6000
15	HR_REP	6500

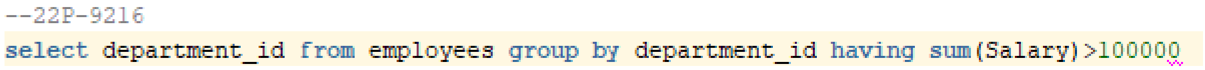
Task 4:

List the departments where the total salary expenditure exceeds $100,000.

Ans:

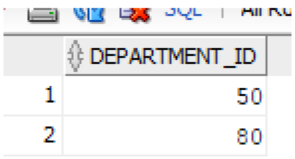
To create a “Department” table with given columns, we run the following

Following is the query:



```
--22P-9216
select department_id from employees group by department_id having sum(Salary)>100000
```

Following is the result:



	DEPARTMENT_ID
1	50
2	80

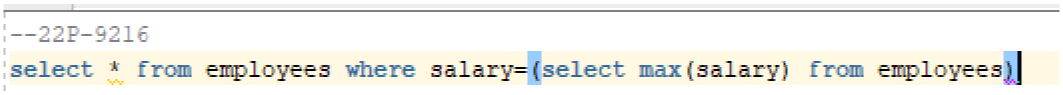
Task 5:

Write a query to find the details of the employee with the highest salary in the company.

Ans:

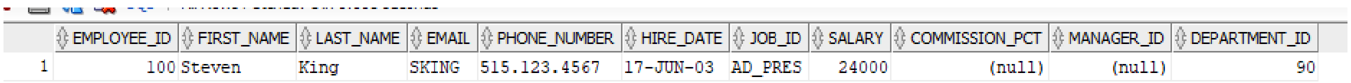
To find the details of employee with the highest salary, we use subquery where we can use one query within another.

Following is the query:



```
--22P-9216
select * from employees where salary=(select max(salary) from employees)
```

Following is the result:



	EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
1	100	Steven	King	SKING	515.123.4567	17-JUN-03	AD_PRES	24000	(null)	(null)	90

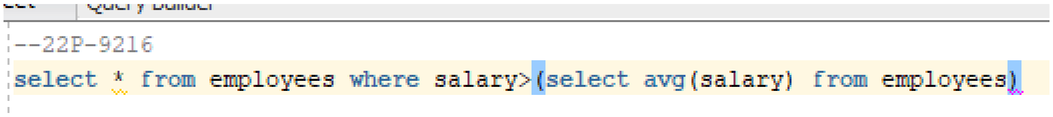
Task 6:

Find all employees whose salary is above the average salary of the entire company.

Ans:

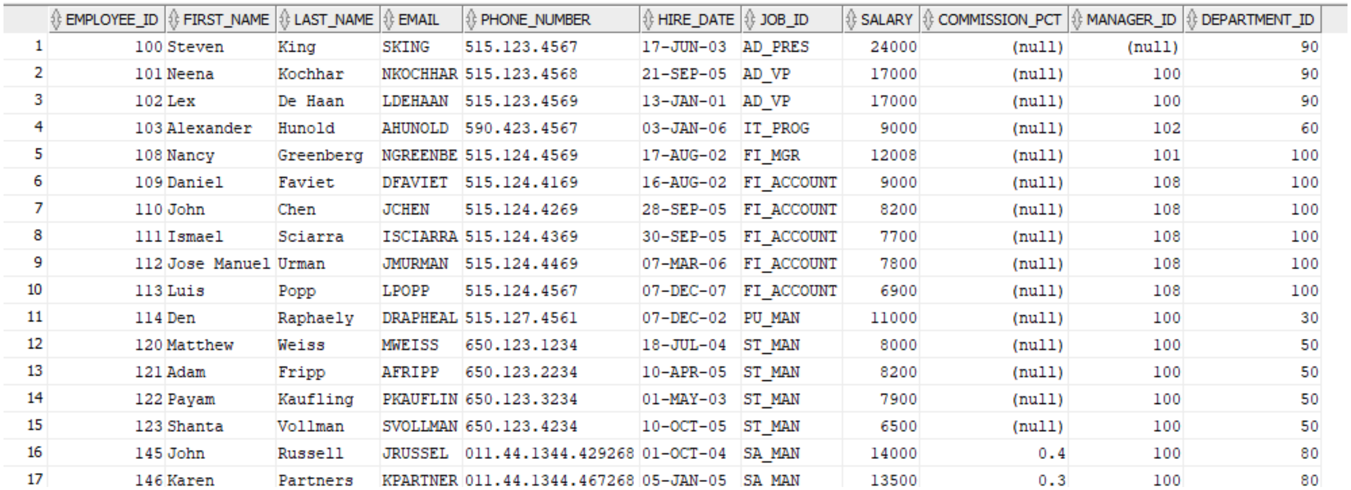
To find employees with salary greater than the average salary of the entire company, we use subquery.

Following is the query:



```
--22P-9216
select * from employees where salary>(select avg(salary) from employees)
```

Following is the result:



	EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
1	100	Steven	King	SKING	515.123.4567	17-JUN-03	AD_PRES	24000	(null)	(null)	90
2	101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-05	AD_VP	17000	(null)	100	90
3	102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-01	AD_VP	17000	(null)	100	90
4	103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-06	IT_PROG	9000	(null)	102	60
5	108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-02	FI_MGR	12008	(null)	101	100
6	109	Daniel	Faviet	DFAVIET	515.124.4169	16-AUG-02	FI_ACCOUNT	9000	(null)	108	100
7	110	John	Chen	JCHEN	515.124.4269	28-SEP-05	FI_ACCOUNT	8200	(null)	108	100
8	111	Ismael	Sciarra	ISCIARRA	515.124.4369	30-SEP-05	FI_ACCOUNT	7700	(null)	108	100
9	112	Jose Manuel	Urman	JMURMAN	515.124.4469	07-MAR-06	FI_ACCOUNT	7800	(null)	108	100
10	113	Luis	Popp	LPOPP	515.124.4567	07-DEC-07	FI_ACCOUNT	6900	(null)	108	100
11	114	Den	Raphaely	DRAPHEAL	515.127.4561	07-DEC-02	PU_MAN	11000	(null)	100	30
12	120	Matthew	Weiss	MWEISS	650.123.1234	18-JUL-04	ST_MAN	8000	(null)	100	50
13	121	Adam	Fripp	AFRIPP	650.123.2234	10-APR-05	ST_MAN	8200	(null)	100	50
14	122	Payam	Kaufling	PKAUFLIN	650.123.3234	01-MAY-03	ST_MAN	7900	(null)	100	50
15	123	Shanta	Vollman	SVOLLMAN	650.123.4234	10-OCT-05	ST_MAN	6500	(null)	100	50
16	145	John	Russell	JRUSSEL	011.44.1344.429268	01-OCT-04	SA_MAN	14000	0.4	100	80
17	146	Karen	Partners	KPARTNER	011.44.1344.467268	05-JAN-05	SA_MAN	13500	0.3	100	80

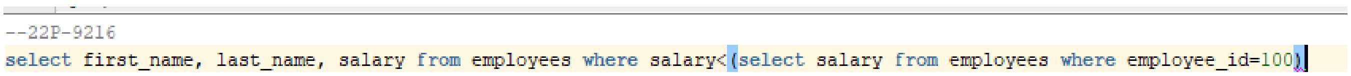
Task 7:

List the names and salaries of employees whose salary is less than the salary of the employee with the ID 100.

Ans:

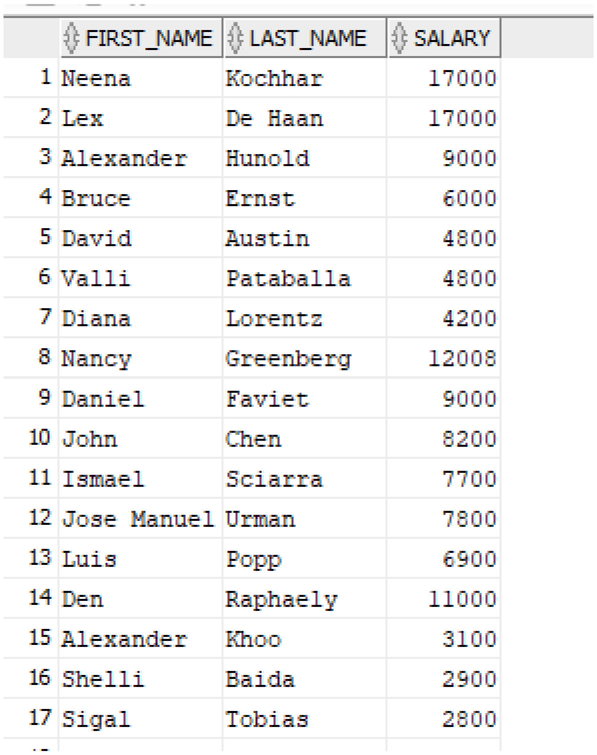
To list the names and salaries of employees with salary less than the salary of employee id 100, we use subquery.

Following is the query:



```
--22P-9216
select first_name, last_name, salary from employees where salary<(select salary from employees where employee_id=100)
```

Following is the result:



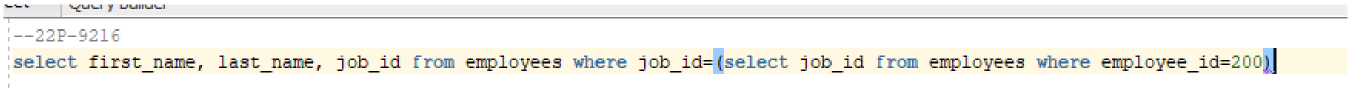
	FIRST_NAME	LAST_NAME	SALARY
1	Neena	Kochhar	17000
2	Lex	De Haan	17000
3	Alexander	Hunold	9000
4	Bruce	Ernst	6000
5	David	Austin	4800
6	Valli	Pataballa	4800
7	Diana	Lorentz	4200
8	Nancy	Greenberg	12008
9	Daniel	Faviet	9000
10	John	Chen	8200
11	Ismael	Sciarra	7700
12	Jose Manuel	Urman	7800
13	Luis	Popp	6900
14	Den	Raphaely	11000
15	Alexander	Khoo	3100
16	Shelli	Baida	2900
17	Sigal	Tobias	2800

Task 8:

Display the first name, last name, and job ID of employees whose job ID is the same as that of the employee with ID 200.

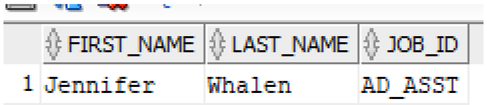
Ans:

To display the first name, last name, and job id of employees having job id same as employee id 200, we use subquery.
Following is the query:



```
--22P-9216
select first_name, last_name, job_id from employees where job_id=(select job_id from employees where employee_id=200)
```

Following is the result:



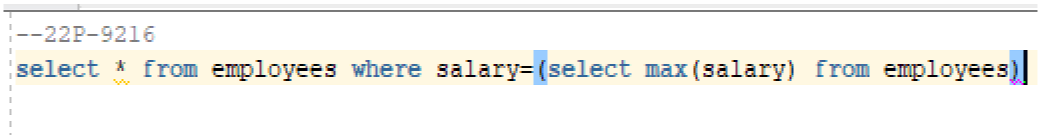
	FIRST_NAME	LAST_NAME	JOB_ID
1	Jennifer	Whalen	AD_ASST

Task 9:

Write a query to find all employees who work in the same department as the employee with the highest salary.

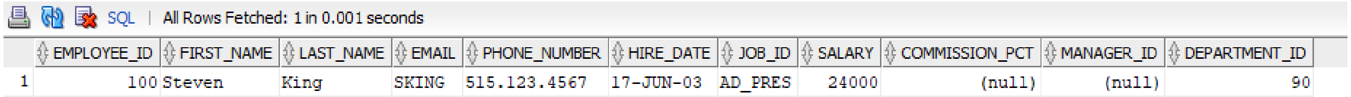
Ans:

To find all employees who work in the same department as the employee with the highest salary, we use subquery.
Following is the query:



```
--22P-9216
select * from employees where salary=(select max(salary) from employees)
```

Following is the result:



SQL | All Rows Fetched: 1 in 0.001 seconds

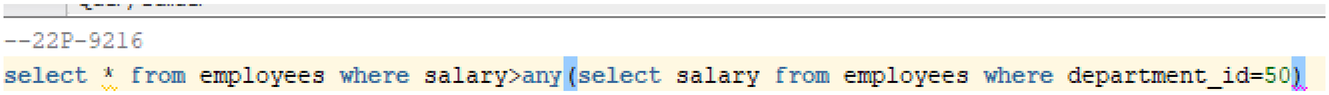
	EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
1	100	Steven	King	SKING	515.123.4567	17-JUN-03	AD_PRES	24000	(null)	(null)	90

Task 10:

List all employees whose salary is more than any employee in department 50.

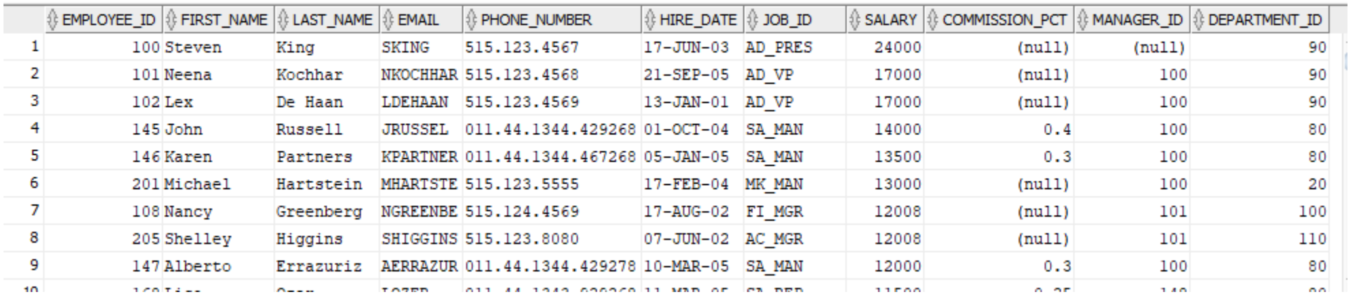
Ans:

To list all the employees with salary greater than any employee of department 50, we use "any" and subquery.
Following is the query:



```
--22P-9216
select * from employees where salary>any(select salary from employees where department_id=50)
```

Following is the result:



	EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
1	100	Steven	King	SKING	515.123.4567	17-JUN-03	AD_PRES	24000	(null)	(null)	90
2	101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-05	AD_VP	17000	(null)	100	90
3	102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-01	AD_VP	17000	(null)	100	90
4	145	John	Russell	JRUSSEL	011.44.1344.429268	01-OCT-04	SA_MAN	14000	0.4	100	80
5	146	Karen	Partners	KPARTNER	011.44.1344.467268	05-JAN-05	SA_MAN	13500	0.3	100	80
6	201	Michael	Hartstein	MHARTSTE	515.123.5555	17-FEB-04	MK_MAN	13000	(null)	100	20
7	108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-02	FI_MGR	12008	(null)	101	100
8	205	Shelley	Higgins	SHIGGINS	515.123.8080	07-JUN-02	AC_MGR	12008	(null)	101	110
9	147	Alberto	Errazuriz	AERRAZUR	011.44.1344.429278	10-MAR-05	SA_MAN	12000	0.3	100	80

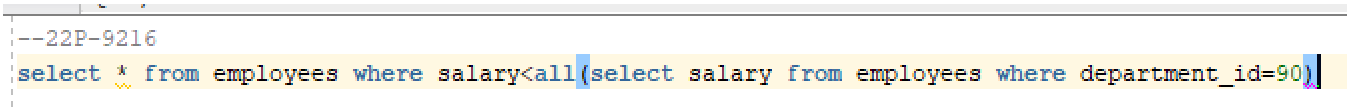
Task 11:

Find all employees whose salary is less than the salary of all employees in department 90.

Ans:

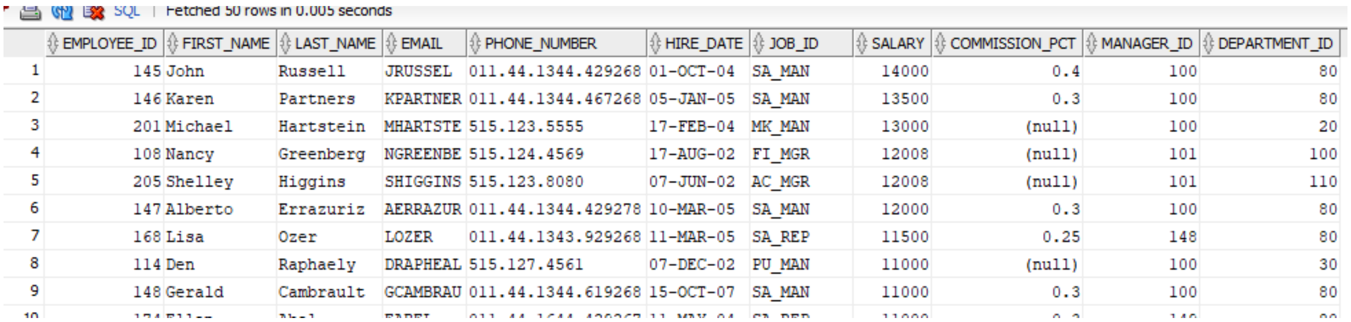
To find the employees with salary less than the salary of all employees of department 90, we use subquery and "all."

Following is the query:



```
--22P-9216
select * from employees where salary<all(select salary from employees where department_id=90)
```

Following is the result:



Fetched 50 rows in 0.005 seconds

	EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
1	145	John	Russell	JRUSSEL	011.44.1344.429268	01-OCT-04	SA_MAN	14000	0.4	100	80
2	146	Karen	Partners	KPARTNER	011.44.1344.467268	05-JAN-05	SA_MAN	13500	0.3	100	80
3	201	Michael	Hartstein	MHARTSTE	515.123.5555	17-FEB-04	MK_MAN	13000	(null)	100	20
4	108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-02	FI_MGR	12008	(null)	101	100
5	205	Shelley	Higgins	SHIGGINS	515.123.8080	07-JUN-02	AC_MGR	12008	(null)	101	110
6	147	Alberto	Errazuriz	AERRAZUR	011.44.1344.429278	10-MAR-05	SA_MAN	12000	0.3	100	80
7	168	Lisa	Ozer	LOZER	011.44.1343.929268	11-MAR-05	SA_REP	11500	0.25	148	80
8	114	Den	Raphaely	DRAPHEAL	515.127.4561	07-DEC-02	PU_MAN	11000	(null)	100	30
9	148	Gerald	Cambrault	GCAMBRAU	011.44.1344.619268	15-OCT-07	SA_MAN	11000	0.3	100	80

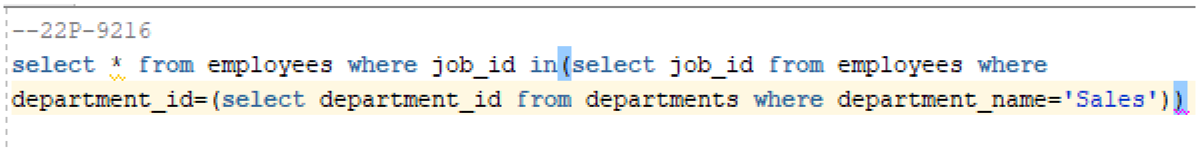
Task 12:

Display the details of employees whose job ID is among the job IDs in the "Sales" department.

Ans:

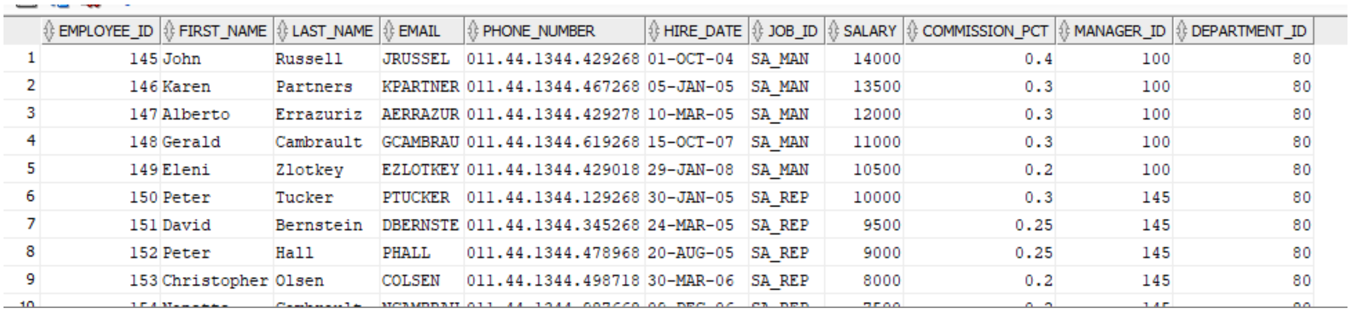
To display the details of employees whose job id is among the job ids of "sales" department, we use two subqueries and "in".

Following is the query:



```
--22P-9216
select * from employees where job_id in(select job_id from employees where
department_id=(select department_id from departments where department_name='Sales'))
```

Following is the result:



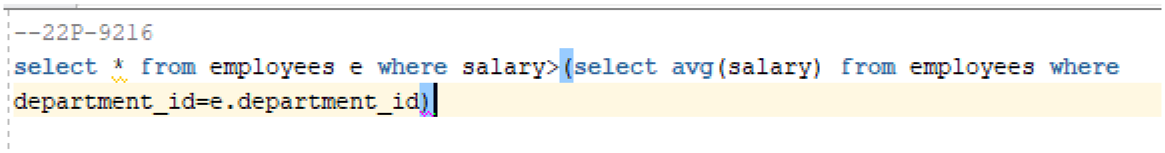
	EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
1	145	John	Russell	JRUSSEL	011.44.1344.429268	01-OCT-04	SA_MAN	14000	0.4	100	80
2	146	Karen	Partners	KPARTNER	011.44.1344.467268	05-JAN-05	SA_MAN	13500	0.3	100	80
3	147	Alberto	Errazuriz	AERRAZUR	011.44.1344.429278	10-MAR-05	SA_MAN	12000	0.3	100	80
4	148	Gerald	Cambrault	GCAMBRAU	011.44.1344.619268	15-OCT-07	SA_MAN	11000	0.3	100	80
5	149	Eleni	Zlotkey	EZLOTKEY	011.44.1344.429018	29-JAN-08	SA_MAN	10500	0.2	100	80
6	150	Peter	Tucker	PTUCKER	011.44.1344.129268	30-JAN-05	SA_REP	10000	0.3	145	80
7	151	David	Bernstein	DBERNSTE	011.44.1344.345268	24-MAR-05	SA_REP	9500	0.25	145	80
8	152	Peter	Hall	PHALL	011.44.1344.478968	20-AUG-05	SA_REP	9000	0.25	145	80
9	153	Christopher	Olsen	COLSEN	011.44.1344.498718	30-MAR-06	SA_REP	8000	0.2	145	80

Task 13:

Write a query to list all employees whose salary is greater than the average salary in their own department.

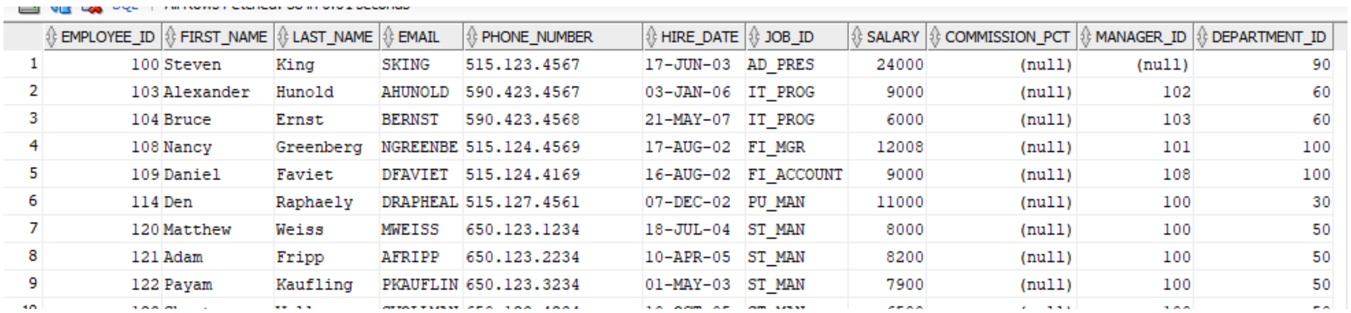
Ans:

To list all employees with salary greater than the average salary of their department, we use subquery and here "e" is used as an alias name for the employees table.
Following is the query:



```
--22P-9216
select * from employees e where salary>(select avg(salary) from employees where
department_id=e.department_id)
```

Following is the result:



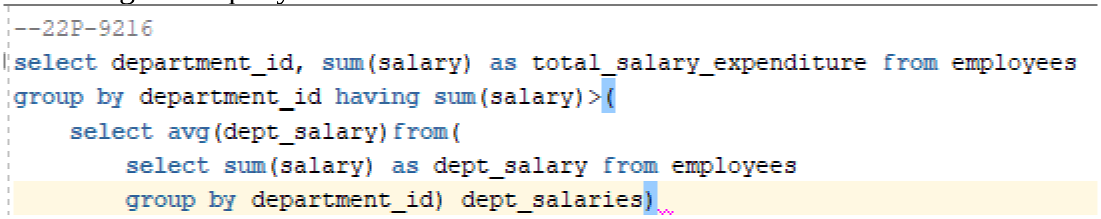
	EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
1	100	Steven	King	SKING	515.123.4567	17-JUN-03	AD_PRES	24000	(null)	(null)	90
2	103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-06	IT_PROG	9000	(null)	102	60
3	104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-07	IT_PROG	6000	(null)	103	60
4	108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-02	FI_MGR	12008	(null)	101	100
5	109	Daniel	Faviet	DFAVIET	515.124.4169	16-AUG-02	FI_ACCOUNT	9000	(null)	108	100
6	114	Den	Raphaely	DRAPHEAL	515.127.4561	07-DEC-02	PU_MAN	11000	(null)	100	30
7	120	Matthew	Weiss	MWEISS	650.123.1234	18-JUL-04	ST_MAN	8000	(null)	100	50
8	121	Adam	Fripp	AFRIPP	650.123.2234	10-APR-05	ST_MAN	8200	(null)	100	50
9	122	Payam	Kaufling	PKAUFLIN	650.123.3234	01-MAY-03	ST_MAN	7900	(null)	100	50

Task 14:

Find the departments where the total salary expenditure is greater than the average total salary expenditure of all departments.

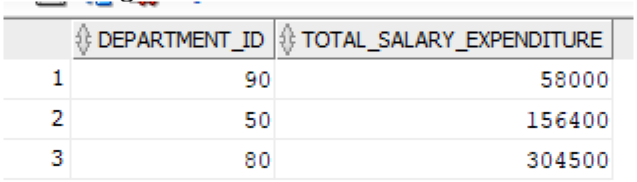
Ans:

To find the departments where the total salary expenditure is greater than the average total salary expenditure of all departments, we use subquery.
Following is the query:



```
--22P-9216
select department_id, sum(salary) as total_salary_expenditure from employees
group by department_id having sum(salary)>(
    select avg(dept_salary)from(
        select sum(salary) as dept_salary from employees
        group by department_id) dept_salaries)
```

Following is the result:



	DEPARTMENT_ID	TOTAL_SALARY_EXPENDITURE
1	90	58000
2	50	156400
3	80	304500

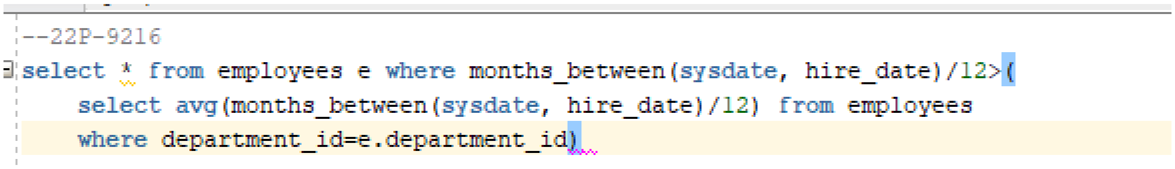
Task 15:

List all employees who have been with the company for more years than the average tenure of their respective department.

Ans:

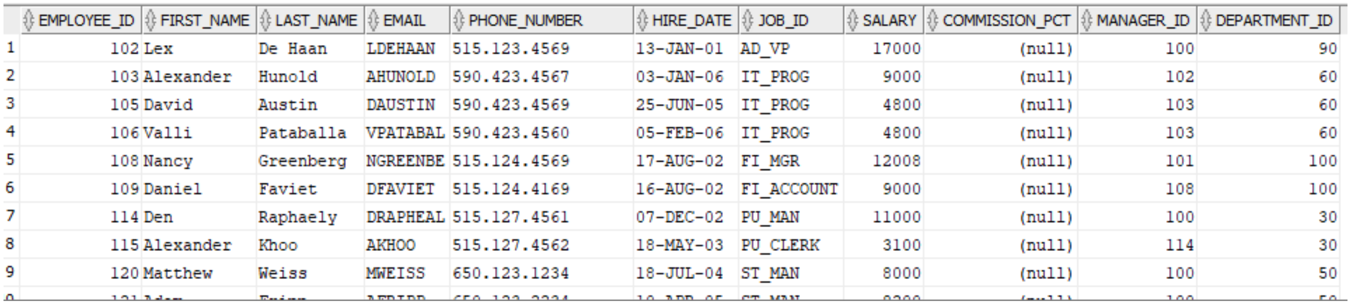
To list all employees who have been with the company for more than more years than the average tenure of their respective department, use subquery.

Following is the query:



```
--22P-9216
select * from employees e where months_between(sysdate, hire_date)/12>(
    select avg(months_between(sysdate, hire_date)/12) from employees
    where department_id=e.department_id)
```

Following is the result:



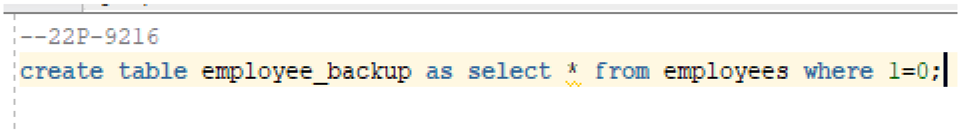
	EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
1	102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-01	AD_VP	17000	(null)	100	90
2	103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-06	IT_PROG	9000	(null)	102	60
3	105	David	Austin	DAUSTIN	590.423.4569	25-JUN-05	IT_PROG	4800	(null)	103	60
4	106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-06	IT_PROG	4800	(null)	103	60
5	108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-02	FI_MGR	12008	(null)	101	100
6	109	Daniel	Faviet	DFAVIET	515.124.4169	16-AUG-02	FI_ACCOUNT	9000	(null)	108	100
7	114	Den	Raphaely	DRAPHEAL	515.127.4561	07-DEC-02	PU_MAN	11000	(null)	100	30
8	115	Alexander	Khoo	AKHOO	515.127.4562	18-MAY-03	PU_CLERK	3100	(null)	114	30
9	120	Matthew	Weiss	MWEISS	650.123.1234	18-JUL-04	ST_MAN	8000	(null)	100	50

Task 16:

Insert a backup of all employees from department 10 into a table called `employee_backup`.

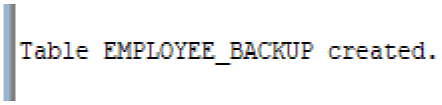
Ans:

First we create a table “employee_backup”.
Following is the query:



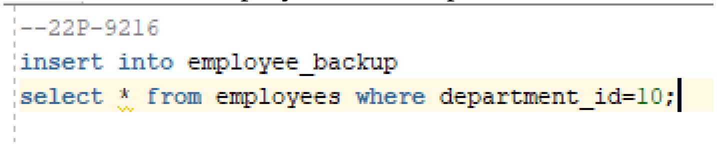
```
--22P-9216
create table employee_backup as select * from employees where 1=0;
```

Following is the result:



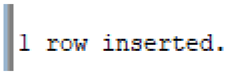
```
Table EMPLOYEE_BACKUP created.
```

Then we insert employees from department 10:



```
--22P-9216
insert into employee_backup
select * from employees where department_id=10;
```

Following is the result:



```
1 row inserted.
```

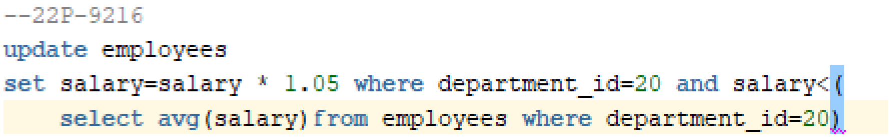
Task 17:

Update the salary of employees in department 20 by 5%, but only if their current salary is less than the average salary of department 20.

Ans:

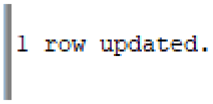
To update the salary of employees of department 20 by 5%, we use subquery.

Following is the query:



```
--22P-9216
update employees
set salary=salary * 1.05 where department_id=20 and salary<(
    select avg(salary)from employees where department_id=20)
```

Following is the result:



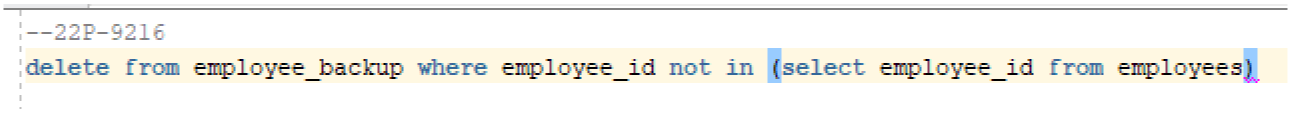
```
1 row updated.
```

Task 18:

Delete records from the `employee_backup` table where the employees no longer exist in the original `employees` table.

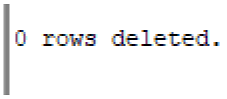
Ans:

To delete records from “employee_backup” where the employees no longer exist in the “employees” table, we run the following query:



```
--22P-9216
delete from employee_backup where employee_id not in (select employee_id from employees)
```

Following is the result (it is showing 0 rows deleted because all employees in employee_backup still exist in employees):



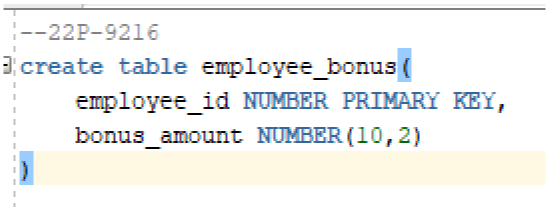
```
0 rows deleted.
```

Task 19:

Insert into `employee_bonus` the employee ID and bonus amount (20% of their salary) for employees who have a salary greater than the average salary of the company.

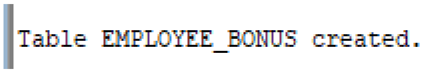
Ans:

First we create "employee_bonus" table.
Following is the query:



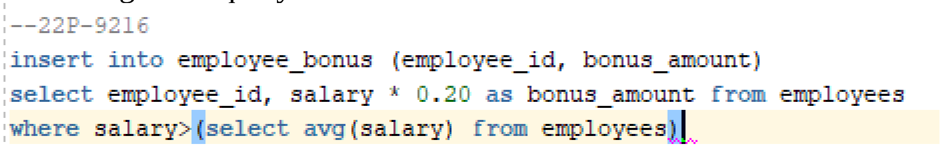
```
--22P-9216
create table employee_bonus(
    employee_id NUMBER PRIMARY KEY,
    bonus_amount NUMBER(10,2)
)
```

Following is the result:



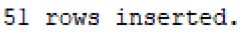
```
Table EMPLOYEE_BONUS created.
```

Then we insert the employee id and bonus amount into it.
Following is the query:



```
--22P-9216
insert into employee_bonus (employee_id, bonus_amount)
select employee_id, salary * 0.20 as bonus_amount from employees
where salary>(select avg(salary) from employees)
```

Following is the result:



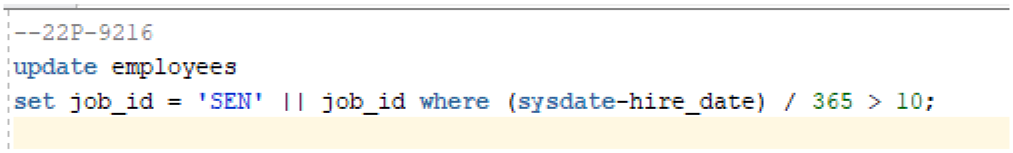
```
51 rows inserted.
```

Task 20:

Update the job title of employees who have been with the company for more than 10 years, setting it to 'Senior' before their current job title.

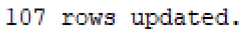
Ans:

We use the “update” and “set” commands to update the job title of employees, setting it to “senior”. Following is the query:



```
--22P-9216
update employees
set job_id = 'SEN' || job_id where (sysdate-hire_date) / 365 > 10;
```

Following is the result:



```
107 rows updated.
```