UNIVERSITY OF CHITTAGONG

Department of Computer Science & Engineering

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Lab_task_02

Course Title: DataBase Systems Lab
Course Code: CSE-414

Submitted To

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Contents

Oracle Database 11g: SQL Fundamentals I (SQL Practice Exercises)

CHAPTER 5

1. Group functions work across many rows to produce one result per group.
   True/False
   Answer:
   True.

2. Group functions include nulls in calculations.
   True/False

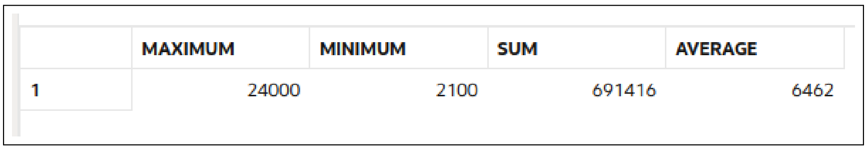
   Answer:
   False.

3. The `WHERE` clause restricts rows before inclusion in a group calculation.
   True/False

   Answer:
   True.

4. Find the highest, lowest, sum, and average salary of all employees. Label the columns as Maximum, Minimum, Sum, and Average, respectively. Round your results to the nearest whole number. Save your SQL statement as lab_05_04.sql. Run the query.

   Answer :



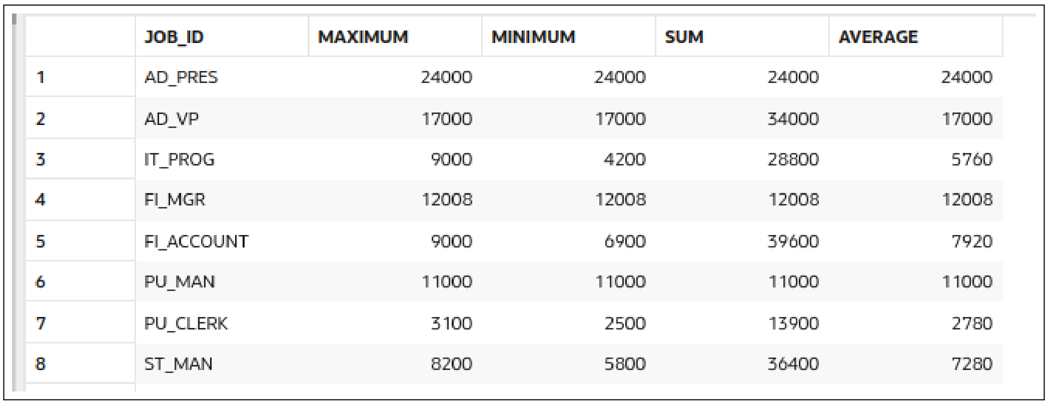
	MAXIMUM	MINIMUM	SUM	AVERAGE
1	24000	2100	691416	6462

Query :

```sql
SELECT
round (max(salary)) as MAXIMUM,
round(min(salary)) as MINIMUM,
round(sum(salary)) as SUM,
round(avg(salary)) as AVERAGE
from hr.employees;
```

5. Modify the query in lab_05_04.sql to display the minimum, maximum, sum, and average salary for each job type. Resave lab_05_04.sql as lab_05_05.sql. Run the statement in lab_05_05.sql.

Answer :



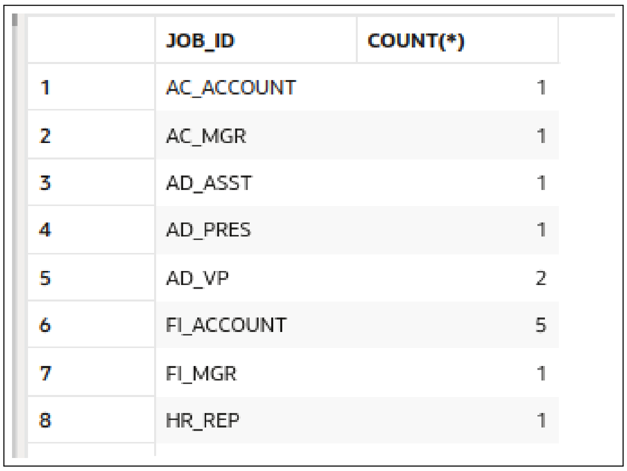
	JOB_ID	MAXIMUM	MINIMUM	SUM	AVERAGE
1	AD_PRES	24000	24000	24000	24000
2	AD_VP	17000	17000	34000	17000
3	IT_PROG	9000	4200	28800	5760
4	FI_MGR	12008	12008	12008	12008
5	FI_ACCOUNT	9000	6900	39600	7920
6	PU_MAN	11000	11000	11000	11000
7	PU_CLERK	3100	2500	13900	2780
8	ST_MAN	8200	5800	36400	7280

Query :

```
SELECT JOB_ID,
round (max(salary)) as MAXIMUM,
round(min(salary)) as MINIMUM,
round(sum(salary)) as SUM,
round(avg(salary)) as AVERAGE
from hr.employees
group by job_id;
```

6. Write a query to display the number of people with the same job. Generalize the query so that the user in the HR department is prompted for a job title. Save the script to a file named lab_05_06.sql. Run the query. Enter IT_PROG when prompted.

Answer :
(Part 1)

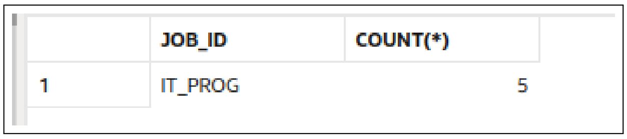


	JOB_ID	COUNT(*)
1	AC_ACCOUNT	1
2	AC_MGR	1
3	AD_ASST	1
4	AD_PRES	1
5	AD_VP	2
6	FI_ACCOUNT	5
7	FI_MGR	1
8	HR_REP	1

Query :

```
SELECT job_id, COUNT(*)
FROM hr.employees
GROUP BY job_id;
```

(Part 2)



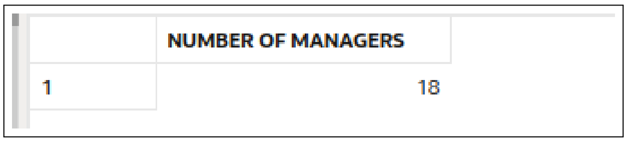
	JOB_ID	COUNT(*)
1	IT_PROG	5

Query :

```
SELECT job_id , count(*)
from hr.employees
where upper (job_id) = upper ('&job_id')
group by job_id;
```

7. Determine the number of managers without listing them. Label the column as Number of Managers. Hint: Use the MANAGER_ID column to determine the number of managers.

   Answer :



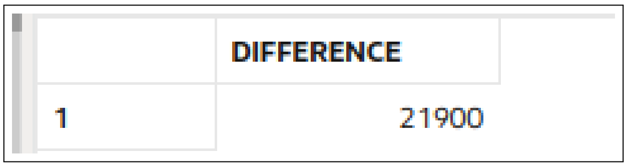
	NUMBER OF MANAGERS
1	18

Query :

```
SELECT COUNT(distinct manager_id) AS "NUMBER OF MANAGERS"
FROM hr.employees;
```

8. Find the difference between the highest and lowest salaries. Label the column `DIFFERENCE`

   Answer :



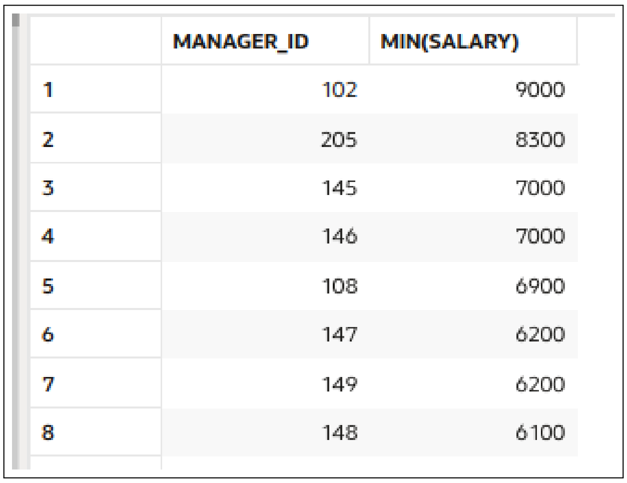
	DIFFERENCE
1	21900

Query :

```
SELECT max(salary) - min(salary) as "DIFFERENCE"
from hr.employees;
```

9. Create a report to display the manager number and the salary of the lowest-paid employee for that manager. Exclude anyone whose manager is not known. Exclude any groups where the minimum salary is $6,000 or less. Sort the output in descending order of salary.

Answer :



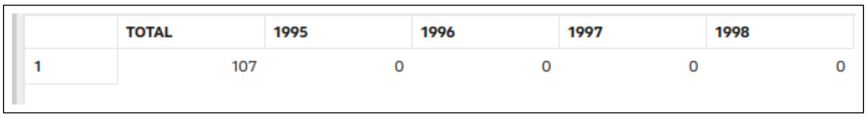
	MANAGER_ID	MIN(SALARY)
1	102	9000
2	205	8300
3	145	7000
4	146	7000
5	108	6900
6	147	6200
7	149	6200
8	148	6100

Query :

```sql
SELECT manager_id, MIN(salary)
FROM hr.employees
WHERE manager_id IS NOT NULL
GROUP BY manager_id
HAVING MIN(salary) >= 6000
ORDER BY MIN(salary) DESC;
```

10. Create a query to display the total number of employees and, of that total, the number of employees hired in 1995, 1996, 1997, and 1998. Create appropriate column headings.

Answer :



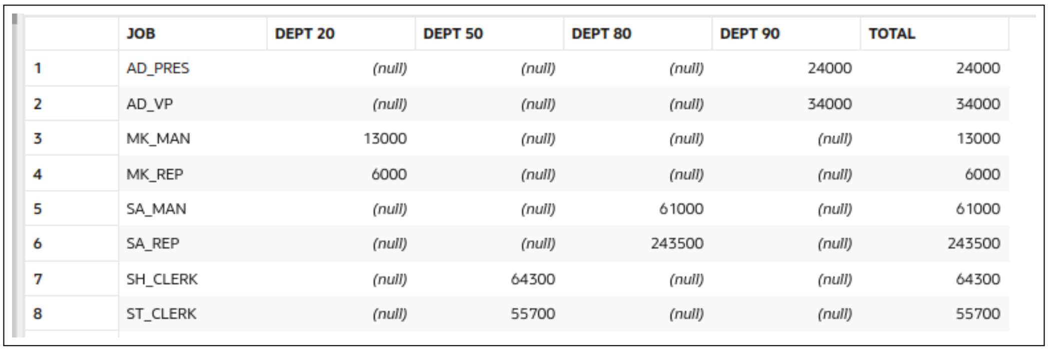
	TOTAL	1995	1996	1997	1998
1	107	0	0	0	0

Query :

```sql
SELECT
   COUNT(*) AS "TOTAL",
   COUNT(CASE WHEN TO_CHAR(hire_date, 'YYYY') = '1995' THEN 1
      END) AS "1995",
   COUNT(CASE WHEN TO_CHAR(hire_date, 'YYYY') = '1996' THEN 1
      END) AS "1996",
   COUNT(CASE WHEN TO_CHAR(hire_date, 'YYYY') = '1997' THEN 1
      END) AS "1997",
   COUNT(CASE WHEN TO_CHAR(hire_date, 'YYYY') = '1998' THEN 1
      END) AS "1998"
FROM hr.employees;
```

11. Create a matrix query to display the job, the salary for that job based on department number,and the total salary for that job, for departments 20, 50, 80, and 90, giving each column an appropriate heading.

Answer :



	JOB	DEPT 20	DEPT 50	DEPT 80	DEPT 90	TOTAL
1	AD_PRES	(null)	(null)	(null)	24000	24000
2	AD_VP	(null)	(null)	(null)	34000	34000
3	MK_MAN	13000	(null)	(null)	(null)	13000
4	MK_REP	6000	(null)	(null)	(null)	6000
5	SA_MAN	(null)	(null)	61000	(null)	61000
6	SA_REP	(null)	(null)	243500	(null)	243500
7	SH_CLERK	(null)	64300	(null)	(null)	64300
8	ST_CLERK	(null)	55700	(null)	(null)	55700

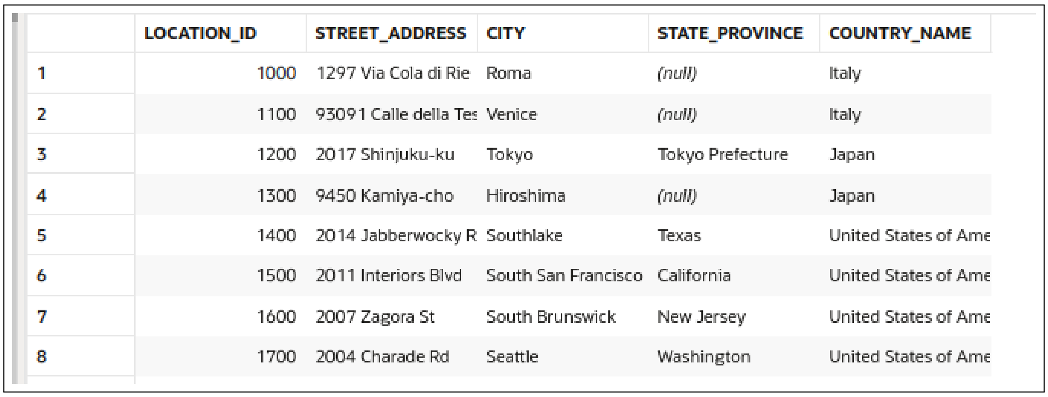
Query :

```
SELECT DISTINCT
   ( JOB_ID )                     "Job",
   SUM(DECODE(DEPARTMENT_ID, 20, SALARY)) "Dept 20",
   SUM(DECODE(DEPARTMENT_ID, 50, SALARY)) "Dept 50",
   SUM(DECODE(DEPARTMENT_ID, 80, SALARY)) "Dept 80",
   SUM(DECODE(DEPARTMENT_ID, 90, SALARY)) "Dept 90",
   SUM(SALARY)                     TOTAL
FROM
   HR.EMPLOYEES
WHERE
   DEPARTMENT_ID IN ( 20, 50, 80, 90 )
GROUP BY
   JOB_ID
ORDER BY
   JOB_ID;
```

CHAPTER 6

1. Write a query for the HR department to produce the addresses of all the departments. Use the LOCATIONS and COUNTRIES tables. Show the location ID, street address, city, state or province, and country in the output. Use a NATURAL JOIN to produce the results.

   Answer :



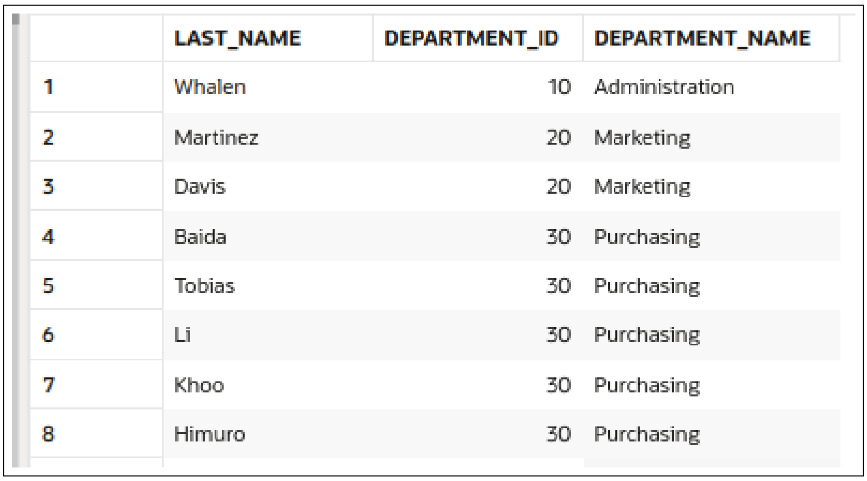
	LOCATION_ID	STREET_ADDRESS	CITY	STATE_PROVINCE	COUNTRY_NAME
1	1000	1297 Via Cola di Rie	Roma	(null)	Italy
2	1100	93091 Calle della Tes	Venice	(null)	Italy
3	1200	2017 Shinjuku-ku	Tokyo	Tokyo Prefecture	Japan
4	1300	9450 Kamiya-cho	Hiroshima	(null)	Japan
5	1400	2014 Jabberwocky R	Southlake	Texas	United States of Ame
6	1500	2011 Interiors Blvd	South San Francisco	California	United States of Ame
7	1600	2007 Zagora St	South Brunswick	New Jersey	United States of Ame
8	1700	2004 Charade Rd	Seattle	Washington	United States of Ame

   Query :

```
SELECT location_id,
       street_address,
       city,
       state_province,
       country_name
FROM hr.locations
NATURAL JOIN hr.countries;
```

2. The HR department needs a report of all employees. Write a query to display the last name, department number, and department name for all the employees..

   Answer :



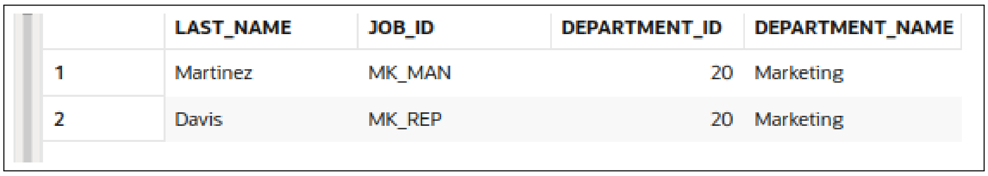
	LAST_NAME	DEPARTMENT_ID	DEPARTMENT_NAME
1	Whalen	10	Administration
2	Martinez	20	Marketing
3	Davis	20	Marketing
4	Baida	30	Purchasing
5	Tobias	30	Purchasing
6	Li	30	Purchasing
7	Khoo	30	Purchasing
8	Himuro	30	Purchasing

Query :

```
SELECT e.last_name,
       e.department_id,
       d.department_name
FROM hr.employees e
JOIN hr.departments d
  ON e.department_id = d.department_id;
```

3. The HR department needs a report of employees in Toronto. Display the last name, job, department number, and the department name for all employees who work in Toronto.

   Answer :



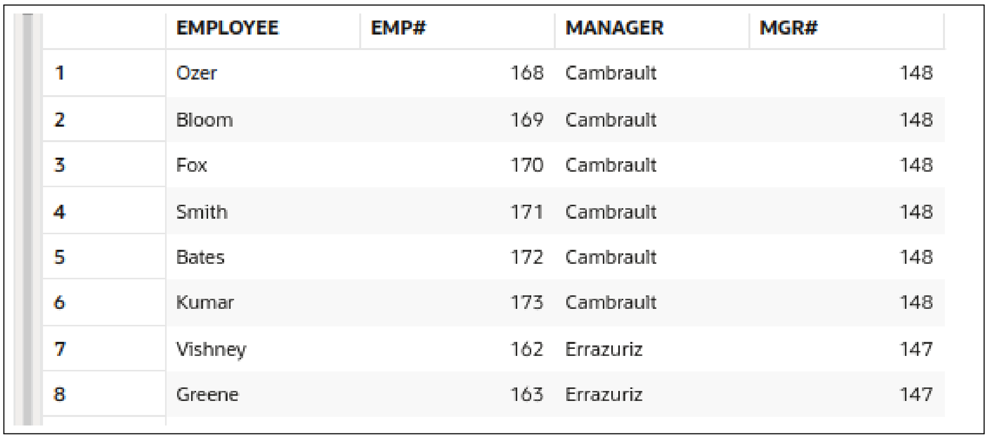
	LAST_NAME	JOB_ID	DEPARTMENT_ID	DEPARTMENT_NAME
1	Martinez	MK_MAN	20	Marketing
2	Davis	MK_REP	20	Marketing

Query :

```
SELECT e.last_name,
       e.job_id,
       e.department_id,
       d.department_name
FROM HR.employees e
JOIN HR.departments d ON e.department_id = d.department_id
JOIN HR.locations l ON d.location_id = l.location_id
WHERE l.city = 'Toronto';
```

4. Create a report to display employees' last name and employee number along with their manager's last name and manager number. Label the columns `Employee`, `Emp`, `Manager`, and `Mgr`, respectively. Save your SQL statement as lab_06_04.sql. Run the query

   Answer :



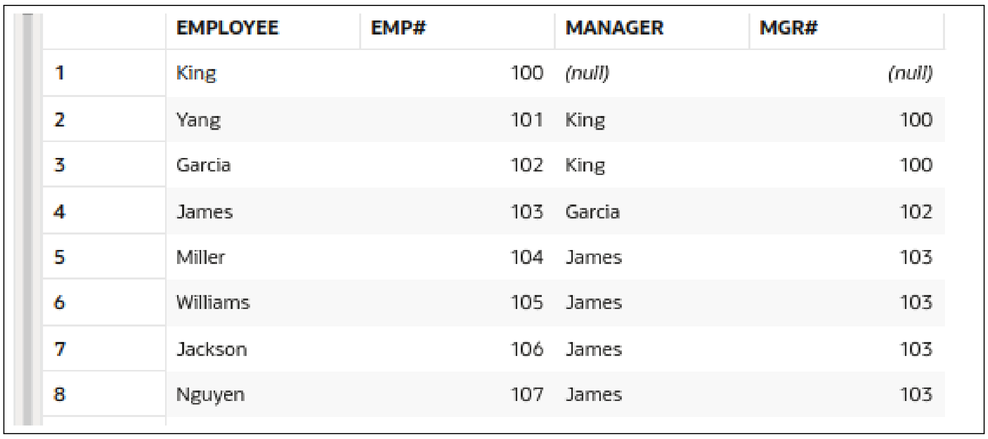
	EMPLOYEE	EMP#	MANAGER	MGR#
1	Ozer	168	Cambrault	148
2	Bloom	169	Cambrault	148
3	Fox	170	Cambrault	148
4	Smith	171	Cambrault	148
5	Bates	172	Cambrault	148
6	Kumar	173	Cambrault	148
7	Vishney	162	Errazuriz	147
8	Greene	163	Errazuriz	147

Query :

```sql
SELECT e.last_name AS "Employee",
     e.employee_id AS "Emp#",
     m.last_name AS "Manager",
     m.employee_id AS "Mgr#"
FROM HR.employees e
JOIN HR.employees m
ON   e.manager_id = m.employee_id;
```

5. Modify lab_06_04.sql to display all employees including King, who has no manager. Order the results by the employee number. Save your SQL statement as lab_06_05.sql. Run the query in lab_06_05.sql.

   Answer :



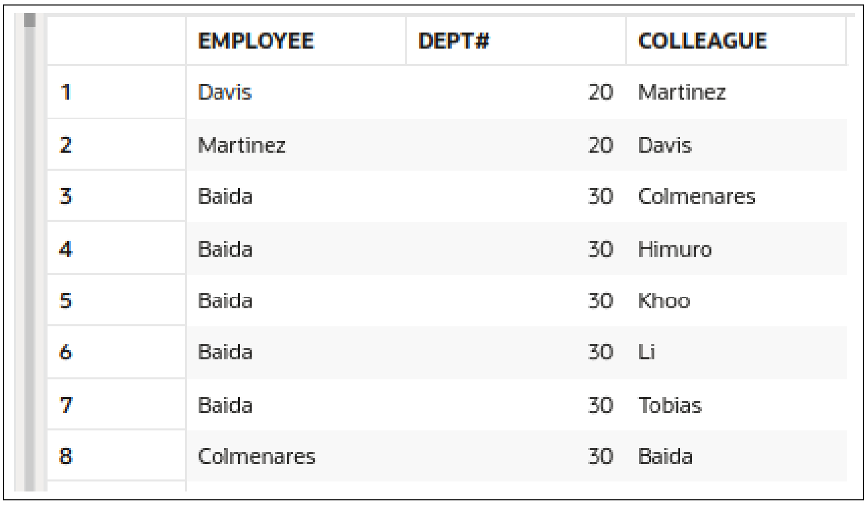
	EMPLOYEE	EMP#	MANAGER	MGR#
1	King	100	(null)	(null)
2	Yang	101	King	100
3	Garcia	102	King	100
4	James	103	Garcia	102
5	Miller	104	James	103
6	Williams	105	James	103
7	Jackson	106	James	103
8	Nguyen	107	James	103

Query :

```sql
SELECT
   e.last_name AS Employee,
   e.employee_id AS "Emp#",
   m.last_name AS Manager,
   m.employee_id AS "Mgr#"
FROM
   hr.employees e
LEFT JOIN
   hr.employees m
ON
   e.manager_id = m.employee_id
ORDER BY
   e.employee_id;
```

6. Create a report for the HR department that displays employee last names, department numbers, and all the employees who work in the same department as a given employee. Give each column an appropriate label. Save the script to a file named lab_06_06.sql.

   Answer :



	EMPLOYEE	DEPT#	COLLEAGUE
1	Davis	20	Martinez
2	Martinez	20	Davis
3	Baida	30	Colmenares
4	Baida	30	Himuro
5	Baida	30	Khoo
6	Baida	30	Li
7	Baida	30	Tobias
8	Colmenares	30	Baida

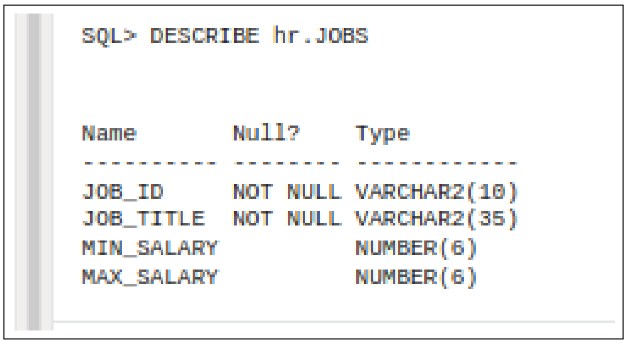
Query :

```sql
SELECT
   e1.last_name AS "Employee",
   e1.department_id AS "Dept#",
   e2.last_name AS "Colleague"
FROM
   hr.employees e1
JOIN
   hr.employees e2
ON
   e1.department_id = e2.department_id
AND
   e1.employee_id != e2.employee_id
ORDER BY
   e1.department_id, e1.last_name, e2.last_name;
```

7. The HR department needs a report on job grades and salaries. To familiarize yourself with the JOB_GRADES table, first show the structure of the JOB_GRADES table. Then create a query that displays the name, job, department name, salary, and grade for all employees.

Answer :

(Part 1)



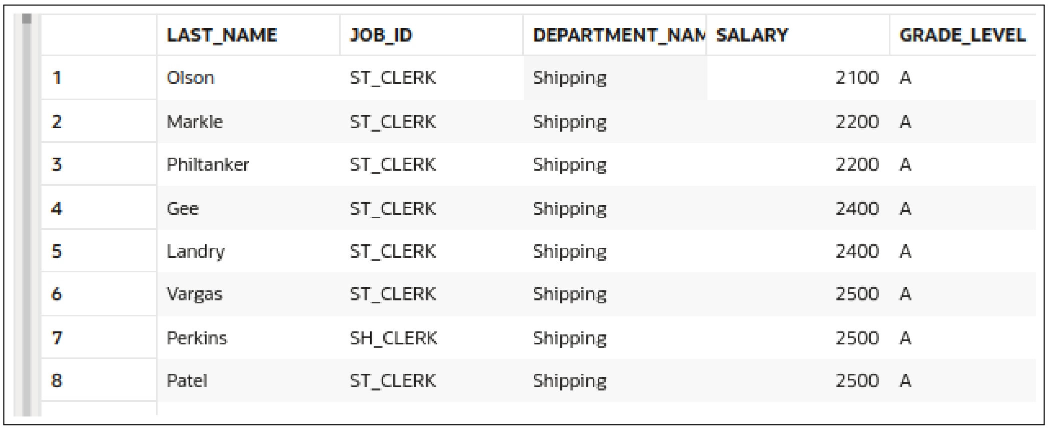
```
SQL> DESCRIBE hr.JOBS


Name       Null?    Type
---------- -------- ------------
JOB_ID     NOT NULL VARCHAR2(10)
JOB_TITLE  NOT NULL VARCHAR2(35)
MIN_SALARY          NUMBER(6)
MAX_SALARY          NUMBER(6)
```

Query :

```sql
DESCRIBE hr.JOBS;
```

(Part 2)



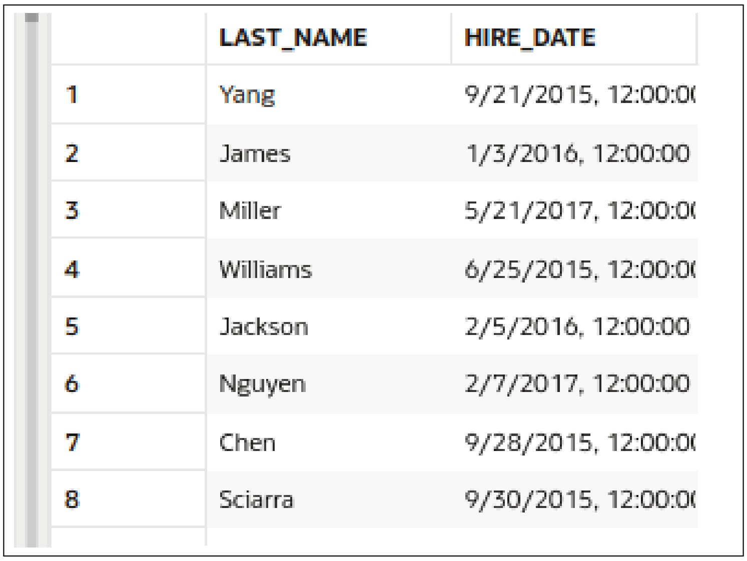
	LAST_NAME	JOB_ID	DEPARTMENT_NAM	SALARY	GRADE_LEVEL
1	Olson	ST_CLERK	Shipping	2100	A
2	Markle	ST_CLERK	Shipping	2200	A
3	Philtanker	ST_CLERK	Shipping	2200	A
4	Gee	ST_CLERK	Shipping	2400	A
5	Landry	ST_CLERK	Shipping	2400	A
6	Vargas	ST_CLERK	Shipping	2500	A
7	Perkins	SH_CLERK	Shipping	2500	A
8	Patel	ST_CLERK	Shipping	2500	A

Query :

```sql
SELECT e.last_name,
       e.job_id,
       d.department_name,
       e.salary,
       CASE
          WHEN e.salary BETWEEN 0 AND 3000 THEN 'A'
          WHEN e.salary BETWEEN 3001 AND 6000 THEN 'B'
          WHEN e.salary BETWEEN 6001 AND 9000 THEN 'C'
          WHEN e.salary BETWEEN 9001 AND 12000 THEN 'D'
          ELSE 'E'
       END AS grade_level
FROM HR.EMPLOYEES e
JOIN HR.DEPARTMENTS d ON e.department_id = d.department_id
ORDER BY e.salary;
```

8. The HR department wants to determine the names of all the employees who were hired after Davies. Create a query to display the name and hire date of any employee hired after employee Davies.

Answer :



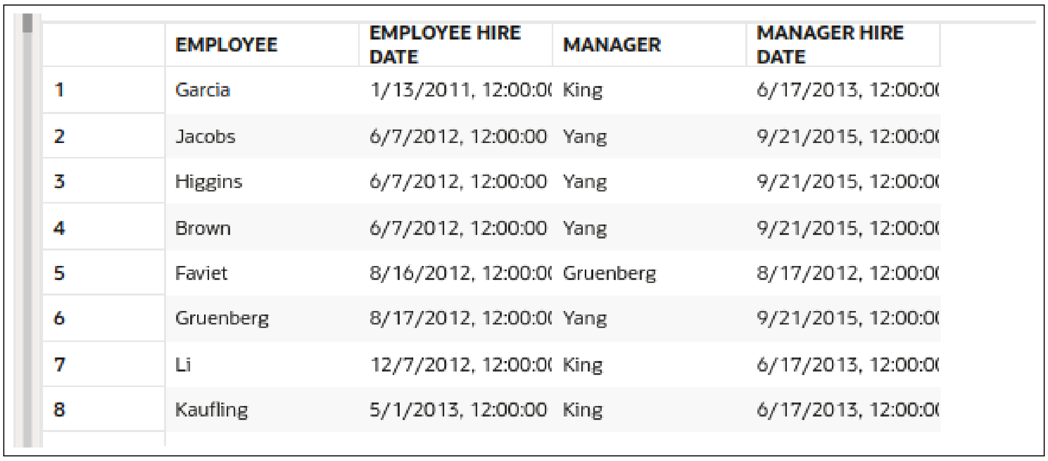
	LAST_NAME	HIRE_DATE
1	Yang	9/21/2015, 12:00:0(
2	James	1/3/2016, 12:00:00
3	Miller	5/21/2017, 12:00:0(
4	Williams	6/25/2015, 12:00:0(
5	Jackson	2/5/2016, 12:00:00
6	Nguyen	2/7/2017, 12:00:00
7	Chen	9/28/2015, 12:00:0(
8	Sciarra	9/30/2015, 12:00:0(

Query :

```
SELECT last_name, hire_date
FROM hr.employees
WHERE hire_date > (
   SELECT hire_date
   FROM hr.employees
   WHERE last_name = 'Davies'
                    );
```

9. The HR department needs to find the names and hire dates of all the employees who were hired before their managers, along with their managers' names and hire dates. Save the script to a file named lab_06_09.sql..

   Answer :



	EMPLOYEE	EMPLOYEE HIRE DATE	MANAGER	MANAGER HIRE DATE
1	Garcia	1/13/2011, 12:00:0(	King	6/17/2013, 12:00:0(
2	Jacobs	6/7/2012, 12:00:00	Yang	9/21/2015, 12:00:0(
3	Higgins	6/7/2012, 12:00:00	Yang	9/21/2015, 12:00:0(
4	Brown	6/7/2012, 12:00:00	Yang	9/21/2015, 12:00:0(
5	Faviet	8/16/2012, 12:00:0(	Gruenberg	8/17/2012, 12:00:0(
6	Gruenberg	8/17/2012, 12:00:0(	Yang	9/21/2015, 12:00:0(
7	Li	12/7/2012, 12:00:0(	King	6/17/2013, 12:00:0(
8	Kaufling	5/1/2013, 12:00:00	King	6/17/2013, 12:00:0(

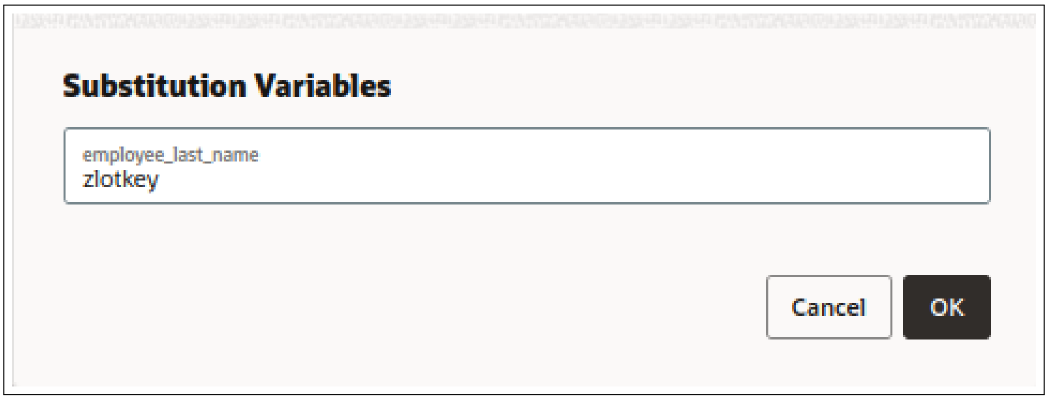
Query :

```
SELECT
   e.last_name AS "Employee",
   e.hire_date AS "Employee Hire Date",
   m.last_name AS "Manager",
   m.hire_date AS "Manager Hire Date"
FROM
   hr.employees e
JOIN
   hr.employees m
ON
   e.manager_id = m.employee_id
WHERE
   e.hire_date < m.hire_date
ORDER BY
   e.hire_date;
```

CHAPTER 7

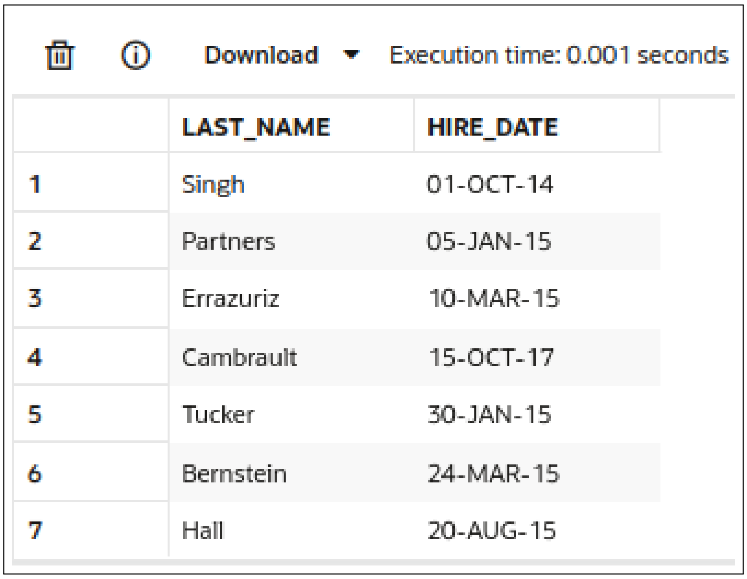
1. The HR department needs a query that prompts the user for an employee last name. The query then displays the last name and hire date of any employee in the same department as the employee whose name they supply (excluding that employee). For example, if the user enters Zlotkey, find all employees who work with Zlotkey (excluding Zlotkey).

   Answer :



Substitution Variables

employee_last_name
zlotkey



Execution time: 0.001 seconds

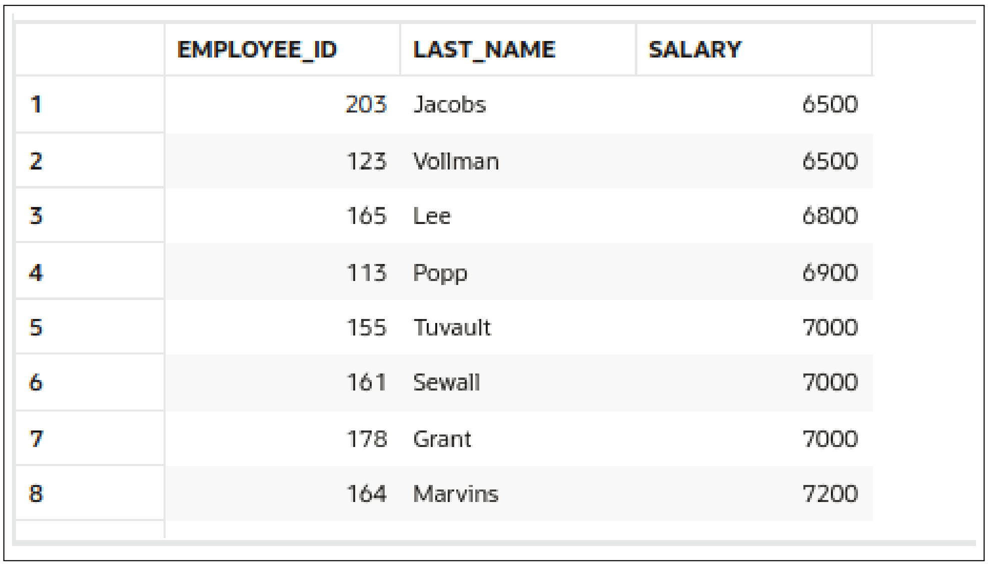
	LAST_NAME	HIRE_DATE
1	Singh	01-OCT-14
2	Partners	05-JAN-15
3	Errazuriz	10-MAR-15
4	Cambrault	15-OCT-17
5	Tucker	30-JAN-15
6	Bernstein	24-MAR-15
7	Hall	20-AUG-15

Query :

```sql
SELECT last_name, to_char (hire_date, 'DD-MON-YY') hire_date
FROM HR.EMPLOYEES
WHERE department_id = ( SELECT department_id
                        FROM hr.employees
                        WHERE last_name = initcap ('&&last_name'))
AND last_name <> initcap ('&last_name');
```

2. Create a report that displays the employee number, last name, and salary of all employees who earn more than the average salary. Sort the results in order of ascending salary.

   Answer :



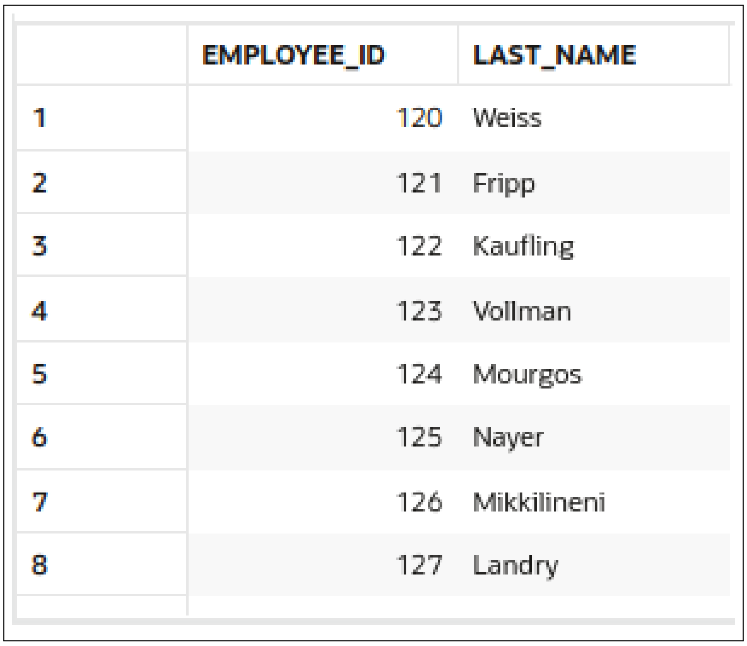
	EMPLOYEE_ID	LAST_NAME	SALARY
1	203	Jacobs	6500
2	123	Vollman	6500
3	165	Lee	6800
4	113	Popp	6900
5	155	Tuvault	7000
6	161	Sewall	7000
7	178	Grant	7000
8	164	Marvins	7200

Query :

```sql
SELECT employee_id, last_name, salary
FROM hr.employees
WHERE salary > (
   SELECT AVG(salary)
   FROM hr.employees
)
ORDER BY salary ASC;
```

3. Write a query that displays the employee number and last name of all employees who work in a department with any employee whose last name contains the letter "u." Save your SQL statement as lab_07_03.sql. Run your query.

   Answer :



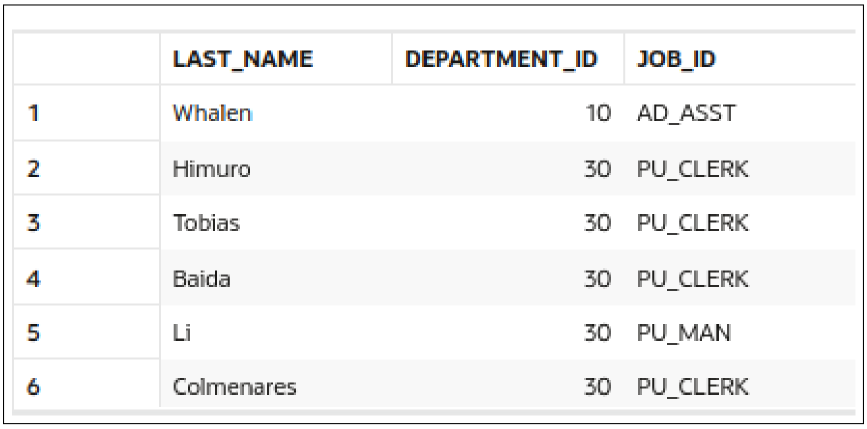
	EMPLOYEE_ID	LAST_NAME
1	120	Weiss
2	121	Fripp
3	122	Kaufling
4	123	Vollman
5	124	Mourgos
6	125	Nayer
7	126	Mikkilineni
8	127	Landry

Query :

```sql
SELECT employee_id, last_name
FROM hr.employees
WHERE department_id IN (
   SELECT department_id
   FROM hr.employees
   WHERE LOWER(last_name) LIKE '%u%'
);
```

4. The HR department needs a report that displays the last name, department number, and job ID of all employees whose department location ID is 1700.

   Answer :



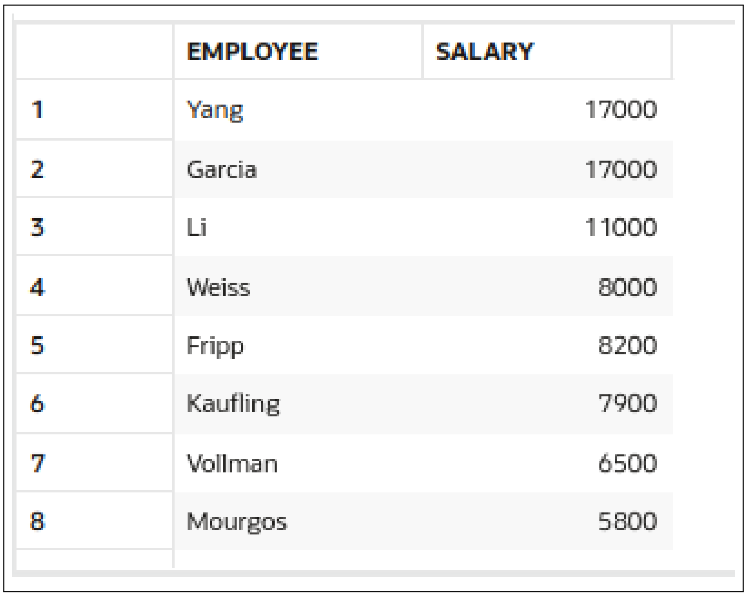
	LAST_NAME	DEPARTMENT_ID	JOB_ID
1	Whalen	10	AD_ASST
2	Himuro	30	PU_CLERK
3	Tobias	30	PU_CLERK
4	Baida	30	PU_CLERK
5	Li	30	PU_MAN
6	Colmenares	30	PU_CLERK

Query :

```sql
SELECT last_name, department_id, job_id
FROM HR.EMPLOYEES
WHERE department_id IN (SELECT department_id
                        FROM HR.DEPARTMENTS
                        WHERE location_id = 1700)
ORDER BY department_id;
```

5. Create a report for HR that displays the last name and salary of every employee who reports to King.

   Answer :



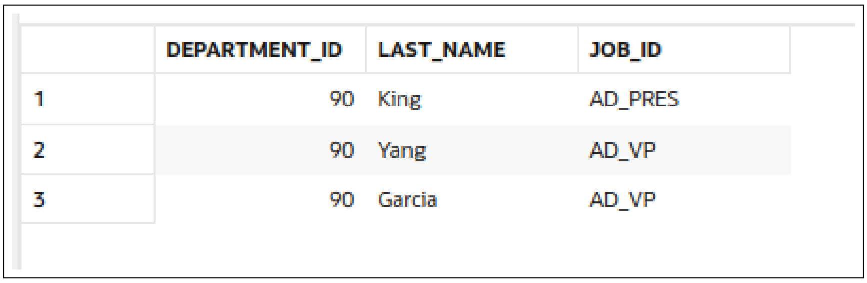
	EMPLOYEE	SALARY
1	Yang	17000
2	Garcia	17000
3	Li	11000
4	Weiss	8000
5	Fripp	8200
6	Kaufling	7900
7	Vollman	6500
8	Mourgos	5800

Query :

```sql
SELECT last_name, salary
FROM HR.EMPLOYEES
WHERE manager_id IN (SELECT employee_id
                     FROM HR.EMPLOYEES
                     WHERE last_name = 'King');
```

6. Create a report for HR that displays the department number, last name, and job ID for every employee in the Executive department.

   Answer :



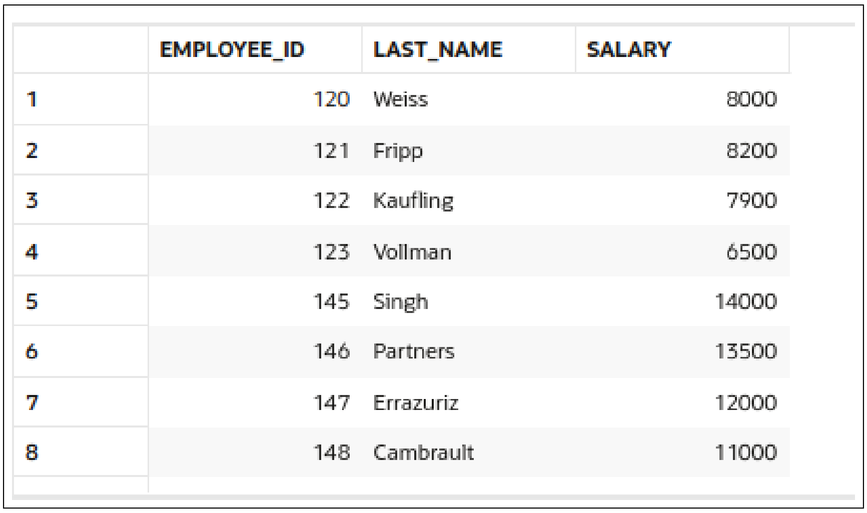
	DEPARTMENT_ID	LAST_NAME	JOB_ID
1	90	King	AD_PRES
2	90	Yang	AD_VP
3	90	Garcia	AD_VP

Query :

```sql
SELECT e.department_id ,
     e.last_name,
     e.job_id
FROM hr.employees e
JOIN hr.departments d ON e.department_id = d.department_id
WHERE d.department_name = ’Executive’;
```

7. Modify the query in lab_07_03.sql to display the employee number, last name, and salary of all employees who earn more than the average salary, and who work in a department with any employee whose last name contains a “u.” Resave lab_07_03.sql as lab_07_07.sql. Run the statement in lab_07_07.sql.

   Answer :



	EMPLOYEE_ID	LAST_NAME	SALARY
1	120	Weiss	8000
2	121	Fripp	8200
3	122	Kaufling	7900
4	123	Vollman	6500
5	145	Singh	14000
6	146	Partners	13500
7	147	Errazuriz	12000
8	148	Cambrault	11000

Query :

```sql
SELECT department_id, last_name, job_id
FROM HR.EMPLOYEES
WHERE department_id in (SELECT department_id
                        FROM HR.DEPARTMENTS
                        WHERE department_name = ’Executive’);
```