

Lab1: Getting familiarized with SQL Join

1. Find all employees who work on IT department and have salary>2000.

```
Select E.* from HR.EMPLOYEES E
JOIN HR.DEPARTMENTS D
ON E.DEPARTMENT_ID = D.DEPARTMENT_ID
WHERE D.DEPARTMENT_NAME = 'IT' AND E.SALARY>2000;
```

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-06	IT_PROG	9000	-	102	60
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-07	IT_PROG	6000	-	103	60
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-05	IT_PROG	4800	-	103	60
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-06	IT_PROG	4800	-	103	60
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-07	IT_PROG	4200	-	103	60

2. Find all employees who works on department located at country 'United States of America' and have salary>4000.

```
Select E.EMPLOYEE_ID,E.FIRST_NAME,E.SALARY,C.COUNTRY_NAME FROM HR.EMPLOYEES E
JOIN HR.DEPARTMENTS D ON E.DEPARTMENT_ID = D.DEPARTMENT_ID
JOIN HR.LOCATIONS L ON L.LOCATION_ID = D.LOCATION_ID
JOIN HR.COUNTRIES C ON C.COUNTRY_ID = L.COUNTRY_ID
WHERE C.COUNTRY_NAME = 'United States of America' AND E.SALARY>4000;
```

EMPLOYEE_ID	FIRST_NAME	SALARY	COUNTRY_NAME
100	Steven	24000	United States of America
101	Neena	17000	United States of America
102	Lex	17000	United States of America
103	Alexander	9000	United States of America
104	Bruce	6000	United States of America

105	David	4800	United States of America
106	Valli	4800	United States of America
107	Diana	4200	United States of America
108	Nancy	12008	United States of America
109	Daniel	9000	United States of America
110	John	8200	United States of America
111	Ismael	7700	United States of America
112	Jose Manuel	7800	United States of America
113	Luis	6900	United States of America
114	Den	11000	United States of America
120	Matthew	8000	United States of America
121	Adam	8200	United States of America
122	Payam	7900	United States of America
123	Shanta	6500	United States of America
124	Kevin	5800	United States of America
184	Nandita	4200	United States of America
185	Alexis	4100	United States of America
200	Jennifer	4400	United States of America
205	Shelley	12008	United States of America
206	William	8300	United States of America

Lab2: Getting familiarized with Horizontal Fragmentation

1. Primary Horizontal Fragmentation

- Divide Employees table with IT and Sales department in different fragments

```
CREATE TABLE IT AS
Select E.* FROM HR.EMPLOYEES E
JOIN HR.DEPARTMENTS D ON E.DEPARTMENT_ID = D.DEPARTMENT_ID
WHERE D.DEPARTMENT_NAME = 'IT';
```

```
CREATE TABLE SALES AS
Select E.* FROM HR.EMPLOYEES E
JOIN HR.DEPARTMENTS D ON E.DEPARTMENT_ID = D.DEPARTMENT_ID
WHERE D.DEPARTMENT_NAME = 'Sales';
```

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-06	IT_PROG	9000	-	102	60
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-07	IT_PROG	6000	-	103	60
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-05	IT_PROG	4800	-	103	60
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-06	IT_PROG	4800	-	103	60
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-07	IT_PROG	4200	-	103	60

IT

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
145	John	Russell	JRUSSEL	011.44.1344.429268	01-OCT-04	SA_MAN	14000	.4	100	80
146	Karen	Partners	KPARTNER	011.44.1344.467268	05-JAN-05	SA_MAN	13500	.3	100	80
147	Alberto	Errazuriz	AERRAZUR	011.44.1344.429278	10-MAR-05	SA_MAN	12000	.3	100	80
148	Gerald	Cambraut	GCAMBRAU	011.44.1344.619268	15-OCT-07	SA_MAN	11000	.3	100	80
149	Eleni	Zlotkey	EZLOTKEY	011.44.1344.429018	29-JAN-08	SA_MAN	10500	.2	100	80
150	Peter	Tucker	PTUCKER	011.44.1344.129268	30-JAN-05	SA REP	10000	.3	145	80

SALES

2. Derived Horizontal Fragmentation

- Create a different fragment for all employees who works on department located at country 'United States of America' and have salary > 4000

```
CREATE TABLE FRAGMENT1 AS
Select E.EMPLOYEE_ID,E.FIRST_NAME,E.LAST_NAME,JOB_ID,SALARY,C.COUNTRY_NAME,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
JOIN HR.COUNTRIES C ON C.COUNTRY_ID = L.COUNTRY_ID
WHERE C.COUNTRY_NAME = 'United States of America' AND E.SALARY > 4000
```

```
CREATE TABLE FRAGMENT2 AS
SELECT *
FROM FRAGMENT1
WHERE DEPARTMENT_NAME = 'IT';
```

```
CREATE TABLE FRAGMENT3 AS
SELECT *
FROM FRAGMENT1
WHERE SALARY > 8000;
```

```
CREATE TABLE FRAGMENT4 AS
SELECT *
FROM FRAGMENT1
WHERE DEPARTMENT_NAME = 'Finance';
```

3. Reconstruction from fragmented DB

- Fetch all employees who work on IT department and Sales department from fragments created on section 1.
- Select all employees who are in IT and Sales department

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-06	IT_PROG	9000	-	102	60
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-07	IT_PROG	6000	-	103	60
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-05	IT_PROG	4800	-	103	60
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-06	IT_PROG	4800	-	103	60
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-07	IT_PROG	4200	-	103	60
145	John	Russell	JRUSSEL	011.44.1344.429268	01-OCT-04	SA_MAN	14000	.4	100	80
146	Karen	Partners	KPARTNER	011.44.1344.467268	05-JAN-05	SA_MAN	13500	.3	100	80
147	Alberto	Errazuriz	AERRAZUR	011.44.1344.429278	10-MAR-05	SA_MAN	12000	.3	100	80
148	Gerald	Cambrault	GCAMBRAU	011.44.1344.619268	15-OCT-07	SA_MAN	11000	.3	100	80
149	Eleni	Zlotkey	EZLOTKEY	011.44.1344.429018	29-JAN-08	SA_MAN	10500	.2	100	80
150	Peter	Tucker	PTUCKER	011.44.1344.129268	30-JAN-05	SA_REP	10000	.3	145	80
151	David	Bernstein	DBERNSTE	011.44.1344.345268	24-MAR-05	SA_REP	9500	.25	145	80
152	Peter	Hall	PHALL	011.44.1344.478968	20-AUG-05	SA_REP	9000	.25	145	80
153	Christopher	Olsen	COLSEN	011.44.1344.498718	30-MAR-06	SA_REP	8000	.2	145	80
154	Nanette	Cambrault	NCAMBRAU	011.44.1344.987668	09-DEC-06	SA_REP	7500	.2	145	80
155	Oliver	Tuvault	OTUVAULT	011.44.1344.486508	23-NOV-07	SA_REP	7000	.15	145	80

Lab 4: Getting familiarized with Vertical Fragmentation

1. Divide HR. EMPLOYEES table to hold employees related information in different fragment and JOB description (all related columns) in different fragment.

```
CREATE TABLE employee AS
SELECT * FROM HR.EMPLOYEES;
```

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
100	Steven	King	SKING	515.123.4567	17-JUN-03	AD_PRES	24000	-	-	90
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-05	AD_VP	17000	-	100	90
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-01	AD_VP	17000	-	100	90
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-06	IT_PROG	9000	-	102	60
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-07	IT_PROG	6000	-	103	60
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-05	IT_PROG	4800	-	103	60
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-06	IT_PROG	4800	-	103	60

2. employee information must hold EMPLOYEE_ID, FIRST_NAME, LAST_NAME, EMAIL, PHONE_NUMBER, HIRE_DATE
job description fragment must hold EMPLOYEE_ID, JOB, SALARY, DEPARTMENT_ID, DEPARTMENT_NAME, JOB_TITLE

```
CREATE TABLE job_description AS
SELECT E.EMPLOYEE_ID,E.SALARY,J.JOB_ID,J.JOB_TITLE,D.DEPARTMENT_ID,D.DEPARTMENT_NAME
FROM HR.EMPLOYEES E, HR.JOBS J, HR.DEPARTMENTS D
WHERE E.JOB_ID = J.JOB_ID
AND E.DEPARTMENT_ID = D.DEPARTMENT_ID;
```

EMPLOYEE_ID	SALARY	JOB_ID	JOB_TITLE	DEPARTMENT_ID	DEPARTMENT_NAME
200	4400	AD_ASST	Administration Assistant	10	Administration
201	13000	MK_MAN	Marketing Manager	20	Marketing
202	6000	MK_REP	Marketing Representative	20	Marketing
116	2900	PU_CLERK	Purchasing Clerk	30	Purchasing
115	3100	PU_CLERK	Purchasing Clerk	30	Purchasing
117	2800	PU_CLERK	Purchasing Clerk	30	Purchasing
118	2600	PU_CLERK	Purchasing Clerk	30	Purchasing
119	2500	PU_CLERK	Purchasing Clerk	30	Purchasing
114	11000	PU_MAN	Purchasing Manager	30	Purchasing

3. Reconstruct all employees and job information from fragment tables in part 1.

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID	EMPLOYEE_ID	SALARY	JOB_ID	JOB_TITLE	DEPARTMENT_ID	DEPARTMENT_NAME
100	Steven	King	SKING	515.123.4567	17-JUN-03	AD_PRES	24000	-	-	90	100	24000	AD_PRES	President	90	Executive
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-05	AD_VP	17000	-	100	90	101	17000	AD_VP	Administration Vice President	90	Executive
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-01	AD_VP	17000	-	100	90	102	17000	AD_VP	Administration Vice President	90	Executive
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-06	IT_PROG	9000	-	102	60	103	9000	IT_PROG	Programmer	60	IT
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-07	IT_PROG	6000	-	103	60	104	6000	IT_PROG	Programmer	60	IT
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-05	IT_PROG	4800	-	103	60	105	4800	IT_PROG	Programmer	60	IT
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-06	IT_PROG	4800	-	103	60	106	4800	IT_PROG	Programmer	60	IT
107	Diana	Lorentz	DLARENTZ	590.423.5567	07-FEB-07	IT_PROG	4200	-	103	60	107	4200	IT_PROG	Programmer	60	IT

Lab 4: Getting familiarized with DB-LINK.

Syntax to create the DB-link:

```
CREATE DATABASE LINK dbLink
```

```
CONNECT TO remote_user
```

```
IDENTIFIED BY password
```

```
USING 'remote-database':
```

Step 1:

```
SALES =
```

```
( DESCRIPTION=
```

```
ADDRESS =(PROTOCOL = TCP)
```

```
//(HOST = 10.50.100.143)
```

```
(PORT =1521)
```

```
(CONNECT_DATA =
```

```
(SERVER= DEDICATED)
```

```
(SERVICE_NAME = SALES_PRD)
```

```
)
```

```
)
```

Step 2:

```
CREATE DATABASE LINK sales
```

```
CONNECT TO bob IDENTIFIED BY 'password'
```

```
USING 'SALES';
```

Step 3:

Insert data

```
INSERT INTO customer@sales customer_id, name, email)
```

```
VALUES (4, 'ABC', 'contact@outlook.com');
```

Select data:

```
select * from customers@sales;
```

Update the data:

```
Update customer@sales
```

```
set name = 'User User' where customer_id = 17;
```

Delete the data:

```
delete from customer@sales where customer_id = 17;
```