**Ex. No: 5 Date: 25 – 08 - 2022**

**Experiment 5**

**Consider the following schema of a database:**

**books** (id, title, type, author\_id, editor\_id, translator\_id)

**authors** (id, first\_name, last\_name)

**editors** (id, first\_name, last\_name)

**translators** (id, first\_name, last\_name)

**Tables:**

**books**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **id** | **title** | **type** | **author\_id** | **editor\_id** | **translator\_id** |
| 1 | Time to Grow Up! | original | 11 | 21 |  |
| 2 | Your Trip | translated | 15 | 22 | 32 |
| 3 | Lovely Love | original | 14 | 24 |  |
| 4 | Dream Your Life | original | 11 | 24 |  |
| 5 | Oranges | translated | 12 | 25 | 31 |
| 6 | Your Happy Life | translated | 15 | 22 | 33 |
| 7 | Applied AI | translated | 13 | 23 | 34 |
| 8 | My Last Book | original | 11 | 27 |  |

**authors**

|  |  |  |
| --- | --- | --- |
| **id** | **first\_name** | **last\_name** |
| 11 | Ellen | Writer |
| 12 | Olga | Savelieva |
| 13 | Jack | Smart |
| 14 | Donald | Brain |
| 15 | Yao | Dou |

**editors**

|  |  |  |
| --- | --- | --- |
| **id** | **first\_name** | **last\_name** |
| 21 | Daniel | Brown |
| 22 | Mark | Johnson |
| 23 | Maria | Evans |
| 24 | Cathrine | Roberts |
| 25 | Sebastian | Wright |
| 26 | Barbara | Jones |
| 27 | Matthew | Smith |

**translators**

|  |  |  |
| --- | --- | --- |
| **id** | **first\_name** | **last\_name** |
| 31 | Ira | Davies |
| 32 | Ling | Weng |
| 33 | Kristian | Green |
| 34 | Roman | Edwards |

**Write SQL queries to**

* **Using INNER JOIN:**
* Show book titles along with their authors (i.e., the author’s first name and last name).
* Display books along with their translators (i.e., the translator’s last name). Only half of our books have been translated and thus have a corresponding translator.
* **Using LEFT JOIN:**
* Display information about each book’s author and translator (i.e., their last names). We also want to keep the basic information about each book (i.e., id, title, and type).
* Show the basic book information (i.e., ID and title) along with the last names of the corresponding editors. Again, we want to keep all the books in the result set.
* **Using RIGHT JOIN:**
* Let us repeat our previous example, but this time, our task will be to keep all the records from the editor’s table.
* **Using FULL OUTER JOIN:**
* Let us again join the books and editor’s tables, but this time, we will be keeping all records from both tables.
* Join all four tables to get information about all the books, authors, editors, and translators in one table.

**Queries:**

* **Using INNER JOIN:**
* Show book titles along with their authors (i.e., the author’s first name and last name).

SQL> SELECT B.id, B.title, A.first\_name, A.last\_name

FROM books B

INNER JOIN authors A

ON B.author\_id = A.id

ORDER BY B.id;

* Display books along with their translators (i.e., the translator’s last name). Only half of our books have been translated and thus have a corresponding translator.

SQL> SELECT B.id, B.title, T.last\_name AS Translator

FROM books B

INNER JOIN translators T

ON B.translator\_id = T.id

ORDER BY b.id;

* **Using LEFT JOIN:**
* Display information about each book’s author and translator (i.e., their last names). We also want to keep the basic information about each book (i.e., id, title, and type).

SQL> SELECT B.id, B.title, B.type, A.last\_name AS Author,

T.last\_name AS Translator

FROM books B

LEFT JOIN authors A

ON B.author\_id = A.id

LEFT JOIN translators T

ON B.translator\_id = T.id

ORDER BY B.id;

* Show the basic book information (i.e., ID and title) along with the last names of the corresponding editors. Again, we want to keep all the books in the result set.

SQL> SELECT B.id, B.title, E.last\_name AS Editor

FROM books B

LEFT JOIN editors E

ON B.editor\_id = E.id

ORDER BY B.id;

* **Using RIGHT JOIN:**
* Let us repeat our previous example, but this time, our task will be to keep all the records from the editor’s table.

SQL> SELECT B.id, b.title, E.last\_name AS Editor

FROM books B

RIGHT JOIN editors E

ON B.editor\_id = E.id

ORDER BY B.id;

* **Using FULL OUTER JOIN:**
* Let us again join the books and editor’s tables, but this time, we will be keeping all records from both tables.

SQL> SELECT B.id, B.title, E.last\_name AS Editor

FROM books B

FULL JOIN editors E

ON B.editor\_id = E.id

ORDER BY B.id;

* Join all four tables to get information about all the books, authors, editors, and translators in one table.

SQL> SELECT B.id, B.title, A.last\_name AS Author, E.last\_name AS Editor,

T.last\_name AS Translator

FROM books B

FULL JOIN authors A

ON B.author\_id = A.id

FULL JOIN editors E

ON B.editor\_id = E.id

FULL JOIN translators T

ON B.translator\_id = T.id

ORDER BY B.id;

**Code:**

SQL> create table authors(id number(2),

2 first\_name varchar2(20),

3 last\_name varchar2(20),

4 primary key(id));

Table created.

SQL> desc authors;

Name Null? Type

----------------------------------------- -------- ----------------------------

ID NOT NULL NUMBER(2)

FIRST\_NAME VARCHAR2(20)

LAST\_NAME VARCHAR2(20)

SQL> create table editors(id number(2),

2 first\_name varchar2(20),

3 last\_name varchar2(20),

4 primary key(id));

Table created.

SQL> desc editors;

Name Null? Type

----------------------------------------- -------- ----------------------------

ID NOT NULL NUMBER(2)

FIRST\_NAME VARCHAR2(20)

LAST\_NAME VARCHAR2(20)

SQL> create table translators(id number(2),

2 first\_name varchar2(20),

3 last\_name varchar2(20),

4 primary key(id));

Table created.

SQL> desc translators;

Name Null? Type

----------------------------------------- -------- ----------------------------

ID NOT NULL NUMBER(2)

FIRST\_NAME VARCHAR2(20)

LAST\_NAME VARCHAR2(20)

SQL> create table books1(id number(1),

2 title varchar2(40),

3 type varchar2(20),

4 author\_id number(2) references authors(id) on delete set null,

5 editor\_id number(2) references editors(id) on delete set null,

6 translator\_id number(2) references translators(id) on delete set null,

7 primary key(id));

Table created.

SQL> desc books1;

Name Null? Type

----------------------------------------- -------- ----------------------------

ID NOT NULL NUMBER(1)

TITLE VARCHAR2(40)

TYPE VARCHAR2(20)

AUTHOR\_ID NUMBER(2)

EDITOR\_ID NUMBER(2)

TRANSLATOR\_ID NUMBER(2)

SQL> insert into authors values(11,'Ellen','Writer');

1 row created.

SQL> insert into authors values(12,'Olga','Savelieva');

1 row created.

SQL> insert into authors values(13,'Jack','Smart');

1 row created.

SQL> insert into authors values(14,'Donald','Brain');

1 row created.

SQL> insert into authors values(15,'Yao','Dou');

1 row created.

SQL> insert into editors values(21,'Daniel','Brown');

1 row created.

SQL> insert into editors values(22,'Mark','Johnson');

1 row created.

SQL> insert into editors values(23,'Maria','Evans');

1 row created.

SQL> insert into editors values(24,'Cathrine','Roberts');

1 row created.

SQL> insert into editors values(25,'Sebastine','Wright');

1 row created.

SQL> insert into editors values(26,'Barbara','Jones');

1 row created.

SQL> insert into editors values(27,'Matthew','Smith');

1 row created.

SQL> insert into translators values(31,'Ira','Davies');

1 row created.

SQL> insert into translators values(32,'Ling','Weng');

1 row created.

SQL> insert into translators values(33,'Kristian','Green');

1 row created.

SQL> insert into translators values(34,'Roman','Edwards');

1 row created.

SQL> insert into books1 values(1,'Time to Grow up!','original',11,21,NULL);

1 row created.

SQL> insert into books1 values(2,'Your Trip','translated',15,22,32);

1 row created.

SQL> insert into books1 values(3,'Lovely Love','original',14,24,NULL);

1 row created.

SQL> insert into books1 values(4,'Dream Your Life','original',11,24,NULL);

1 row created.

SQL> insert into books1 values(5,'Oranges','translated',12,25,31);

1 row created.

SQL> insert into books1 values(6,'Your Happy Life','translated',15,22,33);

1 row created.

SQL> insert into books1 values(7,'Applied AI','translated',13,23,34);

1 row created.

SQL> insert into books1 values(8,'My Last Book','original',11,27,NULL);

1 row created.

SQL> select \* from books1;

ID TITLE TYPE

---------- ---------------------------------------- --------------------

AUTHOR\_ID EDITOR\_ID TRANSLATOR\_ID

---------- ---------- -------------

1 Time to Grow up! original

11 21

2 Your Trip translated

15 22 32

3 Lovely Love original

14 24

ID TITLE TYPE

---------- ---------------------------------------- --------------------

AUTHOR\_ID EDITOR\_ID TRANSLATOR\_ID

---------- ---------- -------------

4 Dream Your Life original

11 24

5 Oranges translated

12 25 31

6 Your Happy Life translated

15 22 33

ID TITLE TYPE

---------- ---------------------------------------- --------------------

AUTHOR\_ID EDITOR\_ID TRANSLATOR\_ID

---------- ---------- -------------

7 Applied AI translated

13 23 34

8 My Last Book original

11 27

8 rows selected.

SQL> set linesize 1500;

SQL> select \* from books1;

ID TITLE TYPE AUTHOR\_ID EDITOR\_ID TRANSLATOR\_ID

---------- ---------------------------------------- -------------------- ---------- ---------- -------------

1 Time to Grow up! original 11 21

2 Your Trip translated 15 22 32

3 Lovely Love original 14 24

4 Dream Your Life original 11 24

5 Oranges translated 12 25 31

6 Your Happy Life translated 15 22 33

7 Applied AI translated 13 23 34

8 My Last Book original 11 27

8 rows selected.

SQL> select \* from authors;

ID FIRST\_NAME LAST\_NAME

---------- -------------------- --------------------

11 Ellen Writer

12 Olga Savelieva

13 Jack Smart

14 Donald Brain

15 Yao Dou

SQL> select \* from editors;

ID FIRST\_NAME LAST\_NAME

---------- -------------------- --------------------

21 Daniel Brown

22 Mark Johnson

23 Maria Evans

24 Cathrine Roberts

25 Sebastine Wright

26 Barbara Jones

27 Matthew Smith

7 rows selected.

SQL> select \* from translators;

ID FIRST\_NAME LAST\_NAME

---------- -------------------- --------------------

31 Ira Davies

32 Ling Weng

33 Kristian Green

34 Roman Edwards

SQL> select B.id, B.title, A.first\_name, A.last\_name

2 from books1 B

3 inner join authors A

4 on B.author\_id = A.id

5 order by B.id;

ID TITLE FIRST\_NAME LAST\_NAME

---------- ---------------------------------------- -------------------- --------------------

1 Time to Grow up! Ellen Writer

2 Your Trip Yao Dou

3 Lovely Love Donald Brain

4 Dream Your Life Ellen Writer

5 Oranges Olga Savelieva

6 Your Happy Life Yao Dou

7 Applied AI Jack Smart

8 My Last Book Ellen Writer

8 rows selected.

SQL> select B.id, B.title, T.last\_name AS Translator

2 from books1 B

3 inner join translators T

4 on B.translator\_id = T.id

5 order by b.id;

ID TITLE TRANSLATOR

---------- ---------------------------------------- --------------------

2 Your Trip Weng

5 Oranges Davies

6 Your Happy Life Green

7 Applied AI Edwards

SQL> select B.id, B.title, B.type, A.last\_name AS Author,

2 T.last\_name AS Translator

3 from books1 B

4 left join authors A

5 on B.author\_id = A.id

6 left join translators T

7 on B.translator\_id = T.id

8 order by B.id;

ID TITLE TYPE AUTHOR TRANSLATOR

---------- ---------------------------------------- -------------------- -------------------- --------------------

1 Time to Grow up! original Writer

2 Your Trip translated Dou Weng

3 Lovely Love original Brain

4 Dream Your Life original Writer

5 Oranges translated Savelieva Davies

6 Your Happy Life translated Dou Green

7 Applied AI translated Smart Edwards

8 My Last Book original Writer

8 rows selected.

SQL> select B.id, B.title, E.last\_name AS Editor

2 from books1 B

3 left join editors E

4 on B.editor\_id = E.id

5 order by B.id;

ID TITLE EDITOR

---------- ---------------------------------------- --------------------

1 Time to Grow up! Brown

2 Your Trip Johnson

3 Lovely Love Roberts

4 Dream Your Life Roberts

5 Oranges Wright

6 Your Happy Life Johnson

7 Applied AI Evans

8 My Last Book Smith

8 rows selected.

SQL> select B.id, b.title, E.last\_name AS Editor

2 from books1 B

3 right join editors E

4 on B.editor\_id = E.id

5 order by B.id;

ID TITLE EDITOR

---------- ---------------------------------------- --------------------

1 Time to Grow up! Brown

2 Your Trip Johnson

3 Lovely Love Roberts

4 Dream Your Life Roberts

5 Oranges Wright

6 Your Happy Life Johnson

7 Applied AI Evans

8 My Last Book Smith

Jones

9 rows selected.

SQL> select B.id, B.title, E.last\_name AS Editor

2 from books1 B

3 full join editors E

4 on B.editor\_id = E.id

5 order by B.id;

ID TITLE EDITOR

---------- ---------------------------------------- --------------------

1 Time to Grow up! Brown

2 Your Trip Johnson

3 Lovely Love Roberts

4 Dream Your Life Roberts

5 Oranges Wright

6 Your Happy Life Johnson

7 Applied AI Evans

8 My Last Book Smith

Jones

9 rows selected.

SQL> select B.id, B.title, A.last\_name AS Author, E.last\_name AS Editor,

2 T.last\_name AS Translator

3 from books1 B

4 full join authors A

5 on B.author\_id = A.id

6 full join editors E

7 on B.editor\_id = E.id

8 full join translators T

9 on B.translator\_id = T.id

10 order by B.id;

ID TITLE AUTHOR EDITOR TRANSLATOR

---------- ---------------------------------------- -------------------- -------------------- --------------------

1 Time to Grow up! Writer Brown

2 Your Trip Dou Johnson Weng

3 Lovely Love Brain Roberts

4 Dream Your Life Writer Roberts

5 Oranges Savelieva Wright Davies

6 Your Happy Life Dou Johnson Green

7 Applied AI Smart Evans Edwards

8 My Last Book Writer Smith

Jones

9 rows selected.