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TP03_DML

```sql
-- 1
SELECT *
FROM books AS B JOIN describes as D
on B.DocID = D.DocID;

-- 2
SELECT distinct StName
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

DocId	Title	Publisher	Year	DocId	keyword
1	book1	NULL	NULL	1	database
1	book1	NULL	NULL	1	programming
2	Kid book	McGraw-Hill	1990	2	programming
2	Kid book	McGraw-Hill	1990	2	web
3	Book2	Allen & Unwin	1990	3	database
3	Book2	Allen & Unwin	1990	3	security
4	Book3	Scholastic	1995	4	database
5	Book4	McGraw-Hill	2000	5	prorgamming
5	Book4	McGraw-Hill	2000	5	web
6	Book5	Allen & Unwin	2010	6	network
6	Book5	Allen & Unwin	2010	6	security
7	Book6	Scholastic	2020	7	network
8	Book7	McGraw-Hill	1975	8	network
8	Book7	McGraw-Hill	1975	8	security
9	Book8	Allen & Unwin	1985	9	mobile
9	Book8	Allen & Unwin	1985	9	web
11	Book1	McGraw-Hill	1980	11	application
11	Book1	McGraw-Hill	1980	11	business int...
11	Book1	McGraw-Hill	1980	11	database

```sql
-- 2
SELECT distinct StName
FROM Students AS S INNER JOIN borrows as B
ON S.StID = B.StID;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

StName
Smith
Tom
Jerry
Dara
Paul

```sql
-- 3
SELECT title
FROM books AS B JOIN has_written as H
ON B.DocID = H.DocID
WHERE AName = "Author2";
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

title
Kid book
Book3
Book7
Kid book
Book3
Book7

```sql
-- 4
SELECT distinct BK.DocID, Title, AName
FROM Books as BK JOIN Borrows as B ON BK.DocID = B.DocID
JOIN has_written as H ON B.DocId = H.DocID;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

DocID	Title	AName
1	book1	Author1
1	book1	Author5
2	Kid book	Author2
2	Kid book	Author3
2	Kid book	Author6
6	Book5	Author1
6	Book5	Author6
7	Book6	Author1
3	Book2	Author3
8	Book7	Author2
4	Book3	Author2
4	Book3	Author4
5	Book4	Author5
5	Book4	Author6

```sql
-- 5. Retrieve the names of students who have borrowed books authored by “Author2”.
SELECT distinct StName
FROM Students As S JOIN borrows As B on
S.StID = B.StID
JOIN has_written As H On H.DocID = B.DocID
WHERE AName = "Author2";
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

StName
Smith
Tom
Dara
Jerry

```sql
-- 6. List the authors of the books the student Smith has borrowed
SELECT *
FROM has_written As H JOIN borrows as B
ON H.DocID = B.DocID
JOIN Students AS S on S.StID = B.StID
WHERE StName = "Smith";
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

DocId	AName	DocId	StId	Date	StId	StName	Major	Age
1	Author1	1	1	2024-04-27	1	Smith	Computer Science	30
1	Author1	1	1	2024-04-27	1	Smith	Computer Science	30
1	Author5	1	1	2024-04-27	1	Smith	Computer Science	30
1	Author1	1	1	2024-04-27	1	Smith	Computer Science	30
1	Author5	1	1	2024-04-27	1	Smith	Computer Science	30
2	Author2	2	1	2024-04-26	1	Smith	Computer Science	30
2	Author3	2	1	2024-04-26	1	Smith	Computer Science	30
2	Author6	2	1	2024-04-26	1	Smith	Computer Science	30
2	Author2	2	1	2024-04-26	1	Smith	Computer Science	30
2	Author3	2	1	2024-04-26	1	Smith	Computer Science	30
2	Author6	2	1	2024-04-26	1	Smith	Computer Science	30
2	Author2	2	1	2024-05-26	1	Smith	Computer Science	30
2	Author3	2	1	2024-05-26	1	Smith	Computer Science	30
2	Author6	2	1	2024-05-26	1	Smith	Computer Science	30
2	Author2	2	1	2024-05-26	1	Smith	Computer Science	30
2	Author3	2	1	2024-05-26	1	Smith	Computer Science	30
2	Author6	2	1	2024-05-26	1	Smith	Computer Science	30
6	Author1	6	1	2024-04-22	1	Smith	Computer Science	30
6	Author1	6	1	2024-04-22	1	Smith	Computer Science	30
6	Author6	6	1	2024-04-22	1	Smith	Computer Science	30
6	Author1	6	1	2024-04-22	1	Smith	Computer Science	30
6	Author6	6	1	2024-04-22	1	Smith	Computer Science	30

```sql
-- 7. Find the authors who have written books with the keyword “database”?
SELECT distinct AName
FROM has_written as H JOIN describes AS D
ON H.DocID = D.DocID
WHERE keyword = "database";
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

AName
Author1
Author5
Author3
Author2
Author4

```sql
-- 8. Identify the books borrowed by students majoring in “Computer Science”
SELECT distinct BK.*
FROM Books As BK  JOIN borrows as B
ON BK.DocID = B.DocID
JOIN students as S on S.StID = b.StID
WHERE Major = "Computer Science";
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

DocId	Title	Publisher	Year
1	book1	NULL	NULL
2	Kid book	McGraw-Hill	1990
6	Book5	Allen & Unwin	2010
3	Book2	Allen & Unwin	1990
4	Book3	Scholastic	1995

```sql
-- 9. Retrieve the titles of books that have not been borrowed by any student.
SELECT title
FROM Books as BK
WHERE DocID NOT in(SELECT DocID FROM borrows);
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

title
Book8
Book1
Book2
Book3
Book4
Book5
Book6
Book7
Book8
Book9
Book1

```sql
-- 10. Retrieve the titles of books that have not been borrowed by any student and were published before 2000.
SELECT *
FROM Books
where year < 2000 AND DocID Not IN (SELECT DocID From borrows);

-- 11. Retrieve the student names with age over than 30 who have not borrowed a book with keyword “programming”.
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

DocId	Title	Publisher	Year
9	Book8	Allen & Unwin	1985
11	Book1	McGraw-Hill	1980
12	Book2	Allen &Unwin	1990
13	Book3	Scholastic	1995
17	Book7	McGraw-Hill	1975
18	Book8	Allen &Unwin	1985
NULL	NULL	NULL	NULL

```sql
-- 11. Retrieve the student names with age over than 30 who have not borrowed a book with keyword “programming”.
SELECT *
FROM (SELECT * from students as S WHERE age > 30) AS S
JOIN borrows as B on S.StID = B.StID
JOIN describes as D on B.DocId = B.DocID
WHERE keyword = "programming";
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

StId	StName	Major	Age	DocId	StId	Date	DocId	keyword
3	Jerry	Mathematics	31	8	3	2024-04-20	1	programming
3	Jerry	Mathematics	31	3	3	2024-04-28	1	programming
3	Jerry	Mathematics	31	3	3	2024-04-25	1	programming
2	Tom	English Literature	32	7	2	2024-04-21	1	programming
2	Tom	English Literature	32	2	2	2024-04-27	1	programming
2	Tom	English Literature	32	2	2	2024-04-26	1	programming
3	Jerry	Mathematics	31	8	3	2024-04-20	2	programming
3	Jerry	Mathematics	31	3	3	2024-04-28	2	programming
3	Jerry	Mathematics	31	3	3	2024-04-25	2	programming
2	Tom	English Literature	32	7	2	2024-04-21	2	programming
2	Tom	English Literature	32	2	2	2024-04-27	2	programming
2	Tom	English Literature	32	2	2	2024-04-26	2	programming

```sql
-- 12. Which books have keywords “database”?
SELECT *
FROM Books as Bk JOIN describes as D On Bk.DocID = D.DocId
WHERE keyword = "database";

-- 13. Which books have keywords “database” or “programming”?
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

DocId	Title	Publisher	Year	DocId	keyword
1	book1	NULL	NULL	1	database
3	Book2	Allen & Unwin	1990	3	database
4	Book3	Scholastic	1995	4	database
11	Book1	McGraw-Hill	1980	11	database

```
72      -- 13. Which books have keywords “database” or “programming”?
73      SELECT *
74      FROM Books as BK JOIN describes as D ON BK.DocId = D.DocId
75      WHERE keyword = "database" or keyword = "programming"
76      UNION
77      SELECT *
78      FROM Books as BK JOIN describes as D ON BK.DocId = D.DocId
79      WHERE keyword = "database"
80      UNION
81      SELECT *
82      FROM Books as BK JOIN describes as D ON BK.DocId = D.DocId
83      WHERE keyword = "programming";
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

DocId	Title	Publisher	Year	DocId	keyword
1	book1	NULL	NULL	1	database
1	book1	NULL	NULL	1	programming
2	Kid book	McGraw-Hill	1990	2	programming
3	Book2	Allen & Unwin	1990	3	database
4	Book3	Scholastic	1995	4	database
11	Book1	McGraw-Hill	1980	11	database

```
85      -- 14. Which books have keywords “database” and “programming”?
86      SELECT BK.*
87      FROM Books as BK JOIN describes as D ON BK.DocId = D.DocId
88      WHERE keyword = "programming"
89      INTERSECT
90      SELECT BK.*
91      FROM Books as BK JOIN describes as D ON BK.DocId = D.DocId
92      WHERE keyword = "database";
93
94      -- 15. Find students who have borrowed a book with a keyword “database” or a keyword “programming”.
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

DocId	Title	Publisher	Year
1	book1	NULL	NULL

```sql
-- 15. Find students who have borrowed a book with a keyword “database” or a keyword “programming”.
SELECT *
FROM students as S JOIN borrows as B on S.StId = B.StId
WHERE B.DocId IN(
    SELECT Bk.DocId
    FROM books as Bk JOIN describes as D on Bk.DocId = D.DocId
    WHERE D.keyword = "database"
    UNION
    SELECT Bk.DocId
    FROM books as Bk JOIN describes as D on Bk.DocId = D.DocId
    WHERE D.keyword = "progamming"
    UNION
    SELECT Bk.DocId
    FROM books as Bk JOIN describes as D on Bk.DocId = D.DocId
    WHERE D.keyword = "database" or D.keyword = "progamming"
);
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

StId	StName	Major	Age	DocId	StId	Date
1	Smith	Computer Science	30	1	1	2024-04-27
3	Jerry	Mathematics	31	3	3	2024-04-25
3	Jerry	Mathematics	31	3	3	2024-04-28
4	Dara	Computer Science	20	1	4	2024-04-29
4	Dara	Computer Science	20	3	4	2024-04-29
4	Dara	Computer Science	20	4	4	2024-04-24
4	Dara	Computer Science	20	4	4	2024-05-07
5	Paul	French Literature	22	1	5	2024-04-25
104	Jerry	Computer Science	NULL	4	104	2024-05-07

```sql
-- 16. Find students who have borrowed a book with a keyword “database” AND a keyword “programming”.
select *
from students as S join borrows as B on S.StId = B.StId
Where B.DocId in (
    select Bk.DocId
    from books as Bk join describes as D on Bk.DocId = D.DocId
    where D.keyword = "database"
    intersect
    select Bk.DocId
    from books as Bk join describes as D on Bk.DocId = D.DocId
    where D.keyword = "programming"
);
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

StId	StName	Major	Age	DocId	StId	Date
1	Smith	Computer Science	30	1	1	2024-04-27
4	Dara	Computer Science	20	1	4	2024-04-29
5	Paul	French Literature	22	1	5	2024-04-25

```
124     -- 17. Retrieve the title of books written by authors who have written books with keyword “web”
125 •   select *
126     from books as Bk JOIN has_written as H ON Bk.DocId = H.DocId
127     where AName in
128     (
129         select AName from describes as D join has_written as H
130         on D.DocId = H.DocId where keyword = "web"
131     );
132
133 •   select distinct AName
134     from has_written as H
135     where DocId in(2, 5, 9);
136 •   select DocId
137     from has_written as H
138     where AName in("Author2". "Author3". "Author4". "Author5". "Author6");
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

DocId	Title	Publisher	Year	DocId	AName
2	Kid book	McGraw-Hill	1990	2	Author2
4	Book3	Scholastic	1995	4	Author2
8	Book7	McGraw-Hill	1975	8	Author2
2	Kid book	McGraw-Hill	1990	2	Author2
4	Book3	Scholastic	1995	4	Author2
8	Book7	McGraw-Hill	1975	8	Author2
2	Kid book	McGraw-Hill	1990	2	Author3
3	Book2	Allen & Unwin	1990	3	Author3
9	Book8	Allen & Unwin	1985	9	Author3
2	Kid book	McGraw-Hill	1990	2	Author3
3	Book2	Allen & Unwin	1990	3	Author3
9	Book8	Allen & Unwin	1985	9	Author3
2	Kid book	McGraw-Hill	1990	2	Author6
5	Book4	McGraw-Hill	2000	5	Author6
6	Book5	Allen & Unwin	2010	6	Author6
2	Kid book	McGraw-Hill	1990	2	Author6

6	Book5	Allen & Unwin	2010	6	Author6
2	Kid book	McGraw-Hill	1990	2	Author6
5	Book4	McGraw-Hill	2000	5	Author6
6	Book5	Allen & Unwin	2010	6	Author6
1	book1	NULL	NULL	1	Author5
5	Book4	McGraw-Hill	2000	5	Author5
1	book1	NULL	NULL	1	Author5
5	Book4	McGraw-Hill	2000	5	Author5
4	Book3	Scholastic	1995	4	Author4
9	Book8	Allen & Unwin	1985	9	Author4
4	Book3	Scholastic	1995	4	Author4
9	Book8	Allen & Unwin	1985	9	Author4

```
140     -- 18. List the names of students majoring in “Computer Science” who have borrowed books published after 2000.
141 •   select*
142     from(select * from students as S where major = "Computer Science") as S
143     join borrows as B on S.StId = B.StId
144     join books as Bk on B.DocId = Bk.DocId
145     where year > 2000;
146
147 •   select DocId
148     from borrows
149     where StId in(1, 4, 7);
150
151     -- 19. List authors who have written books with keywords “security” or “network”
152 •   select distinct AName
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

StId	StName	Major	Age	DocId	StId	Date	DocId	Title	Publisher	Year
1	Smith	Computer Science	30	6	1	2024-04-22	6	Book5	Allen & Unwin	2010

```
150
151     -- 19. List authors who have written books with keywords “security” or “network”
152 •   select distinct AName
153     from has_written as H join describes as D
154     on H.DocId = D.DocId
155     where keyword = "Security" or "Network";
156
157     -- 20. Retrieve the titles of books that have been borrowed by more than one student
158 •   select*
159     from books as Bk join borrows as B1 on Bk.DocId = B1.DocId
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

AName
Author3
Author1
Author6
Author2

```sql
-- 20. Retrieve the titles of books that have been borrowed by more than one student
select*
from books as Bk join borrows as B1 on Bk.DocId = B1.DocId
where exists
(select *
from borrows as B2
where B1.DocId = B2.DocId and B1.StId = B2.StId);
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

DocId	Title	Publisher	Year	DocId	StId	Date
1	book1	NULL	NULL	1	5	2024-04-25
1	book1	NULL	NULL	1	4	2024-04-29
1	book1	NULL	NULL	1	1	2024-04-27
2	Kid book	McGraw-Hill	1990	2	2	2024-04-27
2	Kid book	McGraw-Hill	1990	2	2	2024-04-26
2	Kid book	McGraw-Hill	1990	2	1	2024-05-26
2	Kid book	McGraw-Hill	1990	2	1	2024-04-26
3	Book2	Allen & Unwin	1990	3	4	2024-04-29
3	Book2	Allen & Unwin	1990	3	3	2024-04-28
3	Book2	Allen & Unwin	1990	3	3	2024-04-25
4	Book3	Scholastic	1995	4	104	2024-05-07
4	Book3	Scholastic	1995	4	4	2024-05-07
4	Book3	Scholastic	1995	4	4	2024-04-24
5	Book4	McGraw-Hill	2000	5	5	2024-04-23
6	Book5	Allen & Unwin	2010	6	1	2024-04-22
7	Book6	Scholastic	2020	7	2	2024-04-21
8	Book7	McGraw-Hill	1975	8	3	2024-04-20