set operations with SQL

Authors table

id	last_name	first_name	DoB	Income	Genre
1	Lopez Baranda	Christina	15/11/2000	55000	Fantasy
2	Jin-Soon	Sin	29/03/1983	65000	Crime
3	Jones	Hannah	01/02/1973	129000	Fantasy
4	Novak	Stanislaw	12/12/1992	91000	Crime
5	Turay	Tandice	09/07/1980	99000	Romance
6	Roy	Shanta	11/10/1977	55000	Fantasy
7	Berger	Henry	15/08/1956	63000	Romance
8	Khatami	Paree	11/10/1966	86000	Sci-Fi

Intersect

- Intersection between two sets
- Never used in practice
- Can be replaced with a more complex WHERE condition

```
SELECT last_name, first_name
FROM Authors
WHERE Income > 90000
INTERSECT
SELECT last_name, first_name
FROM Authors
WHERE last_name LIKE '%o%'
```

Result

id	last_name	first_name	DoB	Income	Genre
3	Jones	Hannah	01/02/1973	129000	Fantasy
4	Novak	Stanislaw	12/12/1992	91000	Crime

Remove Intersect

```
SELECT last_name, first_name
FROM Authors
WHERE Income > 90000 AND last_name LIKE '%o%'
```

Union

- Union between two sets
- Rarely used in practice
- Can be replaced with a more complex WHERE condition, *if no duplicates*

```
SELECT last_name, first_name
FROM Authors
WHERE Income > 90000
UNION
SELECT last_name, first_name
FROM Authors
WHERE last_name LIKE '%o%'
```

Result

id	last_name	first_name	DoB	Income	Genre
1	Lopez Baranda	Christina	15/11/2000	55000	Fantasy
2	Jin-Soon	Sin	29/03/1983	65000	Crime
3	Jones	Hannah	01/02/1973	129000	Fantasy
4	Novak	Stanislaw	12/12/1992	91000	Crime
5	Turay	Tandice	09/07/1980	99000	Romance
6	Roy	Shanta	11/10/1977	55000	Fantasy

Remove Union

```
SELECT last_name, first_name
FROM Authors
WHERE Income > 90000 OR last_name LIKE '%o%'
```

Union with duplicates

```
SELECT last_name, first_name
FROM Authors
WHERE Income > 90000
UNION ALL
SELECT last_name, first_name
FROM Authors
WHERE last_name LIKE '%o%'
```

Except

- Difference between two sets
- Useful in practice
- Can be replaced with a much more complex nested query

```
SELECT last_name, first_name
FROM Authors
WHERE Income > 90000
EXCEPT
SELECT last_name, first_name
FROM Authors
WHERE last_name LIKE '%o%'
```

Result

id	last_name	first_name	DoB	Income	Genre
5	Turay	Tandice	09/07/1980	99000	Romance

BooksAuthors table

book_id	author_id
3	6
2	4
2	5
1	1
1	3
1	5
4	8

Table alias

- Giving an alias to a table is like creating a copy
- Example: find the coauthors of the author with id 5

```
SELECT T1.author_id
FROM BooksAuthors T1, BooksAuthors T2
WHERE T1.book_id = T2.book_id AND
      T2.author_id = 5
```

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