**Relational algebra calculator -> RelaX**

https://dbis-uibk.github.io/relax/landing

(see Relax\_Likes.txt)

1. List the fruits that Winnie Likes.

SELECT fruits FROM Likes WHERE name = 'Winnie';

π fruits σ name = 'Winnie' (Likes)

2. List the fruits that Winnie doesn't like but someone else does.

SELECT fruits FROM Likes

MINUS

SELECT fruits FROM Likes WHERE name = 'Winnie';

π fruits (Likes) - π fruits σ name = 'Winnie' (Likes)

3. Who Likes apple?

SELECT name FROM Likes WHERE fruits = 'apple';

π name σ fruits = 'apple' (Likes)

4. List those names who doesn't like pear but like something else.

SELECT name FROM Likes

MINUS

SELECT name FROM Likes WHERE fruits = 'pear';

π name (Likes) - π name σ fruits = 'pear' (Likes)

5. Who Likes raspberry or pear?

SELECT name FROM Likes WHERE fruits = 'raspberry'

UNION

SELECT name FROM Likes WHERE fruits = 'pear';

π name σ fruits = 'raspberry' (Likes) ∪ π name σ fruits = 'pear' (Likes)

6. Who Likes both apple and pear?

SELECT name FROM Likes WHERE fruits = 'apple'

INTERSECT

SELECT name FROM Likes WHERE fruits = 'pear';

π name σ fruits = 'apple' (Likes) ∩ π name σ fruits = 'pear' (Likes)

7. Who Likes apple but doesn't like pear?

SELECT name FROM Likes WHERE fruits = 'apple'

MINUS

SELECT name FROM Likes WHERE fruits = 'pear';

π name σ fruits = 'apple' (Likes) - π name σ fruits = 'pear' (Likes)

8. List the names who like at least two different fruits.

-- Cartesian product

SELECT DISTINCT l1.name FROM Likes l1, Likes l2

WHERE l1.name=l2.name AND l1.fruits <> l2.fruits;

π l1.name σ l1.name = l2.name and l1.fruits <> l2.fruits ( ρ l1 (Likes) ⨯ ρ l2 (Likes) )

9. List the names who like at least three different fruits.

-- one more Cartesian product

SELECT DISTINCT l1.name FROM Likes l1, Likes l2, Likes l3

WHERE l1.name=l2.name AND l2.name=l3.name AND l1.fruits <> l2.fruits

AND l2.fruits <> l3.fruits AND l1.fruits <> l3.fruits;

π l1.name σ l1.name = l2.name and l2.name = l3.name and l1.fruits <> l2.fruits

and l2.fruits <> l3.fruits and l1.fruits <> l3.fruits ( ( ρ l1 (Likes) ⨯ ρ l2 (Likes) ) ⨯ ρ l3 (Likes) )

10. List the names who like at most two different fruits.

SELECT name FROM Likes

MINUS

SELECT DISTINCT l1.name FROM Likes l1, Likes l2, Likes l3

WHERE l1.name=l2.name AND l2.name=l3.name AND l1.fruits <> l2.fruits

AND l2.fruits <> l3.fruits AND l1.fruits <> l3.fruits;

π name (Likes) -

π l1.name σ l1.name = l2.name and l2.name = l3.name and l1.fruits <> l2.fruits

and l2.fruits <> l3.fruits and l1.fruits <> l3.fruits ( ( ρ l1 (Likes) ⨯ ρ l2 (Likes) ) ⨯ ρ l3 (Likes) )

11. List the names who like exactly two different fruits.

SELECT DISTINCT l1.name FROM Likes l1, Likes l2

WHERE l1.name=l2.name AND l1.fruits <> l2.fruits

MINUS

SELECT DISTINCT l1.name FROM Likes l1, Likes l2, Likes l3

WHERE l1.name=l2.name AND l2.name=l3.name AND l1.fruits <> l2.fruits

AND l2.fruits <> l3.fruits AND l1.fruits <> l3.fruits;

π l1.name σ l1.name = l2.name and l1.fruits <> l2.fruits ( ρ l1 (Likes) ⨯ ρ l2 (Likes) )

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π l1.name σ l1.name = l2.name and l2.name = l3.name and l1.fruits <> l2.fruits

and l2.fruits <> l3.fruits and l1.fruits <> l3.fruits ( ( ρ l1 (Likes) ⨯ ρ l2 (Likes) ) ⨯ ρ l3 (Likes) )