

NAME	FRUITS
Piglet	apple
Winnie	apple
Piglet	pear
Winnie	pear
Kanga	pear
Tigger	pear
Winnie	raspberry
Piglet	raspberry
Kanga	raspberry
Tigger	raspberry
Rabbit	strawberry
Piglet	strawberry



Exercises for the first and second practice.

Determine the relational algebraic expression which answers the following questions:

- Which fruits does Winnie like?

$$R1 = \pi_{FRUITS}(\sigma_{NAME='Winnie'}(Likes))$$

- Which fruits **doesn't** Winnie like but someone else do?

$$R2 = \pi_{FRUITS}(Likes) - \pi_{FRUITS}(\sigma_{NAME='Winnie'}(Likes))$$

- Who likes apple?

$$R3 = \pi_{NAME}(\sigma_{FRUITS='Apple'}(Likes))$$

- Who **doesn't** like apple but like something else?

$$R4 = \pi_{NAME}(Likes) - \pi_{NAME}(\sigma_{FRUITS='Apple'}(Likes))$$

- Who likes apple **or** pear?

$$R5 = \pi_{NAME}(\sigma_{FRUITS='Apple'}(Likes)) \cup \pi_{NAME}(\sigma_{FRUITS='Pear'}(Likes))$$

- Who likes both apple **and** pear?

$$R6 = \pi_{NAME}(\sigma_{FRUITS='Apple'}(Likes)) \cap \pi_{NAME}(\sigma_{FRUITS='Pear'}(Likes))$$

- Who likes apple **but doesn't** like pear?

$$R7 = \pi_{NAME}(\sigma_{FRUITS='Apple'}(Likes)) - \pi_{NAME}(\sigma_{FRUITS='Pear'}(Likes))$$

(Cont.) Exercises for the first and second practice.

8. Who likes **at least** two different fruits?

$$R8 = \pi_{NAME}(\sigma_{NAME=NAME1 \text{ AND } FRUITS \neq FRUITS1}(L \times L1))$$

9. Who likes **at least** three different fruits?

$$R9 = \pi_{NAME} \left(\sigma_{NAME=NAME1 \text{ AND } NAME=NAME1 \text{ AND } FRUITS \neq FRUITS1 \text{ AND } FRUITS \neq FRUITS2 \text{ AND } FRUITS1 \neq FRUITS2}((L \times L1) \times L2) \right)$$

10. Who likes **at most** two different fruits?

$$R10 = \pi_{NAME}(L) - R9$$

11. Who likes **exactly** two different fruits?

$$R11 = R8 - R9$$

12. Who likes **every** fruits?

$$R12 = \pi_{NAME}(L) - \pi_{NAME} \left((\pi_{NAME}(L) \times \pi_{FRUITS}(L)) - L \right)$$

13. Who likes **at least** those fruits that Winnie likes?

$$R13 = \pi_{NAME}(L) - \pi_{NAME} \left((\pi_{NAME}(L) \times \pi_{FRUITS}(\sigma_{NAME='Winnie'}(L))) - L \right)$$

14. Who likes **at most** those fruits that Winnie likes?

$$R14 = \pi_{NAME}(L) - \pi_{NAME} \left(L - (\pi_{NAME}(L) \times \pi_{FRUITS}(\sigma_{NAME='Winnie'}(L))) \right)$$

15. Who likes **exactly** those fruits that Winnie likes?

$$R15 = R13 \cap R14$$