Computational Logic
L3.x.26 Exercises

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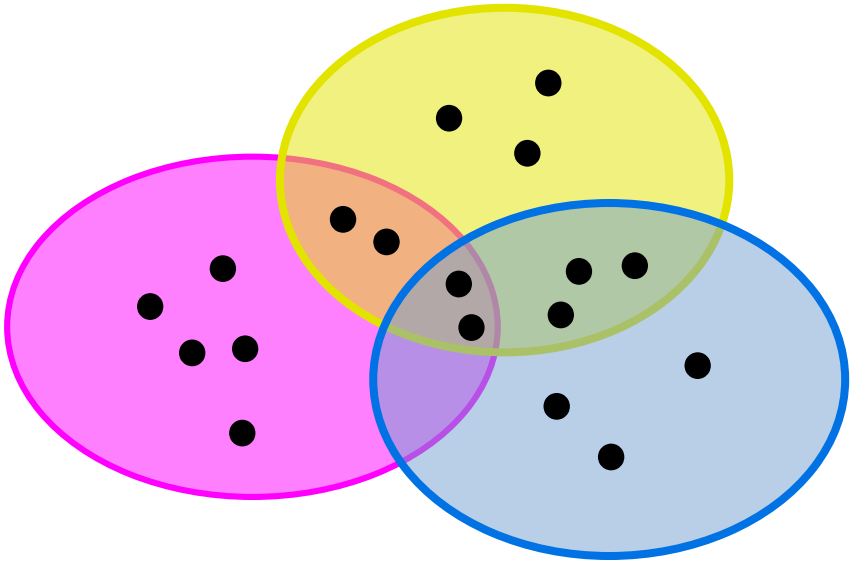
Recap on Set Theory

- Definition via enumeration, Venn diagrams, description
- Union, Intersection, Complement, Difference Complement (if Universe is defined)

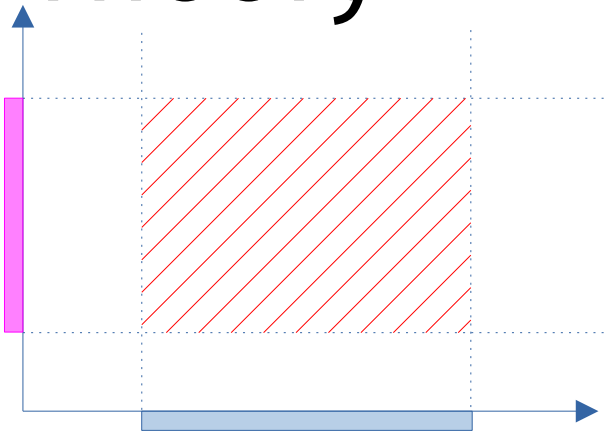


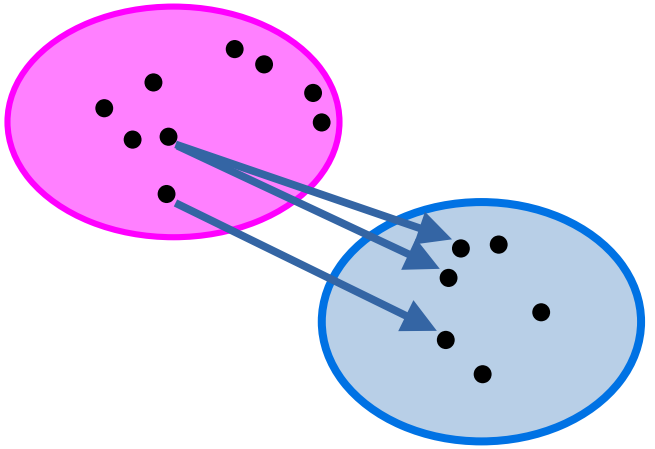
Recap on Set Theory

- Cartesian product:

  $A \times B = \{(a, b) : a \in A \text{ and } b \in B\}$

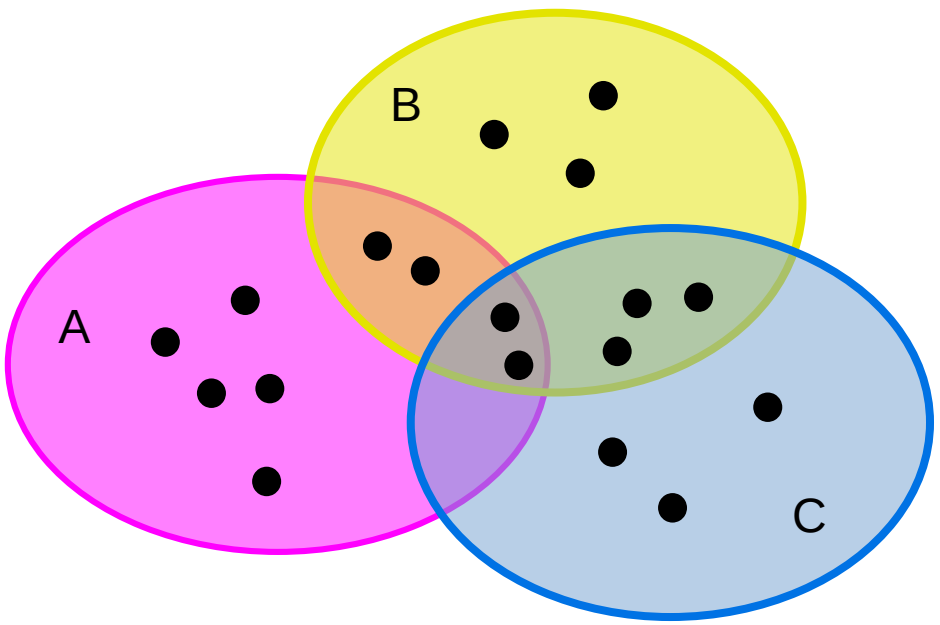
- Relation: a subset of the Cartesian product

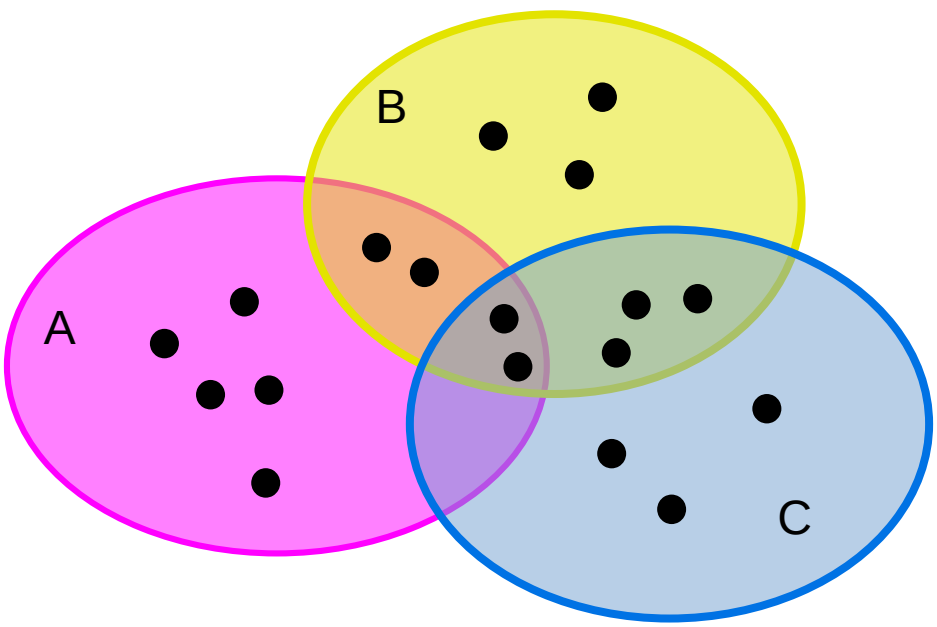




Warm-up Exercise: Distributivity

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$





Exercise at Home

- Using Venn diagrams:
  - Prove the “other” distributivity law
  - Prove the De Morgan’s laws

Sets of sets: a simple exercise :-)

- Let R be the sets of all sets who are not members of themselves
- Does R contain itself?

Infinite Sets: the Hilbert Hotel

https://www.youtube.com/watch?v=Uj3_KqkI9Zo

Exercise at Home

- Represent the “next move” relationship in Tic-Tac-Toe
- Start from the set of board positions

- What properties does it have? Why (or why not)?
  - Reflexive?
  - Symmetric?
  - Transitive?
  - Anti-symmetric?
  - Surjective?
  - Injective?
  - Can you find a partial order?
  - Can you find a partition?

Good luck!
Questions:
https://github.com/avillafiorita/cl-2020

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