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Functional Dependencies

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Database Systems I. Seminar

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Recap

- Notion of Functional dependency
- Key definitions with FDs
- Legal and illegal instances
- Arsmtrong axioms
  - Reflexivity
  - Augmentation
  - Transitivity
- Derivation rules
  - Union
  - Decomposition
  - Pseudotransitivity
- Formal proof for Pseudotransitivity
  - With the tuple function
  - From the Armstrong axioms
- Logical consequence (implication)
- Closure of the dependency set F^+
- Closure of the attribute set A^+
- Find keys with FD-s

Examples

- For which FD-s is the following instance legal?

  $A \rightarrow B$

  $B \rightarrow A$

  $A \rightarrow C$

  $B \rightarrow C$

  $A \rightarrow BC$

  $B \rightarrow AC$

  $AB \rightarrow C$

A	B	C
1	2	3
6	7	3
10	11	12
1	4	3
7	7	3

- Check if the particular FD holds on the given instance!

  $A \rightarrow B$

  $BC \rightarrow A$

  $B \rightarrow C$

A	B	C
1	2	3
4	2	3
5	3	3

Keys

- Given R(A, B, C, D) and the following FDs. For each case, find the possible candidate keys!
  - F1= { C → D, C → A, B → C }
  - F2= { B → C, D → A }
  - F3= { ABC → D, D → A }
  - F4= { A → B, BC → D, A → C }
  - F5= { AB → C, AB → D, C → A, D → B }