



Lecture 16

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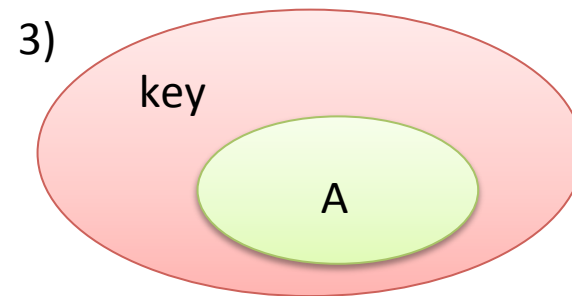
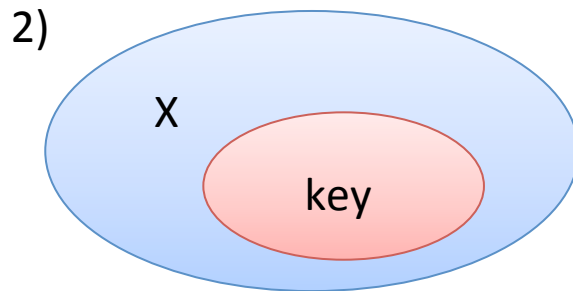
Course Website: <http://www.cse.psu.edu/~yul189/cmpsc431w>

Slides based on McGraw-Hill & Dr. Wang-Chien Lee



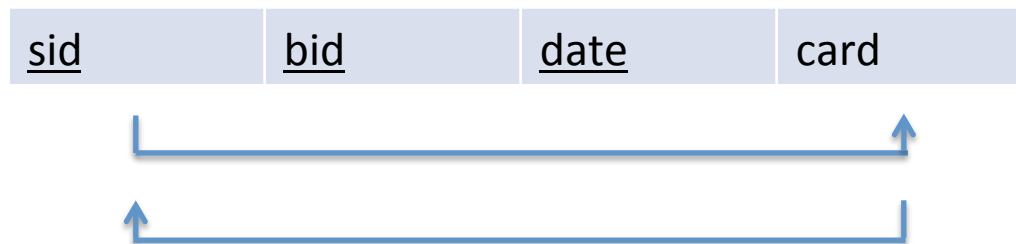
Third Normal Form (3NF)

- Relation R with FDs F is in 3NF if, for all $X \rightarrow A$ in F^+ :
 - 1) $A \in X$ (trivial FD), OR
 - 2) X contains a key for R, i.e., X is a superkey, OR
 - 3) A is part of some key for R



Third Normal Form (3NF) (cont.)

- Even if a relation is in 3NF, some redundancy is still possible
- Example:



This is in 3NF,
but (S, C) still redundantly stored.

Decompose into 3NF

ename	<u>ssn</u>	bdate	addr	dno	dname	dmgr
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