Decomposition: Example

X

ssn	cid	grade
123	413	A
123	415	B
234	211	A

Y

ssn	name	addr
123	Smith	Main
234	Jones	Huron

Given the dependencies below:
Does $X \cap Y \rightarrow X$? Does $X \cap Y \rightarrow Y$?

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ssn	cid	grade	name	addr
123	413	A	Smith	Main
123	415	B	Smith	Main
234	211	A	Jones	Huron

ssn → name, address
(assigned to Y after decomposition)
ssn, cid → grade

Decomposition: Example

X

ssn	cid	grade
123	413	A
123	415	B
234	211	A

ssn, cid → grade

Y

ssn	name	addr
123	Smith	Main
234	Jones	Huron

ssn → name, address

---

ssn	cid	grade	name	addr
123	413	A	Smith	Main
123	415	B	Smith	Main
234	211	A	Jones	Huron

ssn → name, address
ssn, cid → grade

Is X, Y decomposition dependency preserving?
Does it satisfy Lossless-join?

Example continued

- Is it dependency preserving?
  - Yes! Joins are not required to capture all the original dependencies
- Does decomposition have lossless-join property?
  - Check if one of the following is true.
    - $X \cap Y \rightarrow X$, i.e., ssn → ssn, cid, grade
    - $X \cap Y \rightarrow Y$, i.e., ssn → ssn, name, addr

Yes, it has the lossless-join property! Second one is true.

This decomposition is lossless and dependency preserving!