Database Systems Project CSE4020

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Problem. Give the two decompositions you select for further steps, and prove that they are lossless join and functional preserving.

We will use the fact that a decomposition of a relation R into R_1 and R_2 has a lossless join if and only if at least one of the following dependencies is in $F+$:

$$R_1 \cap R_2 \rightarrow R_1$$
$$R_1 \cap R_2 \rightarrow R_2$$

Solution. Consider the following relational schema:

$R =$ hosted_at_and_where_by_whom_with_peer_review(<u>event</u>, venue, chair, <u>paper</u>, <u>author</u>, <u>reviewer</u>)

$F = \{\text{event} \rightarrow \text{venue}, \text{event} \rightarrow \text{chair}\}$

And the following decompositions R_{1_i} and R_{2_i}:

R_1 : hosted_at_where_and_by_whom(<u>event</u>, venue, chair)

R_2 : the_peer_review_process(<u>event</u>, <u>paper</u>, <u>author</u>, <u>reviewer</u>)

So let's calculate $F+ = \{\text{event} \rightarrow \text{venue}, \text{event} \rightarrow \text{chair}\}$.$R_1 \cap R_2 =$ event which is a key for$R_1, R_1 \cup R_2 = R.\{\text{event} \rightarrow \text{venue}, \text{event} \rightarrow \text{chair}\}$ so we have shown a lossless join decomposition exists.R_1 could be further decomposed into $r_1(\underline{event}, venue)$ and $r_2(\underline{event}, chair)$ using the same argument.