

0.29 Canonical Cover for Class

you-said-5

give the functional dependencies after removing the extraneous attributes

ChatGPT said:

After determining that CC is an extraneous attribute in the functional dependency $A \rightarrow \{B, C\}$, we can remove CC from the right-hand side.

The original set of functional dependencies is:

$$F = \{A \rightarrow \{B, C\}, B \rightarrow C\}$$

$$F = \{A \rightarrow \{B, C\}, B \rightarrow C\}$$

step-1-remove-the-extraneous-attribute-cc-from-left.-arightarrow-bc-right.abc

Step 1: Remove the extraneous attribute CC from $A \rightarrow \{B, C\}$
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After removing CC , the dependency $A \rightarrow \{B, C\}$ becomes $A \rightarrow B$.

step-2-the-new-set-of-functional-dependencies

Step 2: The new set of functional dependencies

The functional dependency set after removing the extraneous attribute CC is:

$$F' = \{A \rightarrow B, B \rightarrow C\}$$

$$F = \{A \rightarrow B, B \rightarrow C\}$$

This is the simplified set of functional dependencies after removing the extraneous attributes.

you-said-6

are there any other extraneous attributes remaining in functional dependencies?

ChatGPT said:

To check if there are any remaining extraneous attributes in the functional dependencies $F' = \{A \rightarrow B, B \rightarrow C\}$, we need to follow the steps for identifying extraneous attributes.

step-1-check-if-any-attribute-in-the-left-hand-side-is-extraneous

Step 1: Check if any attribute in the left-hand side is extraneous

- **Dependency 1:** $A \rightarrow B$ $\mathbf{A \rightarrow B}$:

- The left-hand side is AA , which is a single attribute. Since there are no other attributes in the left-hand side, there cannot be any extraneous attributes here.

- **Dependency 2:** $B \rightarrow C$ $\mathbf{B \rightarrow C}$:

- The left-hand side is BB , which is also a single attribute. Similarly, there are no other attributes to check for extraneousness here.

step-2-check-if-any-attribute-in-the-right-hand-side-is-extraneous

Step 2: Check if any attribute in the right-hand side is extraneous

For a right-hand side attribute to be extraneous, it must already be implied by the closure of the left-hand side. Let's compute the closure for each dependency.

- **Dependency 1:** $A \rightarrow B$ $\mathbf{A \rightarrow B}$:

- The closure of AA , A^+A^+ , under $F'F$ is:

* $\text{result} = \{A\}$ $\text{result} = \{A\}$

* Check $A \rightarrow B$ $\mathbf{A \rightarrow B}$: Since $A \subseteq \{A\}A\{A\}$, we add BB to the result.

• $\text{result} = \{A, B\}$ $\text{result} = \{A, B\}$

- Since the right-hand side is just BB , there is no extraneous attribute to remove.

- **Dependency 2:** $B \rightarrow C$ $\mathbf{B \rightarrow C}$:

– The closure of BB, B^+B^+ , under F' is:

- * $\text{result} = \{B\}$
- * Check $B \rightarrow C$: Since $B \subseteq \{B\}$, we add C to the result.

$\cdot \text{result} = \{B, C\}$

– Since the right-hand side is CC , and CC is not already implied by BB without using this dependency, CC is not extraneous.

conclusion-1

Conclusion

There are no remaining extraneous attributes in the functional dependencies $F' = \{A \rightarrow B, B \rightarrow C\}$. This is the minimal set of functional dependencies.

prompt-textarea

composer-background