

Q4 Part d

Monday, 29 April 2024 5:55 PM

(d) Consider a schema $T(A, B, C, D)$ with the functional dependencies $AB \rightarrow C$, $AB \rightarrow D$ and $BC \rightarrow D$.

If we decompose the schema into (A, B, D) & (B, C, D) , is it a **lossless decomposition**? If yes, explain why. If not, try to produce a counterexample.

Are the two subschemas in **Boyce-Codd normal form**? Explain.

[8 marks]

Candidate key
AB

$AB \rightarrow C$
 $AB \rightarrow D$
 $BC \rightarrow D$

YES

Not lossless

A	B	C	D
a_1	b_1	c_1	d_1
a_2	b_1	c_2	d_1

ABD			
a_1	b_1	d_1	
a_2	b_1	d_1	

BCD		
b_1	c_1	d_1
b_1	c_2	d_1

ABCD			
a_1	b_1	c_1	d_1
a_1	b_1	c_2	d_1
a_2	b_1	c_1	d_1
a_2	b_1	c_2	d_1

ABCD
 $AB \rightarrow C$
 $AB \rightarrow D$
 $BC \rightarrow D$
 ABD
 ABC
 ABC

ABD
BCD