Assignment 1 Solution

Introduction to Databases, 2018 Spring Datalab, NTHU

Problem 1

- Skip
- Please refer to the solution on the repository

Problem 2

Request: Decompose this table to match the 3rd normal form

fourm_name	popularity	post_id	title	article	reply
Gossiping	100	132	Girlfriend	How can I get girlfriend?	["Haha", "I don't know"]
Gossiping	100	251	Firends	I don't have a friend	["Haha", "I can be", "QQ"]
Joke	23	41	Knock	Knock! Knock!	["Then?", "What's the point ?"]
Joke	23	156	Santa Claus	Hold! Hold! Hold!	["XDD"]



Problem 2

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Functional Dependency 2

Idea

- Requirements of the 3rd normal form
 - Must comply the 1st normal form
 - No array
 - Must comply the 2nd normal form
 - All fields must depend on primary keys
 - No non key-based FDs
 - Unless RHS of all non key-based FDs belongs to primary key

The 1st Normal Form: No array !!

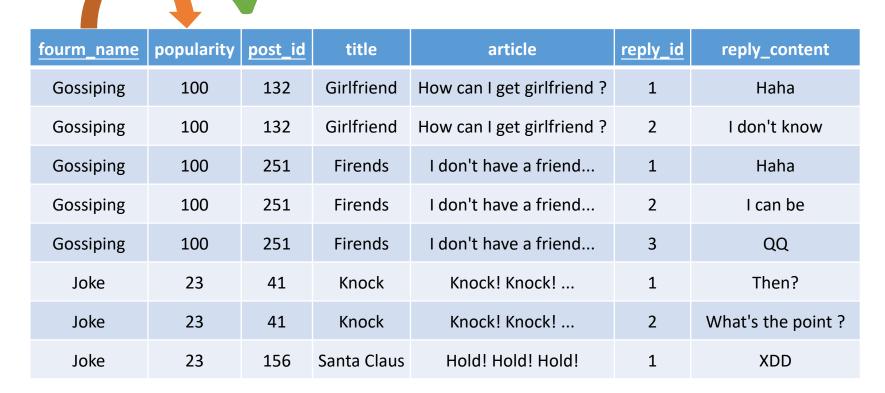
fourm_name	popularity	post_id	title	article	reply
Gossiping	100	132	Girlfriend	How can I get girlfriend?	["Haha", "I don't know"]
Gossiping	100	251	Firends	I don't have a friend	["Haha", "I can be", "QQ"]
Joke	23	41	Knock	Knock! Knock!	["Then?", "What's the point ?"]
Joke	23	156	Santa Claus	Hold! Hold! Hold!	["XDD"]

The 1st Normal Form: No array !!

fourm_name	popularity	post_id	title	article	reply_id	reply_content
Gossiping	100	132	Girlfriend	How can I get girlfriend?	1	Haha
Gossiping	100	132	Girlfriend	How can I get girlfriend?	2	I don't know
Gossiping	100	251	Firends	I don't have a friend	1	Haha
Gossiping	100	251	Firends	I don't have a friend	2	l can be
Gossiping	100	251	Firends	I don't have a friend	3	QQ
Joke	23	41	Knock	Knock! Knock!	1	Then?
Joke	23	41	Knock	Knock! Knock!	2	What's the point ?
Joke	23	156	Santa Claus	Hold! Hold! Hold!	1	XDD

Note: "reply_id" is necessary to identify each content

The 2nd Normal Form : All fields must depends on primary keys



The 2nd Normal Form: All fields must depends on primary keys

fourm_name	popularity	post_id	title	article	reply_id	reply_content
Gossiping	100	132	Girlfriend	How can I get girlfriend?	1	Haha
Gossiping	100	132	Girlfriend	How can I get girlfriend?	2	I don't know
Gossiping	100	251	Firends	I don't have a friend	1	Haha
Gossiping	100	251	Firends	I don't have a friend	2	I can be
Gossiping	100	251	Firends	I don't have a friend	3	QQ
Joke	23	41	Knock	Knock! Knock!	1	Then?
Joke	23	41	Knock	Knock! Knock!	2	What's the point ?
Joke	23	156	Santa Claus	Hold! Hold! Hold!	1	XDD

The 2nd Normal Form: All fields must depends on primary keys

A hidden dependency

fourm_name	popularity	post_id	title	article	reply_id	reply_content
Gossiping	100	132	Girlfriend	How can I get girlfriend?	1	Haha
Gossiping	100	132	Girlfriend	How can I get girlfriend?	2	I don't know
Gossiping	100	251	Firends	I don't have a friend	1	Haha
Gossiping	100	251	Firends	I don't have a friend	2	I can be
Gossiping	100	251	Firends	I don't have a friend	3	QQ
Joke	23	41	Knock	Knock! Knock!	1	Then?
Joke	23	41	Knock	Knock! Knock!	2	What's the point ?
Joke	23	156	Santa Claus	Hold! Hold! Hold!	1	XDD

The Problems of This Table

- You cannot add a forum without a post and a reply
- You also cannot add a post without a reply

fourm_name	popularity	post_id	title	article	reply_id	reply_content
Gossiping	100	132	Girlfriend	How can I get girlfriend?	1	Haha
Gossiping	100	132	Girlfriend	How can I get girlfriend?	2	I don't know
Gossiping	100	251	Firends	I don't have a friend	1	Haha
Gossiping	100	251	Firends	I don't have a friend	2	I can be
Gossiping	100	251	Firends	I don't have a friend	3	QQ
Joke	23	41	Knock	Knock! Knock!	1	Then?
Joke	23	41	Knock	Knock! Knock!	2	What's the point ?
Joke	23	156	Santa Claus	Hold! Hold! Hold!	1	XDD

The 3rd Normal Form: No non key-based dependency



This dependency says the primary key must be "fourm_name"

fourm_name	popularity	post_id	title	article	reply_id	reply_content
Gossiping	100	132	Girlfriend	How can I get girlfriend?	1	Haha
Gossiping	100	132	Girlfriend	How can I get girlfriend?	2	I don't know
Gossiping	100	251	Firends	I don't have a friend	1	Haha
Gossiping	100	251	Firends	I don't have a friend	2	I can be
Gossiping	100	251	Firends	I don't have a friend	3	QQ
Joke	23	41	Knock	Knock! Knock!	1	Then?
Joke	23	41	Knock	Knock! Knock!	2	What's the point?
Joke	23	156	Santa Claus	Hold! Hold! Hold!	1	XDD

This dependency says the primary key must be {"fourm_name", "post_id"}

popularity	post_id	title	article	reply_id	reply_content
100	132	Girlfriend	How can I get girlfriend?	1	Haha
100	132	Girlfriend	How can I get girlfriend?	2	I don't know
100	251	Firends	I don't have a friend	1	Haha
100	251	Firends	I don't have a friend	2	I can be
100	251	Firends	I don't have a friend	3	QQ
23	41	Knock	Knock! Knock!	1	Then?
23	41	Knock	Knock! Knock!	2	What's the point ?
23	156	Santa Claus	Hold! Hold! Hold!	1	XDD
	100 100 100 100 100 23 23	100 132 100 132 100 251 100 251 100 251 23 41 23 41	100 132 Girlfriend 100 132 Girlfriend 100 251 Firends 100 251 Firends 100 251 Firends 23 41 Knock 23 41 Knock	100 132 Girlfriend How can I get girlfriend? 100 132 Girlfriend How can I get girlfriend? 100 251 Firends I don't have a friend 100 251 Firends I don't have a friend 100 251 Firends I don't have a friend 23 41 Knock Knock! Knock! 23 41 Knock Knock! Knock!	100 132 Girlfriend How can I get girlfriend? 1 100 132 Girlfriend How can I get girlfriend? 2 100 251 Firends I don't have a friend 1 100 251 Firends I don't have a friend 2 100 251 Firends I don't have a friend 3 23 41 Knock Knock! Knock! 1 23 41 Knock Knock! Knock! 2

Solution: Decompose it! Done?

	fourm_name	post_id	title	article	reply_id	reply_content
	Gossiping	132	Girlfriend	How can I get girlfriend?	1	Haha
	Gossiping	132	Girlfriend	How can I get girlfriend?	2	I don't know
fourm_nam	ne popularity	251	Firends	I don't have a friend	1	Haha
Gossiping	100	251	Firends	I don't have a friend	2	I can be
Joke	23	251	Firends	I don't have a friend	3	QQ
	Joke	41	Knock	Knock! Knock!	1	Then?
	Joke	41	Knock	Knock! Knock!	2	What's the point ?
	Joke	156	Santa Claus	Hold! Hold! Hold!	1	XDD

the primary key must be {"fourm_name", "post_id", "reply_id"}

The hidden dependency fourm name title article reply_id reply_content post_id Girlfriend Haha Gossiping 132 How can I get girlfriend? 1 Gossiping 132 Girlfriend How can I get girlfriend? 2 I don't know I don't have a friend... Haha Gossiping 251 **Firends** 1 **Firends** I don't have a friend... I can be Gossiping 251 2 251 I don't have a friend... Gossiping **Firends** 3 QQ Knock Knock! Knock! ... 1 Then? popularity fourm_name Knock Knock! Knock! ... 2 What's the point? Gossiping 100 5 Santa Claus 1 **XDD** Hold! Hold! Hold!

23

Joke

Solution: Decompose it again!

article

fourm_name	post_id	title	
Gossiping	132	Girlfriend	ŀ
Gossiping	251	Firends	
Joke	41	Knock	
Joke	156	Santa Claus	

fourm_name	popularity
Gossiping	100
Joke	23

fourm_name	post_id	reply_id	reply_content
Gossiping	132	1	Haha
Gossiping	132	2	I don't know
Gossiping	251	1	Haha
Gossiping	251	2	I can be
Gossiping	251	3	QQ
Joke	41	1	Then?
Joke	41	2	What's the point?
Joke	156	1	XDD

The Final Result

article

How can I get girlfriend?

I don't have a friend...

fourm_name	post_id	title
Gossiping	132	Girlfriend
Gossiping	251	Firends
Joke	41	Knock
Joke	156	Santa Claus

fourm_name	popularity	
Gossiping	100	
Joke	23	

fourm_name	post_id	reply_id	reply_content
Gossiping	132	1	Haha
Gossiping	132	2	I don't know
Gossiping	251	1	Haha
Gossiping	251	2	I can be
Gossiping	251	3	QQ
Joke	41	1	Then?
Joke	41	2	What's the point?
Joke	156	1	XDD