



The Normal Forms

Normal Forms

- State of a relation where certain rules regarding the relation, its data, and its relationships with other relations are satisfied.
- Many normal forms exist. We're looking at 0NF to 3NF.

Zeroth Normal Form (0NF)

- Data in “sort of” a spreadsheet format.
- “cells” of the spreadsheet contain multivalue fields.
- Changes to the data or metadata could possibly require redesigning the whole data set.

Virtual City Public Library

Card	Patrons	Items Loaned
4844124	Rusty Kage, Lucyanna Hotsoss	Books: Haynes Repair Manual - Toyota Camry, Due: 3/25/2017 Movies (DVD): Rush, Due: 3/24/2017
9308009	Dusty Rhoades	Books: Wylde, Z., & Hendrikx, E. (2012). Bringing metal to the children: The complete Berzerker's guide to world tour domination. New York: William Morrow. Due: 4/15/2017
7681891	Randall Graves	Movies (VHS): Navy Seals Due: 6/9/2017
7465947	Caitlyn Bree	Books: Asian Fashion Design for Dummies Due: 6/12/2017
7757391	Connor Murphy	eBooks: The Jungle, Upton Sinclair

First Normal Form (1NF)

- Multivalued attributes are broken out. Each row/column pair has a discrete value.
- Creates more duplication in the data.

PatronCard	PatronFirstName	PatronLastName	LoanedItemType	LoanedItemForm	LoanedItemDueDate	ItemTitle	AuthorFirstName	AuthorLastName
4844124	Rusty	Kage	Book		3/25/2017	Haynes Repair Manual - Toyota Camry		
4844124	Rusty	Kage	Movie	DVD	3/24/2017	Rush		
4844124	Lucyanna	Hotsoss	Book		3/25/2017	Haynes Repair Manual - Toyota Camry		
4844124	Lucyanna	Hotsoss	Movie	DVD	3/24/2017	Rush		
9308009	Dusty	Rhodes	Book		4/15/2017	Bringing metal to the children: The complete Berzerker's guide to world tour domination	Zakk	Wylde
9308009	Dusty	Rhodes	Book		4/15/2017	Bringing metal to the children: The complete Berzerker's guide to world tour domination	Erik	Hendrilkx
7681891	Randall	Graves	Movie	VHS	6/9/2017	Navy Seals		
7465947	Caitlyn	Bree	Book		6/12/2017	Asian Fashion Design for Dummies		
7757391	Connor	Murphy	Book	Electronic		The Jungle	Upton	Sinclair

Second Normal Form (2NF)

- In 1NF AND any partial functional dependencies have been removed.

PatronCard
4844124
9308009
7681891
7465947
7757391

PatronFirstName	PatronLastName
Rusty	Kage
Lucyanna	Hotsoss
Dusty	Rhodes
Randall	Graves
Caitlyn	Bree
Connor	Murphy

LoanedItemType	LoanedItemFormat
Book	
Movie	DVD
Movie	VHS
Book	Electronic

ItemTitle
Haynes Repair Manual - Toyota Camry
Rush
Bringing metal to the children: The complete Berzerker's guide to world tour domination
Navy Seals
Asian Fashion Design for Dummies
The Jungle

LoanedItemDueDate
3/25/2017
3/24/2017
4/15/2017
6/9/2017
6/12/2017

Third Normal Form

- In 2NF AND all transitive dependencies have been removed.
 - Non-key attributes are identified only by the primary key.

PatronFirstName	PatronLastName
Rusty	Kage
Lucyanna	Hotsoss
Dusty	Rhodes
Randall	Graves
Caitlyn	Bree
Connor	Murphy

PatronCard
4844124
9308009
7681891
7465947
7757391

LoanedItemType
Book
Movie

LoanedItemFormat
DVD
VHS
Electronic

ItemTitle
Haynes Repair Manual - Toyota Camry
Rush
Bringing metal to the children: The complete Berzerker's guide to world tour domination
Navy Seals
Asian Fashion Design for Dummies
The Jungle

LoanedItemDueDate
3/25/2017
3/24/2017
4/15/2017
6/9/2017
6/12/2017

Other Normal Forms

- Boyce-Codd Normal Form
 - All remaining anomalies have been removed (only one primary key).
- Fourth Normal Form (4NF)
 - All multivalued dependencies have been removed.
- Fifth Normal Form (5NF)
 - Any remaining anomalies have been removed.



School of Information Studies
SYRACUSE UNIVERSITY