INFO20003 Database Systems

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Lecture 16
Hands-on Normalization

Week 8

Report (<u>reportNo</u>, editor, deptNo, deptName, deptAddr, <u>authorId</u>, authName, authAddr)

reportNo → editor, deptNo

deptNo → deptName, deptAddr

authorId → authName, authAddr

reportNo	editor	deptNo	deptName	deptAddr	authorId	authName	authAddr
4216	woolf	15	design	argus1	53	mantel	cs-tor
4216	woolf	15	design	argus1	44	bolton	mathrev
4216	woolf	15	design	argus1	71	koenig	mathrev
5789	koenig	27	analysis	argus2	26	fry	folkstone
5789	koenig	27	analysis	argus2	38	umar	prise
5789	koenig	27	analysis	argus2	71	koenig	mathrev

first + second normal form

- Is the Report table in 2NF? If not, put the table in 2NF.
- Are there any insert, update or delete anomalies with these 2NF relations?

reportNo → editor, deptNo
deptNo   → deptName, deptAddr
authorId → authName, authAddr

many-many.

Author (<u>authorId</u> , authName, authAddr)
         PK

report (<u>reportNo</u> , editor, deptNo, deptName, deptAddr)
          PK

still have
transitive dependency,
but don't solve in 2NF

AuthorReport (<u>reportNo</u> , <u>authorId</u>)
                 PFK   PFK

2NF

Example #2

Class (<u>courseNumber</u>, roomNumber, instructorName, <u>studentNumber</u>, workshopNumber, grade, tutor)

workshopNumber → tutor

studentNumber, courseNumber → grade, workshopNumber

courseNumber → roomNumber, instructorName

- Normalise the relation into <u>3NF</u>.

course (<u>courseNumber</u>, roomNumber, instructorName)

class (<u>courseNumber</u> ^{PFK}, <u>studentNumber</u>, workshopNumber, grade, tutor)

∋ F V.

3NF   course (courseNumber, roomNumber, instructorName)

workshop (workshopNumber, tutor)

class (<u>courseNumber</u> ^{PFK}, <u>studentNumber</u> ^{PFK}, workshopNumber ^{FK}, grade)

Example #3

OrderItem

OrderID	ItemID	CustomerID	CustomerPostcode	ItemQuantity	CanDispatchFrom
4018	161	191	3053	6	Truganina, Hallam
4022	228	196	3212	1	Somerton
4033	525	25	3124	2	Somerton, Hallam

violate INF

CustomerID → CustomerPostcode
OrderID → CustomerID
OrderID, ItemID → ItemQuantity, CanDispatchFrom

- Normalize the relation to 3NF.

2NF   orderID → customerID

orderCustomer (orderID, customerID, customerPostcode)

PFK
orderItem (orderID, ItemID, ItemQuantity)
PFK   PFK
Location (orderID, ItemID, location)
2NF satisfied

PFK   PFK
Location (orderID, itemID, Location)
put as part of primary key
then can send item from two different places.

orderItem (orderID, ItemID, custID, ItemQuantity, custPostcode)
INF satisfied

2ND   ordercust (orderID, customerID, customerPostcode)

3NF   customerID → customerPostcode

customer (CustomerID , custPostcode)

orderCustomer (orderID , customerID).
                                 FK

orderItem (orderID, itemID, itemQuantity)

Location (orderID , itemID , Location)

- Transactions