

Tutorial – 12: Normalization

Consider a relation *vehicle-rent* with attributes *vehicle-rent* (c_id, name, city, pin-code, vehicle-requested, request-date, return-date), which stores the details of the vehicles booked by a customer. Each customer is identified by a unique id (c_id). Customers can request multiple vehicles simultaneously, but they can place only single request in a day. A sample instance of the relation is as shown below (**use only the given instance to derive the FDs**):

c_id	name	city	pin-code	vehicle-requested	request-date	return-date
1	Ram	Delhi	333001	Sedan, Ertiga	01/06/19	03/06/19
1	Shyam	Delhi	333001	Jaguar	02/06/19	04/06/19
2	Arjun	Mumbai	333031	Sedan	05/06/19	06/06/19
2	Akash	Mumbai	333031	Ertiga, Mercedes	02/06/19	06/06/19
3	Vicky	Hyderabad	333026	Rolls Royce	03/06/19	05/06/19

- (a) Identify the candidate key(s) for the relation after deriving the FDs from the above instance.

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a) For the above table the candidate key is only name. Because all the other columns are not having unique values such that they can represent a tuple

Functional dependency for above table

name \rightarrow cid
 name \rightarrow city
 name \rightarrow pincode
 name \rightarrow vehicle requested
 name \rightarrow request-date
 name \rightarrow return-date

- (b) Normalize the relation till 3NF. Show the steps.

(b) To Normalise this till 3NF, let's start from 1NF
According to 1NF, there should be no multi valued attributes.

∴ Tables should be converted as follows

c_id	name	city	pincode	vehicle requested	req date	ret date
1	Ram	Delhi	333001	Sedan	1/6/19	3/6/19
1	shyam	Delhi	333001	Jaguar	2/6/19	4/6/19
1	Ram	Delhi	333001	Ertiga	1/6/19	3/6/19
2	Arjun	Mumbai	333031	Sedan	5/6/19	6/6/19
2	Akash	Mumbai	333031	Ertiga	2/6/19	6/6/19
2	Akash	Mumbai	333031	Mercedes	2/6/19	6/6/19
3	vicky	Hyd	333026	RollsRoyce	3/6/19	5/6/19

c_id	city	pincode	candidate key
1	Delhi	333001	1) city
2	Mumbai	333031	2) pincode
3	Hyderabad	333026	3) c_id

city	name	vehicle requested	req date	return date
Delhi	Ram	Sedan	1/6/19	3/6/19
Delhi	Ram	Ertiga	1/6/19	3/6/19
Delhi	shyam	Jaguar	2/6/19	4/6/19
Mumbai	Arjun	Sedan	5/6/19	6/6/19
Mumbai	Akash	Ertiga	2/6/19	6/6/19
Mumbai	Akash	Mercedes	2/6/19	6/6/19
Hyderabad	Vicky	RollsRoyce	3/6/19	5/6/19

Candidate key: combination of city, name, vehicle