CarPost plateNumber																	
						_											
		model	bodyStyle	manufacturerName		fuel E bybrid	carYear	mileage	San Jose	carState	price 6500	postDate	outerColor				
1PLT123 2PLT123	owner1@gmail.com owner1@gmail.com		Hatchback Sedan	Toyota Toyota		5 hybrid 5 gas		160k 110k	San Jose San Franci:		7500			owner2@gmail.com			
3PLT123	owner3@gmail.com		Hatchback	Toyota	55	5 gas		100k	Fresno	CA	8500	2022/5/9	Blue	owner1@gmail.com			
4PLT123	owner4@gmail.com		Sedan	Toyota	2	5 hybrid		200k	Berkeley	CA	9000		Grey				
DONE! - · ·	ne Join Danne																
BCNF Lossles CarInfo	ss Join Decomposition			Cities			CarPost										
model model	bodyStyle	manufacturerName		city	carState	1	plateNumber	ownerEmail	model	mpg	fuel	carYear	mileage	city	orice p	oostDate outerCo	lor bookmarkedB
Prius	Hatchback	Tovota		San Jose	CA		1PLT123	owner1@gmail.com			5 hybrid		160k	San Jose	6500	2024/5/9 Navy	owner2@gma
Camry	Sedan	Toyota		San Francisco	CA	1	2PLT123	owner1@gmail.com			5 gas		110k	San Francisco	7500	2023/5/1 Black	
,				Fresno	CA	1	3PLT123	owner3@gmail.com			i5 gas		100k	Fresno	8500	2022/5/9 Blue	owner1@gma
				Berkeley	CA		4PLT123	owner4@gmail.com			5 hybrid		200k	Berkeley	9000	2021/5/9 Grey	
Explanation fo	or the Decomposition:																
CarPost(<u>plater</u>	Number, ownerEmail.	model, bodyStyle, m	anutacturerNa	ame, mpg, tuel, carYe	ar, mileagi	e, city, carS	tate, price, pos	tDate, outerColor, boo	okmarkedBy)								
To normalize tl	the CarPost relation in	to BCNF, we first idea	tify all function	onal dependencies													
	tional dependencies:																
	FD1: plateNumber, o	wnerEmail -> model,	mpg, fuel, ca	arYear, mileage, city, p	rice, postE	Date, outer0	Color, bookman	kedBy									
	FD2: model -> bodyS	Style, manufacturerNa	ame														
	FD3: city -> carState																
	ry functional dependen																
				arYear, mileage, city, p													
				sitive Dependency) A					ompose.								
				(LHS does not conta	in a key)	Thus, we	should decon	pose.									
	We decompose and								1.45.1								
		Carlnfo(model, body		ail, model, mpg, fuel, o	ai reai, iii	ileage, city,	price, postbat	e, outercolor, bookma	irkeuby)								
		Cities(city, carState)		ururr4ama)													
3. Check if the	e dependencies are pr																
			npg, fuel, car'	Year, mileage, city, pri	ce, postDa	ate, outerCo	olor, bookmark	edBy									
	R2: model -> bodySt																
	R3: city -> carState																
			encies in eacl	h relation to validate th	ney are in	BCNF:											
	1. R1(CarPost) FDs:																
	plateNumber, owners																
	plateNumber, owners																
	plateNumber, owners																
	plateNumber, owner																
	plateNumber, owner																
	plateNumber, owners																
	plateNumber, owners	Email -> postDate															
	plateNumber, owner	Email -> outerColor															
	plateNumber, owners																
				s fully functionally de													
				ansitively dependent													
	As we can see, for	all functional depen	dencies in R	t1, the left hand side	(determin	nant) conta	ins a candida	te key. Therefore, R1	is in BCNF.								
	2. R2(CarInfo) FDs																
	2. R2(Carinto) FDs model -> bodyStyle																
	model -> manufactur	rerName															
			v attribute is	s fully functionally de	nenden+	on a candi	date key Tho	refore. R2 complies :	with 2NF								
	As we can see, no r	non-candidate key a	ttribute is tra	s fully functionally de ansitively dependent	on a can	didate key	Therefore, R	3 complies with 3NF.									
	As we can see, for	aii runctional depen	gencies in R	t3, the left hand side	determin	ant) conta	ıns a candida	te key. Therefore, R3	is in BCNF.								
	Therefore, we have s	nunneef-ll	oneless	Docome #													
	Therefore, we have s	successibility made a t	.USSIESS JUIT	Decomposition.													
3CNF Validation	ion of UserAccount Re	elation:															
	ion of UserAccount Re email, firstName, lastN		sword)														
JserAccount(g			sword)														
JserAccount(g	email, firstName, lastN tional dependencies: email -> firstName		sword)														
JserAccount(g	email, firstName, lastN tional dependencies: email -> firstName email -> lastName		sword)														
JserAccount(g	email, firstName, lastN tional dependencies: email -> firstName email -> lastName email -> username		sword)														
JserAccount(g	email, firstName, lastN tional dependencies: email -> firstName email -> lastName email -> username email -> password	Name, username, pas															
JserAccount(g . All the functi	email, firstName, lastN tional dependencies: email -> firstName email -> lastName email -> username email -> password se, every non-candida	lame, username, pas	ully function						2NF.								
IserAccount(g . All the functions as we can see	email, firstName, lastN tional dependencies: email -> firstName email -> lastName email -> username email -> password se, every non-candidate ee, no non-candidate	lame, username, pas ate key attribute is f key attribute is tran	ully function sitively depe	endent on a candidat	e key. Th	erefore, Us	erAccount co	mplies with 3NF.		BChe.							
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```
2000 rows in set (0.01 sec)
mysql> SELECT COUNT(*) FROM carpost;
| COUNT(*) |
     2000 |
1 row in set (0.00 sec)
mysql> SELECT COUNT(*) FROM cities;
| COUNT(*) |
      20 |
1 row in set (0.00 sec)
mysql> SELECT COUNT(*) FROM carpost A, cities B WHERE A.city = B.city;
| COUNT(*) |
     2000 |
1 row in set (0.03 sec)
mysql>|
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mysql> SELECT COUNT(*) FROM carpost;
| COUNT(*) |
     2000 |
1 row in set (0.00 sec)
mysql> SELECT COUNT(*) FROM carinfo;
| COUNT(*) |
      20 |
1 row in set (0.00 sec)
mysql> SELECT COUNT(*) FROM carpost A, carinfo B WHERE A.model = B.model;
| COUNT(*) |
    2000 |
1 row in set (0.00 sec)
mysql>
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mysql> SELECT COUNT(*) FROM carpost;
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mysql> SELECT COUNT(*) FROM carinfo;
| COUNT(*) |
       20 |
1 row in set (0.00 sec)
mysql> SELECT COUNT(*) FROM cities;
| COUNT(*) |
       20 |
1 row in set (0.00 sec)
mysql> SELECT COUNT(*) FROM carpost A, carinfo B, cities C WHERE A.model = B.model AND A.city = C.city;
| COUNT(*) |
     2000 |
1 row in set (0.00 sec)
mysql>
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