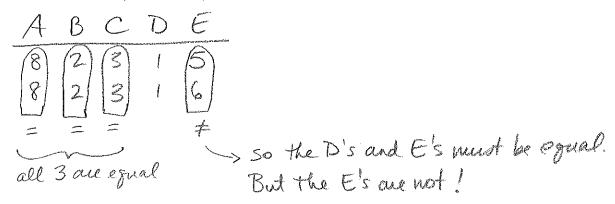
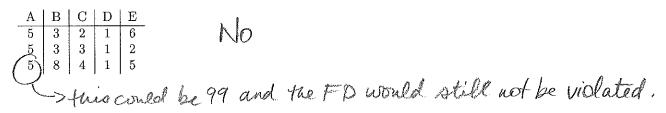
## In-class Exercises: BCNF

## 1. FD recap.

(a) Create an instance of relation R(A, B, C, D, E) that violates this functional dependency:  $ABC \rightarrow DE$ .



(b) Suppose we have a relation R(A, B, C, D, E). Does the instance below violate the functional dependency  $DB \rightarrow A$ ?



## 2. Is a relation in BCNF?

(a) Suppose we have a relation Students(SID, email, course, term, prof), and that these FDs hold:  $\{(SID) \rightarrow \text{email}; \text{ course, term} \rightarrow \text{prof}; \text{ SID, course} \rightarrow \text{grade.} \}$ . Is this relation in BCNF?  $\mathcal{N}_{\mathcal{O}}$ .

SIDT = SID, email ,', SID is not a superbey for the relation
We know the relation is ust in BENF without looking at the other FDs.

(b) Suppose we have a relation Customers(name, DOB, address, favouriteCar, manufacturer) and these FDs hold: { name  $\rightarrow$  DOB, favouriteCar; favouriteCar  $\rightarrow$  manufacturer }. Is this relation in BCNF?  $\mathcal{N}_{O}$ ,

(d) Suppose we have a relation R(A, B, C, D, E) and these FDs hold: { B  $\rightarrow$  AC; CB  $\rightarrow$  E; A  $\rightarrow$  D }. Is this relation in BCNF?  $\nwarrow$  O

$egin{aligned}  ext{How does BCNF help? 0} \  ext{\{ part} & ightarrow  ext{manufacturer; } \  ext{p} \end{aligned}$		relation Parts(part,	manufacturer, sei	ter, price) with t	nese r Ds.
(a) Keeping in mind the F	Ds, make an instance of thi	s relation that has	redundant inform	ation.	
Part	manufactuer	<u>seller</u>	Price		
`A	(WAT)	Roba	1.44		
A	JHW JHW	Walmout	1.48		
Redundant THW. NB (b) If we applied the decor	! We could line : We need the faposition step from BCNF	ase either o =D to Eurov decomposition, who	this. Mer	l each of the new	v relations
R(=Pa	t, manfactuu	DAP"	e.	redu	reply retarney
R2 = P0	ut, seller, pri	ce			J
It is a coin the FDs.	cidence that to That is often	here corre not the	spond exa case.	ictly to	
(c) Project the FDs onto			_ 1	)	
PM Pt=FV Mt=V		P 5	Price Pt = St = V Pt =	S Pr	Ф Ф Ф
/, Put -> Mo is the only to (d) Put the same data as	unfacturen  in RI  in part (a) into your new so		V PR	= PSPM = PRM	1
part manfactuer	pat seller	price /	redundancy?	= 2 W	14
A JHW	A Rona A Walmat	1.49	! The o	only T-D i	n R215 Manfach
No redundar	iaj.				
(e) Is it possible to create	redundancy with this new	schema?	1	1 . R7	
No. A p but that the fact	eat may is not red about who n can state	rpeat a undant. ramfactur each so	s needed We fac es what ach fac	tored on the outo of	) t" 21,
where we	namer to be		V		