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Lab 7

Part One: Tycho CEO Fred Johnson has put together a spreadsheet of all the data he has so far, which he personally collected.

1. As he shows you the spreadsheet, having just signed your consulting agreement, he asks what you think of it. How do you reply?
What software is referenced by these package IDs? There should be separate specific data about the software packages like a name, and a software developing company in addition to the package ID. The tag number should do the same. Tag numbers should be able to connect tag number to computer location, brand and year just as an example. If I looked at this with little to no knowledge of the way things work here I wouldn't understand any of this data because it does not yet have enough context to be information.

2. Put his data in 1NF and display it. (Show me the table; no SQL.)

Install

PackageID varchar(4)	TagNumber int	InstallDate timeDate	SoftwareCostUSD double
AC01	32808	09/13/2005	754.95
DB32	32808	12/03/2005	380
DB32	37691	06/15/2005	380
DB33	57772	05/27/2005	412.77
WP08	32808	01/12/2006	185.00
WP08	37691	06/15/2005	227.50
WP08	57222	05/27/2005	170.24
WP09	59836	10/30/2005	35.00
WP09	77740	05/27/2005	35.00

3. What is the primary key?
A composite of the PackageID and TagNumber.

Part Two: Add two columns of new data: one column for software package name (e.g., Zork, Portal, etc.) and one for computer model (e.g., IBM, Apple, etc.). Be sure that your new data is consistent with the original data. Do not add any additional columns.

4. Display the new table.

Install

PackageID varchar(4)	PackageName varchar(50)	TagNumber int	ComputeModel varchar(50)	InstallDate timeDate	SoftwareCostUSD double
AC01	Microsoft Access	32808	Apple	09/13/2005	754.95
DB32	Postgres	32808	Apple	12/03/2005	380
DB32	Postgres	37691	IBM	06/15/2005	380
DB33	MySql	57772	Windows	05/27/2005	412.77
WP08	Skype	32808	Apple	01/12/2006	185.00
WP08	Skype	37691	IBM	06/15/2005	227.50
WP08	Skype	57222	Windows	05/27/2005	170.24
WP09	Slack	59836	Apple	10/30/2005	35.00
WP09	Slack	77740	Windows	05/27/2005	35.00

5. Identify and document all functional dependencies.
(PackageID,TagNumber) → InstallDate, SoftwareCostUSD
PackageID → Package Name
Tag Number → ComputerModel

6. Explain why this new table is not in third normal form.
There are partial key dependencies. Since this violates second normal form and second normal form is a prerequisite to third normal form, the new table cannot be in third normal form.

Part Three: Decompose your 1NF table into a set of tables that are in at least third normal form. (BCNF would be better.) Remember that it's wrong to add artiFicial keys to associative entities. Actually, as I said before, do not add any additional columns.

7. Identify all primary keys (determinants) for all tables.
PackageID is the primary key for the Packages table. TagNumber is the primary key for the Computers table. The primary key for the install table is a composite key with the PackageID and the TagNumber.

8. Identify all functional dependencies for all tables.
There is a functional dependency on Packages from Install concerning the PackageID. There is also a functional dependency on Computers from Instal concerning TagNumber. Both of these are caused by the fact that the primary key in Install is a composite of PackageID and TagNumber.

9. Explain why the new tables are in third normal form.
These tables are in third normal form because they lack multiple key dependency. That is there are no non-key attributes dependent on more than one key in a table.

10. Draw a beautiful E/R diagram.