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Lab 7: Normalization Part One
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1. Tycho CEO Fred Johnson has put together a spreadsheet of all the data he has so far, which he personally collected.

- A. As he shows you the spreadsheet, having just signed your consulting agreement, he asks what you think of it. How do you reply?

I believe you have a great start, and I have enough information to provide you with an extremely useful spreadsheet.

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

PackageID	TagNumber	InstallDate	SoftwareCostUSD
AC01	32808	09-13-2005	754.95
DB32	32808	12-03-2005	380.00
DB32	32791	06-15-2005	380.00
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	59536	10-30-2005	35.00
WP09	77740	05-27-2005	35.00

- C. What is the primary key?

The primary key for the table would be the composite key of packageID and TagNumber. The composite key is a combination of both columns that can be used to uniquely identify each row.

2. 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.

A. Display the new table.

PackageID	TagNumber	InstallDate	SoftwareCostUSD	SoftwarePackageName	ComputerModel
AC01	32808	09-13-2005	754.95	Portal	Apple
DB32	32808	12-03-2005	380.00	Zork	Microsoft
DB32	32791	06-15-2005	380.00	Zork	Microsoft
DB33	57772	05-27-2005	412.77	Zork	Microsoft
WP08	32808	01-12-2006	185.00	Lotus Notes	Lenovo
WP08	37691	06-15-2005	227.50	Lotus Notes	Lenovo
WP08	57222	05-27-2005	170.24	Lotus Notes	Lenovo
WP09	59536	10-30-2005	35.00	Zork	Lenovo
WP09	77740	05-27-2005	35.00	Zork	Lenovo

B. Identify and document all functional dependencies

PackageID + TagNumber \rightarrow InstallDate, SoftwareCostUSD, SoftwarePackageName, ComputerModel

C. Explain why this new table is not in third normal form.

This table is not in third normal form because there are no multiple key dependencies. The ComputerModel is only dependent on the TagNumber. Also The SoftwareCostUSD and SoftwarePackageName are only dependent on the PackageID.

3. 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.

A. Identify all primary keys (determinants) for all tables.

The only primary key would be the PackageID.

B. Identify all functional dependencies for all tables

TagNumber \rightarrow Computer Model

PackageID \rightarrow SoftwareCostUSD and SoftwarePackageName

PackageID + TagNumber \rightarrow InstallDate

C. Explain why the new tables are in third normal form.

The new tables are in third normal form because every prime attribute is associated with a primary key. There is also no transitive functional dependency within the tables.

D. Draw a beautiful E/R Diagram.

