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Lab 7

1.) Tycho CEO Fred Johnson has put together a spread sheet 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. This is good, however, let's see if we can make it clearer.
   b. Put this data in 1NF and display it.

PackageID	TagNumber	InstallDate	SoftwareCostUSD
AC01	32808	09-13-2005	754.95
DB32	32808	12-03-2005	380.00
DB32	37691	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. The primary key is a combination of PackageID and TagNumber. This would make the primary key a composite key.
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

PackageName	PackageID	Model	TagNumber	InstallDate	SoftwareCostUSD
Zork	AC01	Lenovo	32808	09-13-2005	754.95
Portal	DB32	Lenovo	32808	12-03-2005	380.00
Portal	DB32	Apple	37691	06-15-2005	380.00
Access	DB33	Dell	57772	05-27-2005	412.77
Postgre	WP08	Lenovo	32808	01-12-2006	185.00
Postgre	WP08	Apple	37691	06-15-2005	227.50
Postgre	WP08	Dell	57222	05-27-2005	170.24
Word	WP09	Toshiba	59536	10-30-2005	35.00
Word	WP09	Dell	77740	05-27-2005	35.00

b. Identify and document all functional dependencies.
   i. TagNumber→Model
   ii. PackageID→ PackageName
   iii. TagNumber, PackageID→ SoftwareCostUSD, InstallDate
c. Explain why this new table is not in third normal form.
   i. This table is not in third normal form because there are multiple key dependencies.

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.

PackageID	PackageName
AC01	Zork
DB32	Portal
DB33	Access
WP08	Postgre
WP09	Word

TagNumber	Model
32808	Apple
37691	Lenovo
57772	Dell
57222	Dell
77740	Dell
59536	Toshiba

a. Identify all primary keys (determinants) for all tables.
   i. PackageID, TagNumber
b. Identify all functional dependencies for all tables.
   i. TagNumber→Model
   ii. PackageID→ PackageName
c. Explain why the new tables are in third normal form.
   i. These tables are in third normal form because they are atomic, have no partial dependencies, and do not contain multiple key dependencies.
d. Draw a E/R Diagram

Computers

TagNumber(PK)
Model

Installations

TagNumber(FK)
PackageID(FK)
InstallDate
SPftwareCostUSD

Software

PackageID(PK)
PackageName