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Database Management
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Lab 7: Normalization One

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?

I would reply to the new client by saying:
"Thank you, Fred, for setting time aside from your busy schedule to gather and create the rough draft database that you had sent me. I am happy that you had contacted me because I had immediately identified many different complications with the database. However, realize that you have created a fantastic foundation for me to build on which will help us finish this project within the respected time frame. With that said, I have prepared myself with many solutions that I am excited to share with yourself and your employees. First, I would talk about the structure of the data and the importance of atomicity within data. Then I would mention that redundancy will occur where it can lead to some of the columns remaining unclear."

2. 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	37691	06/15/2005	380.00
DB33	57772	05/27/2005	412.77
WP08	32808	01/12/2005	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?

The primary key consists of PackageID and TagNumber which make up a composite key. The co mbination of the two identify unique rows within the data set.

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.

PackageID	TagNumber	InstallDate	CostUSD	SoftwPackage	CompModel
AC01	32808	09/13/2005	754.95	Photoshop	Apple
DB32	32808	12/03/2005	380.00	Microsoft Office	Apple
DB32	37691	06/15/2005	380.00	Microsoft Office	HP
DB33	57772	05/27/2005	412.77	Microsoft Outlook	Dell
WP08	32808	01/12/2006	185.00	RealPlayer	Apple
WP08	37691	06/15/2005	227.50	RealPlayer	HP
WP08	57222	05/27/2005	170.24	RealPlayer	Dell
WP09	59836	10/30/2005	35.00	Dreamweaver C C	IBM
WP09	77740	05/27/2005	35.00	Dreamweaver C C	Toshiba

5. Identify and document all functional dependencies.

The following are the functional dependencies that exist in the table:

1.PackageID SoftwarePackage;
2.TagNumber CompModel;
3.(PackageID,TagNumber) CostUSD;
4.(PackageID, TagNumber) InstallDate;

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

The table above is not in the 3rd normal form because it is still not in the 2nd normal form. As we know it must be in the 2nd normal form before it can be in the 3rd. This is because there are subqueries of data that apply to multiple rows in the same table that should be separated into different tables otherw ise known as partial dependency. There is also anomalies present that can signify irregularities.

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 artiEicial keys to associative entities. A s I said before, do not add any additional columns.

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

Software Table: PackageID
Computers Table: TagNumber
Software Installation Table: (PackageID, TagNumber)

8. Identify all functional dependencies for all tables.

Software Table: PackageID SoftwPackage
Computers Table: TagNumber CompModel

Software Installation Table: (PackageID, TagNumber) InstallDate
(PackageID,TagNumber) CostUSD

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

These new table are in the 3rd normal form because the tables are atomic. This is one of the relational rules for a table to not cause error. The columns in every table are completely dependent on the primary keys they are associated with which means it is in 2nd normal form as well.

10. Draw a beautiful E/R diagram.

PackageID	SoftwPackage
AC01	Photoshop
DB32	Microsoft Office
DB33	Microsoft Outlook
WP08	RealPlayer
WP09	Dreamweaver CC

TagNumber	CompModel
32808	Apple
37691	HP
57772	Dell
59836	IBM
77740	Toshiba

PackageID	TagNumber	InstallDate	CostUSD
AC01	32808	09/13/2005	754.95
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