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Lab 7

Part 1:

1. There are some flaws and inconsistencies with the current data table. For example, there are duplicate TagNumbers and PackageIDs. There is no row where each data value is unique. The TagNumber 32808 is associated with three different package IDs install dates, and costs. Additionally, some PackageIDs are associated with one TagNumber, whereas others are associated with multiple TagNumbers. I would try to politely critique the inconsistencies within the data table while offering positive and reinforcing solutions. For example:

This table looks good; however, there are some modifications that can be made to make it more efficient for your business. I appreciate the work you have done so far, but there are some duplications and inconsistencies that we can address to more efficiently track the software packages installed on your station computers.

2. Put his data in 1NF and display it.

PackageID	TagNumber	InstallDate	SoftwareCostUSD
AC01	32808	09-13-2005	754.95
DB32	32808	12-03-2005	380.00
WP08	32808	01-12-2006	185.00
DB32	37691	06-15-2005	380.00
WP08	37691	06-15-2005	227.50
WP08	57222	05-27-2005	170.24
DB33	57772	05-27-2005	412.77
WP09	59836	10-30-2005	35.00
WP09	77740	05-27-2005	35.00

3. What is the primary key?

(PackageID, TagNumber)

Part 2:

4. Display the new table.

PackageID	TagNumber	Model	PackageName	InstallDate	SoftwareCostUSD
AC01	32808	Apple	Zork	09-13-2005	754.95
DB32	32808	Apple	Portal	12-03-2005	380.00
WP08	32808	Apple	Word	01-12-2006	185.00
DB32	37691	HP	Portal	06-15-2005	380.00
WP08	37691	HP	Word	06-15-2005	227.50
WP08	57222	IBM	Word	05-27-2005	170.24
DB33	57772	Dell	Chrome	05-27-2005	412.77
WP09	59836	Asus	PostgreSQL	10-30-2005	35.00
WP09	77740	Toshiba	PostgreSQL	05-27-2005	35.00

5. Identify and document all functional dependencies.

(PackageID, TagNumber) → InstallDate

(PackageID, TagNumber) → SoftwareCostUSD

TagNumber → Model

PackageID → PackageName

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

The table is not in third normal form because there are too many multi-key dependencies. For example, PackageName is functionally determined by the candidate key PackageID, TagNumber and Model is also functionally determined by the same candidate key PackageID, TagNumber.

It would be in third normal forms if entities in these fields were dependent on a single primary key. In its current state, if entities were to be deleted from the table, other data reliant on said entities would also be unintentionally deleted which could cause a delete anomaly. There are also insertion anomalies because in order to add data, every field must have an entity as to avoid nulls.

Part 3:

TABLE A:

Packages:

PackageID	PackageName
AC01	Zork
DB32	Portal
DB33	Chrome
WP08	Word
WP09	PostgreSQL

TABLE B:

Computers:

TagNumber	Model
32808	Apple
37691	HP
57222	IBM
57772	Dell
59836	Asus
77740	Toshiba

TABLE C:

Installations:

PackageID	TagNumber	InstallDate	SoftwareCostUSD
AC01	32808	09-13-2005	754.95
DB32	32808	12-03-2005	380.00
WP08	32808	01-12-2006	185.00
DB32	37691	06-15-2005	380.00
WP08	37691	06-15-2005	227.50
WP08	57222	05-27-2005	170.24
DB33	57772	05-27-2005	412.77
WP09	59836	10-30-2005	35.00
WP09	77740	05-27-2005	35.00

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

TABLE A: Computers Primary Key: TagNumber

TABLE B: Packages Primary Key: PackageID

TABLE C: Installations Primary Key: (PackageID, TagNumber)

8. Identify all functional dependencies for all tables.

TagNumber → Model
PackageID → PackageName
(PackageID, TagNumber) → SoftwareCostUSD
(PackageID, TagNumber) → InstallDate

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

The new tables are in both first and second normal form. This means these tables are no partial key dependencies in the tables. The tables also do not have any multi-key dependencies or an instance of two or more candidate keys determining one attribute. Rows can be deleted without causing anomalies because the data will still exist in other tables rather than depend on existence in a single row. For example, if the software package WP09 was never installed on 05-27-2005, the PackageName (PostgreSQL) will still be associated with the PackageID (WP09) thus preventing a delete anomaly.

Since all data is determined by a primary key, it is possible to add data to the table even if it lacks information that corresponds to certain fields. For example, a package may be added to the database even if it has not been installed onto a specific computer. In the previous data table, this scenario would require nulls to be placed in the table rather than just including the data in the database.

10. Draw a beautiful E/R diagram.