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Database Management 308
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Lab 7: Normalization 1

Part 1
1. This table is not in First Normal Form. It is a mess! The attributes within the table are not in atomic form and need to be reorganized.

2. Table in 1NF:

PackageID-TagNumber	InstallDate	SoftwareCostUSD
AC01-32808	9-13-2005	754.95
DB32-32808	12-03-2005	380.00
DB32-37691	6-15-2005	380.00
DB33-57772	5-27-2005	412.77
WP08-32808	01-12-2006	185.00
WP08-37619	6-15-2005	227.50
WP08-57222	05-27-2005	170.24
WP09-59836	10-30-2005	35.00
WP09-77740	05-27-2005	35.00

3. The primary key is a composite key called PackageID-TagNumber

Part 2
4. New table with two added columns:

PackageID-TagNumber	InstallDate	SoftwareCostUSD	PackageName	Computer Model
AC01-32808	9-13-2005	754.95	Zork	IBM
DB32-32808	12-03-2005	380.00	Portal	Apple
DB32-37691	6-15-2005	380.00	Snappy	Lenovo
DB33-57772	5-27-2005	412.77	MacPorts	Apple
WP08-32808	01-12-2006	185.00	Cydia	Apple
WP08-37619	6-15-2005	227.50	AppImage	Dell
WP08-57222	05-27-2005	170.24	Homebrew	IBM
WP09-59836	10-30-2005	35.00	Cabal	IBM
WP09-77740	05-27-2005	35.00	Chocolatey	HP

5. PackageID determines the PackageName and the TagNumber determines the Computer Model, InstallDate and SoftwareUSD. Therefore the PackageID-TagNumber determines the InstallDate, SoftwareCostUSD.

6. The new table is not in Third Normal Form because it is not in Second Normal Form. The table has multi-key functional dependencies, which means that there are attributes that depend on many other attributes instead of the primary key alone, violating Third Normal Form.

Part 3

7. You can decompose your 1NF table into three individual tables: Software table, Hardware table, and Installation table. The Software table would include the PackageID and PackageName, where PackageID would be the primary key. The Hardware table would include the TagNumber and Computing Model, where the TabNumber is the primary key. The Installation table would include the PackageID-TagNumber InstallDate and the CostUSD, where the PackageID-TagNumber is the primary key.

8. The function dependences of this table are:

   a. Software → PackageID, PackageName

   b. Hardware → TagNumber, ComputingModel

   c. PackageID-TagNumber → InstallDate, SoftwareCostUSD

9. The new table is in Third Normal Form because the attributes within the table on dependent on their primary key only and not on other keys within the table. This new tables reduces data redundancy and enhances data integrity.

10. Entity Relationship Diagram: