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Database Management
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<center>Lab 7: Normalization One</center>

Part One:

1.

"I want to keep my job" response:
        This is an impressive collection of data. I can make some improvements and have this implemented by the deadline outlined in our agreement.

"I want to lose my job" response:
        This is a massive collection of data. There is no structure to the data at all, some of the data is not atomic, there is redundancy present in the table, and some of these column names are ambiguous. It is going to take some time to fix this table up to meet specifications.

2. Software Installation Table:

PackID	TagNum	InstallData	SoftwareCost
AC01	32808	09/13/95	754.95
DB32	32808	12/03/95	380
DB32	37691	06/15/95	380
DB33	57772	05/27/95	412.77
WP08	32808	01/12/96	185
WP08	37691	06/15/95	227.5
WP08	57222	05/27/95	170.24
WP09	59836	10/30/95	35
WP09	77740	05/27/95	35

3. The primary key is a composite key consisting of PackID and TagNum

Part Two:

4. Software Installation Table

PackID	TagNum	InstallData	SoftwareCost	SoftwareName	ComputerModel
AC01	32808	09/13/95	754.95	Starcraft	HP
DB32	32808	12/03/95	380	Portal	HP
DB32	37691	06/15/95	380	Portal	Dell
DB33	57772	05/27/95	412.77	Diablo 2	Apple
WP08	32808	01/12/96	185	Windows 95	HP
WP08	37691	06/15/95	227.5	Windows 95	Dell
WP08	57222	05/27/95	170.24	Windows 95	Microsoft
WP09	59836	10/30/95	35	Zork	Samsung
WP09	77740	05/27/95	35	Zork	IBM

5. Functional dependencies:

       PackID TagNum -> InstallDate
       PackID TagNum -> SoftwareCost
       PackID TagNum -> SoftwareName
       PackID TagNum -> ComputerModel
       PackID -> SoftwareName
       TagNum -> ComputerModel

6. This new table is not in third normal form because not all non-key attributes depend on only the primary key. The functional dependency TagNum -> ComputerModel is in violation, as ComputerModel is a non-key attribute that depends on only the partial key dependency of TagNum. Additionally, the three anomalies are present with this unnormalized data which can cause serious problems.

Part Three:

7. Primary Keys:

Computers: TagNum
Software: PackID
Installation: PackID + TagNum

8. Functional dependencies:

      PackID TagNum -> InstallDate
      PackID TagNum -> SoftwareCostUSD

      PackID -> SoftwareName
      TagNum -> ComputerModel

9. These new tables are in third normal form because each nonkey attribute in the composite table (Installation) are functionally determined by the primary key, the whole primary key, and nothing by the primary key. Each of the strong entities, Computers and Software, also are in 3NF, as their primary keys functionally determine the other non-key attributes of the relation.

10. E/R Diagram: