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CMPT 308: Database Systems
Lab 7: Normalization One

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

Part 1:

1. The first thing that I would tell CEO Fred Johnson is that his database violates the first normal form rule. The first normal form rule by Codd says that a table must have its own structure. Tables must have atomic table that are indivisible and not multivalued. This is shown in the Tag Numbers 32808 and 37691 in DB32. In addition to this, Tag Numbers 57772 in Package ID DB33 and TagNumber 32808 in Package ID AC01 are repeated in the WP08 Package ID.

2.

PackageID	TagNumber	InstallDate	SoftwareCostUSD
WP08	32808	01-12-2006	185.00
	37691	06-15-2005	227.50
	57222	05-27-2005	170.24
WP09	59836	10-30-2005	35.00
	77740	05-27-2005	35.00

3. The primary key of this database if the composite key of Package ID & TagNumber. Combining each will uniquely identify each software update for the user.

Part 2:
1.

Package ID	TagNumber	InstallDate	SoftwareCostUSD	SoftwarePackage	ComputerModel
WP08	32808	1/12/06	185.00	Zork	IBM
	37691	6/15/05	227.50	Zork	Apple
	57222	5/27/05	170.24	Zork	IBM
WP09	59836	10/30/05	35.00	Portal	IBM
	77740	5/27/05	35.00	Portal	Apple

2. A functional dependency is a piece of data that is reliant on another piece of data. Data is determinant on another piece of data when the user can tell one piece of data from the other one. In the newly updated Tycho database, there are multiple functional dependencies.

- TagNumber can tell you the Computer Model. Computer model is functionally dependent on TagNumber.
- TagNumber can tell your Package ID, but Package ID cannot tell you TagNumber
- PackageID can tell you Software Package
- Install Date is functionally dependent on the Primary key of PackageID and TagNumber
- SoftwareCostUSD is functionally dependent on Primary key.

3. The second normal form rule says that there must be no partial key dependencies in a database. When we added the Software Package Name, we created some partial key dependencies in the database. Because of this violation, their database cannot pass the third normal form rule either. The third normal form rule says that a database must pass the 2nd normal form rule and there must be no multi-key dependencies and nonkey column attributes must only have one determinant.

Part 3
1. The Primary keys are Bolded in the tables below in the ERD.
2. Functional dependency:
- SoftwareCostUSD is functionally dependent on Software Package
- TagNumber and ComputerModel is functionally dependent on PackageID
- Software and Package tables are functionally dependent on Tracking table

3. These new tables for the Tycho Database are in third normal form because there are no multi-key dependencies. Nonkey column attributes all have only one determinant. A foreign key was created to solve this problem. The Boyce Codd Normal form rule is also fulfilled because it prevents nonkey and multi-key dependencies on key column attributes.
4.