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CMPT 308

Lab 7-Normalization 1

Part One:

1. This big table is inefficient and unusable since it is subject to insert, update and delete anomalies. We must separate columns into non-ambiguous tables that have functional dependence, aka “normalize.”
2. 1NF Table:

|  |  |  |  |
| --- | --- | --- | --- |
| **PackageID** | **TagNumber** | Installation Date | 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 | 01-12-2006 | 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 |

1. The primary key is a composite key with PackageID and TagNumber.

Part Two:

1. With two new columns:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **PackageID** | **TagNumber** | InstallDate | SoftwareCost  USD | Software-Package-Name | CompModel |
| AC01 | 32808 | 09-13-2005 | 754.95 | Zork | Apple |
| DB32 | 32808 | 12-03-2005 | 380.00 | Portal | Apple |
| DB32 | 37691 | 06-15-2005 | 380.00 | Portal | IBM |
| DB33 | 57772 | 05-27-2005 | 412.77 | Portal 2 | HP |
| WP08 | 32808 | 01-12-2006 | 185.00 | GTA | Apple |
| WP08 | 37691 | 06-15-2005 | 227.50 | Orange Box | IBM |
| WP08 | 57222 | 05-27-2005 | 170.24 | Stanley | Dell |
| WP09 | 59836 | 10-30-2005 | 35.00 | Half-Life | HP |
| WP09 | 77740 | 05-27-2005 | 35.00 | Half-Life | Dell |

1. Functional dependencies:

a-[Package ID, TagNumber] 🡪 InstallDate, SoftwareCostUSD, SoftwarePackageName, CompModel

b-Package ID🡪 TagNumber

c- TagNumber🡪 CompModel

d-SoftwarePackageName🡪 SoftwareCostUSD

1. This table is **not** in 3NF because it is not even in 2NF. In order for the table to be in 2NF it needs to have no partial key dependencies. For example, CompModel is dependent on TagNumber, but not PackageID. There is also a transitive dependency between dependencies a-c.

Part Three:

|  |  |  |
| --- | --- | --- |
| Installations | Computers | Software |
| PackageID (PK)  TagNumber(PK)  SoftwareName  InstallDate | TagNumber (PK)  CompModel | SoftwareName (PK)  SoftwareCostUSD |

1. Primary key for all tables: PackageID, TagNumber, SoftwarePackageName
2. Functional Dependencies:
3. [PackageID,TagNumber]🡪 SoftwarePackageName, InstalDate
4. TagNumber 🡪 CompModel
5. SoftwarePackageName🡪SoftwareCostUSD

9) Tables are in the third form because the table is in the second form and there are no multi-key dependencies. Non-key attributes like CompModel only depends on TagNumber. SoftwareCostUSD only depends on SoftwarePackageName. InstalDate depends on the the composite key, of PackageID/TagNumber. This also eliminates the three anomalies. If you add/update/delete TagNumbers to the Computers table with their model, you will not affect the Software tables. The installations table acts as an associative entity that holds foreign keys. Similar with the Software table, if you add/update/delete another package name with its cost, it will have no affect on the already installed packages and the computers recorded.

10) E/R Diagram:

