

PART ONE:

- I would say that this is a good first step towards the improvement of your business, there is a lot of duplicate data and lack of organization but a good starting point.

| PackageID | TagNumber | InstallDate | SoftwarePriceUSD |
|-----------|-----------|-------------|------------------|
| AC01 | 32808 | 09-13-2005 | 754.00 |
| 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 |

The Primary key is a combination of the PackageID and TagNumber.

PART TWO:

| PackageID | TagNumber | InstallDate | SoftwarePriceUSD | SoftwarePackageName | ComputerModel |
|-----------|-----------|-------------|------------------|---------------------|---------------|
| AC01 | 32808 | 09-13-2005 | 754.00 | Zork | Dell |
| DB32 | 32808 | 12-03-2005 | 380.00 | Portal | Dell |
| DB32 | 37691 | 06-15-2005 | 380.00 | Portal | Apple |
| DB33 | 57772 | 05-27-2005 | 412.77 | Adobe | Apple |
| WP08 | 32808 | 01-12-2006 | 185.00 | Microsoft Word | Dell |
| WP08 | 37691 | 06-15-2005 | 227.50 | Microsoft Word | HP |
| WP08 | 57222 | 05-27-2005 | 170.24 | Microsoft Word | Lenovo |
| WP09 | 59836 | 10-30-2005 | 35.00 | Microsoft Excel | HP |
| WP09 | 77740 | 05-27-2005 | 35.00 | Microsoft Excel | HP |

PackageID → SoftwarePackageName

TagNumber → ComputerModel

InstallDate → SoftwarePriceUSD

(PackageID, Tagnumber) → PackageID

(PackageID, Tagnumber) → TagNumber

(PackageID, Tagnumber) → InstallDate

(PackageID, Tagnumber) → SoftwarePriceUSD

(PackageID, Tagnumber) → SoftwarePackageName

(PackageID, Tagnumber) → ComputerModel

This is not in third normal form because in third normal form you cannot have multiple key dependencies in non-key attributes. The first two dependencies should not exist in the same table as the other dependencies. Having multiple key dependencies (SoftwarePackageName is dependent on Package id which is dependent on (PackageID, TagNumber)) proves that this table is not in third normal form.

PART THREE:

Installations:

| PackageID | TagNumber | InstallDate | SoftwarePriceUSD |
|-----------|-----------|-------------|------------------|
| AC01 | 32808 | 09-13-2005 | 754.00 |
| 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 |

Primary Key: (PackageID, TagNumber)

Dependencies:

(PackageID, Tagnumber) → PackageID

(PackageID, Tagnumber) → TagNumber

(PackageID, Tagnumber) → InstallDate

(PackageID, Tagnumber) → SoftwarePriceUSD

ComputerModels:

| TagNumber | ComputerModel |
|-----------|---------------|
| 32808 | Dell |
| 37691 | Apple |
| 57772 | Apple |
| 57222 | Lenovo |
| 59836 | HP |
| 77740 | HP |

Primary Key: TagNumber

Dependencies:

Tag Number → ComputerModel

Software Packages:

| PackageID | SoftwarePackageName |
|-----------|---------------------|
| AC01 | Zork |
| DB32 | Portal |
| DB33 | Adobe |
| WP08 | MicrosoftWord |
| WP09 | Microsoft Excel |

Primary Key: PackageID

Dependencies:

PackageID → SoftwarePackageName

These tables are in third normal form because they have no multiple key dependencies in non-key attributes while being in second normal form. In all tables the attributes depend only and fully on the key.

