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DBMS 308

3/29/16

Normalization 1

**Part One**

1.  Thank you for gather this data for me but it is far from being useful information yet.  It does not follow any of my former DBMS teachers Alan's rules nor Boyce Codd Normal Form so we have a lot of work to do.  The table is not atomic and its clutter will make it more likely that you will make simple errors that can be avoided.

2.  The information following 1$^{st}$ NF

| PackageID | TagNumber | InstallDate | SoftwareCostUSD |
|---|---|---|---|
| AC01 | 32808 | 9/13/2005 | $ 754.95 |
| DB32 | 32808 | 12/3/2005 | $ 380.00 |
| DB32 | 37691 | 6/15/2005 | $ 380.00 |
| DB33 | 57772 | 5/27/2005 | $ 412.77 |
| WP08 | 32808 | 1/12/2006 | $ 185.00 |
| WP08 | 37691 | 6/15/2005 | $ 227.50 |
| WP08 | 57222 | 5/27/2005 | $ 170.24 |
| WP09 | 59836 | 10/30/2005 | $ 35.00 |
| WP09 | 77740 | 5/27/2005 | $ 35.00 |

3. The primary key would be the composite key of {PackageID TagNumber}

**Part Two**

4.

| PackageID | TagNumber | InstallDate | SoftwareCostUSD | SoftwarePackage | ComputerModel |
|---|---|---|---|---|---|
| AC01 | 32808 | 9/13/2005 | $ 754.95 | Zork | IBM |
| DB32 | 32808 | 12/3/2005 | $ 380.00 | Portal | IBM |
| DB32 | 37691 | 6/15/2005 | $ 380.00 | Portal | Apple |
| DB33 | 57772 | 5/27/2005 | $ 412.77 | Pig | Microsoft |
| WP08 | 32808 | 1/12/2006 | $ 185.00 | Dragon | IBM |
| WP08 | 37691 | 6/15/2005 | $ 227.50 | Dragon | Apple |
| WP08 | 57222 | 5/27/2005 | $ 170.24 | Dragon | Dell |
| WP09 | 59836 | 10/30/2005 | $ 35.00 | Cave | HP |
| WP09 | 77740 | 5/27/2005 | $ 35.00 | Cave | Lenovo |

5. Functional Dependencies

- PackageID TagNumber → InstallDate
- PackageID TagNumber → SoftwareCostUSD
- PackageID → SoftwarePackage
- TagNumber → ComputerModel

6. This new table is not in $3^{rd}$ NF because there are partial key dependencies. Example PackageID → SoftwarePackage because PackageID is part of a composite key that is already a primary key. Technically this violates $2^{nd}$ NF, and since it's not in $2^{nd}$ NF the table can't be in $3^{rd}$ NF


**Part Three**

7. & 8.

| PackageID | TagNumber | InstallDate | SoftwareCostUSD |
|---|---|---|---|
| AC01 | 32808 | 9/13/2005 | $ 754.95 |
| DB32 | 32808 | 12/3/2005 | $ 380.00 |
| DB32 | 37691 | 6/15/2005 | $ 380.00 |
| DB33 | 57772 | 5/27/2005 | $ 412.77 |
| WP08 | 32808 | 1/12/2006 | $ 185.00 |
| WP08 | 37691 | 6/15/2005 | $ 227.50 |
| WP08 | 57222 | 5/27/2005 | $ 170.24 |
| WP09 | 59836 | 10/30/2005 | $ 35.00 |
| WP09 | 77740 | 5/27/2005 | $ 35.00 |

Table Name: Orders

Primary Key:  PackageID TagNumber

FD:  PackageID TagNumber → InstallDate;  PackageID TagNumber → SoftwareCostUSD

| PackageID | SoftwarePackage |
|---|---|
| AC01 | Zork |
| DB32 | Portal |
| DB33 | Pig |
| WP08 | Dragon |
| WP09 | Cave |

Table Name: Software

Primary Key: PackageID

FD:  PackageID → SoftwarePackage

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

Table Name: Computer

Primary Key: TagNumber

FD:  TagNumber → ComputerModel

8. All 3 tables are in 3<sup>rd</sup> NF because they meet the first and second normal form rules and the also have no multiple key dependencies.  The tables all follow the rule of "the key, the whole key, and nothing but they key."

9. ER Diagram

## Order

| PackageID | TagNumber | InstallDate | SoftwareCostUSD |
|-----------|-----------|-------------|-----------------|
| AC01 | 32808 | 9/13/2005 | $ 754.95 |
| DB32 | 32808 | 12/3/2005 | $ 380.00 |
| DB32 | 37691 | 6/15/2005 | $ 380.00 |
| DB33 | 57772 | 5/27/2005 | $ 412.77 |
| WP08 | 32808 | 1/12/2006 | $ 185.00 |
| WP08 | 37691 | 6/15/2005 | $ 227.50 |
| WP08 | 57222 | 5/27/2005 | $ 170.24 |
| WP09 | 59836 | 10/30/2005 | $ 35.00 |
| WP09 | 77740 | 5/27/2005 | $ 35.00 |

## Software

| PackageID | SoftwarePackage |
|-----------|-----------------|
| AC01 | Zork |
| DB32 | Portal |
| DB33 | Pig |
| WP08 | Dragon |
| WP09 | Cave |

## Computer

| TagNumber | ComputerMo |
|-----------|------------|
| 32808 | IBM |
| 37691 | Apple |
| 57222 | Dell |
| 57772 | Microsoft |
| 59836 | HP |
| 77740 | Lenovo |