Part One:

I would say "the spreadsheet has lots of duplicate data and we should try to rename columns better. If someone looked at this they wouldn't necessarily know that TagNumber means the computer. Let's try to organize this better so it is self-explanatory and more efficient."

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ordno | PackageID | TagNumber | InstallDate | SoftwarePriceUSD |
| AC01, 32808 | AC01 | 32808 | 09-13-2005 | 754.00 |
| DB32, 32808 | DB32 | 32808 | 12-03-2005 | 380.00 |
| DB32, 37961 | DB32 | 37691 | 06-15-2005 | 380.00 |
| DB32, 57772 | DB33 | 57772 | 05-27-2005 | 412.77 |
| WP08, 32808 | WP08 | 32808 | 01-12-2006 | 185.00 |
| WP08, 37691 | WP08 | 37691 | 06-15-2005 | 227.50 |
| WP08, 57222 | WP08 | 57222 | 05-27-2005 | 170.24 |
| WP09, 59836 | WP09 | 59836 | 10-30-2005 | 35.00 |
| WP09, 77740 | WP09 | 77740 | 05-27-2005 | 35.00 |

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

Part Two:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Ordno | PackageID | TagNumber | InstallDate | SoftwarePriceUSD | SoftwarePackageName | ComputerModel |
| AC01, 32808 | AC01 | 32808 | 09-13-2005 | 754.00 | Zork | Dell |
| DB32, 32808 | DB32 | 32808 | 12-03-2005 | 380.00 | Portal | Dell |
| DB32, 37961 | DB32 | 37691 | 06-15-2005 | 380.00 | Portal | Apple |
| DB32, 57772 | DB33 | 57772 | 05-27-2005 | 412.77 | Adobe | Apple |
| WP08, 32808 | WP08 | 32808 | 01-12-2006 | 185.00 | Microsoft Word | Dell |
| WP08, 37691 | WP08 | 37691 | 06-15-2005 | 227.50 | Microsoft Word | HP |
| WP08, 57222 | WP08 | 57222 | 05-27-2005 | 170.24 | Microsoft Word | Lenovo |
| WP09, 59836 | WP09 | 59836 | 10-30-2005 | 35.00 | Microsoft Excel | HP |
| WP09, 77740 | WP09 | 77740 | 05-27-2005 | 35.00 | Microsoft Excel | HP |

PackageID -> SoftwarePackageName

TagNumber -> ComputerModel

Ordno -> PackageID

Ordno -> TagNumber

Ordno -> InstallDate

Ordno -> SoftwarePriceUSD

Ordno -> SoftwarePackageName

Ordno -> ComputerModel

This is not in third Normal Form because there are multiple key dependencies in non-key attributes. The first two dependencies should not exist in the same table as the rest of the dependencies. In this table, SoftwarePackageName is dependent on PackageID which is dependent on Ordno. This is a multiple key dependency and it proves that this table is not in third Normal Form.

Part Three:

Orders

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ordno | PackageID | TagNumber | InstallDate | SoftwarePriceUSD |
| AC01, 32808 | AC01 | 32808 | 09-13-2005 | 754.00 |
| DB32, 32808 | DB32 | 32808 | 12-03-2005 | 380.00 |
| DB32, 37961 | DB32 | 37691 | 06-15-2005 | 380.00 |
| DB32, 57772 | DB33 | 57772 | 05-27-2005 | 412.77 |
| WP08, 32808 | WP08 | 32808 | 01-12-2006 | 185.00 |
| WP08, 37691 | WP08 | 37691 | 06-15-2005 | 227.50 |
| WP08, 57222 | WP08 | 57222 | 05-27-2005 | 170.24 |
| WP09, 59836 | WP09 | 59836 | 10-30-2005 | 35.00 |
| WP09, 77740 | WP09 | 77740 | 05-27-2005 | 35.00 |

Primary Key:

Ordno

Dependencies:

Ordno -> PackageID

Ordno -> TagNumber

Ordno -> InstallDate

Ordno -> SoftwarePriceUSD

ComputerModels

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

Primary Key:

TagNumber

Dependencies:

TagNumber -> ComputerModel

SoftwarePackages

|  |  |
| --- | --- |
| 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 are in second Normal Form and there are no multiple key dependencies in non-key attributes. In all of these tables attributes depend on the key, the whole key and nothing but the key.



Primary Key:

TagNumber

Dependencies:

TagNumber -> ComputerModel