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Lab 7, Normalization Part 1

1. Part One
   1. After being shown this spreadsheet, I am impressed with the amount of work that you have put into this project. Your organization for your project is very neat but I have some changes that I wish to make as a part of my consultation.
   2. Table shown below

|  |  |  |  |
| --- | --- | --- | --- |
| **packageID** | **tagNumber** | **installDate** | **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 of this table would be the composite key of packageID and tagNumber.

1. Part Two
2. Table for part 2, question 1 is shown below

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **packageID** | **tagNumber** | **installDate** | **softwareCostUSD** | **packageName** | **computerModel** |
| AC01 | 32808 | 09-13-2005 | 754.95 | Notepad++ | Mac |
| DB32 | 32808 | 12-03-2005 | 380.00 | Photoshop | Mac |
| DB32 | 37691 | 06-15-2005 | 380.00 | Photoshop | Dell |
| DB33 | 57772 | 05-27-2005 | 412.77 | PostgreSQL | HP |
| WP08 | 32808 | 01-12-2006 | 185.00 | Intellij | Mac |
| WP08 | 37691 | 06-15-2005 | 227.50 | Intellij | Dell |
| WP08 | 57222 | 05-27-2005 | 170.24 | Intellij | MSI |
| WP09 | 59836 | 10-30-2005 | 35.00 | Apache | Asus |
| WP09 | 77740 | 05-27-2005 | 35.00 | Apache | Sony |

1. Functional Dependencies
   1. packageID 🡪 packageName
   2. tagNumber 🡪 computerName
   3. packageID, tagNumber 🡪 installDate, softwareCostUSD
2. Why is this not in 3NF?
   1. This data is not in third normal form because it does not satisfy the requirement of being in second normal form, meaning that it has each field’s data being attributable to only the entire primary key, not any candidate keys. Because computerName is dependent on tagNumber, but not packageID, this violates that rule.
3. Part Three

Decomposition of tables  
Systems

|  |  |
| --- | --- |
| **tagNumber** | **computerModel** |
| 32808 | Mac |
| 37691 | Dell |
| 57772 | HP |
| 57222 | MSI |
| 59836 | Asus |
| 77740 | Sony |

Software

|  |  |
| --- | --- |
| **packageID** | **packageName** |
| AC01 | Notepad++ |
| DB32 | Photoshop |
| DB33 | PostgreSQL |
| WP08 | Intellij |
| WP09 | Apache |

Installations

|  |  |  |  |
| --- | --- | --- | --- |
| **packageID** | **tagNumber** | **installDate** | **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. ID all primary keys for all tables
   1. Software
      1. Primary Key - packageID
   2. Systems
      1. Primary key - tagNumber
   3. Installations
      1. Primary key – {packageID, tagNumber}
2. Functional dependencies
   1. packageID 🡪 packageName
   2. tagNumber 🡪 computerModel
   3. packageID, tagNumber 🡪 installDate, softwareCostUSD
3. Why are these in 3NF
   1. These tables are in third normal form because they are all tables where each non-key field is dependent on the key, the whole key, and nothing but the key. There are no other possible dependencies that can lead to discrepancies in your data.
4. E/R Diagrams

|  |  |
| --- | --- |
| Software | |
| PK, FK | packageID  packageName |

|  |  |
| --- | --- |
| Systems | |
| PK, FK | tagNumber  computerModel |

|  |  |
| --- | --- |
| Installations | |
| PK, FK  PK, FK | packageID  tagNumber  packageName  computerModel |