**Learning Activity 2-19**

**Examples of Normalization:**

**1. Transform the following table so that it is in first normal form:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Full name** | **Address** | **Neighborhood** | **Rented\_Movies** | **Category** |
| Janet Jones | First Street Plot, No 4, London | Chelsea | Pirates of the Caribbean, Clash of the Titans | Action, Action |
| Robert Phil | 3rd Street, 35, London | soho | Matrix, Forrest Gump | Science-Fiction, Tragicomedy |
| Robert Phil | 5th Av. 46, London | camden | Wrath of the Titans | Action |

**2. Transform the resulting tables so that they are in second normal form.**

**3. Add a column to the rental table that will be part of the primary key and whose title is customer\_id. Add another column titled Gender that will specify whether the customer is male or female. Transform said table so that it is in third normal form. Check the other tables and verify that they are also there.**

**4. Add the transaction\_id column to the rental table, which will be the primary key or, at least, the candidate key. Determines if it is in FNBC and transforms said table so that it is there if necessary.**

**5. Transform the following table so that it is in 2NF (see that the same employee can be in several different projects):**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **project\_code** | **project\_title** | **project\_manager** | **Budget** | **employee\_id** | **employee\_name** | **department\_id** | **department\_name** | **Salary\_hour** |
| PC010 | S. Pensions | M Phillips | 24500 | S10001 | A. Smith | L004 | ITEM | 22.00 |
| PC010 | S. Pensions | M Phillips | 24500 | S10030 | L.Jones | L023 | Pensions | 18.50 |
| PC010 | S. Pensions | M Phillips | 24500 | S21010 | P.Lewis | L004 | ITEM | 21.00 |
| PC045 | S. Salaries | H.Martin | 17400 | S10010 | B. Jones | L004 | ITEM | 21.75 |
| PC045 | S. Salaries | H.Martin | 17400 | S10001 | A. Smith | L004 | ITEM | 18.00 |
| PC045 | S. Salaries | H.Martin | 17400 | S31002 | T.Gilbert | L028 | DB | 25.50 |
| PC045 | S. Salaries | H.Martin | 17400 | S13210 | W. Richards | L008 | Wages | 17.00 |
| PC064 | HR S. | K.Lewis | 12250 | S31002 | T.Gilbert | L028 | DB | 23.25 |
| PC064 | HR S. | K.Lewis | 12250 | S21010 | P.Lewis | L004 | ITEM | 17.50 |
| PC064 | HR S. | K.Lewis | 12250 | S10034 | B.James | L009 | HR | 16.50 |

**6. Transform the resulting tables so that they are in 3NF.**

**7. Are the resulting tables in BCNF? If they are not, transform them and if they are, modify some so that they are not but still comply with the 3NF.**

**8. Modify the following table so that it is in 1NF (you also want to save the headquarters city in the USA and the zip code of each client:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **employee\_id** | **employee\_name** | **sales\_office** | **Office phone** | **Client1** | **Client2** | **Client3** |
| 1003 | Mary Smith | Chicago | 312-555-1212 | ford | G.M. |  |
| 1004 | John Hunt | New York | 212-555-1212 | Dell | H.P. | Manzana |
| 1005 | Martin Hap | Chicago | 312-555-1212 | Boeing |  |  |

**9. Considering customer\_name+customer\_city as the primary key of the customer table, is it located in 2NF? And the employee table? Transform those that require it.**

**10. Are the resulting tables in 3NF?**

**11. Consider the following table of supermarket orders. Is it 2NF compliant? If not, make the necessary transformations.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Invoice\_Number** | **Line** | **Client\_ID** | **Client\_Name** | **Address** | **Amount** | **Article** | **Unit price** |
| 1001 | 1 | 43 | Anthony | Bº San José 23 | 200 | Screw | 0.05 |
| 1001 | 2 | 43 | Anthony | Bº San José 23 | 300 | Nut | 0.05 |
| 1001 | 3 | 43 | Anthony | Bº San José 23 | 100 | Washer | 0.02 |
| 1002 | 1 | 55 | Raquel | Bº San Juan 13 | 1 | Engine | 55.00 |
| 1002 | 2 | 55 | Raquel | Bº San Juan 13 | 10 | Mountain range | 12.00 |
| 1003 | 1 | 43 | Anthony | Bº San José 23 | 5 | Flange | 1.50 |

**12. Are the resulting tables in 3NF? If not, transform them.**

**13. Suppose we have a table for a weight loss clinic. In this clinic, patients have several sessions with different doctors. Session 0 is a presentation session and takes place at 9:00 or 1:00 p.m. Diagnostic session 1 is given at 10:00 or 14:00 and so on. Let's look at an example of the patient appointment table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **patient\_id** | **Patient\_name** | **session\_id** | **appointment\_time** | **Doctor** |
| 1 | John | 0 | 9 o'clock | Martinez |
| 2 | Kerr | 0 | 9 o'clock | Alvarez |
| 3 | Adam | 1 | 10:00 | Martinez |
| 4 | Robert | 0 | 13:00 | Alvarez |
| 5 | Zane | 1 | 14:00 | Martinez |

**to. Taking into account that the primary key is the union: patient\_id + session\_id, do what is necessary so that the table is in 2NF.**

**b. Do whatever it takes to get it to 3NF.**

**c. Are the resulting tables in BCNF? If they are not, make the necessary changes.**