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**Metropolitan State University**

**ICS 311 —Database Management Systems**

**Homework #3**

**Q1 (2 Points) Explain why this table is not in 1NF (First Normal Form)? List column(s) which are causing the anomalies.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***branchNo*** | *branchRegion* | *telNos* | ***mgrStaffNo*** | *mgrName* |
| BR001 | North | 503-555-3618, 503-555-4646 | S1500 | Daniel Jacobs |
| BR002 | South | 206-555-6756, 207-555-8856 | S0010 | Mary Anderson |
| BR003 | East | 210-371-3444, 210-371-3455 | S0145 | Peter McDonalds |
| BR004 | West | 506-455-2131, 506-455-2132 | S2250 | Sally Stockholm |

Solution:The “*telNos*” column is causing the anomalies. Because there values are multivalued in one row, and like there are two phone numbers inside the one row.

**Q2 (4 Points) Convert above table to 1NF**

Solution:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***branchNo*** | *branchRegion* | *telNos* | ***mgrStaffNo*** | *mgrName* |
| BR001 | North | 503-555-3618 | S1500 | Daniel Jacobs |
| BR001 | North | 503-555-4646 | S1500 | Daniel Jacobs |
| BR002 | South | 206-555-6756 | S0010 | Mary Anderson |
| BR002 | South | 207-555-8856 | S0010 | Mary Anderson |
| BR003 | East | 210-371-3444 | S0145 | Peter McDonalds |
| BR003 | East | 210-371-3455 | S0145 | Peter McDonalds |
| BR004 | West | 506-455-2131 | S2250 | Sally Stockholm |
| BR004 | West | 506-455-2132 | S2250 | Sally Stockholm |

**Q3 (4 Points) Convert below table to 2NF. Draw the table(s) with correct values.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***branchNo*** | *branchRegion* | *branchTelno* | ***mgrStaffNo*** | *mgrName* | *mgrPosition* | *hoursPerWeek* |
| BR001 | North | 503-555-3618 | S1500 | Daniel Jacobs | Jr Manager | 32 |
| BR002 | South | 206-555-6756 | S0010 | Mary Anderson | Sr Manager | 40 |
| BR003 | East | 210-371-3444 | S0145 | Peter McDonalds | Sr Manager | 36 |
| BR004 | West | 506-455-2131 | S2250 | Sally Stockholm | Jr Manager | 44 |

|  |  |  |
| --- | --- | --- |
| ***branchNo*** | *branchRegion* | *branchTelno* |
| BR001 | North | 503-555-3618 |
| BR002 | South | 206-555-6756 |
| BR003 | East | 210-371-3444 |
| BR004 | West | 506-455-2131 |

Solution:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***mgrStaffNo*** | | *mgrName* | | *mgrPosition* | |
| S1500 | | Daniel Jacobs | | Jr Manager | |
| S0010 | | Mary Anderson | | Sr Manager | |
| S0145 | | Peter McDonalds | | Sr Manager | |
| S2250 | | Sally Stockholm | | Jr Manager | |
| ***branchNo*** | ***mgrStaffNo*** | | *hoursPerWeek* | |
| BR001 | S1500 | | 32 | |
| BR002 | S0010 | | 40 | |
| BR003 | S0145 | | 36 | |
| BR004 | S2250 | | 44 | |

**Q4 (4 Points) Convert below table to 3NF. Draw the table(s) with correct values.**

Employee Table is in 1NF

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Emp\_id** | **Emp\_name** | **Emp\_zip** | **Emp\_city** | **Emp\_county** | **Emp\_state** |
| 1001 | John Smith | 90224 | Compton | Los Angeles | CA |
| 1002 | Matt Adam | 37012 | Alexandria | Dekalb | TN |
| 1006 | Laura Graham | 55404 | Minneapolis | Ramsey | MN |
| 1101 | Lily Taylor | 11234 | Brooklyn | Kings | NY |
| 1201 | Steve Hopkins | 73301 | Austin | Travis | TX |
| 1255 | Alyssa Lennon | 90224 | Compton | Los Angeles | CA |
| 1304 | Mike Hanzlik | 55404 | Minneapolis | Ramsey | MN |

Solution:

|  |  |
| --- | --- |
| **Emp\_id** | **Emp\_name** |
| 1001 | John Smith |
| 1002 | Matt Adam |
| 1006 | Laura Graham |
| 1101 | Lily Taylor |
| 1201 | Steve Hopkins |
| 1255 | Alyssa Lennon |
| 1304 | Mike Hanzlik |

|  |  |  |  |
| --- | --- | --- | --- |
| **Emp\_zip** | **Emp\_city** | **Emp\_county** | **Emp\_state** |
| 90224 | Compton | Los Angeles | CA |
| 37012 | Alexandria | Dekalb | TN |
| 55404 | Minneapolis | Ramsey | MN |
| 11234 | Brooklyn | Kings | NY |
| 73301 | Austin | Travis | TX |

|  |  |
| --- | --- |
| **Emp\_id** | **Emp\_zip** |
| 1001 | 90224 |
| 1002 | 37012 |
| 1006 | 55404 |
| 1101 | 11234 |
| 1201 | 73301 |
| 1255 | 90224 |
| 1304 | 55404 |