**Homework 06**

**Deadline: March 10 (12pm)**

Erik Sundblad

Below is a table named “Projects” that lists the number of hours some of the employees of a fictitious company put into different projects. Note that in this company a project can only have one designated project type.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SSN** | **Employee’s Name** | **Project** | **Project’s Type** | **Number of Hours** |
| 666666666 | Morbid Mojito | 1-“Spooky Wedding”  7-“Horror Hall” | 6-Event  2-Construction | 32.5  150 |
| 123456789 | Sam Mai Tai | 3-“Mai Tai Bar” | 2-Construction | 180 |
| 888777666 | James Brandy | 2-“Droid”  5-“Run4Life App”  6-“Stop, Breath, & Think” | 3-Software  3-Software  9-Research | 37  21.5  999.99 |

a) Normalize the table to 1NF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SSN** | **Employee’s Name** | **Project Number** | **Project Name** | **Project type #** | **Projects Type** | **Number of Hours** |
| 666666666 | Morbid Mojito | 1 | “Spooky Wedding | 6 | Event | 32.5 |
| 666666666 | Morbid Mojito | 7 | “Horror Hall” | 2 | Construction | 150 |
| 123456789 | Sam Mai Tai | 3 | “Mai Tai Bar” | 2 | Construction | 180 |
| 888777666 | James Brandy | 2 | “Droid” | 3 | Software | 37 |
| 888777666 | James Brandy | 5 | “Run4Life App” | 3 | Software | 21.5 |
| 888777666 | James Brandy | 6 | “Stop, Breathe, Think” | 9 | Research | 999.99 |

b) Normalize to 2NF.

Key is {**SSN, Project Number** }

List all functional dependencies that are considered violations of the 2NF:

SSN >Employee’s Name

Project Number->Project Name

Project Number->Project type #

Project Number->Project type

Project Number->Number of Hours

Relational schema after normalization to 2NF:

|  |  |
| --- | --- |
| **Employee’s** | |
| **SSN** | **Employee’s Name** |
| 666666666 | Morbid Mojito |
| 123456789 | Sam Mai Tai |
| 888777666 | James Brandy |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Projects** | | | | |
| **Project Number** | **Project Name** | **Project type #** | **Project Type** | **Number of hours** |
| 1 | “Spooky Wedding” | 6 | Event | 32.5 |
| 2 | “Droid” | 3 | Software | 37 |
| 3 | “Mai Tai Bar” | 2 | Construction | 180 |
| 5 | “Run4Life App” | 3 | Software | 21.5 |
| 6 | “Stop, Breathe, & Think” | 9 | Research | 999.99 |
| 7 | “Horror Hall” | 2 | Construction | 150 |

|  |  |
| --- | --- |
| **Employee Project’s** | |
| **Project Number** | **SSN** |
| 1 | 666666666 |
| 2 | 888777666 |
| 3 | 123456789 |
| 5 | 888777666 |
| 6 | 888777666 |
| 7 | 666666666 |

c) Normalize to 3NF.

List all functional dependencies that are considered violations of the 3NF:

Project type#-> Project type

Relational schema after normalization to 3NF:

|  |  |
| --- | --- |
| **Employee’s** | |
| **SSN** | **Employee’s Name** |
| 666666666 | Morbid Mojito |
| 123456789 | Sam Mai Tai |
| 888777666 | James Brandy |

|  |  |
| --- | --- |
| **Employee Project’s** | |
| **Project Number** | **SSN** |
| 1 | 666666666 |
| 2 | 888777666 |
| 3 | 123456789 |
| 5 | 888777666 |
| 6 | 888777666 |
| 7 | 666666666 |

|  |  |
| --- | --- |
| **Project Type’s** | |
| **Project type #** | **Project Type** |
| 2 | Construction |
| 3 | Software |
| 6 | Event |
| 9 | Research |

|  |  |  |  |
| --- | --- | --- | --- |
| **Projects** | | | |
| **Project Number** | **Project Name** | **Project type #** | **Number of hours** |
| 1 | “Spooky Wedding” | 6 | 32.5 |
| 2 | “Droid” | 3 | 37 |
| 3 | “Mai Tai Bar” | 2 | 180 |
| 5 | “Run4Life App” | 3 | 21.5 |
| 6 | “Stop, Breathe, & Think” | 9 | 999.99 |
| 7 | “Horror Hall” | 2 | 150 |