

**ISM 6217 – Database Management Systems**

**Fall 2017**

**Class Assignment 2**

**5 points**

**Task: Database Normalization**

1. **Normalize the following Table using the rules 1NF and 2NF.**
2. **Show the normalized form after each step. Also highlight the Primary Key of the Table(s).**

**Student Info**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Student ID** | **Name** | **Email** | **Course No.** | **Grade Points** |
| **100111** | **John Doe** | **doe@usna.edu** | **NN204, SI204, IT221** | **2,3,3** |
| **92244** | **Matt Smith** | **smith@usna.edu** | **SM223, EE301** | **4,4** |
| **113221** | **Melinda Black** | **black@usna.edu** | **SI204** | **3** |
| **90110** | **Tom Johnson** | **Johnson@usna.edu** | **NN204, SI204, IT221** | **4,2,3** |

1. **Can you do 3NF normalization on this table ? If No …why ?**
2. **What fictitious attribute can you add to the original table so 3NF normalization can be applied ? Show all the three forms 1NF, 2NF, 3NF using that attribute in the original table.**

**Answer to question 1 and 2**

1NF

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Student ID** | **Name** | **Email** | **Course No.** | **Grade Points** |
| 100111 | John Doe | doe@usna.edu | NN204 | 2 |
| 100111 | John Doe | doe@usna.edu | SI204 | 3 |
| 100111 | John Doe | doe@usna.edu | IT221 | 3 |
| 92244 | Matt Smith | smith@usna.edu | SM223 | 4 |
| 92244 | Matt Smith | smith@usna.edu | EE301 | 4 |
| 113221 | Melinda Black | black@usna.edu | SI204 | 3 |
| 90110 | Tom Johnson | Johnson@usna.edu | NN204 | 4 |
| 90110 | Tom Johnson | Johnson@usna.edu | SI204 | 2 |
| 90110 | Tom Johnson | Johnson@usna.edu | IT221 | 3 |

2NF

COMPOSITE KEY -STUDENT ID AND COURSE NO. PRIMARY AND COMPOSITE KEYS ARE HIGHLIGHTED

STUDENT DETAILS

|  |  |  |
| --- | --- | --- |
| **Student ID** | **Name** | **Email** |
| 100111 | John Doe | doe@usna.edu |
| 92244 | Matt Smith | smith@usna.edu |
| 113221 | Melinda Black | black@usna.edu |
| 90110 | Tom Johnson | Johnson@usna.edu |

GRADE TABLE IN 1NF --- cannot be broken further --- 2NF NOT POSSIBLE

|  |  |  |
| --- | --- | --- |
| **Student ID** | **Course No.** | **Grade Points** |
| 100111 | NN204 | 2 |
| 100111 | SI204 | 3 |
| 100111 | IT221 | 3 |
| 92244 | SM223 | 4 |
| 92244 | EE301 | 4 |
| 113221 | SI204 | 3 |
| 90110 | NN204 | 4 |
| 90110 | SI204 | 2 |
| 90110 | IT221 | 3 |

**3. Can you do 3NF normalization on this table ? If No …why ?**

NO because there is no transitive data.

**4.What fictitious attribute can you add to the original table so 3NF normalization can be applied ? Show all the three forms 1NF, 2NF, 3NF using that attribute in the original table.**

So a fictitious attribute “PROFESSOR” is being added.

0NF – ORIGINAL TABLE

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Student ID** | **Name** | **Email** | **Course No.** | **Grade Points** | **Professor** |
| **100111** | **John Doe** | **doe@usna.edu** | **NN204, SI204, IT221** | **2,3,3** | **A,B,C** |
| **92244** | **Matt Smith** | **smith@usna.edu** | **SM223, EE301** | **4,4** | **D,E** |
| **113221** | **Melinda Black** | **black@usna.edu** | **SI204** | **3** | **B** |
| **90110** | **Tom Johnson** | **Johnson@usna.edu** | **NN204, SI204, IT221** | **4,2,3** | **A,B,C** |

1NF

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Student ID** | **Name** | **Email** | **Course No.** | **Grade Points** | **Professor** |
| 100111 | John Doe | doe@usna.edu | NN204 | 2 | A |
| 100111 | John Doe | doe@usna.edu | SI204 | 3 | B |
| 100111 | John Doe | doe@usna.edu | IT221 | 3 | C |
| 92244 | Matt Smith | smith@usna.edu | SM223 | 4 | D |
| 92244 | Matt Smith | smith@usna.edu | EE301 | 4 | E |
| 113221 | Melinda Black | black@usna.edu | SI204 | 3 | B |
| 90110 | Tom Johnson | Johnson@usna.edu | NN204 | 4 | A |
| 90110 | Tom Johnson | Johnson@usna.edu | SI204 | 2 | B |
| 90110 | Tom Johnson | Johnson@usna.edu | IT221 | 3 | C |

**2NF & 3NF**

STUDENT DETAILS

|  |  |  |
| --- | --- | --- |
| **Student ID** | **Name** | **Email** |
| 100111 | John Doe | doe@usna.edu |
| 92244 | Matt Smith | smith@usna.edu |
| 113221 | Melinda Black | black@usna.edu |
| 90110 | Tom Johnson | Johnson@usna.edu |

GRADE TABLE

|  |  |  |
| --- | --- | --- |
| **Student ID** | **Course No.** | **Grade Points** |
| 100111 | NN204 | 2 |
| 100111 | SI204 | 3 |
| 100111 | IT221 | 3 |
| 92244 | SM223 | 4 |
| 92244 | EE301 | 4 |
| 113221 | SI204 | 3 |
| 90110 | NN204 | 4 |
| 90110 | SI204 | 2 |
| 90110 | IT221 | 3 |

COURSE TABLE

|  |  |
| --- | --- |
| **Course No.** | **Professor** |
| NN204 | A |
| SI204 | B |
| IT221 | C |
| SM223 | D |
| EE301 | E |