|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Student*  *Number* | *Student*  *Name* | *Subject*  *Code* | *Subject Name* | *Grade Result* | *Year* | *Semester* |
| 11004400 | Burke, A | SYS1001 | Systems 1 | D | 1995 | 1 |
| 11004400 | Burke, A | SYS1252 | Systems 2 | C | 1995 | 2 |
| 11220044 | Chan, C | SYS1001 | Systems 1 | N | 1994 | 3 |
| 11220044 | Chan, C | SYS1001 | Systems 1 | C | 1995 | 1 |
| 11220044 | Chan, C | SFT1122 | Programming | P | 1995 | 1 |
| 10102244 | Wills, Z | TEC3641 | Systems | HD | 1995 | 1 |
| 10102244 | Wills, Z | TEC3441 | Programming | HD | 1995 | 1 |
| 10102244 | Wills, Z | TEC3421 | Electronics | HD | 1995 | 1 |

**Exercise 6: Normalization**

Name: Jonel Dominic E. Tapang Course & Year: BSCS -2

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**First Normal Form (1NF)**

**Second Normal Form (2NF)**

Student Subject Grade

|  |  |
| --- | --- |
| *Student*  *Number* | *Student*  *Name* |
| 11004400 | Burke, A |
| 11220044 | Chan, C |
| 10102244 | Wills, Z |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Student*  *Number* | *Subject*  *Code* | *Grade Result* | *Year* | *Semester* |
| 11004400 | SYS1001 | D | 1995 | 1 |
| 11004400 | SYS1252 | C | 1995 | 2 |
| 11220044 | SYS1001 | N | 1994 | 3 |
| 11220044 | SYS1001 | C | 1995 | 1 |
| 11220044 | SFT1122 | P | 1995 | 1 |
| 10102244 | TEC3641 | HD | 1995 | 1 |
| 10102244 | TEC3441 | HD | 1995 | 1 |
| 10102244 | TEC3421 | HD | 1995 | 1 |

|  |  |
| --- | --- |
| *Subject*  *Code* | *Subject Name* |
| SYS1001 | Systems 1 |
| SYS1252 | Systems 2 |
| SFT1122 | Programming |
| TEC3641 | Systems |
| TEC3441 | Programming |
| TEC3421 | Electronics |

**Third Normal Form (3NF)**

The Relations - Student, Subject and Grade are already in a 3rd Normal Form because it is already 2NF and every non- key attribute is nontransitively dependent on the primary key.

ERD

Why Normalization is a necessary part of data modelling?

It is very necessary to normalize data because in the insert, delete and update anomaly will occur that will make the data unreliable. The insert anomaly will occur when certain attributes cannot be inserted into the database without the presence of other attributes. The same case as insert anomaly, the delete anomaly will exists when a certain attributes are lost because of deletion of other attributes. The update anomaly will also occur in cases when one or more duplicated data is updated, but not all, the old data still exist somewhere.

**Student**

**Grade**

**Subject**

1. **First Normal Form (1NF)**

Prescription

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pres\_no | Doc\_no | Doc\_name | Doc\_add | Doc\_phone | Pres\_date | Pat\_name | Pat\_add | Dru\_name | Dru\_des | Dru\_dos | Dru\_qty |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |

Patient

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pat\_no | Pat\_name | Pat\_add | Pat\_phone | Dru\_name | Dru\_dos | Dru\_qty | Date\_pres | Pat\_dru\_rect |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

1. **Second Normal Form**

|  |  |  |  |
| --- | --- | --- | --- |
| Doc\_no | Doc\_name | Doc\_add | Doc\_phone |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pat\_no | Pat\_name | Pat\_add | Pat\_phone | Pat\_drug\_react |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Doctor Patient

Drugs

|  |  |  |  |
| --- | --- | --- | --- |
| Drug\_name | Drug\_des | Drug\_dosage | Drug\_qty |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Prescription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pres\_no | Doc\_no | Pat\_no | Drug\_name | Pres\_date |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

1. **Third Normal Form**

|  |  |  |  |
| --- | --- | --- | --- |
| Doc\_no | Doc\_name | Doc\_add | Doc\_phone |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Doctor Patient

|  |  |  |  |
| --- | --- | --- | --- |
| Pat\_no | Pat\_name | Pat\_add | Pat\_phone |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Drugs

|  |  |
| --- | --- |
| Drug\_name | Drug\_des |
|  |  |
|  |  |
|  |  |
|  |  |

Prescription

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Pres\_no | Doc\_no | Pat\_no | Pres\_date | Drug\_name | Drug\_dosage | Drug\_qty | Pat\_drug\_react |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

Assumption

We cannot insert the fact that the particular patient had that particular drug reaction since such reactions depends upon the dosage and quantity intake of the patients. Also, we cannot insert the fact that the drug name has a particular dosage and quantity intake because it depends on the patients. However, the doctor relation is already in 3NF.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Claim No.* | *Claim Date* | *Claimant\_name* | *Claim Type* | *Claim Type Payment Rate* | *Claim Details* | *Policy No.* | *Policy Type* |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

1. **Unnormalized Form**

Claim

Policy

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Policy No* | *Policy Type* | *Policy Date* | *Policy Renewal Date* | *Policy Amount Due* | *No. Claimed Processed* | *Claim no., date of claim, claim type, amount paid* |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

First Normal Form

Claim

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Claim No.* | *Claim Date* | *Claimant\_name* | *Claim Type* | *Claim Type Payment Rate* | *Claim Details* | *Policy No.* | *Policy Type* |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

Policy

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Policy No* | *Policy Type* | *Policy Date* | *Policy Renewal Date* | *Policy Amount Due* | *No. Claimed Processed* | *Claim no.* | *Date of claim* | *Claim Type* | *Amount Paid* |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

Second Normal Form

Claim

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Claim No.* | *Claim Date* | *Claimant name* | *Claim Type* | *Claim Type Payment Rate* | *Claim Details* |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Policy

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Policy No* | *Policy Type* | *Policy Date* | *Policy Renewal Date* | *Policy Amount Due* |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Insurance

|  |  |  |  |
| --- | --- | --- | --- |
| *Policy No* | *Claim No* | *No. Claimed Processed* | *Amount Paid* |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Third Normal Form

Claim

|  |  |
| --- | --- |
| *Claimant name* | *Claim Date* |
|  |  |
|  |  |
|  |  |
|  |  |

Claim Desc

|  |  |  |  |
| --- | --- | --- | --- |
| *Claim No.* | *Claim Type* | *Claim Type Payment Rate* | *Claim Details* |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Policy

|  |  |  |
| --- | --- | --- |
| *Policy No* | *Policy Type* | *Policy Date* |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Insurance

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Policy No* | *Claim No* | *Claimant name* | *No. Claimed Processed* | *Amount Paid* | *Policy Renewal Date* | *Policy Amount Due* |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

Assumption

We cannot insert the fact that the particular claimant had that particular claim type and details because it’s up to the claimant the type of claim he\she claims also even if there’s no one who claim that claim type, it will still exist. Also, about the policy, the renewal and amount due should not depend on the policy no.

1. Third Normal Form

Employee

|  |  |  |  |
| --- | --- | --- | --- |
| *Emp\_Name* | *Emp\_Address* | *Emp\_Telephone* | *Emp\_Date of Birth* |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Department

|  |  |
| --- | --- |
| *Dep. No* | *Dep. Name* |
|  |  |
|  |  |
|  |  |
|  |  |

Training

|  |  |  |  |
| --- | --- | --- | --- |
| *Training Course Name* | *Training Course Date* | *Course Duration* | *Skill Level Acquired* |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Project

|  |  |  |  |
| --- | --- | --- | --- |
| *Proj\_No* | *Proj\_Name* | *Proj\_Start Date* | *Proj\_End Date* |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Personnel

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Personnel No.* | *Employee Name* | *Dep\_No.* | *Training Course Name* | *Proj\_No* |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

1. Third Normal Form

Supplier Item

|  |  |
| --- | --- |
| *Supplier Code* | *Supplier Name* |
| 4576 | Grey |
| 7589 | Black |
| 3849 | White |

|  |  |
| --- | --- |
| *Item Code* | *Item Description* |
| 3593 | Nut |
| 9284 | Bolt |
| 3598 | Washer |
| 3485 | Spring |
| 5467 | Screw |

Purchase

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Purchase Order Number* | *Supplier Code* | *Item Code* | *Qty* | *Cost ($)* | *PO date* |
| 158976 | 4576 | 3593 | 35 | 8 | 15/5/98 |
| 158976 | 4576 | 9287 | 40 | 25 | 15/5/98 |
| 158976 | 4576 | 3598 | 30 | 5 | 15/5/98 |
| 454638 | 7589 | 3485 | 400 | 200 | 14/5/98 |
| 374365 | 3849 | 3593 | 10 | 3 | 12/5/98 |
| 374365 | 3849 | 5467 | 11 | 3 | 12/5/98 |