Normalization

|  |  |  |
| --- | --- | --- |
| **Name** | **Marks** | **City** |
| John | 89,98,78 | X |
| Sam | 65,89,82 | Y |
| Alice | 81,87,74 | Z |
| Bob | 73,79,71 | C |

1. Insert Anomalies (Abnormality)
2. Update Anomalies (Abnormality)
3. Delete Anomalies (Abnormality)

**Normalization can be done in various forms –**

1. First Normal Form (1NF)
2. Second Normal Form (2NF)
3. Third Normal Form (3NF)
4. Boyce Codd Normal Form (3.5NF – BCNF)

**1 NF**

Every single data(value) should be in an individual cell

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Marks | Subject | City |
| John | 89 | C | X |
| John | 98 | C++ | X |
| John | 78 | Java | X |
| Sam | 65 | C | Y |
| Sam | 89 | C++ | Y |
| Sam | 82 | Java | Y |
| ……… | … | … | …. |

**2NF**

1. Table has to be in 1NF
2. There should be a prime attribute for uniquely identifying the record

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Roll No | Name | C | C++ | Java | City |
| 1 | John | 89 | 98 | 78 | X |
| 2 | Sam | 65 | 89 | 82 | Y |
| 3 | Alice | 81 | 87 | 74 | Z |
| 4 | Bob | 73 | 79 | 71 | C |

**3NF**

1. Table has to be in 2NF
2. Every Transitive dependency has to be resolved / removed

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Roll No | Name | C | C++ | Java | City | Area | Pin code |
| 1 | John | 89 | 98 | 78 | X | X1 | 1234 |
| 2 | Sam | 65 | 89 | 82 | Y | Y2 | 2468 |
| 3 | Alice | 81 | 87 | 74 | Z | Z4 | 9874 |
| 4 | Bob | 73 | 79 | 71 | C | C8 | 3567 |
| 5 | Alexa | 81 | 87 | 74 | P | P3 | 9873 |
| 6 | Peter | 73 | 79 | 71 | C | C6 | 3569 |
| 7 | Thomas | 81 | 87 | 74 | Z | Z4 | 9874 |
| 8 | Jason | 73 | 79 | 71 | C | C8 | 3567 |

**A -> B** and **B -> C** then **A->C**

Student (Table 1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Roll No | Name | C | C++ | Java | Pin code |
| 1 | John | 89 | 98 | 78 | 1234 |
| 2 | Sam | 65 | 89 | 82 | 2468 |
| 3 | Alice | 81 | 87 | 74 | 2468 |
| 4 | Bob | 73 | 79 | 71 | 3567 |
| 5 | Alexa | 81 | 87 | 74 | 9873 |
| 6 | Peter | 73 | 79 | 71 | 3569 |
| 7 | Thomas | 81 | 87 | 74 | 9874 |
| 8 | Jason | 73 | 79 | 71 | 3567 |

Address (Table 2)

|  |  |  |
| --- | --- | --- |
| Pin code | City | Area |
| 1234 | X | X1 |
| 2468 | Y | Y2 |
| 9874 | Z | Z4 |
| 3567 | C | C8 |
| 3569 | C | C6 |
| 9873 | P | P3 |

Product

|  |  |
| --- | --- |
| Product Id | Product name |
| 1 | Book |
| 2 | Pen |
| 3 | Eraser |
| 4 | Pencil |
| 5 | Sharpener |
| 6 | Scale |

Product Stocks

|  |  |  |
| --- | --- | --- |
| ProductId | Stock Date | ProductQuantity |
| 1 | 26-08-2024 | 20 |
| 2 | 26-08-2024 | 45 |
| 3 | 26-08-2024 | 65 |
| 4 | 26-08-2024 | 78 |
| 5 | 26-08-2024 | 100 |
| 6 | 26-08-2024 | 60 |
| 1 | 27-08-2024 | 15 |
| 2 | 27-08-2024 | 50 |
| 3 | 27-08-2024 | 61 |
| 4 | 27-08-2024 | 72 |
| 5 | 27-08-2024 | 10 |
| 6 | 27-08-2024 | 40 |