**Problem Description:**

Consider the following relation about cricket players during a season. The following table tracks the number of runs scored by the player. An instance of the table as it stands is given. Assume:

1. No two players have the same name.
2. A player can play against another team more than once but not on the same date. Further, a player plays only one game on any date
3. A coach coaches only one team.
4. Two teams can have a game against different opponents on the same date.
5. Every player is given a number and no two players on the same team can have the same number. Two players on different teams can have the same number.

**Player (PlayerName, PlayerState, PlayerNumber, PlayerTeam, TeamCoach, GameAgainst, GameDate, PlayerRuns)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sachin Tendulkar | Maharashtra | 10 | India | Gary christian | Pakistan  Pakistan  England | 17/3/11  25/3/11  29/5/11 | 85  99  90 |
| Ricky Ponting | Western Australia | 35 | Australia | John Buchanan | India  India  New Zealand | 10/5/03  12/5/03  22/7/03 | 89  93  0 |

For the following questions, explain your steps clearly.

1. Is the relation in 1NF? Why or why not? If not, reduce the relation to 1NF.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **player name** | **player state** | **player number** | **player team** | **team coach** | **game against** | **game date** | **runs** |
| sachin Tendulkar | Maharashtra | 10 | India | Gary christian | Pakistan | 17/3/11 | 85 |
| sachin Tendulkar | Maharashtra | 10 | India | Gary christian | Pakistan | 25/3/11 | 99 |
| sachin Tendulkar | Maharashtra | 10 | India | Gary christian | England | 29/5/11 | 90 |
| Ricky Ponting | Western Australia | 34 | Australia | John Buchanan | India | 10/5/03 | 89 |
| Ricky Ponting | Western Australia | 34 | Australia | John Buchanan | India | 12/5/03 | 93 |
| Ricky Ponting | Western Australia | 34 | Australia | John Buchanan | New Zealand | 22/5/03 | 0 |

1. Using your knowledge of cricket and from the instance, identify the functional dependencies for this relation.

**PlayerName, PlayerState,PlayerNumber, PlayerTeam, TeamCoach==>GameAgainst, GameDate, PlayerRuns**

1. Is the table you created in question 1 also in 2NF? If not decompose the relation into ones that are in 2NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **player number** | **player name** | **player state** | **player team** | **team coach** |
| 11 | sachin Tendulkar | Maharashtra | India | Gary christian |
| 34 | Ricky Ponting | Western Australia | Australia | John Buchanan |

|  |  |  |
| --- | --- | --- |
| **game against** | **game date** | **runs** |
| pakistan | 17/03/03 | 85 |
| pakistan | 25/03/03 | 99 |
| england | 29/05/03 | 90 |
| India | 10/05/03 | 89 |
| India | 12/05/03 | 93 |
| new zealand | 22/05/03 | 0 |

1. Is/Are the table(s) you created in question 3 also in 3NF? If not decompose into 3NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **player number(PK)** | **player name** | **player state** | **player team** | **team coach** |
| 11 | sachin Tendulkar | Maharashtra | India | Gary christian |
| 34 | Ricky Pontin | Western Australia | Australia | John Buchanan |

|  |  |  |  |
| --- | --- | --- | --- |
| **player number(FK)** | **game against** | **game date** | **runs** |
| 10 | pakistan | 17/03/11 | 85 |
| 10 | pakistan | 25/03/11 | 99 |
| 10 | england | 29/03/11 | 90 |
| 35 | India | 10/05/03 | 89 |
| 35 | India | 12/05/03 | 93 |
| 35 | new zealand | 22/05/03 | 0 |