**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:

* No two players have the same name.
* 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
* A coach coaches only one team.
* Two teams can have a game against different opponents on the same date.
* 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 | 11 | India | Greg Chappel | Pakistan  Pakistan  England | 12/3/03  25/3/03  29/3/03 | 95  22  88 |
| Adam Gilchrist | Western Australia | 34 | Australia | John Buchanan | S. Africa  S. Africa  New Zealand | 10/3/03  11/3/03  12/3/03 | 42  61  62 |

For the following questions, explain your steps clearly.

* 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 | 11 | India | Greg Chappel | Pakistan | 12/3/03 | 95 |
| sachin Tendulkar | Maharashtra | 11 | India | Greg Chappel | Pakistan | 25/3/03 | 22 |
| sachin Tendulkar | Maharashtra | 11 | India | Greg Chappel | England | 29/3/03 | 88 |
| Adam Gilchrist | Western Australia | 34 | Australia | John Buchanan | S. Africa | 10/3/03 | 42 |
| Adam Gilchrist | Western Australia | 34 | Australia | John Buchanan | S. Africa | 11/3/03 | 61 |
| Adam Gilchrist | Western Australia | 34 | Australia | John Buchanan | New Zealand | 12/3/03 | 62 |

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

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

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

Player Details:

|  |  |  |
| --- | --- | --- |
| **PlayerName(PK)** | **PlayerState** | **PlayerNumber** |
| Sachin Tendulkar | Maharashtra | 11 |
| Adam Gilchrist | Western Australia | 34 |

TeamInfo:

|  |  |
| --- | --- |
| **PlayerTeam(PK)** | **TeamCoach** |
| India | Greg Chappel |
| Australia | John Buchanan |

MatchDatails

|  |  |  |
| --- | --- | --- |
| **GameAgainst** | **GameDate** | **PlayerRuns** |
| Pakistan | 12/3/03 | 95 |
| Pakistan | 25/3/03 | 22 |
| England | 29/3/03 | 88 |
| S. Africa | 10/3/03 | 42 |
| S. Africa | 11/3/03 | 61 |
| New Zealand | 12/3/03 | 62 |

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

PlayerDatails

|  |  |  |  |
| --- | --- | --- | --- |
| **PlayerName(PK)** | **PlayerState** | **PlayerNumber** | **PlayerTeam(FK)** |
| Sachin Tendulkar | Maharashtra | 11 | India |
| Adam Gilchrist | Western Australia | 34 | Australia |

TeamInfo

|  |  |
| --- | --- |
| **PlayerTeam(PK)** | **TeamCoach** |
| India | Greg Chappel |
| Australia | John Buchanan |

Match deails

|  |  |  |  |
| --- | --- | --- | --- |
| **PlayerName(FK)** | **GameAgainst** | **GameDate** | **PlayerRuns** |
| Sachin Tendulkar | Pakistan | 12/3/03 | 95 |
| Sachin Tendulkar | Pakistan | 25/3/03 | 22 |
| Sachin Tendulkar | England | 29/3/03 | 88 |
| Adam Gilchrist | S. Africa | 10/3/03 | 42 |
| Adam Gilchrist | S. Africa | 11/3/03 | 61 |
| Adam Gilchrist | New Zealand | 12/3/03 | 62 |

**Part 1**

ER Diagram:

Draw an ER Diagram for a company database with the following specifications.

* A company is identified by its name (which is unique), address, and the name of the CEO who is an employee.
* A Company employs many employees. Employees are identified by an ID (unique), name, rank and age. Employees are either part-time or full-time. Full-time employees are eligible for a number of vacation days and a monthly salary. Part-time employees work a certain number of hours a week and earn pay based on an hourly rate – you must keep track of the number of hours worked.
* A Company can have several divisions. Divisions are identified by a name and a division manager, who is also an employee. A division can be a manufacturing plant or a management facility. The manufacturing plant produces a certain number of parts per day and has a safety officer who is also an employee.
* Divisions make products. A product is identified by a Product ID (unique), a product classification, and a product name. Many divisions can make the same product.
* Employees are assigned to divisions. You will need to store the date on which an employee was assigned to a division. An employee can be assigned to only one division at a time.

Reduce the above statements to ER diagram

Creation of Table with constraints

* Create a table Product as per the following specifications.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Data Type** | **Size** | **Allow Null** | **Condition** |
| ProductID | Auto Increment |  | No | Primary Key |
| Description | String | 30 | No | UNIQUE , NON-CLUSTERED INDEX |
| SetQty | Integer |  | No | Either 1, 5 or 10  Default value 1 |
| Rate | e.g. 100.25 | Precision 10 and scale 2 | Yes | Range :  51 – 5000 |

* Insert 20 records in the above Product table
* Update all the rates with 10% rate hike.
* Delete last record by providing the ProductID.
* Alter the above table and add the following column.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Data Type** | **Size** | **Allow Null** | **Condition** |
| MarginCode | Char | 1 | Yes | A or B or Null |

* Update few records to set MarginCode to A and some records MarginCode to B
* Update all the SetQty to 10 for all Items which have MarginCode A and whose original SetQty is 1.