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1 Part1

1.
$\sigma_{country1=country2}(Competes) = \emptyset$

2. $\sigma_{(dateIssued<date)or((dateIssued=date)and(timeIssued<time))}(Ticket \bowtie Match) = \emptyset$

3. cannot be expressed

4. $Team1 := \rho_{counrty,coach \to countryH,coachH}(Team)$
$\sigma_{(country!=countryH)and(coach=coachH)}(Team1 \times Team) = \emptyset$

5. $Player[position] \subseteq \{G, D, M, S\}$

2 Part2

1.
$Match_Stadium_Competes := Match \bowtie Stadium \bowtie Competes$
$Country1_stadium := \pi_{country1,SID}(Match_Stadium_Competes)$
$Country2_stadium := \pi_{country2,SID}(Match_Stadium_Competes)$
$All_happened_country_stadium :=$
$\rho_{Country1 \to country}(Country1_stadium) \cup rho_{Country2 \to country}(Country2\_stadium)$
$All_possible_country_stadium := \pi_{country,SID}(Team \times Stadium)$
$All_not_happened_country_stadium := All_possible_country_stadium - All_happened_country_stadium$
$Result := \pi_{country}(Team) - \pi_{country}(All_not_happened_country_stadium)$

2. cannot be expressed

3.
$playedAsCountry1 := \pi_{country1}(Competes)$
$playedAsCountry2 := \pi_{country2}(Competes)$
$AllCountryPlayed := \rho_{country1 \to country}(playedAsCountry1) \cup \rho_{country2 \to country}(playedAsCountry2)$
$AllNotPlayedCountry := \pi_{country}(Team) - AllCountryPlayed$

$Result := \pi_{PID}(Player \bowtie AllNotPlayedCountry)$

4.
$MoreThan2Staium := \pi_{SID}(\rho_{MID,SID \to MIDH,SIDH}(Match) \bowtie_{(MIDH \neq MID) and (SIDH = SID)}$
$Match$
$Result := \pi_{SID}(Match) - MoreThan2Stadium$

5.
$Competes1 := \rho_{MID,country1,country2,goals1,goals2 \to MIDH,country1H,country2H,goalsH,goals2H}(Competes)$
$A := (Competes1.goals1H - Competes1.goals2H > Competes.goals1 - Competes.goals2 >= 0)$
$B := (Competes1.goals2H - Competes1.goals1H > Competes.goals2 - Competes.goals1 >= 0)$
$AllNotHighestCompetes := Competes1 \bowtie_{AorB} Competes2$
$AllHighestCompetes := Competes - \pi_{MID,country1,coutry2,goals1,goals2}(AllNotHighestCompetes)$
$AllHighestCompetesCountries = \pi_{country}(\rho_{country1 \to country}(AllHighestCompetes)) \cup$
$\pi_{country}(\rho_{country1 \to country}(AllHighestCompetes))$
$Result := \pi_{coach}(AllHighestCompetesCountries \bowtie Team)$

6.
$AllDplayer := \sigma_{position = 'D'}(Player)$
$AllDcomb := \rho_{PID,goals \to PIDH,goalsH}(AllDplayer \times AllDplayer)$
$NotHighestPlayer := \pi_{PID,fname,lname,position,goals,country}(\sigma_{goals < goalsH}(AllDcomb)$
$Result := \pi_{fname,lname}(AllDplayer - NotHighestPlayer)$

7.
$Ticket_comb := \rho_{TID,dateIssued,timeIssued,MID \to TID1,dateIss1,timeIss1,MID1}(Ticket) \times$
$Ticket$
$A := ((dateIssued = dateIss1) and (timeIssued > timeIss1))$
$Not1stTickets := \pi_{TID,dateIssued,timeIssued,MID}(\sigma_{(dateIssued > dateIss1) or A}(Ticket_comb)$
$The1stTicket := Ticket - Not1stTickets$
$CountriesOf1stTicket := The1stTicket \bowtie Competes$
$TheWinnerOf1stTicket := \pi_{country}(\rho_{country1 \to country}(\sigma_{goals1 > goals2}(CountriesOf1stTicket))) \cup$
$\pi_{country}(\rho_{country2 \to country}(\sigma_{goals2 > goals1}(CountriesOf1stTicket)))$

8.
$Spain_players := \sigma_{country = 'Spain'}(Player)$
$transfer := \sigma_{goals < goalsH}(\rho_{PID,goals \to PIDH,goalsH}(Spain_players) \times Spain_players)$
$SpainNot1stGoalsPlayers := \pi_{PID,fname,lname,goals}(transfer)$
$transfer2 := \rho_{PID,goals \to PIDH,goalsH}(SpainNot1stGoalsPlayers) \times SpainNot1stGoalsPlayers$
$transfer3 := \pi_{PID,fname,lname,goals}(\sigma_{goals < goalsH}(transfer2))$
$The2ndSpainPlayer := \pi_{fname,lname}(SpainNot1stGoalsPlayers - transfer3)$

9.

$Tickets_on_Match_day := Ticket \bowtie_{dateIssued=date} Match$
$Tickets_on_Match_dayH := \rho_{TID,MID \to TIDH,MIDH}(Tickets_on_Match_day)$
$More_than_two_tickets_match := \pi_{MID}(\sigma_{(TID \neq TIDH) and (MID=MIDH)}(Tickets_on_Match_dayH \times Tickets_on_Match_day))$

10.
$AllCountriesHaveWon := \pi_{country}(\rho_{country1 \to country}(\sigma_{goals1>goals2}(Competes))) \cup \pi_{country}(\rho_{country2 \to country}(\sigma_{goals2>goals1}(Competes)))$
$PlayersOfCountriesWon := Player \bowtie AllCountriesHaveWon$
$tranfer1 := \rho_{PID,goals,country \to PIDH,goalsH,countryH}(PlayersOfCountriesWon)$
$The1stGoalPlayers := \pi_{position,goals,country}(\sigma_{goals<goalsH}(transfer1 \bowtie_{countryH=country} PlayersOfCountriesWon))$