

# Football Leagues Algebra

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فهرست بازیکنان اولیه هر تیم در بازی

```
SELECT
    t.TeamName,
    p.Fname AS PlayerFirstName,
    p.Lname AS PlayerLastName,
    m.MatchID,
    m.MatchDate,
    pim.Position,
    pim.MatchRate
FROM
    PlayerInMatch pim
JOIN
    Player p ON pim.PlayerSsn = p.PlayerSsn
JOIN
    Team t ON (pim.PlayerSsn IN (
        SELECT PlayerSsn
        FROM PlayerContract
        WHERE DestinationTeamID = t.TeamID
    ))
JOIN
    Match m ON pim.MatchID = m.MatchID
JOIN
    MatchEvents me ON me.MatchID = m.MatchID
JOIN
    Event e ON me.EventID = e.EventID
WHERE
    pim.Fixed = 1
ORDER BY
    m.MatchID,
    t.TeamName,
    p.Lname;
```

$\pi_{TeamName, Fname, Lname, MatchID, MatchDate, Position, MatchRate}(\sigma_{Fixed=1}(PlayerInMatch) \bowtie_{PlayerSsn} Player \bowtie_{MatchID} Match \bowtie_{PlayerSsn \in (\pi_{PlayerSsn}(\sigma_{DestinationTeamID=TeamID}(PlayerContract)))} Team)$

آمار فنی مربوط به بازی برای هر یک از تیم‌های شرکت کننده در آن بازی

```
SELECT
    m.MatchID,
    m.MatchDate,
    ht.TeamName AS HomeTeam,
    pt.HomeGoalsNum AS HomeGoals,
    t.TeamName AS AwayTeam,
    pt.AwayGoalsNum AS AwayGoals,
    pt.HomeFormation,
    pt.AwayFormation,
    SUM(CASE WHEN e.EventType = 'Yellow Card' AND ht.TeamID = pt.HomeTeamID THEN 1 ELSE 0 END) AS
HomeYellowCards,
    SUM(CASE WHEN e.EventType = 'Red Card' AND ht.TeamID = pt.HomeTeamID THEN 1 ELSE 0 END) AS
HomeRedCards,
    SUM(CASE WHEN e.EventType = 'Yellow Card' AND t.TeamID = pt.AwayTeamID THEN 1 ELSE 0 END) AS
AwayYellowCards,
    SUM(CASE WHEN e.EventType = 'Red Card' AND t.TeamID = pt.AwayTeamID THEN 1 ELSE 0 END) AS
AwayRedCards
FROM
    Match m
JOIN
    Participates pt ON m.MatchID = pt.MatchID
JOIN
    Team ht ON pt.HomeTeamID = ht.TeamID
JOIN
    Team t ON pt.AwayTeamID = t.TeamID
LEFT JOIN
    MatchEvents me ON m.MatchID = me.MatchID
LEFT JOIN
    Event e ON me.EventID = e.EventID
LEFT JOIN
    Player p ON me.PerformerPlayer = p.PlayerSsn
GROUP BY
    m.MatchID, m.MatchDate, ht.TeamName, pt.HomeGoalsNum, t.TeamName, pt.AwayGoalsNum,
    pt.HomeFormation, pt.AwayFormation
ORDER BY
    m.MatchDate, m.MatchID;
```

$\Pi$ MatchID, MatchDate, HomeTeam, HomeGoals, AwayTeam, AwayGoals, HomeFormation, AwayFormation, HomeYellowCards, HomeRedCards, A  
wayYellowCards, AwayRedCards

$(\gamma$ MatchID, MatchDate, HomeTeam, HomeGoalsNum, AwayTeam, AwayGoalsNum, HomeFormation, AwayFormation

(Match $\bowtie$ Participates $\bowtie$ Team AS HomeTeam $\bowtie$ Team AS AwayTeam $\bowtie$ MatchEvents $\bowtie$ Event $\bowtie$ Pla  
yer $\bowtie$ PlayerContract))

## گل زنان یک بازی

```
SELECT
    m.MatchID,
    m.MatchDate,
    t.TeamName,
    p.Fname AS PlayerFirstName,
    p.Lname AS PlayerLastName,
    e.EventTime,
    e.EventType
FROM
    Match m
JOIN
    MatchEvents me ON m.MatchID = me.MatchID
JOIN
    Event e ON me.EventID = e.EventID
JOIN
    Player p ON me.PerformerPlayer = p.PlayerSsn
JOIN
    PlayerContract pc ON p.PlayerSsn = pc.PlayerSsn
JOIN
    Team t ON pc.DestinationTeamID = t.TeamID
WHERE
    e.EventType = 'Goal'
ORDER BY
    m.MatchDate, m.MatchID, e.EventTime;
```

$\pi_{\text{MatchID, MatchDate, TeamName, PlayerFirstName, PlayerLastName, EventTime, EventType}}(\sigma_{\text{EventType='Goal'}}(((\text{Match} \bowtie_{\text{MatchID}} \text{MatchEvents}) \bowtie_{\text{EventID}} \text{Event}) \bowtie_{\text{PerformerPlayer}} \text{Player}) \bowtie_{\text{PlayerSsn}} \text{PlayerContract}) \bowtie_{\text{DestinationTeamID=TeamID}} \text{Team}))$

## بازیکنان اخطاری یک بازی

```
SELECT
    m.MatchID,
    m.MatchDate,
    t.TeamName,
    p.Fname AS PlayerFirstName,
    p.Lname AS PlayerLastName,
    e.EventTime,
    e.EventType AS CardType
FROM
    Match m
JOIN
    MatchEvents me ON m.MatchID = me.MatchID
JOIN
    Event e ON me.EventID = e.EventID
JOIN
    Player p ON me.PerformerPlayer = p.PlayerSsn
JOIN
    PlayerContract pc ON p.PlayerSsn = pc.PlayerSsn
JOIN
    Team t ON pc.DestinationTeamID = t.TeamID
WHERE
    e.EventType IN ('Yellow Card', 'Red Card')
ORDER BY
    m.MatchDate, m.MatchID, e.EventTime;
```

$\pi_{\text{MatchID, MatchDate, TeamName, PlayerFirstName, PlayerLastName, EventTime, CardType}}(\sigma_{\text{EventType} \in \{\text{'YellowCard'}, \text{'RedCard'}\}}(((\text{Match} \bowtie_{\text{MatchID}} \text{MatchEvents}) \bowtie_{\text{EventID}} \text{Event}) \bowtie_{\text{PerformerPlayer}} \text{Player}) \bowtie_{\text{PlayerSsn}} \text{PlayerContract}) \bowtie_{\text{DestinationTeamID=TeamID}} \text{Team}))$

## آمار تعویض‌های یک بازی

SELECT

```
m.MatchID,
m.MatchDate,
t.TeamName,
p_out.Fname AS OutgoingPlayerFirstName,
p_out.Lname AS OutgoingPlayerLastName,
p_in.Fname AS IncomingPlayerFirstName,
p_in.Lname AS IncomingPlayerLastName,
e.EventTime
```

FROM

```
Match m
```

JOIN

```
MatchEvents me ON m.MatchID = me.MatchID
```

JOIN

```
Event e ON me.EventID = e.EventID
```

JOIN

```
Player p_out ON me.PerformerPlayer = p_out.PlayerSsn
```

JOIN

```
Player p_in ON me.InvolvedPlayer = p_in.PlayerSsn
```

JOIN

```
PlayerContract pc_out ON p_out.PlayerSsn = pc_out.PlayerSsn
```

JOIN

```
PlayerContract pc_in ON p_in.PlayerSsn = pc_in.PlayerSsn
```

JOIN

```
Team t ON pc_out.DestinationTeamID = t.TeamID
```

WHERE

```
e.EventType = 'Substitution'
```

ORDER BY

```
m.MatchDate, m.MatchID, e.EventTime;
```

$\pi_{MatchID, MatchDate, TeamName, OutgoingPlayerFirstName, OutgoingPlayerLastName, IncomingPlayerFirstName, IncomingPlayerLastName, EventTime}(\sigma_{EventType='Substitution'}(((Match \bowtie_{MatchID} MatchEvents) \bowtie_{EventID} Event) \bowtie_{PerformerPlayer = p\_out} (Player)) \bowtie_{InvolvedPlayer = p\_in} (Player)) \bowtie_{PlayerSsn = p\_cout} (PlayerContract)) \bowtie_{PlayerSsn = p\_pcin} (PlayerContract)) \bowtie_{DestinationTeamID = TeamID} Team))$

## تاریخچه حضور بازیکن در تیم‌های مختلف

```

SELECT
    p.Fname as 'First name',
    p.Lname as 'Last name',
    t.TeamName,
    pc.ContractDate AS ContractStartDate,
    pc.TerminationDate AS ContractEndDate,
    pc.Salary,
    COUNT(pm.MatchID) AS MatchesPlayed,
    SUM(CASE WHEN e.EventType = 'Goal' THEN 1 ELSE 0 END) AS GoalsScored,
    SUM(CASE WHEN e.EventType = 'Yellow Card' THEN 1 ELSE 0 END) AS YellowCards,
    SUM(CASE WHEN e.EventType = 'Red Card' THEN 1 ELSE 0 END) AS RedCards,
    AVG(pm.MatchRate) AS AverageRating,
    SUM(CASE WHEN pm.Fixed = 1 THEN 1 ELSE 0 END) AS Fixed,
    SUM(CASE WHEN pm.Fixed = 0 THEN 1 ELSE 0 END) AS Substitutions
FROM
    PlayerContract pc
JOIN
    Team t ON pc.DestinationTeamID = t.TeamID
JOIN
    PlayerInMatch pm ON pc.PlayerSsn = pm.PlayerSsn
JOIN
    Match m ON pm.MatchID = m.MatchID
LEFT JOIN
    MatchEvents me ON pm.MatchID = me.MatchID AND me.PerformerPlayer = pc.PlayerSsn
JOIN
    Event e ON me.EventID = e.EventID
JOIN
    Player p ON pm.PlayerSsn = p.PlayerSsn
GROUP BY
    p.Fname, p.Lname, pc.PlayerSsn, t.TeamName, pc.ContractDate, pc.TerminationDate, pc.Salary;

```

$\pi_{\text{First name, Last name, TeamName, ContractStartDate, ContractEndDate, Salary, MatchesPlayed, GoalsScored, YellowCards, RedCards, AverageRating, Fixed, Substitutions}}(\gamma_{\text{Fname, Lname, PlayerSsn, TeamName, ContractDate, TerminationDate, Salary}}(((PlayerContract \bowtie_{\text{DestinationTeamID=TeamID}} Team) \bowtie_{\text{PlayerSsn}} PlayerInMatch) \bowtie_{\text{MatchID}} Match) \bowtie_{\text{MatchID}} MatchEvents) \bowtie_{\text{EventID}} Event) \bowtie_{\text{PlayerSsn}} Player)))$

## تاریخچه حضور بازیکن در انواع لیگ‌های مختلف

```

SELECT
    p.PlayerSsn,
    l.LeagueName,
    t.TeamName,
    p.Fname AS PlayerFirstName,
    p.Lname AS PlayerLastName,
    DATEDIFF(DAY, pc.ContractDate, GETDATE()) AS TotalDaysInLeague,
    SUM(CASE WHEN e.EventType = 'Goal' THEN 1 ELSE 0 END) AS GoalsScored,
    AVG(pm.MatchRate) AS AverageRating
FROM
    League l
JOIN
    Ranking r ON l.LeagueID = r.LeagueID
JOIN
    Team t ON r.TeamID = t.TeamID
JOIN
    PlayerContract pc ON t.TeamID = pc.DestinationTeamID
JOIN
    Player p ON pc.PlayerSsn = p.PlayerSsn
JOIN
    PlayerInMatch pm ON p.PlayerSsn = pm.PlayerSsn
JOIN
    Match m ON pm.MatchID = m.MatchID
LEFT JOIN
    MatchEvents me ON pm.MatchID = me.MatchID AND me.PerformerPlayer = p.PlayerSsn
JOIN
    Event e ON me.EventID = e.EventID
GROUP BY
    p.PlayerSsn, pc.ContractDate, l.LeagueName, t.TeamName, p.Fname, p.Lname;

ΠPlayerSsn,LeagueName,TeamName,PlayerFirstName,PlayerLastName,TotalDaysInLeague,GoalsScored,AverageRating
(γPlayerSsn,ContractDate,LeagueName,TeamName,PlayerFirstName,PlayerLastName((((League⋈LeagueID
Ranking)⋈TeamIDTeam)⋈DestinationTeamIDPlayerContract)⋈PlayerSsnPlayer)⋈PlayerSsn
PlayerInMatch)⋈MatchIDMatch))

```

## آمار بازیهای انجام شده یک تیم در یک نوع لیگ

```
SELECT
  m.LeagueWeek,
  t.TeamName AS 'Home Team name',
  t2.TeamName as 'Away Team name',
  pt.HomeFormation 'Team format',
  pt.HomeGoalsNum as 'Home Team Goals number',
  pt.AwayGoalsNum as 'Away Goals number',
  SUM(CASE WHEN e.EventType = 'Yellow Card' AND pm.PlayerSsn = me.PerformerPlayer AND pm.MatchID =
m.MatchID AND pc.DestinationTeamID = 2 THEN 1 ELSE 0 END) AS YellowCards,
  SUM(CASE WHEN e.EventType = 'Red Card' AND pm.PlayerSsn = me.PerformerPlayer AND pm.MatchID =
m.MatchID AND pc.DestinationTeamID = 2 THEN 1 ELSE 0 END) AS RedCards
FROM
  Event e
left JOIN
  MatchEvents me ON me.EventID = e.EventID
left JOIN
  PlayerInMatch pm ON pm.PlayerSsn = me.PerformerPlayer
left JOIN
  PlayerContract pc ON pc.PlayerSsn = pm.PlayerSsn
left JOIN
  Team t ON t.TeamID = pc.DestinationTeamID
left JOIN
  Participates pt ON pt.HomeTeamID = t.TeamID
left JOIN
  Team t2 ON t2.TeamID = pt.AwayTeamID
left JOIN
  Match m ON m.MatchID = pt.MatchID
left JOIN
  League l ON l.LeagueID = m.LeagueID
where
  (pt.HomeTeamID = 2 OR pt.AwayTeamID = 2) and l.LeagueID = 2 and pm.MatchID = me.MatchID and e.EventID
= me.EventID
Group by
  m.LeagueWeek,
  t.TeamName,
  t2.TeamName,
  pt.HomeFormation,
  pt.HomeGoalsNum,
  pt.AwayGoalsNum
order by
  m.LeagueWeek;
```

$\pi_{\text{LeagueWeek, TeamName, TeamFormat, SelectedTeamGoalsNumber, RivalGoalsNumber, YellowCards, RedCards}}$

$(\sigma_{\text{HomeTeamID} = 2 \text{ and } \text{LeagueID} = 2}(\gamma_{\text{LeagueWeek, TeamName, HomeFormation, HomeGoalsNum, AwayGoalsNum}}$   
 $(\text{Event} \bowtie \text{MatchEvents} \bowtie \text{PlayerInMatch} \bowtie \text{PlayerContract} \bowtie \text{Team} \bowtie \text{Participates} \bowtie \text{Match})))$



## تاریخچه سرمربیان تیم

SELECT

```
t.TeamName,
ts.Fname,
ts.Lname,
ts.BirthDate,
ts.Age,
ts.PhoneNumber,
ts.Address,
tsc.ContractDate,
tsc.ContractPeriod,
tsc.TerminationDate,
tsc.Salary,
r.GamesPlayed,
r.Wins AS Wins,
r.Draws AS Draws,
r.Losts AS Losses,
r.GoalsFor,
r.GoalsAgainst,
SUM(CASE WHEN e.EventType = 'Yellow Card' AND (t.TeamID = pt.HomeTeamID OR t.TeamID =
pt.AwayTeamID) THEN 1 ELSE 0 END) AS YellowCards,
SUM(CASE WHEN e.EventType = 'Red Card' AND (t.TeamID = pt.HomeTeamID OR t.TeamID = pt.AwayTeamID)
THEN 1 ELSE 0 END) AS RedCards
FROM
    TechnicalStaff ts
JOIN
    TechnicalStaffContract tsc ON ts.TechnicalStaffSsn = tsc.TechnicalStaffSsn
JOIN
    Team t ON tsc.DestinationTeamID = t.TeamID
JOIN
    Ranking r ON r.TeamID = t.TeamID
JOIN
    League l ON r.LeagueID = l.LeagueID
JOIN
    Match m ON m.LeagueID = l.LeagueID
JOIN
    MatchEvents me ON me.MatchID = m.MatchID
JOIN
    Event e ON e.EventID = me.EventID
JOIN
    Participates pt ON pt.MatchID = m.MatchID
WHERE
    ts.TechnicalStaffRole = 'Coach' AND tsc.ContractDate <= GETDATE() AND (tsc.TerminationDate IS NULL
OR tsc.TerminationDate > GETDATE())

Group by t.TeamName, ts.Fname, ts.Lname, ts.BirthDate, ts.Age, ts.PhoneNumber, ts.Address,
tsc.ContractDate, tsc.ContractPeriod, tsc.TerminationDate, tsc.Salary, r.GamesPlayed, r.Wins, r.Draws,
r.Losts, r.GoalsFor, r.GoalsAgainst
ORDER BY
    tsc.ContractDate DESC;
```

$\pi$ TeamName, CoachFirstName, CoachLastName, CoachBirthDate, CoachAge, CoachPhoneNumber, CoachAddress, ContractDate, ContractPeriod, TerminationDate, Salary, GamesPlayed, Wins, Draws, Losses, GoalsFor, GoalsAgainst, YellowCards, RedCards

$(\sigma_{\text{TechnicalStaffRole} = \text{'Coach'}} \text{ AND } \text{ContractDate} \leq \text{GETDATE}() \text{ AND } (\text{TerminationDate IS NULL OR TerminationDate} > \text{GETDATE}()))$

$(\text{TechnicalStaff} \bowtie \text{TechnicalStaffContract} \bowtie \text{Team} \bowtie \text{Ranking} \bowtie \text{League} \bowtie \text{Match} \bowtie \text{MatchEvents} \bowtie \text{Event} \bowtie \text{Participates})$

آمار فنی بازیکنان کنونی یک تیم به همراه اطلاعات قرارداد آنها

```
SELECT
    p.PlayerSsn,
    p.Fname,
    p.Lname,
    p.Weight,
    p.Height,
    pc.ContractDate,
    pc.ContractPeriod,
    pc.TerminationDate,
    pc.Salary,
    pc.ShirtNumber,
    (SELECT COUNT(*) FROM PlayerInMatch pim WHERE pim.PlayerSsn = p.PlayerSsn) AS TotalMatches
FROM
    Player p
JOIN
    PlayerContract pc ON p.PlayerSsn = pc.PlayerSsn
WHERE
    pc.DestinationTeamID = 2 AND pc.TerminationDate > GETDATE()
ORDER BY
    p.Fname, p.Lname;
```

$\pi_{\text{PlayerSsn, Fname, Lname, Weight, Height, ContractDate, ContractPeriod, TerminationDate, Salary, ShirtNumber, TotalMatches}}$   
 $(\sigma_{\text{DestinationTeamID}=2 \wedge \text{TerminationDate} > \text{GETDATE()}}(\text{Player} \bowtie \text{PlayerContract}))$

آمار سرمربی فعلی تیم به همراه اطلاعات قرارداد وی

```
SELECT
    ts.TechnicalStaffSsn,
    ts.Fname AS CoachFirstName,
    ts.Lname AS CoachLastName,
    tsf.ContractDate,
    tsf.TerminationDate,
    tsf.Salary,
    r.GamesPlayed AS 'Games Coached',
    SUM(CASE WHEN e.EventType = 'Goal' THEN 1 ELSE 0 END) AS Goals,
    SUM(CASE WHEN e.EventType IN ('Yellow Card', 'Red Card') THEN 1 ELSE 0 END) AS TotalWarnings
FROM
    TechnicalStaffContract tsf
JOIN
    TechnicalStaff ts ON tsf.TechnicalStaffSsn = ts.TechnicalStaffSsn
JOIN
    Participates p ON tsf.DestinationTeamID = p.HomeTeamID OR tsf.DestinationTeamID = p.AwayTeamID
LEFT JOIN
    MatchEvents me ON p.MatchID = me.MatchID
LEFT JOIN
    Event e ON me.EventID = e.EventID
JOIN
    Ranking r ON r.TeamID = tsf.DestinationTeamID
WHERE
    ts.TechnicalStaffRole = 'Coach'
GROUP BY
    r.GamesPlayed,
    ts.TechnicalStaffSsn,
    ts.Fname,
    ts.Lname,
    tsf.ContractDate,
    tsf.TerminationDate,
    tsf.Salary;
```

$\pi_{\text{TechnicalStaffSsn, CoachFirstName, CoachLastName, ContractDate, TerminationDate, Salary, Games Coached, Goals, TotalWarnings}}$   
 $(\sigma_{\text{TechnicalStaffRole}='Coach'}(\text{TechnicalStaffContract} \bowtie \text{TechnicalStaff} \bowtie \text{Ranking}))$

آمار کادر فنی فعلی تیم به همراه سمت و اطلاعات قرارداد آنها

```
SELECT
    ts.TechnicalStaffSsn,
    ts.Fname AS 'Staff First Name',
    ts.Lname AS 'Staff Last Name',
    ts.TechnicalStaffRole AS 'Technical Staff Role',
    tsf.ContractDate,
    tsf.TerminationDate,
    tsf.Salary
FROM
    TechnicalStaff ts
JOIN
    TechnicalStaffContract tsf ON ts.TechnicalStaffSsn = tsf.TechnicalStaffSsn
```

$\pi_{\text{TechnicalStaffSsn, Staff First Name, Staff Last Name, Technical Staff Role, ContractDate, TerminationDate, Salary}}$   
(TechnicalStaff  $\bowtie$  TechnicalStaffContract)

آمار هر کدام از بازیکنان خریداری شده توسط یک تیم در یک بازه زمانی مشخص

```
SELECT
    pc.PlayerSsn,
    p.Fname AS PlayerFirstName,
    p.Lname AS PlayerLastName,
    pc.ContractDate,
    pc.TerminationDate,
    pc.Salary,
    t.TeamName AS 'Current team',
    COALESCE(t2.TeamName, '---') AS 'Previous Team name'
FROM
    PlayerContract pc
JOIN
    Player p ON pc.PlayerSsn = p.PlayerSsn
JOIN
    Team t ON pc.DestinationTeamID = t.TeamID
JOIN
    Team t2 ON pc.PreviousTeamID = t2.TeamID
WHERE
    pc.ContractDate >= '2020-02-01' AND pc.ContractDate <= '2021-12-01';
```

$\pi_{\text{PlayerSsn, PlayerFirstName, PlayerLastName, ContractDate, TerminationDate, Salary, Current team, Previous Team name}}$  ( $\sigma_{\text{ContractDate} \geq '2020-02-01' \wedge \text{ContractDate} \leq '2021-12-01'}$  (PlayerContract  $\bowtie$  Player  $\bowtie$  Team  $\bowtie$  Team as t2))

آمار تمامی قراردادهای بازیکنان با تیم‌ها طی یک بازه زمانی مشخص

```
SELECT
    pc.PlayerSsn,
    p.Fname AS PlayerFirstName,
    p.Lname AS PlayerLastName,
    pc.ContractDate,
    pc.TerminationDate,
    pc.Salary,
    t.TeamName AS 'Team'
FROM
    PlayerContract pc
JOIN
    Player p ON pc.PlayerSsn = p.PlayerSsn
JOIN
    Team t ON pc.DestinationTeamID = t.TeamID
JOIN
    Team t2 ON pc.PreviousTeamID = t2.TeamID
WHERE
    pc.ContractDate >= '2020-01-01' AND pc.ContractDate <= '2021-12-01';
```

$\pi_{\text{PlayerSsn, PlayerFirstName, PlayerLastName, ContractDate, TerminationDate, Salary, Team}}(\sigma_{\text{ContractDate} \geq '2020-01-01' \wedge \text{ContractDate} \leq '2021-12-01'}(\text{PlayerContract} \bowtie \text{Player} \bowtie \text{Team} \bowtie \text{Team as t2}))$

آمار تمامی قراردادهای اعضاء کادر فنی با تیم‌ها طی یک بازه زمانی مشخص

```
SELECT
    pf.Fname AS PersonnelFirstName,
    pf.Lname AS PersonnelLastName,
    pf.TechnicalStaffRole AS PersonnelRole,
    t.TeamName,
    tc.ContractDate,
    tc.TerminationDate,
    tc.TechnicalStaffSsn,
    tc.Salary
FROM
    TechnicalStaffContract tc
JOIN
    TechnicalStaff pf ON tc.TechnicalStaffSsn = pf.TechnicalStaffSsn
JOIN
    Team t ON tc.DestinationTeamID = t.TeamID
WHERE
    tc.ContractDate >= '2020-01-01' AND tc.ContractDate <= '2021-01-01';
```

$\pi_{\text{PersonnelFirstName, PersonnelLastName, PersonnelRole, TeamName, ContractDate, TerminationDate, TechnicalStaffSsn, Salary}}(\sigma_{\text{ContractDate} \geq '2020-01-01' \wedge \text{ContractDate} \leq '2021-01-01'}(\text{TechnicalStaffContract} \bowtie \text{TechnicalStaff} \bowtie \text{Team}))$

مبلغ هزینه کلی پرداختی هر تیم به بازیکنان فعلی

```
SELECT
    t.TeamName,
    SUM(pc.Salary) AS TotalPaymentToPlayers
FROM
    PlayerContract pc
JOIN
    Team t ON pc.DestinationTeamID = t.TeamID
where
    pc.TerminationDate > GETDATE()
GROUP BY
    t.TeamName;
```

$\pi_{TeamName, TotalPaymentToPlayers}(\gamma_{TeamName, SUM(Salary) \text{ as } TotalPaymentToPlayers}(\sigma_{TerminationDate > GETDATE()}(PlayerContract \bowtie Team)))$

مبلغ هزینه کلی پرداختی هر تیم به اعضا فعلی کادر فنی

```
SELECT
    t.TeamName,
    SUM(tc.Salary) AS TotalPaymentToStaff
FROM
    TechnicalStaffContract tc
JOIN
    Team t ON tc.DestinationTeamID = t.TeamID
where
    tc.TerminationDate > GETDATE()
GROUP BY
    t.TeamName;
```

$\pi_{TeamName, TotalPaymentToStaff}(\gamma_{TeamName, SUM(Salary) \text{ as } TotalPaymentToStaff}(\sigma_{TerminationDate > GETDATE()}(TechnicalStaffContract \bowtie Team)))$

## جدول لیگ

SELECT

```
    l.LeagueName,
    l.Season,
    t.TeamName,
    r.GamesPlayed,
    r.Wins,
    r.Draws,
    r.Losts,
    r.GoalsFor,
    r.GoalsAgainst,
    r.GoalsDifference,
    r.TeamRate,
    SUM(CASE WHEN e.EventType = 'Yellow Card' AND (t.TeamID = pt.HomeTeamID OR t.TeamID =
pt.AwayTeamID) THEN 1 ELSE 0 END) AS YellowCards,
    SUM(CASE WHEN e.EventType = 'Red Card' AND (t.TeamID = pt.HomeTeamID OR t.TeamID = pt.AwayTeamID)
THEN 1 ELSE 0 END) AS RedCards
FROM
    Team t
JOIN
    Ranking r ON t.TeamID = r.TeamID
JOIN
    League l ON r.LeagueID = l.LeagueID
JOIN
    Match m ON m.LeagueID = l.LeagueID
JOIN
    MatchEvents me ON me.MatchID = m.MatchID
JOIN
    Event e ON e.EventID = me.EventID
JOIN
    Participates pt ON pt.MatchID = m.MatchID
WHERE
    l.LeagueID = 2 AND Season = '2022-2023'
group by
    l.LeagueName,
    l.Season,
    t.TeamName,
    r.GamesPlayed,
    r.Wins,
    r.Draws,
    r.Losts,
    r.GoalsFor,
    r.GoalsAgainst,
    r.GoalsDifference,
    r.TeamRate

ORDER BY
    r.TeamRate DESC,
    GoalsDifference DESC;
```

$\pi_{\text{LeagueName,Season,TeamName,GamesPlayed,Wins,Draws,Losts,GoalsFor,GoalsAgainst,GoalsDifference,TeamRate,YellowCards,RedCards}}$

$(\gamma_{\text{LeagueName,Season,TeamName,GamesPlayed,Wins,Draws,Losts,GoalsFor,GoalsAgainst,GoalsDifference,TeamRate}}$

$(\sigma_{\text{LeagueID}=2 \text{ AND Season} = '2022-2023'}$

$(\text{Team} \bowtie \text{Ranking} \bowtie \text{League} \bowtie \text{Match} \bowtie \text{MatchEvents} \bowtie \text{Event} \bowtie \text{Participates})))$

## آمار بازی‌های انجام شده در یک لیگ

```
SELECT
    m.MatchDate,
    s.StadiumName,
    t.TeamName AS HomeTeam,
    t2.TeamName AS AwayTeam,
    p.HomeGoalsNum AS 'Home Team Goals',
    p.AwayGoalsNum AS 'Away Team Goals',
    (SELECT COUNT(*) FROM Ticket ti WHERE ti.MatchID = m.MatchID) AS 'The number of spectators',
    (SELECT Sum(ti.Price) FROM Ticket ti WHERE ti.MatchID = m.MatchID) AS 'Profit from ticket sales',
    re.Fname AS 'Referee First Name',
    re.Lname AS 'Referee Last Name',
    rf.RefereeRole,
    su.Fname AS 'Supervisor First Name',
    su.Lname AS 'Supervisor Last Name'
FROM
    Participates p
JOIN
    Team t ON p.HomeTeamID = t.TeamID
JOIN
    Team t2 ON p.AwayTeamID = t2.TeamID
JOIN
    Match m ON m.MatchID = p.MatchID
JOIN
    RefereeTeam rf ON m.MatchID = rf.MatchID
JOIN
    stadium s ON m.StadiumID = s.StadiumID
JOIN
    Ticket ti ON m.MatchID = ti.MatchID
JOIN
    Referee re ON rf.RefereeSsn = re.RefereeSsn
JOIN
    SupervisorTeam sut ON m.MatchID = sut.MatchID
JOIN
    Supervisor su ON sut.SupervisorSsn = su.SupervisorSsn

Group by m.MatchDate, s.StadiumName, t.TeamName, t2.TeamName, m.MatchID, p.HomeGoalsNum, p.AwayGoalsNum,
re.Fname, re.Lname, rf.RefereeRole, su.Fname, su.Lname;
```

$\pi_{\text{MatchDate, StadiumName, HomeTeam, AwayTeam, Home Team Goals, Away Team Goals, Number of Spectators, Profit from Ticket Sales, Referee First Name, Referee Last Name, Referee Role, Supervisor First Name, Supervisor Last Name}}$   
 $(\gamma_{\text{MatchID, HomeGoalsNum, AwayGoalsNum, Fname, Lname, RefereeRole, Fname, Lname}}$   
 $(\sigma_{\text{MatchID} = \text{MatchID}}(\text{Participates} \bowtie \text{Team} \bowtie \text{Team} \bowtie \text{Match} \bowtie \text{RefereeTeam} \bowtie \text{Stadium} \bowtie \text{Ticket} \bowtie \text{Referee}$   
 $\bowtie \text{SuperVisorTeam} \bowtie \text{SuperVisor})))$



## آمار فنی بازیکنان شاغل در یک لیگ

```
SELECT
    t.TeamName,
    p.Fname AS PlayerFirstName,
    p.Lname AS PlayerLastName,
    COUNT(pm.MatchID) AS MatchesPlayed,
    SUM(CASE WHEN e.EventType = 'Goal' THEN 1 ELSE 0 END) AS GoalsScored,
    SUM(CASE WHEN e.EventType = 'Yellow Card' THEN 1 ELSE 0 END) AS YellowCards,
    SUM(CASE WHEN e.EventType = 'Red Card' THEN 1 ELSE 0 END) AS RedCards,
    AVG(pm.MatchRate) AS AverageRating
FROM
    Team t
JOIN
    PlayerContract pc ON t.TeamID = pc.DestinationTeamID
JOIN
    Player p ON pc.PlayerSsn = p.PlayerSsn
JOIN
    PlayerInMatch pm ON p.PlayerSsn = pm.PlayerSsn
JOIN
    Match m ON pm.MatchID = m.MatchID
JOIN
    MatchEvents me ON pm.MatchID = me.MatchID AND me.PerformerPlayer = p.PlayerSsn
JOIN
    Event e ON me.EventID = e.EventID
GROUP BY
    t.TeamName, p.Fname, p.Lname;
```

$\pi_{TeamName, PlayerFirstName, PlayerLastName, MatchesPlayed, GoalsScored, YellowCards, RedCards, AverageRating}$

$(\gamma_{TeamID, PlayerSsn, Fname, Lname}$

$(\sigma_{EventType = 'Goal' \text{ or } EventType = 'Yellow Card' \text{ or } EventType = 'Red Card'}(Team \bowtie PlayerContract \bowtie Player \bowtie PlayerInMatch \bowtie Match \bowtie MatchEvents \bowtie Event)))$

## بازیکنان محروم از یک هفته از لیگ

```
SELECT
    p.FName AS PlayerFirstName,
    p.LName AS PlayerLastName,
    t.TeamName,
    e.EventType,
    m.LeagueWeek+1 as LeagueWeek
FROM
    Player p
JOIN
    PlayerContract pc ON p.PlayerSsn = pc.PlayerSsn
JOIN
    Team t ON pc.DestinationTeamID = t.TeamID
JOIN
    PlayerInMatch pm ON p.PlayerSsn = pm.PlayerSsn
JOIN
    Match m ON pm.MatchID = m.MatchID
JOIN
    MatchEvents me ON pm.MatchID = me.MatchID AND me.PerformerPlayer = p.PlayerSsn
JOIN
    Event e On me.EventID = e.EventID
WHERE
    (e.EventType = 'Red Card') OR ((SELECT COUNT(*) FROM MatchEvents WHERE PerformerPlayer =
    p.PlayerSsn AND m.LeagueWeek <= 1 AND e.EventType = 'Yellow Card') >= 3)
GROUP BY
    p.FName, p.LName, t.TeamName, e.EventType ,m.LeagueWeek;
```

$\pi_{\text{PlayerFirstName, PlayerLastName, TeamName, EventType, LeagueWeek}}(\sigma_{\text{EventType} = \text{'Red Card'} \text{ or } (\text{YellowCardCount} \geq 3)}$   
 $(\rho_{\text{YellowCardCount}}$   
 $(\gamma_{\text{PerformerPlayer, LeagueWeek, EventType}}(\text{Player} \bowtie \text{PlayerContract} \bowtie \text{Team} \bowtie \text{PlayerInMatch} \bowtie \text{Match} \bowtie \text{Match}$   
 $\text{Events} \bowtie \text{Event}))))$