Data Base Final Project

Relational Algebra

عکس های مربوط به جبر رابطه ای کیفیت نسبتا خوبی دارند؛ فقط کمی نیاز به زوم دارند :)

{گزارشگیری از بازی}

✓ فهرست بازیکنان اولیه هر تیم در بازی

```
SELECT mpi.team_name, pl.player_name, pl.player_number, mpi.player_post
FROM `match_player_information` mpi
JOIN `player` pl ON mpi.player_ssn = pl.player_ssn
WHERE (mpi.match_date = '2025-02-25') AND ( mpi.match_stadium = 'Azadi')
ORDER BY pl.team_name, pl.player_name
```

$$\pi_{mpi.team\_name,\, pl.player\_name,\, pl.player\_number,\, mpi.player\_post}\left(\sigma_{mpi.match\_date\,=\,'2025-02-25'\,\wedge\, mpi.match\_stadium\,=\,'Azadi'}\left(\left(mpi\right)\bowtie_{mpi.player\_ssn\,=\,pl.player\_ssn}\left(pl\right)\right)\right)\tau_{pl.team\_name,\, pl.player\_name}$$

✓ آمار فنی مربوط به بازی برای هر یک از تیمهای شرکت کننده در آن بازی، شامل: تعداد گلهای زده و خورده، تعداد اخطارها و نوع هر یک (کارت زرد یا قرمز) و نیز آرایش اولیه تیم در بازی

```
SELECT mti.team_name, mti.hosting_status, mti.team_arrange, mti.goals_score,
mti.goals_concede, yel.yellow_cards, red.red_cards
FROM `match_team_information` mti
LEFT JOIN (
    SELECT pc.match_date, pc.match_stadium, COUNT(pc.card_color) AS
`yellow_cards`, pl.team_name
    FROM `player_cards` pc
    JOIN `player` pl ON pc.player_ssn = pl.player_ssn
    WHERE (pc.match_date = '2025-02-25') AND (pc.match_stadium = 'Azadi') AND
(pc.card_color = 'yellow')
    GROUP BY pc.match_date, pc.match_stadium, pl.team_name
) yel ON (mti.match_date = yel.match_date) AND (mti.match_stadium =
yel.match_stadium) AND (mti.team_name = yel.team_name)
LEFT JOIN (
    SELECT pc.match_date, pc.match_stadium, COUNT(pc.card_color) AS
`red_cards`, pl.team_name
    FROM `player_cards` pc
    JOIN `player` pl ON pc.player_ssn = pl.player_ssn
```

```
    WHERE (pc.match_date = '2025-02-25') AND (pc.match_stadium = 'Azadi') AND
(pc.card_color = 'red')
    GROUP BY pc.match_date, pc.match_stadium, pl.team_name
) red ON (mti.match_date = red.match_date) AND (mti.match_stadium =
red.match_stadium) AND (mti.team_name = red.team_name)
WHERE (mti.match_date = '2025-02-25') AND (mti.match_stadium = 'Azadi')
```

$$\pi_{mti.team\_name, mti.hosting\_status, mti.team\_arrange, mti.goals\_score, mti.goals\_concede, yel.yellow\_cards, red.red\_cards}\left(\sigma_{mti.match\_date = '2025-02-25' \wedge mti.match\_stadium = 'Azadi'}(mti)\right)$$

✓ نام گلزنان یک بازی به همراه نام تیم و زمان گلزنی

```
SELECT pl.team_name, pl.player_name, pl.player_number, mpi.player_post,
ps.penalty, ps.score_time
FROM `pleyer_scores` ps
JOIN `player` pl ON ps.player_ssn = pl.player_ssn
JOIN `match_player_information` mpi ON ps.player_ssn = mpi.player_ssn
WHERE (ps.match_date = '2025-02-25') AND (ps.match_stadium = 'Azadi') AND
(mpi.match_date = '2025-02-25') AND (mpi.match_stadium = 'Azadi')
ORDER BY ps.score_time, pl.team_name
```

$$\pi_{team\_name, player\_name, player\_number, player\_post, penalty, score\_time}\left(\sigma_{match\_date = '2025-02-25' \wedge match\_stadium = 'Azadi'}\left(player\_scores \bowtie player\right) \bowtie match\_player\_information\right) \text{ORDER BY score\_time, team\_name}$$

✓ نام بازیکنان اخطاری یک بازی به همراه نام تیم، زمان و نوع اخطار (کارت زرد یا قرمز)

```
SELECT pl.team_name, pl.player_name, pl.player_number, pc.card_color,
pc.card_time
FROM `player_cards` pc
JOIN `player` pl ON pc.player_ssn = pl.player_ssn
JOIN `match_player_information` mpi ON pc.player_ssn = mpi.player_ssn
WHERE (pc.match_date = '2025-02-25') AND (pc.match_stadium = 'Azadi') AND
(mpi.match_date = '2025-02-25') AND (mpi.match_stadium = 'Azadi')
ORDER BY pc.card_time, pl.player_name
```

$$\pi_{team\_name, player\_name, player\_number, card\_color, card\_time}\left(\sigma_{match\_date = '2025-02-25' \wedge match\_stadium = 'Azadi'}\left(player\_cards \bowtie player\right) \bowtie match\_player\_information\right) \text{ORDER BY card\_time, player\_name}$$

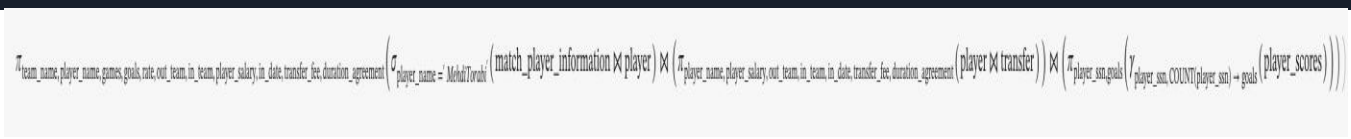
✓ آمار تعویضهای یک بازی شامل نام تیم، نام بازیکنان ورودی و خروجی به زمین و زمان تعویض

```sql
SELECT sb.team_name, pil.player_name AS in_player, pol.player_name AS
out_player, sb.subs_time
FROM `substitution` sb
JOIN `player` pil ON sb.in_player = pil.player_ssn
JOIN `player` pol ON sb.out_player = pol.player_ssn
WHERE (sb.match_date = '2025-02-25') AND (sb.match_stadium = 'Azadi')
ORDER BY sb.subs_time
```

{گزارشگیری از عملکرد بازیکن}

- ✓ تاریخچه حضور بازیکن در تیمهای مختلف شامل نام تیم، تاریخ شروع و پایان قرارداد، مبلغ دستمزد و آمار فنی وی (شامل تعداد بازیهای انجام داده، تعداد گلهای زده، تعداد اخطارها به تفکیک نوع، میانگین امتیاز و نیز تعداد بازیهایی که در ترکیب اصلی بوده و تعویض شده است)

```
SELECT pl.player_name, mpi.team_name, COUNT(mpi.team_name) AS `games`,
toa.goals, ROUND(AVG(mpi.player_rate), 1) AS `rate`, tot.out_team,
tot.in_team, tot.player_salary, tot.in_date, tot.transfer_fee,
tot.duration_agreement
FROM `match_player_information` mpi
JOIN `player` pl ON mpi.player_ssn = pl.player_ssn
JOIN (
    SELECT pl.player_name, pl.player_salary, tr.out_team, tr.in_team,
tr.in_date, tr.transfer_fee, tr.duration_agreement
    FROM `player` pl
    JOIN `transfer` tr ON pl.player_ssn = tr.player_ssn
    WHERE pl.player_name = 'Mehdi Torabi'
) tot ON pl.player_name = tot.player_name AND mpi.team_name = tot.in_team
JOIN (
    SELECT ps.player_ssn, COUNT(ps.player_ssn) AS `goals`
    FROM `pleyer_scores` ps
    GROUP BY ps.player_ssn
) toa ON mpi.player_ssn = toa.player_ssn
WHERE pl.player_name = 'Mehdi Torabi'
GROUP BY mpi.team_name, pl.player_name, tot.player_salary, tot.out_team,
tot.in_team, tot.in_date, tot.transfer_fee, tot.duration_agreement, toa.goals
```



✓ تاریخچه حضور بازیکن در انواع لیگهای مختلف شامل فهرست تیمها، کل مدت حضور در هر نوع لیگ، تعداد گلهای زده در هر نوع لیگ و نیز میانگین امتیاز

```sql
SELECT pl.player_name, tm.league_name, mpi.team_name, COUNT(mpi.team_name) AS
`games`, ROUND(AVG(mpi.player_rate), 1) AS `rate`, tot.goals,
MIN(mpi.match_date) AS first_play_date, MAX(mpi.match_date) AS last_play_date
FROM `match_player_information` mpi
JOIN `player` pl ON mpi.player_ssn = pl.player_ssn
JOIN `team` tm ON mpi.team_name = tm.team_name
JOIN (
    SELECT ps.player_ssn, COUNT(ps.player_ssn) AS `goals`
    FROM `pleyer_scores` ps
    GROUP BY ps.player_ssn
) tot ON mpi.player_ssn = tot.player_ssn
WHERE pl.player_name = 'Mehdi Torabi'
GROUP BY mpi.team_name, pl.player_name, tot.goals
ORDER BY pl.player_name
```

$$\pi_{\text{team\_name, player\_name, games, rate, goals, first\_play\_date, last\_play\_date}}\left(\sigma_{\text{player\_name} = \text{'MehdiTorabi'}}\left(\text{match\_player\_information} \bowtie \text{player}\right) \bowtie \text{team}\right)\text{ORDER BY player\_name}$$

{گزارشگیری از تیم}

✓ آمار بازیهای انجام شده یک تیم در یک نوع لیگ، شامل: شماره هفته لیگ، نام تیم مقابل، نتیجه بازی و نیز آمار فنی همان تیم در همان بازی (تعداد گلهای زده و خورده، تعداد اخطارها و نوع هر یک (کارت زرد یا قرمز) و نیز آرایش اولیه تیم در بازی)

```
SELECT mch.home_team, mch.away_team, mch.week_of_league, mti.match_date,
mti.team_arrange, mti.goals_score, mti.goals_concede
FROM `match_team_information` mti
JOIN `match` mch ON (mti.match_stadium = mch.stadium_name) AND (mti.match_date
= mch.match_date)
WHERE mti.team_name = 'Perspolis'
ORDER BY mch.match_date DESC
```

$$\pi_{\text{home\_team, away\_team, week\_of\_league, match\_date, team\_arrange, goals\_score, goals\_concede}}\left(\sigma_{\text{team\_name} =' \textit{Perspolis}'}\left(\text{match\_team\_information} \bowtie \text{match}\right)\right)\text{ORDER BY match\_date DESC}$$

✓ آمار فنی بازیکنان کنونی یک تیم به همراه اطلاعات قرارداد آنها

```
SELECT tm.team_name, pl.player_number, pl.player_name, pl.player_age,
pl.player_salary, tr.in_date, tr.out_team, tr.transfer_fee,
tr.duration_agreement
FROM `player` pl
JOIN  `team` tm ON tm.team_name = pl.team_name
LEFT JOIN `transfer` tr ON pl.player_ssn = tr.player_ssn
-- WHERE tm.team_name = 'Perspolis'
ORDER BY tm.team_name, tr.in_date DESC, pl.player_name
```

$$\pi_{\text{team\_name, player\_number, player\_name, player\_age, player\_salary, in\_date, out\_team, transfer\_fee, duration\_agreement}}\left(\sigma_{\text{team\_name} =' \textit{Perspolis}'}\left(\text{player} \bowtie \text{team}\right)\right)\text{ORDER BY team\_name, in\_date DESC, player\_name}$$

✓ آمار سرمربی فعلی تیم به همراه اطلاعات قرارداد وی

```sql
SELECT tm.team_name, co.coach_name AS `coach_name`, co.coach_age,
co.coach_salary, co.in_date, co.duration_agreement
FROM `team` tm
LEFT JOIN `coach` co ON tm.team_name = co.team_name
-- WHERE tm.team_name = 'Perspolis'
```

$$\pi_{\text{team\_name, coach\_name, coach\_age, coach\_salary, in\_date, duration\_agreement}}\left(\sigma_{\text{team\_name} = \text{'Perspolis'}}\left(\text{team} \bowtie \text{coach}\right)\right)$$

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

```sql
SELECT tm.team_name, st.staff_name, st.staff_age, st.staff_job,
st.staff_salary, st.in_date, st.duration_agreement
FROM `team` tm
JOIN `staff` st ON tm.team_name = st.team_name
-- WHERE tm.team_name = 'Perspolis'
ORDER BY tm.team_name, st.staff_name
```

$$\pi_{\text{team\_name, staff\_name, staff\_age, staff\_job, staff\_salary, in\_date, duration\_agreement}}\left(\sigma_{\text{team\_name} = \text{'Perspolis'}}\left(\text{team} \bowtie \text{staff}\right)\right)\text{ORDER BY team\_name, staff\_name}$$

{گزارشگیری از قراردادها}

✓ آمار هر کدام از بازیکنان خریداری شده توسط یک تیم در یک بازه زمانی مشخص به همراه اطلاعات قرارداد و نام تیم قبلی هر بازیکن (در صورتی که بازیکن از تیمی خریداری نشده است، هیچ مقدار میباشد)

```sql
SELECT pl.player_name, pl.player_age, pl.player_salary, tr.out_team,
tr.transfer_fee, tr.in_team, tr.in_date, tr.duration_agreement
FROM `team` tm
JOIN `player` pl ON tm.team_name = pl.team_name
JOIN `transfer` tr ON tr.player_ssn = pl.player_ssn
-- WHERE tr.in_team = 'Perspolis'
ORDER BY tr.in_date DESC, pl.player_name
```

$$\pi_{\text{team\_name, player\_name, player\_age, player\_salary, out\_team, transfer\_fee, in\_team, in\_date, duration\_agreement}}\left(\sigma_{\text{in\_team = 'Perspolis'}}\left(\text{team} \bowtie \text{player}\right)\right)\text{ORDER BY in\_date DESC, player\_name}$$

✓ آمار تمامی قراردادهای بازیکنان با تیمها طی یک بازه زمانی مشخص

```sql
SELECT pl.player_name, pl.player_age, pl.player_salary, tr.out_team,
tr.transfer_fee, tr.in_team, tr.in_date, tr.duration_agreement
FROM `team` tm
JOIN `player` pl ON tm.team_name = pl.team_name
JOIN `transfer` tr ON tr.player_ssn = pl.player_ssn
-- WHERE tr.in_date BETWEEN '2023-01-01' AND '2024-01-01'
ORDER BY tr.in_date DESC, pl.player_name;
```

$$\pi_{\text{team\_name, player\_name, player\_age, player\_salary, out\_team, transfer\_fee, in\_team, in\_date, duration\_agreement}}\left(\sigma_{\text{in\_date BETWEEN '2023-01-01' AND '2024-01-01'}}\left(\text{team} \bowtie \text{player}\right)\right)\text{ORDER BY in\_date DESC, player\_name}$$

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

```sql
SELECT st.staff_name, st.staff_age, st.staff_job, st.staff_salary,
st.team_name, st.in_date, st.duration_agreement
FROM `team` tm
JOIN `staff` st ON tm.team_name = st.team_name
-- WHERE st.in_date BETWEEN '2021-01-01' AND '2023-01-01'
ORDER BY st.in_date DESC, st.staff_name;
```

$$\pi_{\text{team\_name, staff\_name, staff\_age, staff\_job, staff\_salary, in\_date, duration\_agreement}}\left(\sigma_{\text{in\_date BETWEEN '2021-01-01' AND '2023-01-01'}}\left(\text{team} \bowtie \text{staff}\right)\right)\text{ORDER BY in\_date DESC, staff\_name}$$

✓ مبلغ هزینه کلی پرداختی هر تیم به بازیکنان فعلی

```sql
SELECT tm.team_name, SUM(pl.player_salary) AS `price_to_players`
FROM `team` tm
JOIN `player` pl ON tm.team_name = pl.team_name
GROUP BY tm.team_name
ORDER BY SUM(pl.player_salary) DESC;
```

$$\pi_{\text{team\_name,price\_to\_players}}\left(\gamma_{\text{team\_name, SUM(player\_salary)} \rightarrow \text{price\_to\_players}}\left(\text{team} \bowtie \text{player}\right)\right)\text{ORDER BY SUM(player\_salary) DESC}$$

✓ مبلغ هزینه کلی پرداختی هر تیم به اعضا فعلی کادر فنی

```sql
SELECT tot.team_name, SUM(tot.salary) AS `salary`, 'coach & staffs' AS
`price_to`
FROM (
    SELECT tm.team_name, SUM(st.staff_salary) AS `salary`, 'staffs' AS
`price_to`
    FROM `team` tm
    JOIN `staff` st ON tm.team_name = st.team_name
    GROUP BY tm.team_name
    -- ORDER BY `salary` DESC
    UNION
    SELECT tm.team_name, SUM(ch.coach_salary) AS `salary`, 'coach' AS
`price_to`
    FROM `team` tm
    JOIN `coach` ch ON tm.team_name = ch.team_name
    GROUP BY tm.team_name
    -- ORDER BY `salary` DESC
    ) tot
GROUP BY tot.team_name
ORDER BY `salary` DESC;
```

$$\pi_{\text{team\_name,salary,price\_to}}\left(\gamma_{\text{team\_name,SUM(salary)}\to\text{salary,'coach\&staffs'}\to\text{price\_to}}\left(\left(\pi_{\text{team\_name,staff\_salary}\to\text{salary,'staffs'}\to\text{price\_to}}(\text{team}\bowtie\text{staff})\right)\cup\left(\pi_{\text{team\_name,coach\_salary}\to\text{salary,'coach'}\to\text{price\_to}}(\text{team}\bowtie\text{coach})\right)\right)\right)\text{ORDER BY salary DESC}$$

{گزارشگیری از لیگ}

✓ جدول لیگ شامل نام تیمها و آمار فنی آنها (تعداد بازیها، برد، باخت و مساوی، تعداد گلهای زده و خورده و نیز تعداد و انواع اخطارهای دریافتی)

```
SELECT tm.team_name, tm.points, tm.goals_score, tm.goals_concede,
(tm.goals_score - tm.goals_concede) AS `GD`, tm.wins, tm.draws, tm.loses
FROM `league` lg
JOIN `team` tm ON lg.league_name = tm.league_name
WHERE lg.league_name = 'Khalig Fars'
ORDER BY tm.points DESC, (tm.goals_score - tm.goals_concede) DESC;
```

$$\pi_{\text{team\_name, points, goals\_score, goals\_concede, GD, wins, draws, loses}}\left(\sigma_{\text{league\_name} = \text{'KhaligFars'}}\left(\text{league} \bowtie \text{team}\right)\right)\text{ORDER BY points DESC, (goals\_score - goals\_concede) DESC}$$

✓ آمار بازیهای انجام شده در یک لیگ)یا یک هفته از لیگ(شامل: نام تیمها)میزبان و مهمان(، نتیجه، تاریخ و محل برگزاری بازی، تعداد تماشاچیان، درآمد حاصل از فروش بلیطهای بازی، نام اعضای تیم داوری و نیز ناظران بازی

```
SELECT mch.home_team AS `home`, mch.away_team AS `away`,mch.match_result AS
`result`, mch.week_of_league AS `week`, mch.match_date AS `date`,
mch.stadium_name AS `stadium`, rf.main_referee, rf.right_referee,
rf.left_referee
FROM `match` mch
JOIN `referee_team` rf ON mch.referee_team_id = rf.referee_team_id
-- WHERE mch.week_of_league = 5
ORDER BY mch.week_of_league, mch.match_date;
```

$$\pi_{\text{home, away, result, week, date, stadium, main\_referee, right\_referee, left\_referee}}\left(\sigma_{\text{week\_of\_league} = 5}\left(\text{match} \bowtie \text{referee\_team}\right)\right)\text{ORDER BY week, date}$$

✓ آمار فنی بازیکنان شاغل در یک لیگ (شامل تعداد بازیهای انجام داده، تعداد گلهای زده، تعداد اخطارها به تفکیک نوع، میانگین امتیاز) به همراه تیم آنها

```
SELECT pl.player_name AS `name`, COUNT(ps.score_time) AS `goal`,
COUNT(mp.player_ssn) AS `game`, ROUND(AVG(mp.player_rate), 1) AS `rate`,
COUNT(pc.card_time) AS `cards`, pl.team_name AS `team`
FROM `match_player_information` mp
LEFT JOIN `player` pl ON mp.player_ssn = pl.player_ssn
LEFT JOIN `pleyer_scores` ps  ON mp.player_ssn = ps.player_ssn
LEFT JOIN `player_cards` pc ON mp.player_ssn = pc.player_ssn
GROUP BY mp.player_ssn;
```

$$\pi_{\text{name, goal, game, rate, cards, team}}\left(\gamma_{\text{player\_ssn, COUNT(score\_time)} \to \text{goal, COUNT(player\_ssn)} \to \text{game, AVG(player\_rate)} \to \text{rate, COUNT(card\_time)} \to \text{cards}}\left(\left(\text{match\_player\_information}\right) \bowtie \text{player}\right) \bowtie \text{player\_scores}\right)$$

✓ نام بازیکنان محروم یک هفته از لیگ به همراه نام تیم آنها (بازیکنی که در بازیهای قبلی، سه کارت زرد گرفته یا در بازی پیشین، کارت قرمز گرفته است)

```
SELECT pl.player_name AS `name`, pl.team_name AS `team`, '3 Yellow Card' AS `because of`
FROM `player` pl
JOIN `player_cards` pc ON pl.player_ssn = pc.player_ssn
WHERE pc.card_color = 'Yellow'
GROUP BY pl.player_ssn
HAVING COUNT(pc.card_color) >= 1 -- pc.card_color >= 3
UNION
SELECT pl.player_name AS `name`, pl.team_name AS `team`, 'Red Card' AS `because of`
FROM `player` pl
JOIN `player_cards` pc ON pl.player_ssn = pc.player_ssn
WHERE pc.card_color = 'Red';


SELECT pl.player_name AS `name`, pl.team_name AS `team`, mp.player_injury AS `injury`,
pc.card_color AS `card`, pc.card_time AS `time`, mch.week_of_league AS `week`,
mch.home_team AS `home`, mch.away_team AS `away`
FROM `player` pl
JOIN `player_cards` pc ON pl.player_ssn = pc.player_ssn
JOIN `match` mch ON pc.match_stadium = mch.stadium_name AND pc.match_date = mch.match_date
JOIN `match_player_information` mp ON pl.player_ssn = mp.player_ssn;
```

$$\pi_{\text{name, team,}' 3YellowCard' \to \text{because of}}\left(\sigma_{\text{card\_color} =' Yellow'}\left(\text{player} \bowtie \text{player\_cards}\right)\right)\text{GROUP BY player\_ssn}$$