Bilkent University

Department of Computer Engineering

CS 353 – Database Management Systems

Final Report

Kumpir: Football Database Systems

Spring 2018

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Bilkent University

May, 14

1. PROJECT DESCRIPTION

“Kumpir” is a web-based application for managing and observing a football league; designed to be used by players, agents, coaches, managers, and football community. Kumpir is aimed to grow the football community with an appealing design and with detailed information about the league; all the while providing a secure and efficient way of handling transfers and league management.

The system includes information about players, teams, matches, transfers, rents, and trade offers. Most information in the system is public, which provides easy access to the fans and professionals alike. Some information, such as usernames and passwords, are private and are not displayed publicly.

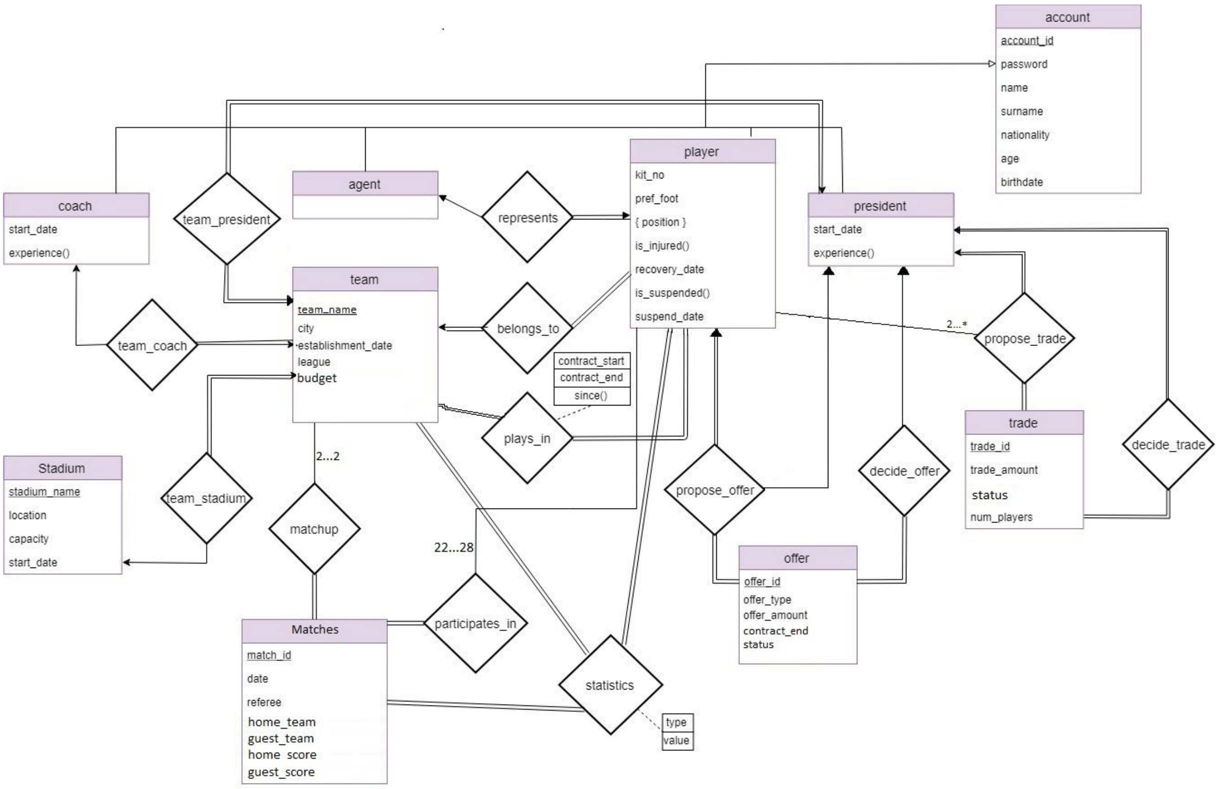
The database includes a large amount of data related to coaches, presidents, agents, football teams, players, games between teams, transfer and trade offers, and statistics related to these entities such as pass accuracy and a total number of goals scored by a player. Every user, regardless of their status, can access the information about the club’s transfer, wage budget; players, coaches and presidents; and teams’ league statistics such as standing. Furthermore, some accounts have privileges. For example, transfer and trade offer only be proposed by presidents even though the result of these offers is public.

By implementing an application where transfers are handled, and public data is broadcasted, we are aiming to establish a universal platform both for club executives, players and fans alike.

Ecem İlgün : Secondary indexes, triggers, views, reports,
Serdar Taşkafa : Backend of various pages, fronted of various pages
Berat Biçer: Core logic of django framework, views, reports, Backend of various pages
Batu: Frontend of various pages, backend of various pages

All members did the initial design of database together.

2. E/R MODEL



3. RELATION SCHEMAS

3.1. Matches

matches(<u>match_id,</u> date, referee, home_team, guest_team, home_score, guest_score)

3.2. Positions

positions(<u>account_id, position</u>)

3.3. Player

player(account_id, password, name, surname, nationality, age, kit_no, pref_foot, prev_transfer_fee, recovery_date, suspend_date, belong_to_team_name)

3.4. President

president(account_id, password, name, surname, nationality, age, start_date, team_name)

3.5. Coach

coach(account_id, password, name, surname, nationality, age, start_date, team_name)

3.6. Agent

agent(account_id, password, name, surname, nationality, age, player_account_id)

3.7. Team

team(team_name, city, league, stadium_name, budget, establishment_date)

3.8. Stadium

stadium(name, location, capacity, start_date)

3.9. Plays_in

plays_in(team_name, account_id, contract_start, contract_end)

3.10. Offer

offer(offer_id, offer_type, offer_amount, contract_end, decidepresident_account_id, status)

3.11. Trade

trade(trade_id, trade_type, trade_amount, contract_end, decidepresident_account_id, status)

3.12. Propose Offer

offer(offer_id, player_account_id, president_account_id)

3.13. Propose Trade

offer(trade_id, player_account_id, president_account_id)

3.14. Participates_in

offer(account_id, match_id)

3.15. Statistics

trade(match_id, team_name, account_id, type, value)

4. IMPLEMENTATION DETAILS

Our system has two components, which are the database and the website. MySQL is used for database and it is powered by MariaDB. We did not automate adding data points and we are instead adding them manually.

For database part, or the backend, we are using Django. Using that is a good choice because it is a contemporary technology which is widely used in the industry and learning that framework will be beneficial for us. The Django-based system manages entry, update and delete operations on data points. It also manages the transitions between different pages and populating related data on them.

The user interface display and interaction functionalities we used HTML, CSS and JavaScript. HTML is used to structure the pages that the user see, CSS is used for applying layouts and designs on these pages. JavaScript facilitates the execution of simple scripts necessary for functioning of these pages.

One of the major problems we faced is the inherent structure of Django. It creates models by itself and performs many operations itself without giving any SQL query. After implementing that way, we decided to change the design and perform every operation, including creating the tables by using our own SQL queries.

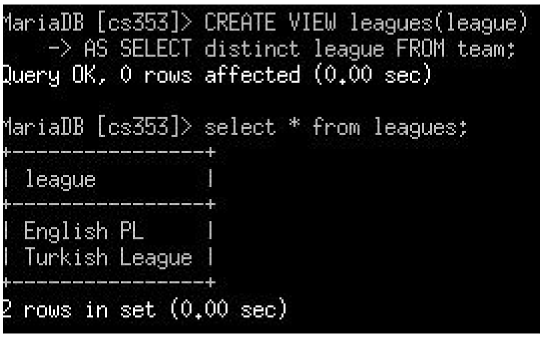
5. ADVANCED DATABASE COMPONENTS

5.1. VIEWS

5.1.1. LEAGUES

CREATE VIEW leagues(league)

AS SELECT distinct league FROM team



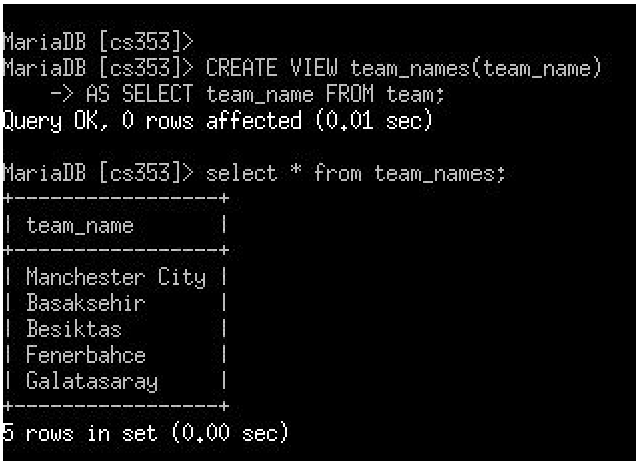
```
lariaDB [cs353]> CREATE VIEW leagues(league)
    -> AS SELECT distinct league FROM team;
Query OK, 0 rows affected (0.00 sec)

lariaDB [cs353]> select * from leagues;
+----------------+
| league         |
+----------------+
| English PL     |
| Turkish League |
+----------------+
2 rows in set (0.00 sec)
```

5.1.2. TEAM NAMES

CREATE VIEW team_names(team_name)

AS SELECT team_name FROM team



```
lariaDB [cs353]>
lariaDB [cs353]> CREATE VIEW team_names(team_name)
    -> AS SELECT team_name FROM team;
Query OK, 0 rows affected (0.01 sec)

lariaDB [cs353]> select * from team_names;
+-----------------+
| team_name       |
+-----------------+
| Manchester City |
| Basaksehir      |
| Besiktas        |
| Fenerbahce      |
| Galatasaray     |
+-----------------+
5 rows in set (0.00 sec)
```

5.1.3. WIN COUNT PER TEAM

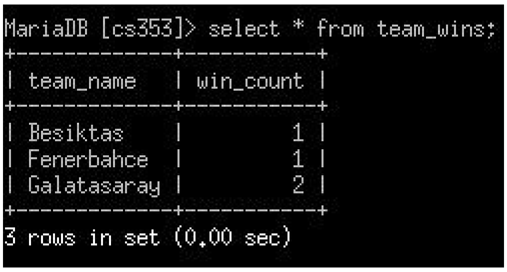
CREATE VIEW team_wins(team_name, win_count)

AS SELECT team_name, count(match_id) AS win_count

FROM match, team_names

WHERE (home_team = team_name AND home_score > guest_score) OR (guest_team = team_name AND home_score < guest_score)

GROUP BY team_name



```
MariaDB [cs353]> select * from team_wins;
+-------------+-----------+
| team_name   | win_count |
+-------------+-----------+
| Besiktas    |         1 |
| Fenerbahce  |         1 |
| Galatasaray |         2 |
+-------------+-----------+
3 rows in set (0.00 sec)
```

5.1.4. DRAW COUNT PER TEAM

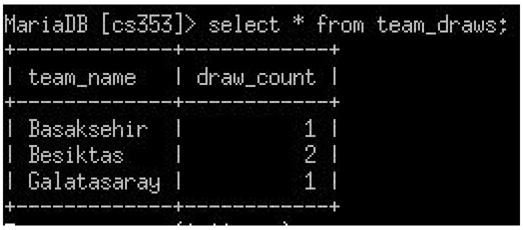
CREATE VIEW team_draws(team_name, draw_count)

AS SELECT team_name, count(match_id) AS draw_count

FROM match, team_names

WHERE (home_team = team_name OR guest_team = team_name) AND home_score = guest_score

GROUP BY team_name



```
MariaDB [cs353]> select * from team_draws;
+-------------+------------+
| team_name   | draw_count |
+-------------+------------+
| Basaksehir  |          1 |
| Besiktas    |          2 |
| Galatasaray |          1 |
+-------------+------------+
```

5.1.5. LOSS COUNT PER TEAM

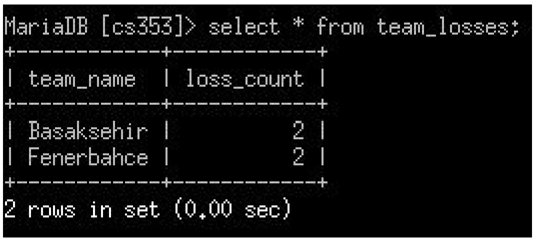
CREATE VIEW team_losses(team_name, loss_count)

AS SELECT team_name, count(match_id) AS loss_count

FROM match, team_names

WHERE (home_team = team_name AND home_score < guest_score) OR (guest_team = team_name AND home_score > guest_score)

GROUP BY team_name



```
MariaDB [cs353]> select * from team_losses;
+------------+------------+
| team_name  | loss_count |
+------------+------------+
| Basaksehir |          2 |
| Fenerbahce |          2 |
+------------+------------+
2 rows in set (0.00 sec)
```

5.2. REPORTS

5.2.1. LEAGUE STANDINGS

SELECT team_name, points, win_count, draw_count, loss_count

FROM team NATURAL JOIN (SELECT teams.team_name as team_name,

IFNULL(team_wins.win_count, 0) win_count,

IFNULL(team_draws.draw_count, 0) draw_count, IFNULL(team_losses.loss_count, 0) loss_count,

IFNULL(team_wins.win_count, 0) * 3 + IFNULL(team_draws.draw_count, 0) points

FROM (SELECT team_name FROM team_wins UNION

SELECT team_name FROM team_draws UNION

SELECT team_name FROM team_losses) teams

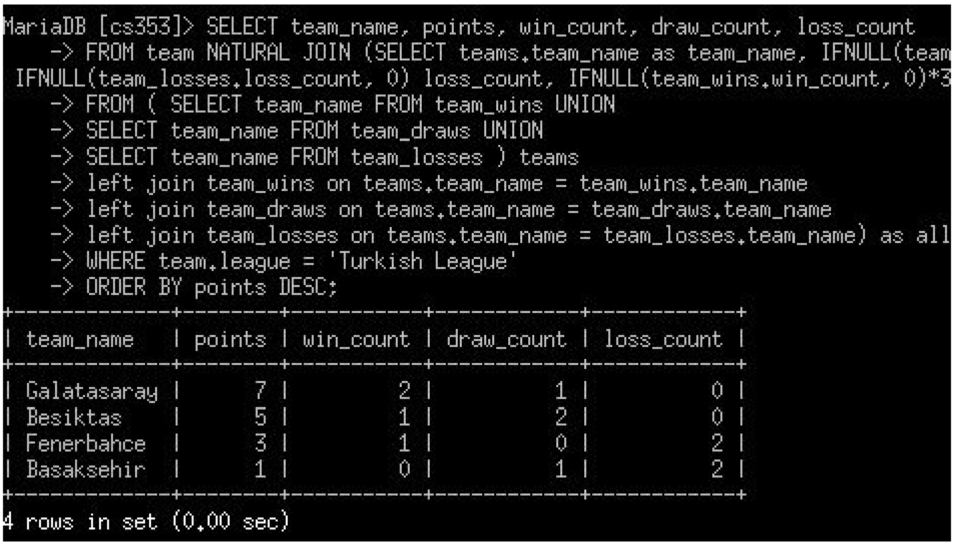
LEFT JOIN team_wins ON teams.team_name = team_wins.team_name

LEFT JOIN team_draws ON teams.team_name = team_draws.team_name

LEFT JOIN team_losses ON teams.team_name = team_losses.team_name

WHERE team.league = 'universities') as points

ORDER BY points DESC;



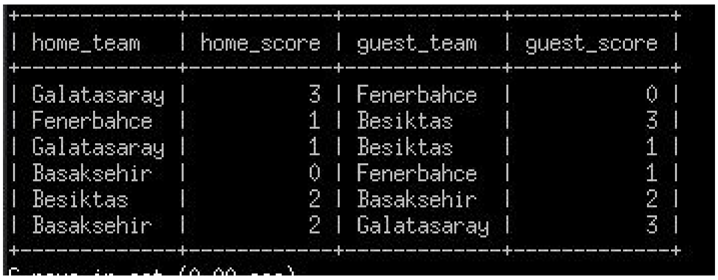
```
MariaDB [cs353]> SELECT team_name, points, win_count, draw_count, loss_count
    -> FROM team NATURAL JOIN (SELECT teams.team_name as team_name, IFNULL(team
 IFNULL(team_losses.loss_count, 0) loss_count, IFNULL(team_wins.win_count, 0)*3
    -> FROM ( SELECT team_name FROM team_wins UNION
    -> SELECT team_name FROM team_draws UNION
    -> SELECT team_name FROM team_losses ) teams
    -> left join team_wins on teams.team_name = team_wins.team_name
    -> left join team_draws on teams.team_name = team_draws.team_name
    -> left join team_losses on teams.team_name = team_losses.team_name) as all
    -> WHERE team.league = 'Turkish League'
    -> ORDER BY points DESC;
+-------------+--------+-----------+------------+------------+
| team_name   | points | win_count | draw_count | loss_count |
+-------------+--------+-----------+------------+------------+
| Galatasaray |      7 |         2 |          1 |          0 |
| Besiktas    |      5 |         1 |          2 |          0 |
| Fenerbahce  |      3 |         1 |          0 |          2 |
| Basaksehir  |      1 |         0 |          1 |          2 |
+-------------+--------+-----------+------------+------------+
4 rows in set (0.00 sec)
```

5.2.2. MATCH HISTORY OF A GIVEN LEAGUE

SELECT home_team, home_score, guest_team, guest_score

FROM matches, (SELECT team_name, league FROM team) as names

WHERE home_team = team_name AND names.league = 'Turkish League'



```
+-------------+------------+-------------+-------------+
| home_team   | home_score | guest_team  | guest_score |
+-------------+------------+-------------+-------------+
| Galatasaray |          3 | Fenerbahce  |           0 |
| Fenerbahce  |          1 | Besiktas    |           3 |
| Galatasaray |          1 | Besiktas    |           1 |
| Basaksehir  |          0 | Fenerbahce  |           1 |
| Besiktas    |          2 | Basaksehir  |           2 |
| Basaksehir  |          2 | Galatasaray |           3 |
+-------------+------------+-------------+-------------+
6 rows in set (0.00 sec)
```

5.3. TRIGGERS

5.3.1. UPDATE MATCHES AFTER INSERT ON STATISTICS

```
DELIMITER $
CREATE TRIGGER update_matches_insert AFTER INSERT ON statistics
FOR EACH ROW
BEGIN
IF match_id = NEW.match_id AND NEW.team_name = home_team AND NEW.type = 'goal' THEN
UPDATE matches
SET home_score = home_score + NEW.value;
ELSEIF match_id = NEW.match_id AND NEW.team_name = guest_team AND NEW.type = 'goal' THEN
UPDATE matches
SET guest_score = guest_score + NEW.value;
END IF;
END; $
```

5.3.2. UPDATE MATCHES AFTER UPDATE ON STATISTICS

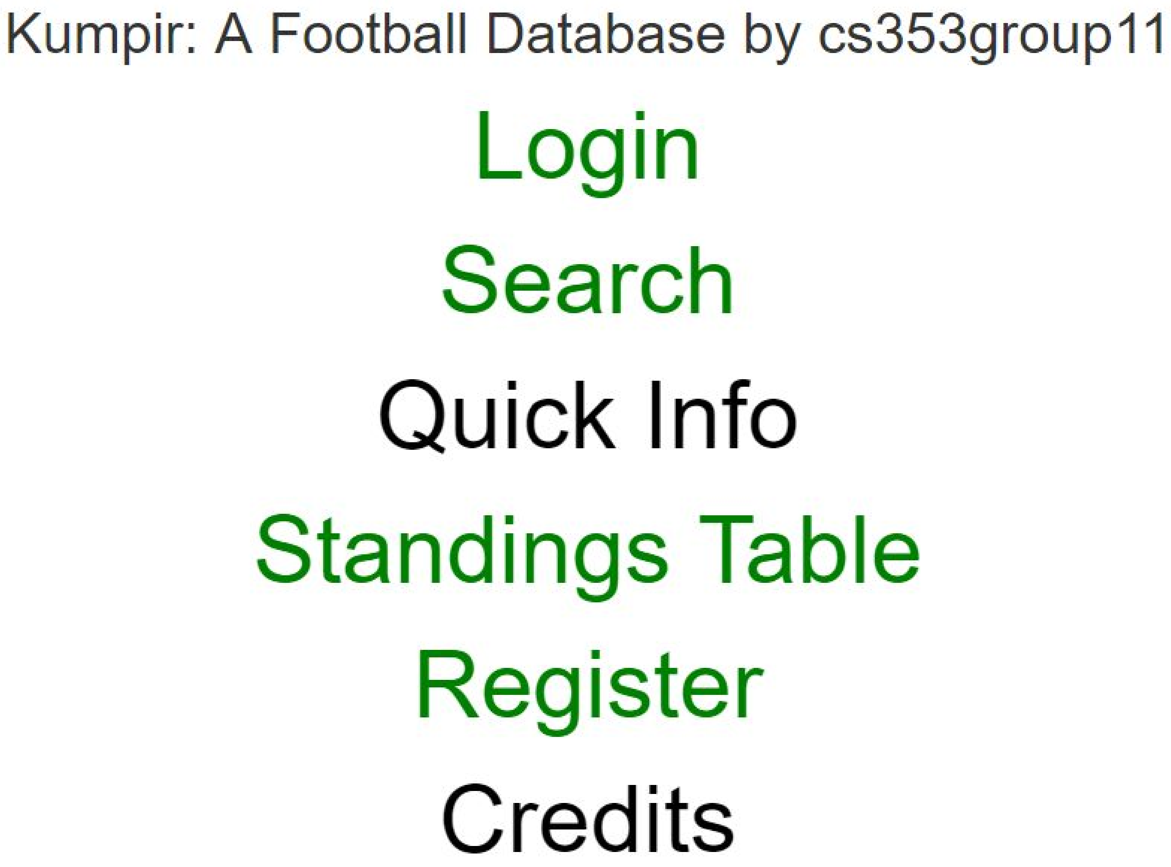
```
DELIMITER $
CREATE TRIGGER update_matches_update AFTER UPDATE ON statistics
FOR EACH ROW
BEGIN
IF match_id = NEW.match_id AND NEW.team_name = home_team AND NEW.type = 'goal' THEN
UPDATE matches
SET home_score = home_score + NEW.value - OLD.value;
ELSEIF match_id = NEW.match_id AND NEW.team_name = guest_team AND NEW.type = 'goal' THEN
UPDATE matches
SET guest_score = guest_score + NEW.value - OLD.value;
END IF;
END; $
```

```
---------------------------
2 rows in set (0.00 sec)
```

6. USER MANUAL

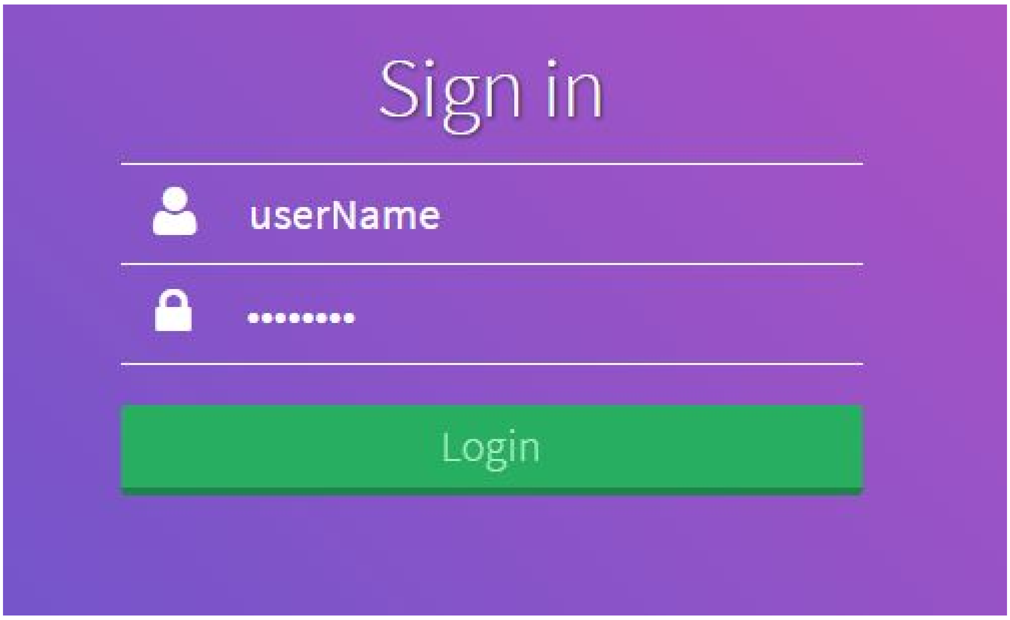
6.1. MAIN PAGE

When user enters the application, they will first be directed to that page. After login, they will be directed to the authenticated version of the main page.



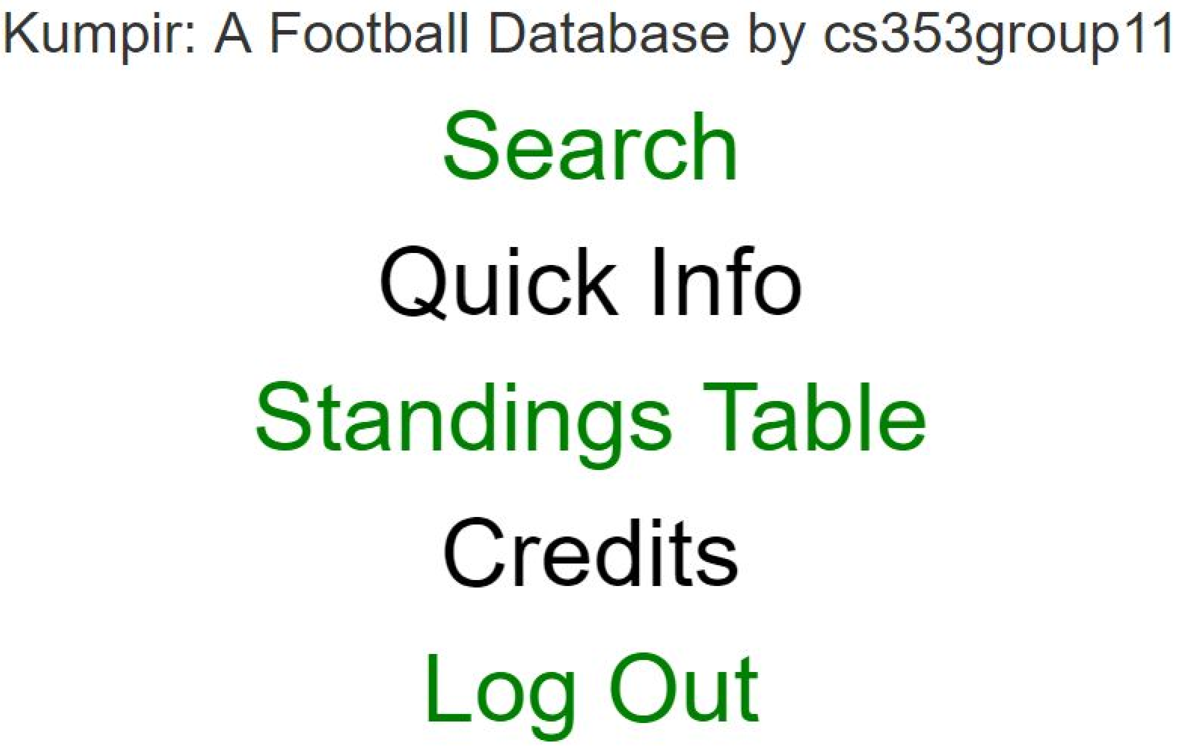
Kumpir: A Football Database by cs353group11

6.2. LOGIN PAGE



Users of our system can login to system using that page. With login, users can access their private, authenticated pages. From these pages, they can access passwords. Also, presidents can propose and decide on offers and trades.

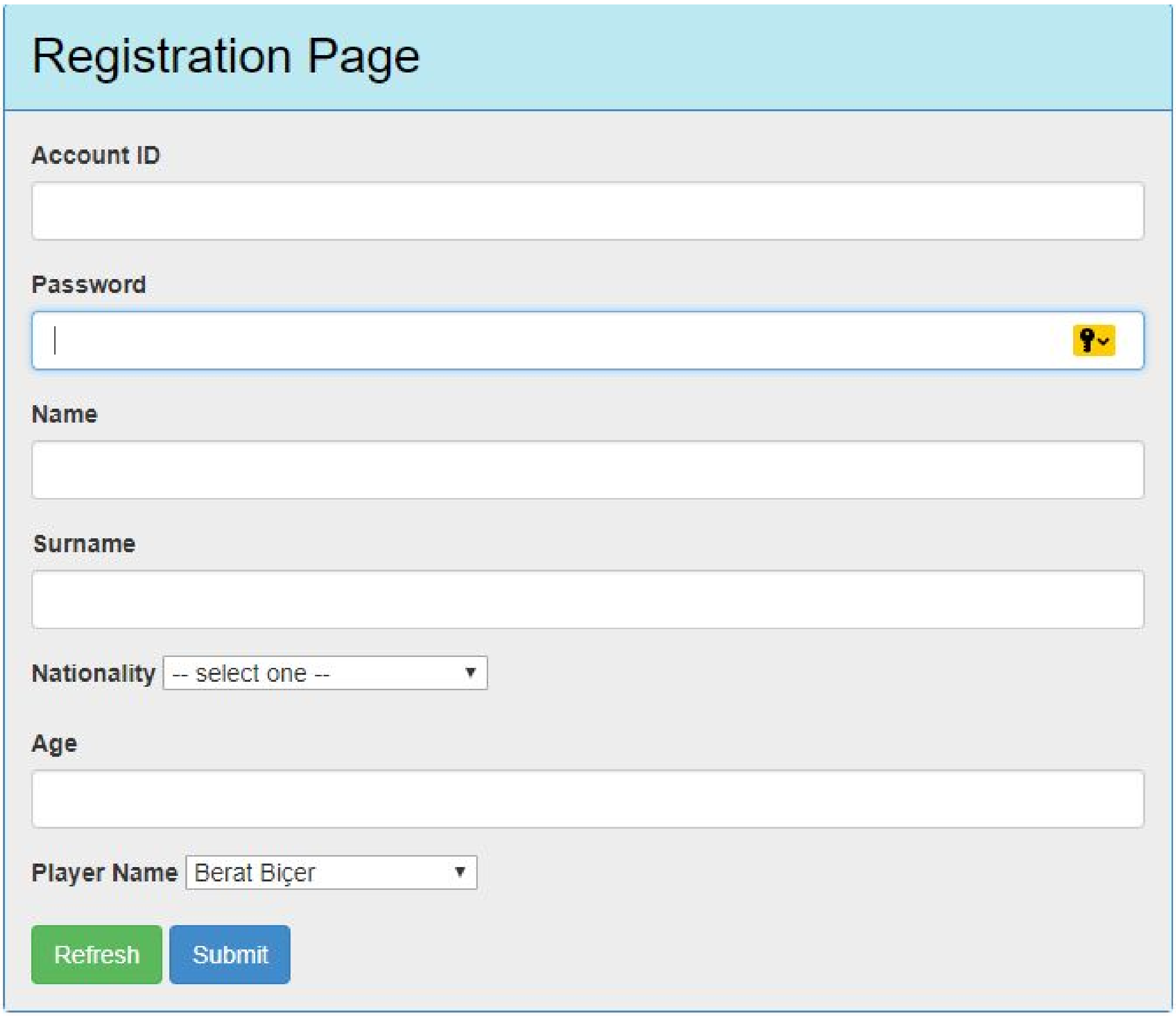
6.3. AUTHENTICATED MAIN PAGE



6.4. REGISTRATION PAGE

User can register themselves to system as either agent, coach, player or as president. Account id must be authentical. Also, teams, nationalities and dates which are invalid cannot be chosen. Each of the following pages look similar but they require different information fields.

6.4.1. AGENT REGISTRATION



Registration Page

Account ID

Password

Name

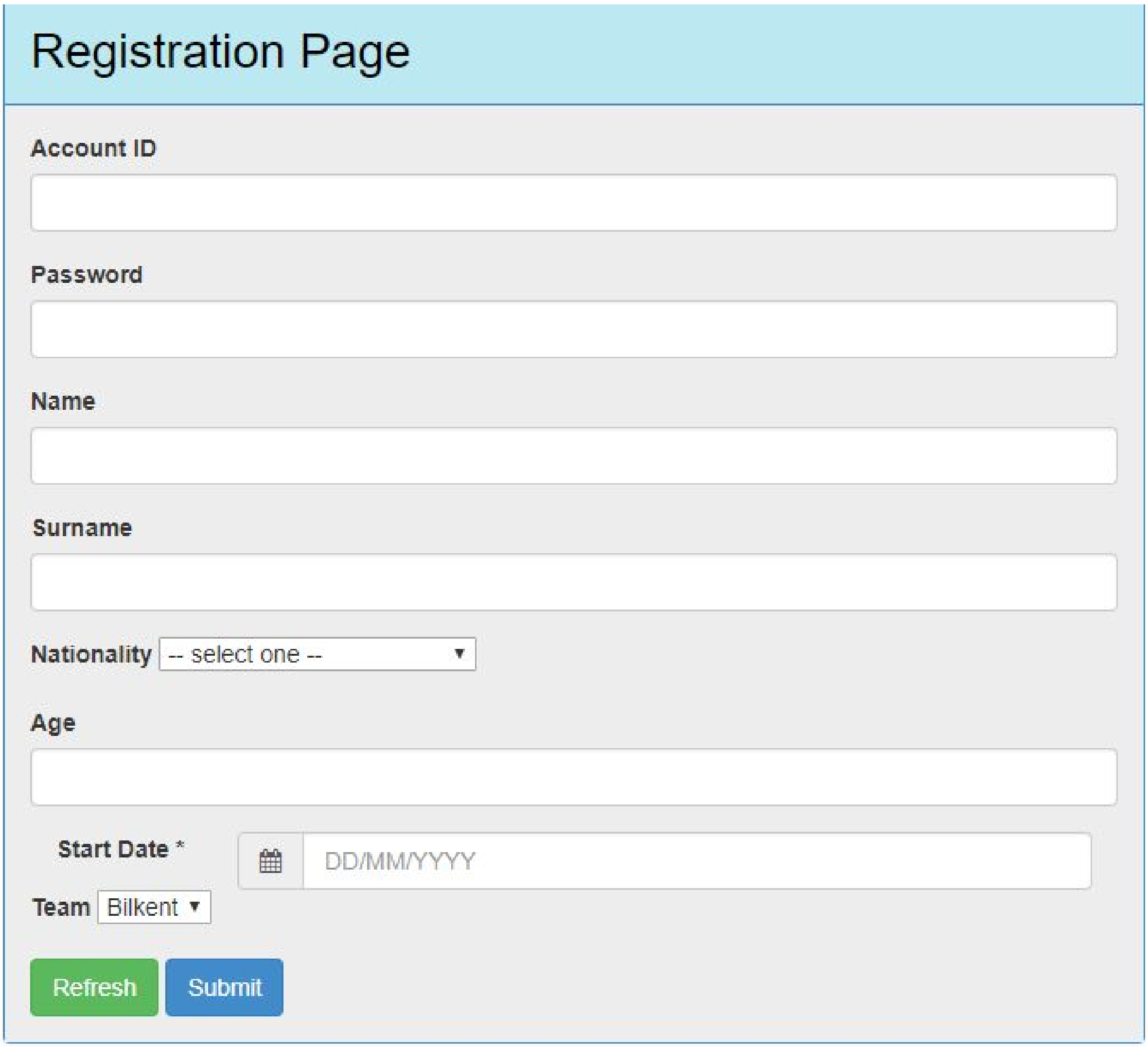
Surname

Nationality -- select one --

Age

Player Name Berat Biçer

6.4.2. COACH REGISTRATION



Registration Page

Account ID

Password

Name

Surname

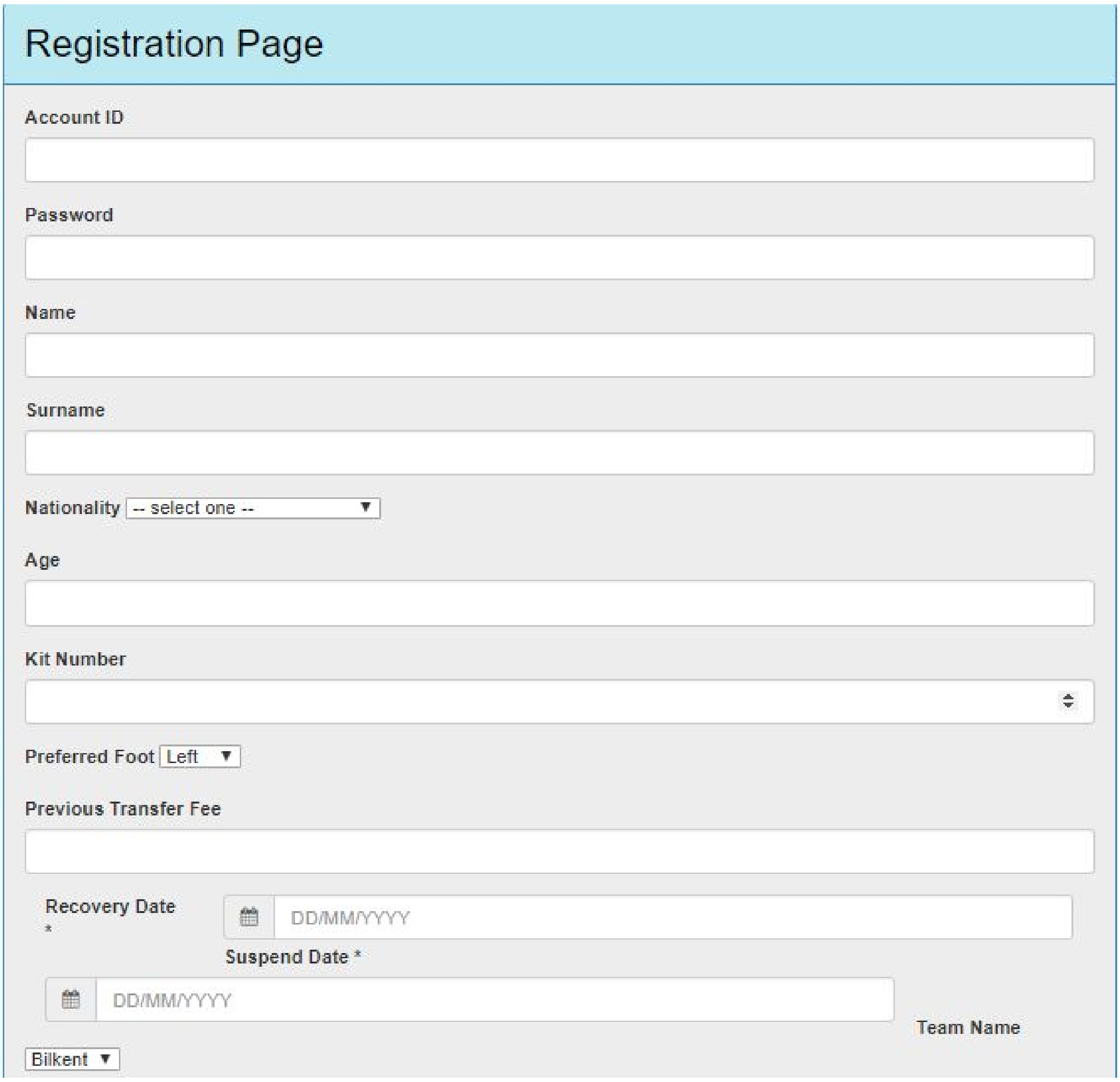
Nationality -- select one --

Age

Start Date * DD/MM/YYYY

Team Bilkent

6.4.3. PLAYER REGISTRATION



Registration Page

Account ID

Password

Name

Surname

Nationality -- select one --

Age

Kit Number

Preferred Foot Left

Previous Transfer Fee

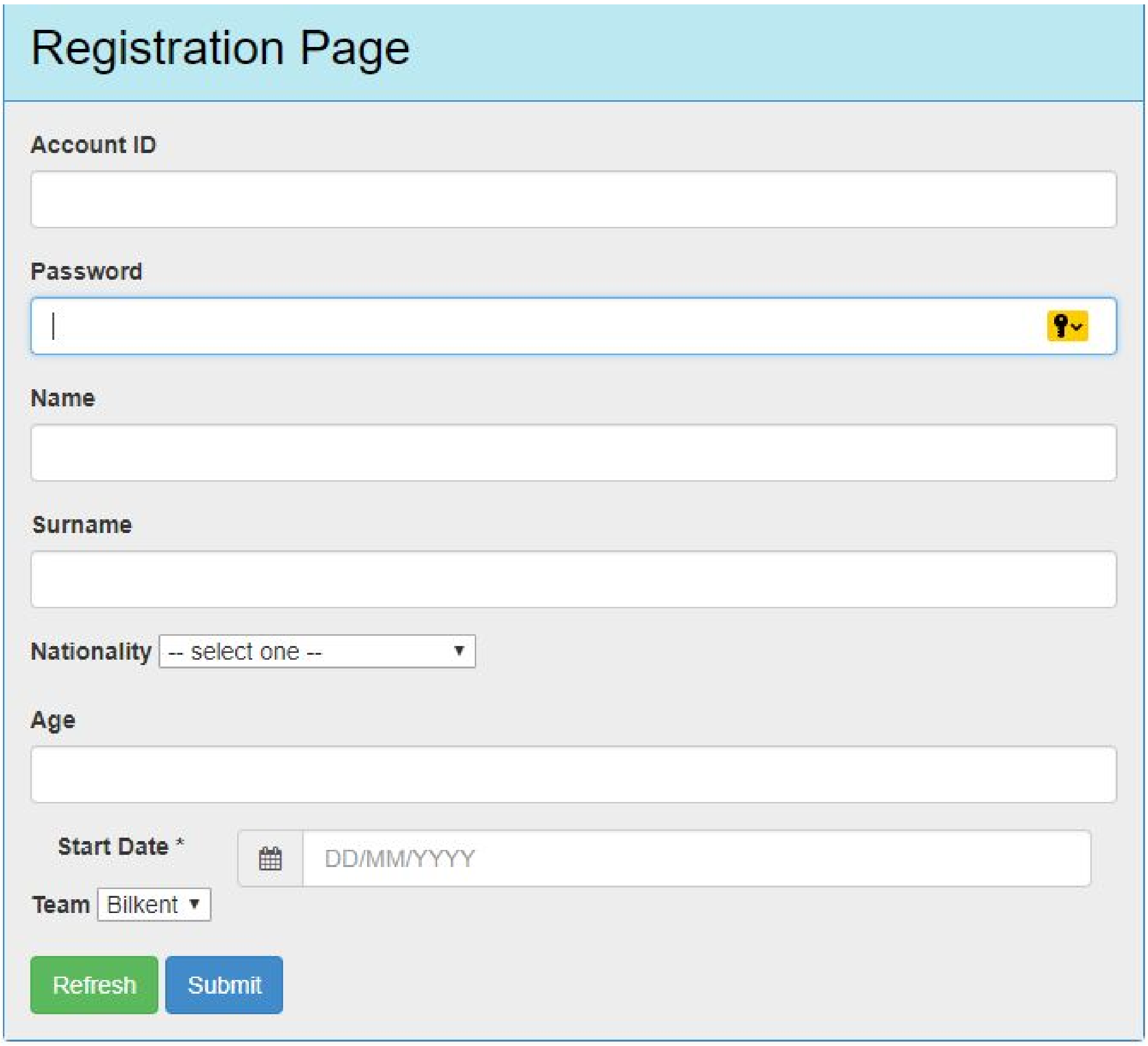
Recovery Date * DD/MM/YYYY

Suspend Date * DD/MM/YYYY

Team Name

Bilkent

6.4.4. PRESIDENT REGISTRATION



Registration Page

Account ID

Password

Name

Surname

Nationality -- select one --

Age

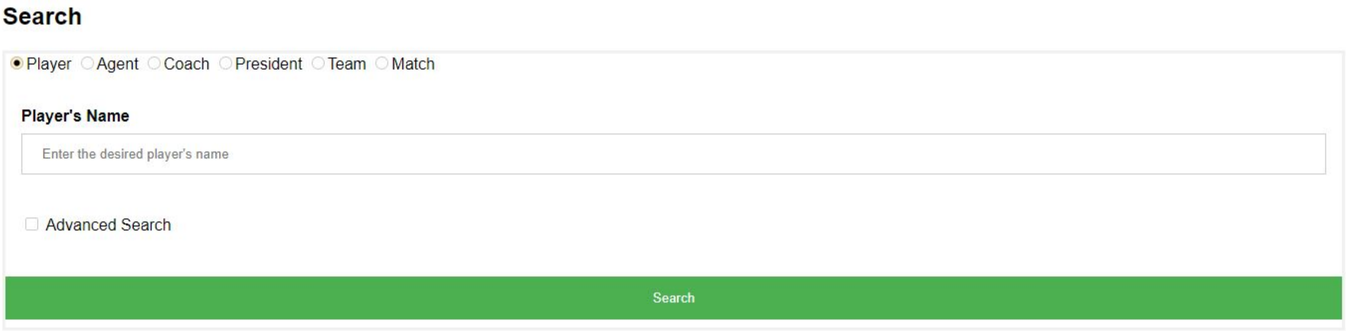
Start Date * DD/MM/YYYY

Team Bilkent

6.5. SEARCH PAGE

In this section, users can search for other users. In basic search section, search can be made using name. Search is not confined to players. Agents, coaches, presidents, teams and matches can be searched. If the user is not satisfied with the basic search capabilities, they can opt for advanced search. In that case, they can apply more constraints over search results. If a president wants to make an offer, they will be directed to that page. Here, they can search for the player for whom they want to make an offer.

6.5.1. BASIC SEARCH



Search

● Player ○ Agent ○ Coach ○ President ○ Team ○ Match

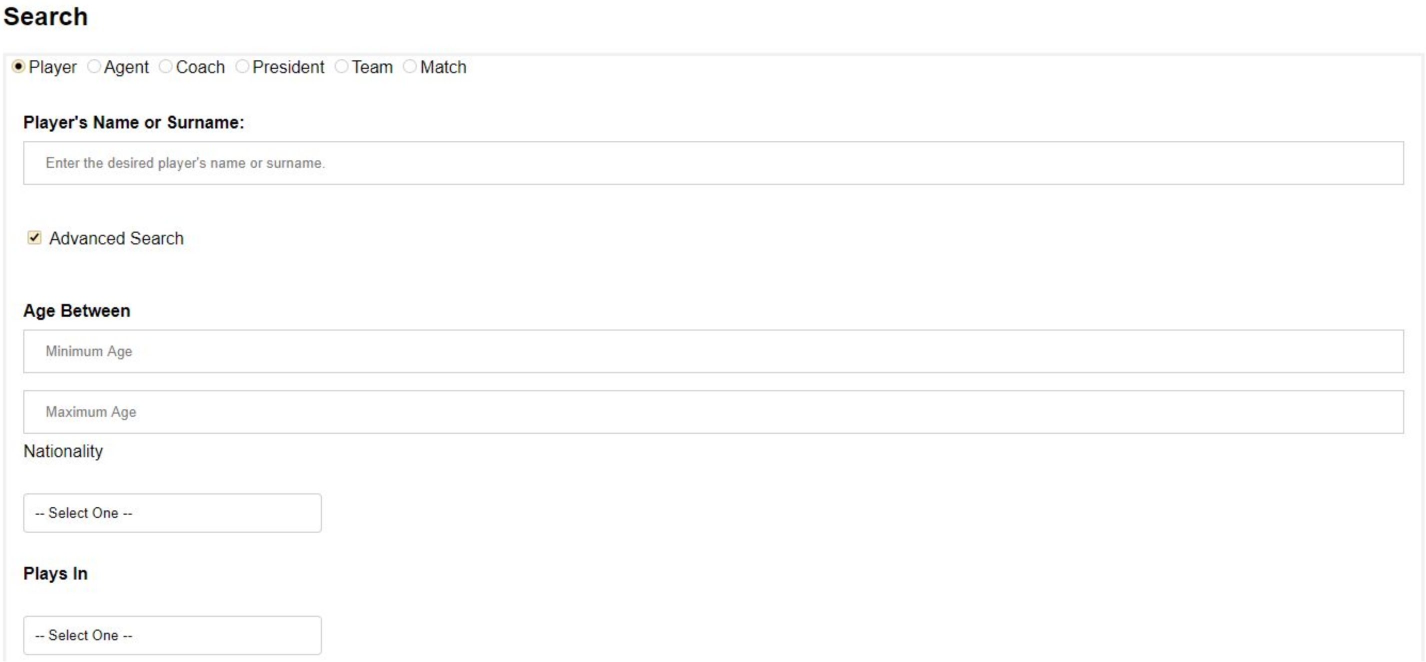
Player's Name

Enter the desired player's name

□ Advanced Search

Search

6.5.2. ADVANCED SEARCH FOR PLAYER



Search

● Player ○ Agent ○ Coach ○ President ○ Team ○ Match

Player's Name or Surname:

Enter the desired player's name or surname.

☑ Advanced Search

Age Between

Minimum Age

Maximum Age

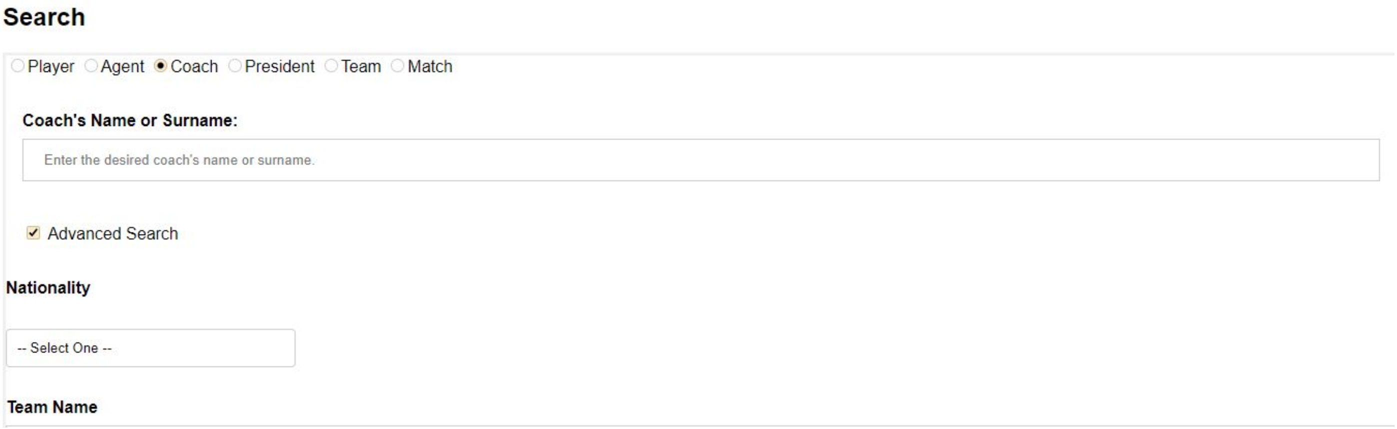
Nationality

-- Select One --

Plays In

-- Select One --

6.5.3. ADVANCED SEARCH FOR COACH



Search

○ Player ○ Agent ● Coach ○ President ○ Team ○ Match

Coach's Name or Surname:

Enter the desired coach's name or surname.

☑ Advanced Search

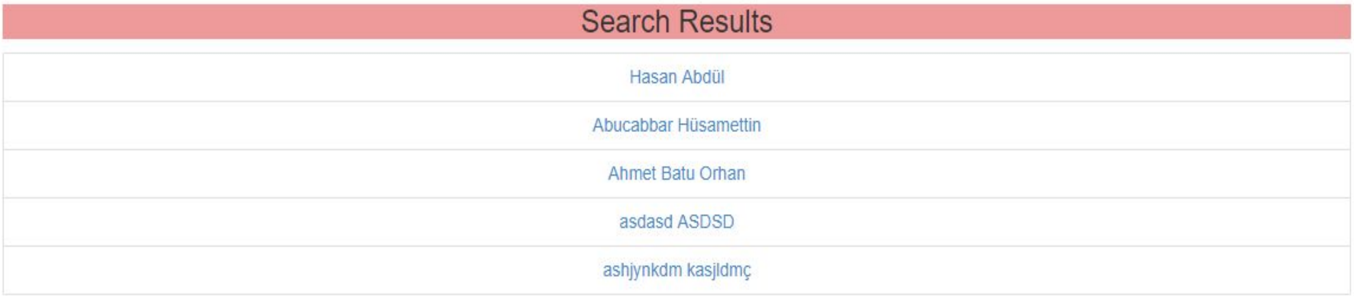
Nationality

-- Select One --

Team Name

6.6. SEARCH RESULTS PAGE

After performing one search, user will see that page. We give screenshot for only a player search. Other cases are similar to that. Users can click one of these results to see details of the respective account.



Search Results

Hasan Abdül

Abucabbar Hüsamettin

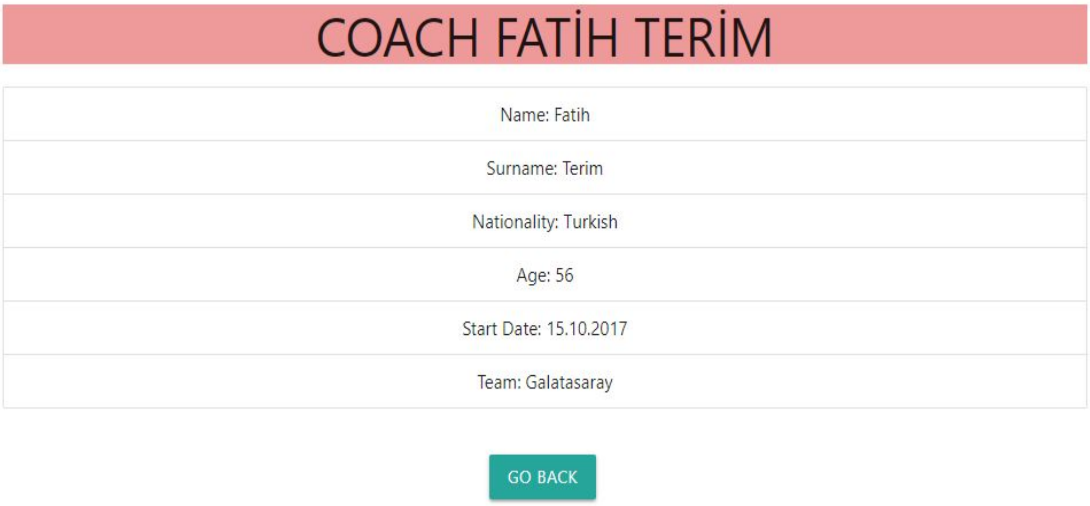
Ahmet Batu Orhan

asdasd ASDSD

ashjynkdm kasjldmç

6.7. PROFILE PAGE

6.7.1. COACH PROFILE



COACH FATİH TERİM

Name: Fatih

Surname: Terim

Nationality: Turkish

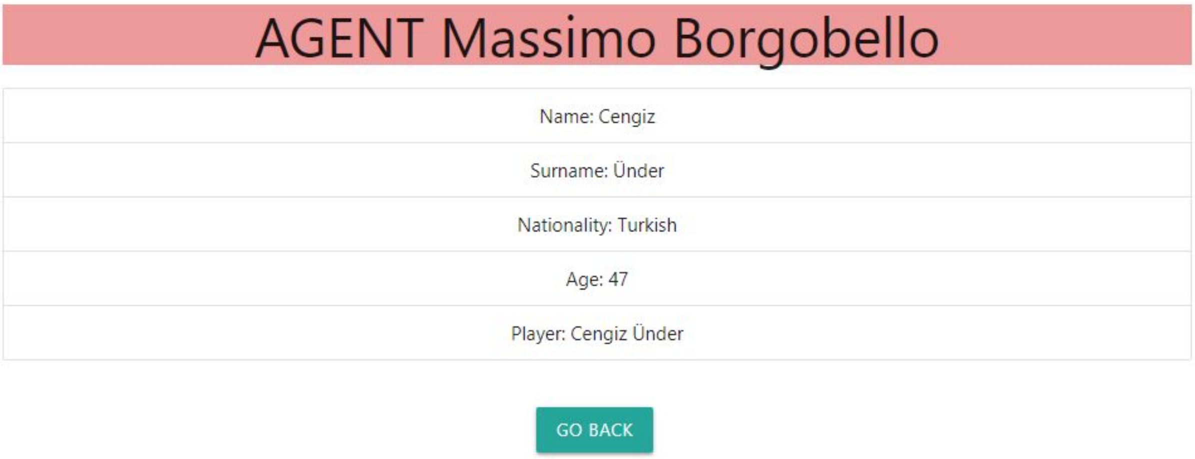
Age: 56

Start Date: 15.10.2017

Team: Galatasaray

This is the public profile page of coaches of teams. Information such as name, surname, nationality, age, start date and team are displayed here.

6.7.2. AGENT PROFILE PAGE



AGENT Massimo Borgobello

Name: Cengiz

Surname: Ünder

Nationality: Turkish

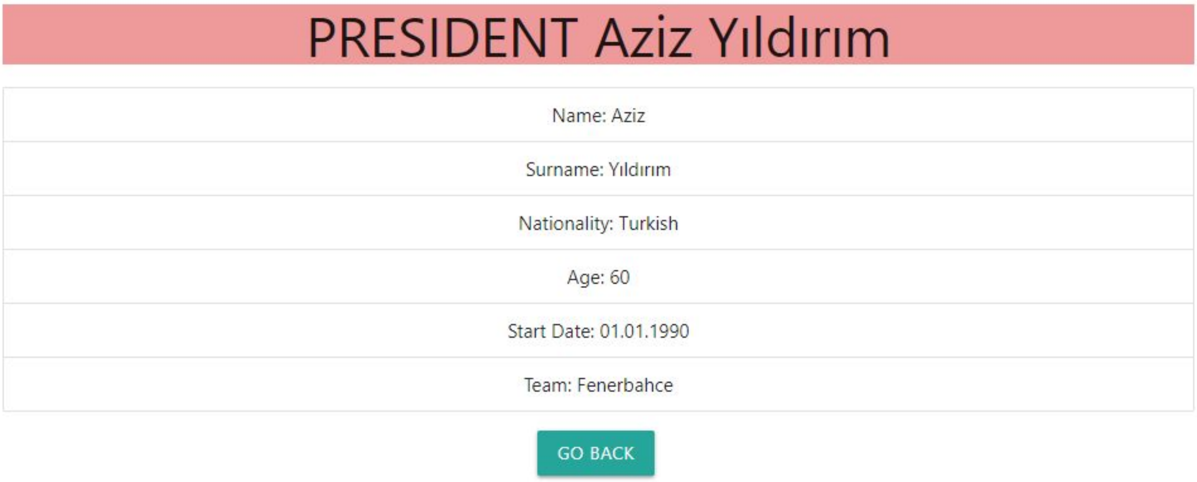
Age: 47

Player: Cengiz Ünder

That page is the public page of agents of individual players. After searching for agents, user can access this page to get more detailed information about the agent.

6.7.3. PRESIDENT PROFILE PAGE

The following page shows public information about the respective president. The related information is consisted of name, surname, nationality, age, starting date and team name. Please note, non-authenticated users cannot access account id and password. Also, they cannot access current trades and offers and they also cannot propose offers and trades.



PRESIDENT Aziz Yıldırım

Name: Aziz

Surname: Yıldırım

Nationality: Turkish

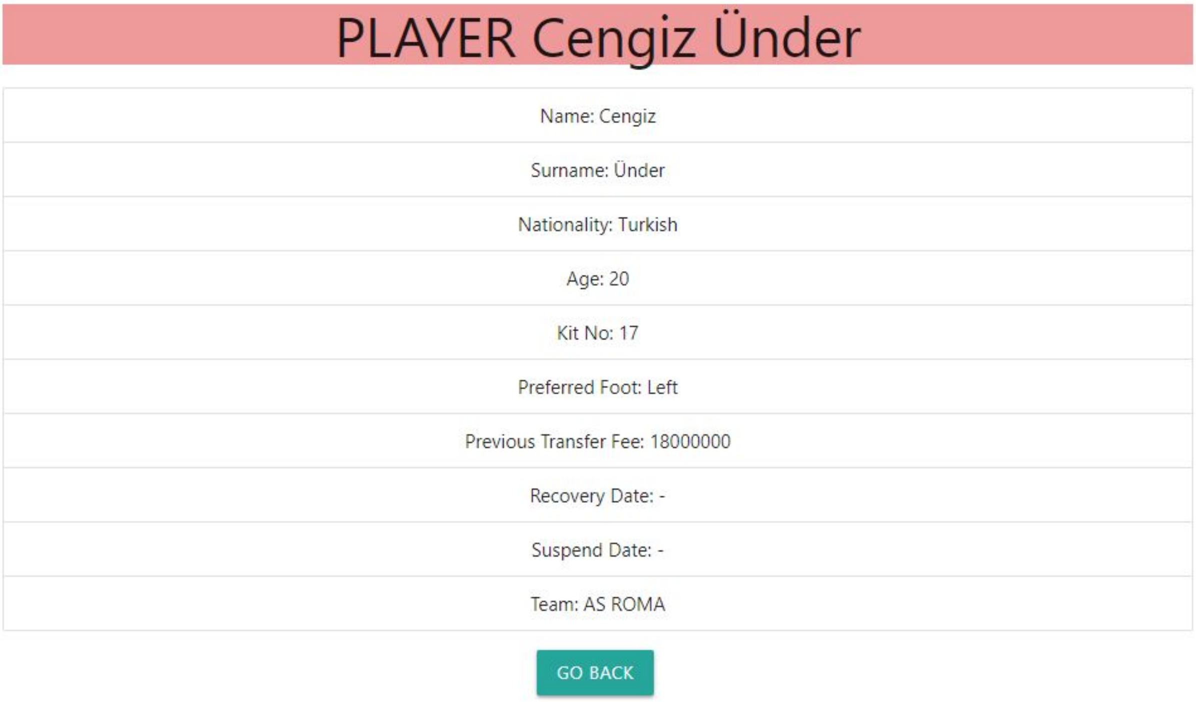
Age: 60

Start Date: 01.01.1990

Team: Fenerbahce

6.7.4. PLAYER PROFILE PAGE

That is the public profile of players. Alongside usual user information, kit no, injury information, team name are also displayed.



PLAYER Cengiz Ünder

Name: Cengiz

Surname: Ünder

Nationality: Turkish

Age: 20

Kit No: 17

Preferred Foot: Left

Previous Transfer Fee: 18000000

Recovery Date: -

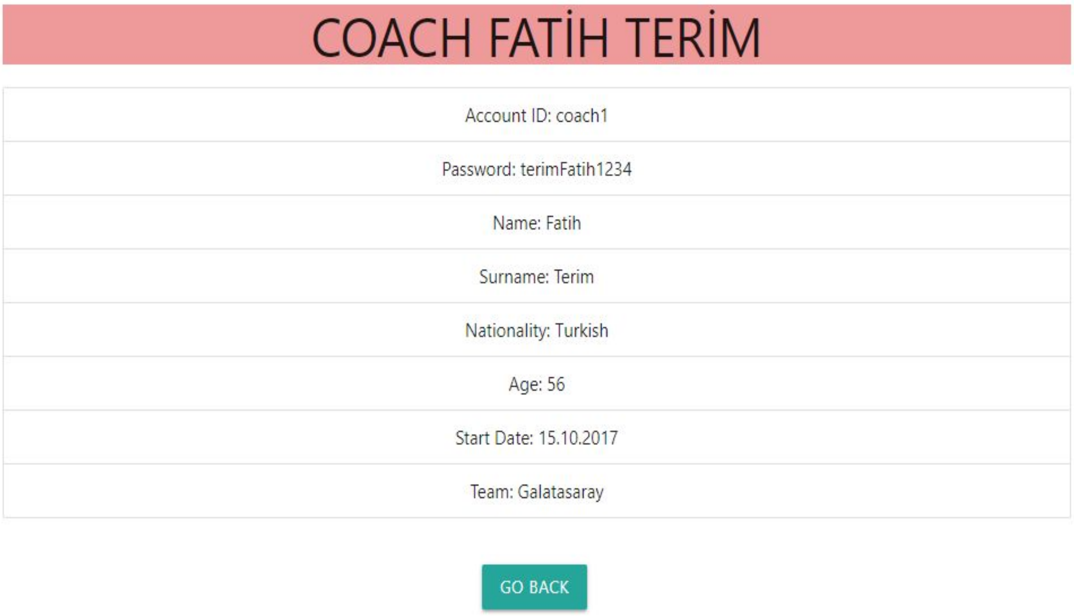
Suspend Date: -

Team: AS ROMA

6.8. AUTHENTICATED PROFILE PAGE

6.8.1. AUTHENTICATED COACH PROFILE

This is the public profile page of coaches of teams. Information such as name, surname, nationality, age, start date and team are displayed here. After authentication, account ID and password are made visible.



COACH FATİH TERİM

Account ID: coach1

Password: terimFatih1234

Name: Fatih

Surname: Terim

Nationality: Turkish

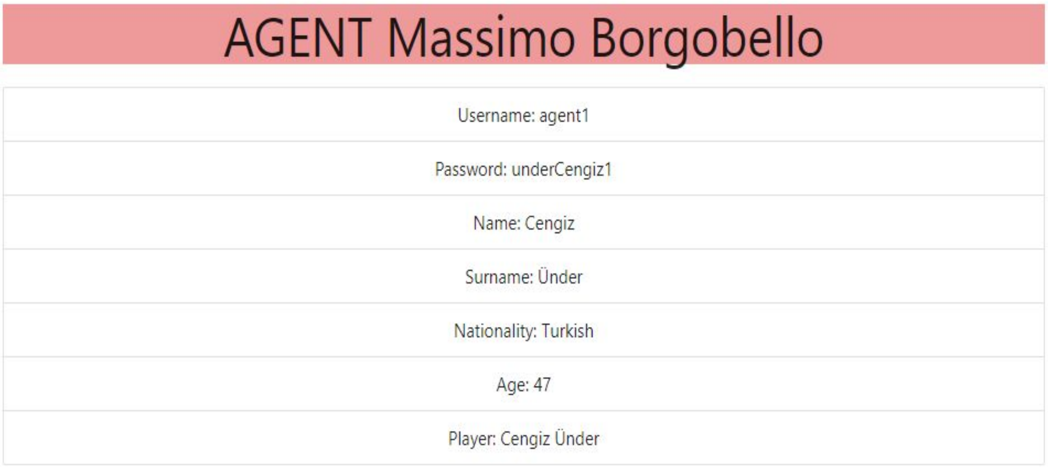
Age: 56

Start Date: 15.10.2017

Team: Galatasaray

6.8.2. AUTHENTICATED AGENT PROFILE

That page is the public page of agents of individual players. After searching for agents, user can access this page to get more detailed information about the agent. After authentication, account ID and password are made visible.



AGENT Massimo Borgobello

Username: agent1

Password: underCengiz1

Name: Cengiz

Surname: Ünder

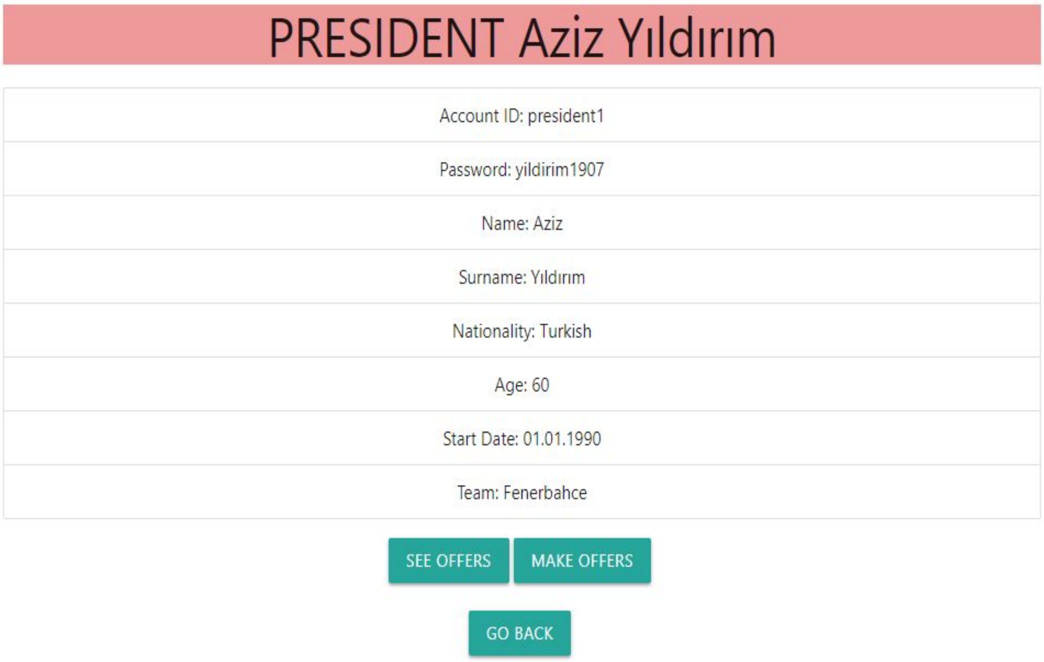
Nationality: Turkish

Age: 47

Player: Cengiz Ünder

6.8.3. AUTHENTICATED PRESIDENT PROFILE

The following page shows public information about the respective president. The related information is consisted of name, surname, nationality, age, starting date and team name. After authentication, account ID and password are made visible. Also, they can access current offers and propose offers.



PRESIDENT Aziz Yıldırım

Account ID: president1

Password: yildirim1907

Name: Aziz

Surname: Yıldırım

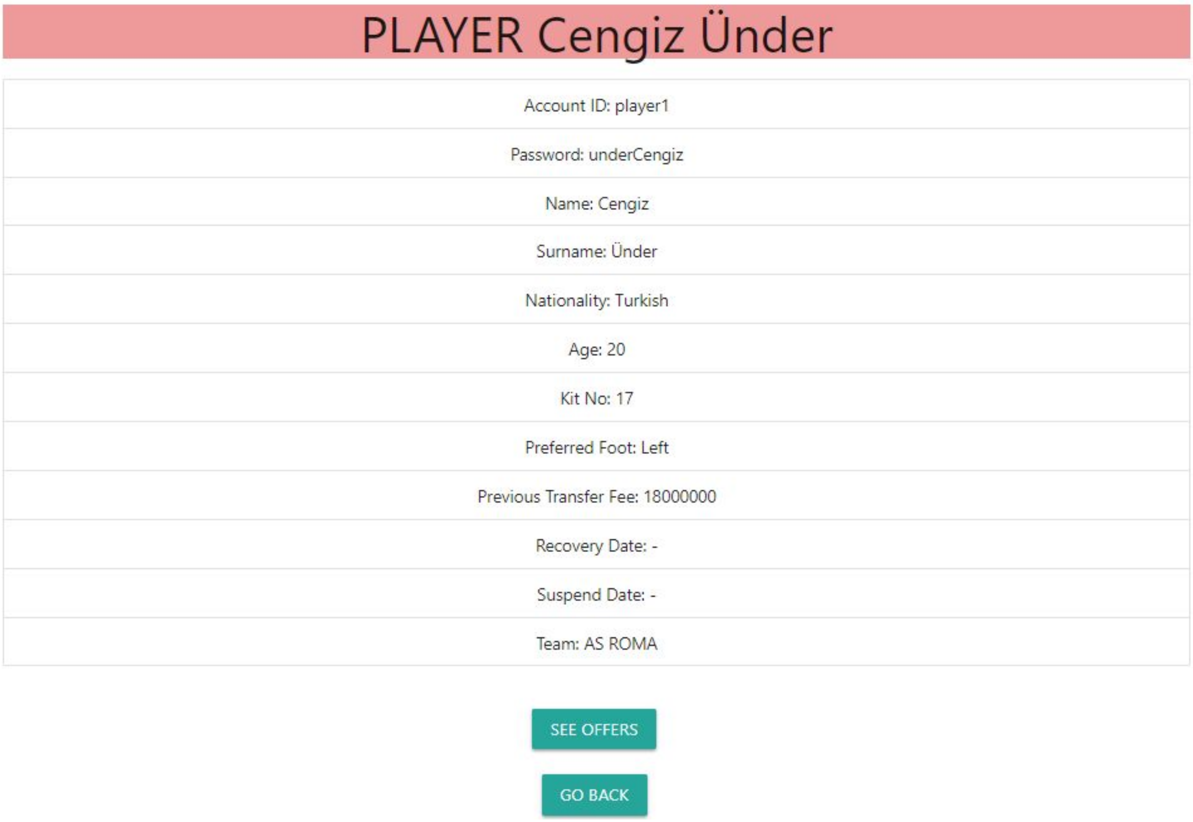
Nationality: Turkish

Age: 60

Start Date: 01.01.1990

Team: Fenerbahce

6.8.4. AUTHENTICATED PLAYER PROFILE



PLAYER Cengiz Ünder

Account ID: player1

Password: underCengiz

Name: Cengiz

Surname: Ünder

Nationality: Turkish

Age: 20

Kit No: 17

Preferred Foot: Left

Previous Transfer Fee: 18000000

Recovery Date: -

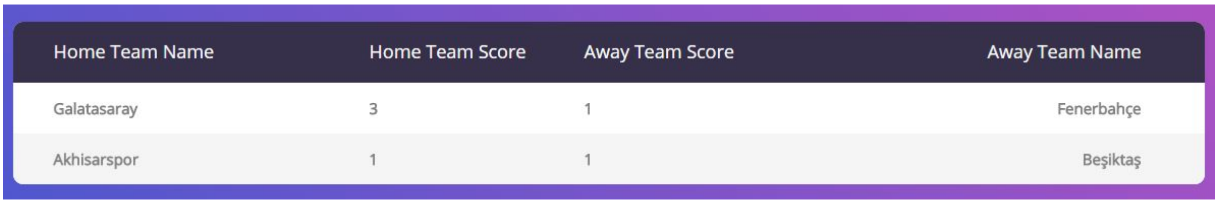
Suspend Date: -

Team: AS ROMA

6.9. MATCHES PAGE

6.10. MATCH HISTORY PAGE

From this page, users can see the matches played in the last week. Only team names and the score is displayed for each match.

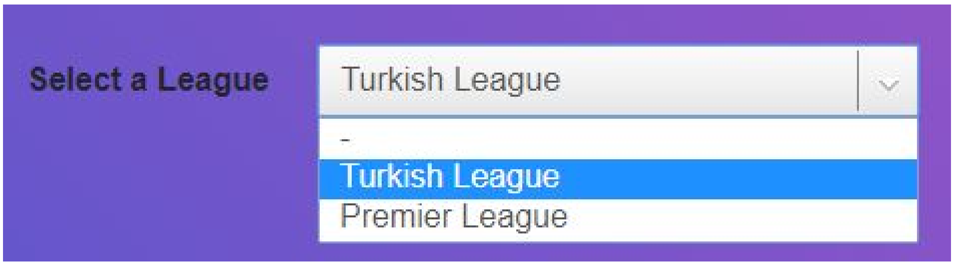


Home Team Name	Home Team Score	Away Team Score	Away Team Name
Galatasaray	3	1	Fenerbahçe
Akhisarspor	1	1	Beşiktaş

6.11. STANDINGS PAGE

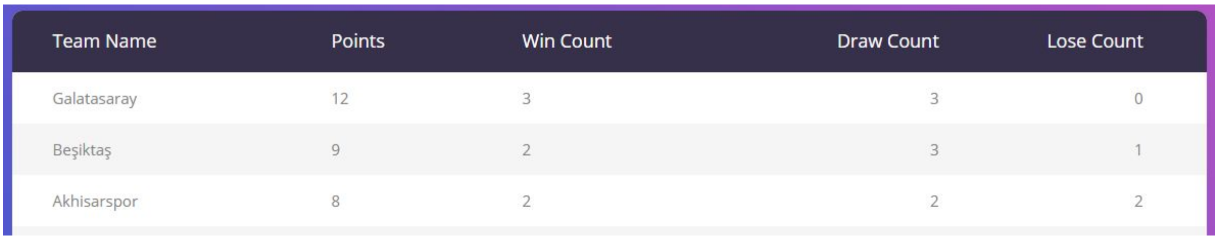
Here, users can choose among leagues and look at the current standings in that league. Standings are consisted of points, win counts, draw counts and lose counts. Please note, points are calculated as 3*win_count+1*draw_count.

6.11.1. LEAGUE SELECTION PAGE



Select a League: Turkish League

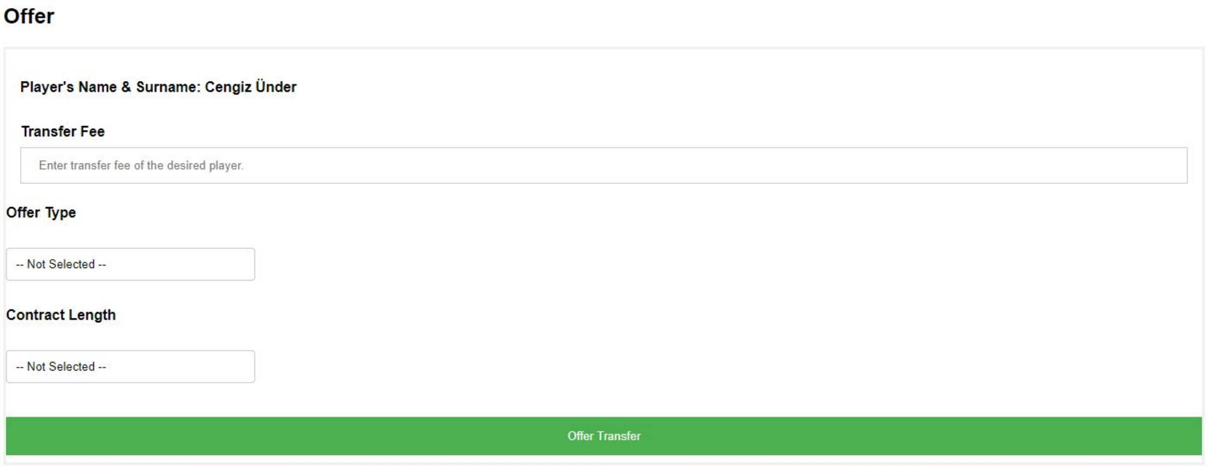
6.11.2. LEAGUE STANDINGS PAGE



Team Name	Points	Win Count	Draw Count	Lose Count
Galatasaray	12	3	3	0
Beşiktaş	9	2	3	1
Akhisarspor	8	2	2	2

6.12. OFFER MAKING

This page can only be accessed by authenticated presidents. When they look at a player page, they can also access that page. They will be required to enter offer type, contract length and of course the transfer fee.



Offer

Player's Name & Surname: Cengiz Ünder

Transfer Fee: Enter transfer fee of the desired player.

Offer Type: -- Not Selected --

Contract Length: -- Not Selected --