Java EE Distributed Applications Report

Sports Betting Application

Faculty of Science and Technology
University of Limoges

presented by

Nguyen Thi Mai Phuong
Nguyen Van Tien
Doan Thi Van Thao

Master 1 CRYPTIST

Supervisor: Prof. Emmanuel Conchon

January 13, 2021

1 Application's Structure

Sports betting is the activity of predicting sports results and placing a wager on the outcome. Sports *bettors* place their wagers legally through a *bookmaker* or *sportsbook*, who is responsible for feeding the game into a match. All the bettors and bookmakers can make profit from betting activities.

Based on the deviations of the traditional betting methods and the scope of the project, here we present a wager between two actors `Bettor`, and `Bookmaker`, where `Bettor` is the one who places a bet, while `Bookmaker` sets up all the odds before a match starts. The third actor is `Admin`, who manages the list of `Bettor`, and `Bookmaker`.

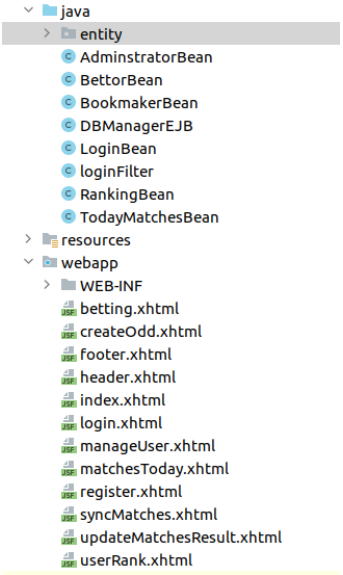

Figure 1: Application's structure.

After researching on the nature of betting and based on the activities of each character, we decides to focus structure of the application on the modularity and extensibility. Therefore, we divided the project programming into 3 main parts, each of which is able to scale when the project's scope is expanded.

The first part is called `Entity`, which defines 5 main objects corresponding to different tables in the database: `Bet`, `Competition`, `Match`, `Odd`, and `User`. The second includes Bean classes that define each moved-object accompany with his activities. And the last is `.xhtml` files, which present web-pages' designs. The detail of the application's functions will be demonstrated on the next section.

2 Application's Features

The application is implemented with different functions, corresponding to 3 main roles of the characters: `Administrator`, `Bettor`, and `Bookmaker`.

In order to optimize the application's complexity, all 3 roles share several common functions such as:

- **Login** and **Logout** (see more on item 4 below);
- Watching **upcoming matches**;
- Viewing **the ranking table of users** (sorted by limcoins).

1. `Administrator`:
   An administrator has a full control for both `bettors` and `bookmakers`, an administrator can:
   - Delete an inactive bettor or bookmaker;
   - Create a new active bettor or bookmaker. A new created bettor will receive 1000 limcoins in his pocket at the beginning;
   - Modify the information of a bettor or bookmaker;
   - View lists of bettors and bookmakers with their ranking based on their limcoins as illustrated on Figure 2.

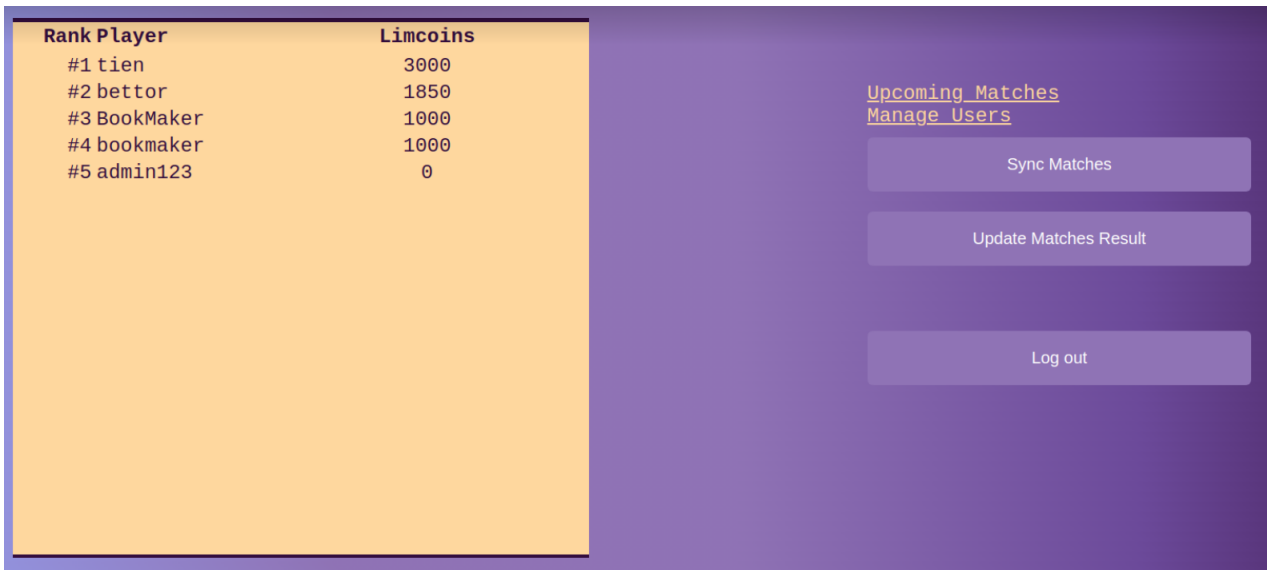

Figure 2: Admin's functions.

   - Sync matches. This action should been done to update the list of matches from API football-data.org (mentioned on section 3);
   - Update matches result. After a match is finished, it is needed to update budgets (in limcoins) of bookmakers and and bettors relating to the match.

2. `Bettor`:
   A bettor is a player, who can place a bet and gain profit or lose from it, he can:
   - View detail
     On the main screen, a bettor can view his profile's name and available budget, as long as a list of updated matches as shown on Figure 3, which displays detail of all matches available by day, including `Competition` column as a name of the tournament.

Competition	Team A	vs	Team B	Start Time
PL	Burnley FC	Bet this game	Manchester United FC	12-1-2021 20:15:00
NLD	PSV	Bet this game	AZ	13-1-2021 17:45:00
ENG	Manchester City FC	Bet this game	Brighton & Hove Albion FC	13-1-2021 18:0:00
PL	Manchester City FC	Bet this game	Brighton & Hove Albion FC	13-1-2021 18:0:00
NLD	Fortuna Sittard	Bet this game	Sparta Rotterdam	13-1-2021 19:0:00
NLD	ADO Den Haag	Bet this game	VVV Venlo	13-1-2021 19:0:00
ENG	Brentford FC	Bet this game	Bristol City FC	13-1-2021 19:0:00
NLD	Feyenoord Rotterdam	Bet this game	PEC Zwolle	13-1-2021 20:0:00
ENG	Tottenham Hotspur FC	Bet this game	Fulham FC	13-1-2021 20:15:00
PL	Tottenham Hotspur FC	Bet this game	Fulham FC	13-1-2021 20:15:00
NLD	SC Heerenveen	Bet this game	RKC Waalwijk	14-1-2021 17:45:00
NLD	FC Twente '65	Bet this game	AFC Ajax	14-1-2021 19:0:00
NLD	Willem II Tilburg	Bet this game	FC Groningen	14-1-2021 20:0:00
ENG	Arsenal FC	Bet this game	Crystal Palace FC	14-1-2021 20:0:00
PL	Arsenal FC	Bet this game	Crystal Palace FC	14-1-2021 20:0:00

Figure 3: Upcoming Matches page.

In addition, a better is allowed to view all matches suitable for the bettor's budget. That means the matches which require the bet value more than the bettor's budget will not be shown on the viewed match list.

- Place a bet
  The most important function of a bettor is to place a bet. Thus, the application is designed for him to place his bet on any matches that he interests. There are options for a bettor to choose how much he wants to bet on a match. This number will be saved on the application. After the match finishes, his budget will increase or decrease automatically depending on his victory or loss.

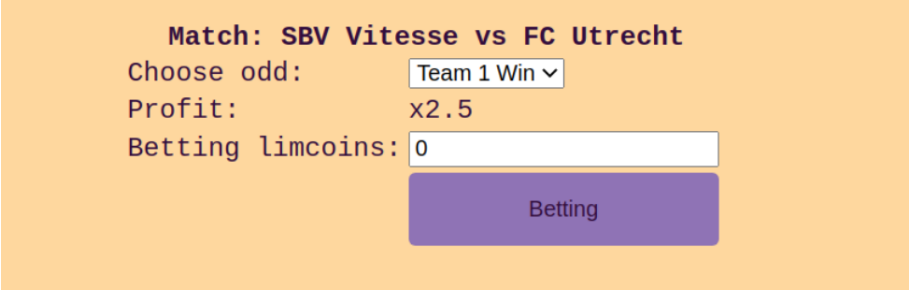

Figure 4: A bettor places a bet.

- Change a bet
  It is possible for a bettor to change his bet before the match starts. After it starts, all the bets and odds are fixed.

- View a list of his bets
  This function allows bettors to follow his bets on scheduled matches and make edition if needed.

3. `Bookmaker`:
   The vig is the main way bookmaker make a profit. It's a fee bettors pay when plac-

ing bets. In the game, bookmakers are responsible for setting the odds. Therefore, the system allow them to: Create a new odd, view the list of his odds, and modify the odds of scheduled matches.

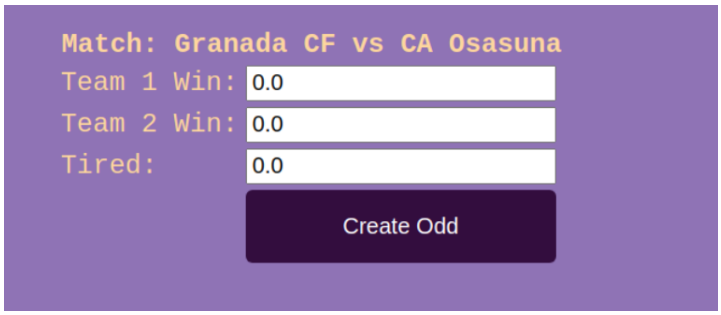

Figure 5: Bookmaker creating an Odd.

4. **Perform authentication**
   Because the scope of each user logging in the app is different, so to identify users, application uses Login and Logout functions as on Figure 6.

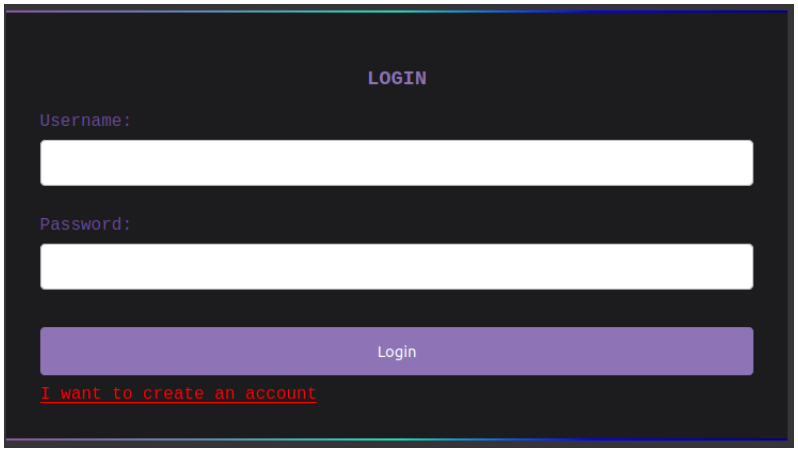

Figure 6: Login page.

A new user can create a new account for the first time with his email and password, which will be saved for the next login. Once logging out, users will be required to login again for next session.

3 Additional features

- The project is using an **external REST API** from `https://www.api-football.com/` to access all API endpoints, which can retrieve the lists and results of matches about Football Leagues & Cups.

- **Authentication and security**: to strengthen site security, the application distinguished 3 roles corresponding to 3 characters, each of who is in different scope with different functions. In the **Sign in** page, a user has permission to select creating a

username in the scope of a *bettor* or *bookmaker*. Moreover, it is required to create a password which contains at least one lowercase character, uppercase character, a *digit* and it's length must be between 6 and 20 characters. This is to make sure that no user can guess and fake another.

- **REST service**: As defined, we plan to build the project based on REST service architecture. That means a Bettor could carry out all the handling operations of objects (CRUD) through REST web services. However, within the limit of time, the RESTful web services is not fully completed as expected.

4 Summary

In the scope of the project, we implement a sports betting application, where the application met the given requirements and furthermore, implemented additional features. However, due to the lack of experience in managing communication between pages, there are still some errors which happen when users manipulate continuously while the activities are interacting with each other.