

APPENDIX

USE CASE UC1: DEFINE LEAGUE

Primary Actor: IFA Administrator

Stakeholders and Interests:

- IFA: Wants to have an integrated and complete approach to governing leagues within its system. Wants to be able to customize variability according to league in question.
- Team: Wants fair and impartial rulesets used to control scheduling and ranking.

Precondition:

- Certified IFA Administrator and IFA manager are identified and authenticated.²
- A request to define a new league has been made to the employee.²

Main Success Scenario:

1. IFA Administrator starts a new addition of a league.^{1,2}
2. IFA Administrator enters name of the league.^{1,2}
3. IFA Administrator selects name of the country in which the league is active.^{1,2}
4. IFA Administrator selects type of league: professional or amateur.²
5. System presents suggestions for budget management and currency used. Budget management based on a set of rules associated with professional and amateur leagues.^{1,2} Currency based on the country.²
6. IFA Administrator selects budget management system (may deviate from suggested).^{1,2}
7. IFA Administrator enters league's seasonal start and end date.²
8. System presents suggestions for rulesets concerning team rankings within a league and the scheduling of matches. Suggestions based on type of league, country, and the league's seasons.^{1,2}
9. IFA Administrator selects rulesets concerning team rankings within a league and scheduling of matches (may deviate from suggested).
10. System presents overview of defined league.
11. IFA Administrator confirms addition of newly defined league.
12. System notifies an IFA manager for approval of addition.²
13. IFA manager approves addition of newly defined league.²
14. System logs addition and stores defined league's information in database system.^{1,2}

Special Requirements:

- Access system from a web-based application.²
 - Language internationalization on text displayed.²
 - Pluggable business rules insertable at steps 5 and 8.^{1,2}
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USE CASE UC2: REGISTER TEAM

Primary Actor: IFA Administrator

Stakeholders and Interests:

- IFA: Wants to ensure teams can participate in the appropriate leagues based on their country of origin and their category (amateur or professional). Wants to keep leagues up to date.

Precondition:

- Certified IFA Administrator is identified and authenticated.²
- A team has applied for registration within a league and the IFA has reviewed and approved the application (occurs outside of the system).²
- The required league has already been defined.^{1,2}

Main Success Scenario:

1. IFA Administrator starts a new addition of a team.²
2. IFA Administrator enters name of the team.²
3. IFA Administrator selects name of the country the team resides in, the location, and players involved.^{1,2}
4. IFA Administrator selects category of the team: professional or amateur.^{1,2}
5. System presents a list of leagues relevant for the country and category of the team.^{1,2}
6. IFA Administrator selects league the team will participate in.²
7. System presents overview of described team.
8. IFA Administrator confirms addition of newly registered team.
9. System logs addition and stores registered team's information in database system.^{1,2}

Special Requirements:

- Access system from a web-based application.²
- Language internationalization on text displayed.²

Open Issues:

- Must an IFA manager approve of the registration of a team by an IFA Administrator?

USE CASE UC3: SCHEDULE MATCHES

Primary Actor: IFA Administrator

Stakeholders and Interests:

- IFA: Wants mostly automated scheduling to reduce workload of IFA staff. Wants to reduce bias in matchmaking by having a system decide on matchmaking based on algorithms.^{1,2}
- Referees: When assigned to a match, want the system to take into consideration their schedule and preferred time slots, to avoid working at a time of inconvenience.^{1,2}
- Teams: Want the system to automate matchmaking to support fairness and reduce bias, which can result from manual matchmaking involving employees.^{1,2}

Precondition:

- Certified IFA Administrator is identified and authenticated.²
- A referee has already indicated his or her availability in terms of schedule.^{1,2}

Main Success Scenario:

1. IFA Administrator selects league for which matches need to be scheduled.^{1,2}
2. IFA Administrator starts a new league scheduling.^{1,2}
3. System schedules the league's matches using a ruleset to avoid bias (see special requirements for details).^{1,2}
4. System assigns referees to league's matches.² Assigning takes into consideration a referee's personal schedule (constraints)^{1,2}, and avoids the same referee officiating the same team more than once to avoid bias².
5. System presents updated schedule.
6. IFA Administrator confirms schedule.
7. System logs league's schedule and stores information in database system.^{1,2}

Special Requirements:

- Access system from a web-based application.²

- Language internationalization on text displayed.²
- Pluggable business rules insertable at step 3. Currently based on balancing of the following: the hours at which teams play (time of day)², the (previous) ranking of teams², and the time intervals between matches to avoid rest periods being much shorter compared to other teams².
- Pluggable business rules insertable at step 4.

Open issues:

- What customization is needed for tournament style leagues, where it is not clear in advance which teams play against each other?

USE CASE UC3B: INDICATE SCHEDULE

This use case is considered a prerequisite of use case UC3, as it is necessary for referees to first indicate their schedule *before* a match is scheduled.

Primary Actor: Referee

Stakeholders and Interests:

- Referee: Wants to be able to indicate scheduling constraints to avoid being assigned to matches at inconvenient times^{1,2}. Wants to indicate preferences for dates and locations as well.²

Precondition:

- The referee is identified and authenticated.²

Main Success Scenario:

1. Referee starts a new schedule update.^{1,2}
2. Referee chooses between entering his or her available schedule manually, or synchronizing with his or her e-scheduling service.²
3. Referee selects preferred timeslots, dates, and locations for officiating.²
4. System presents overview of provided data.
5. Referee confirms inserted information.
6. System logs referee's updated schedule and stores it in database system.^{1,2}

Special Requirements:

- Access system from a web-based application or a mobile device.²
- Language internationalization on text displayed.²

USE CASE UC4: RECORD MATCH EVENTS

Primary Actor: Referee

Stakeholders and Interests:

- Referee: Wants accurate, fast entry, as time is scarce in the middle of a match. Wants to ensure match events are quickly provided so information on a match remains up to date.^{1,2}
- IFA: Wants the referee to report on match events quickly to prevent unauthorized data sources being accepted. Currently vague who records data, referees directly recording will provide authority.^{1,2}

Precondition:

- The referee is identified and authenticated.²

Main Success Scenario*:

1. Referee starts a new match event.^{1,2}
 2. Referee enters goal scored, time of score, and player who scored during match.²
 3. System stores goal scored, time of score, and player who scored.
 4. System sends notification to fans subscribed to receiving goal related information.
 5. Referee enters yellow and/or red cards given during match and the name of the player involved.²
 6. System stores yellow and/or red cards given and the name of the player involved.
 7. System sends notification to fans subscribed to receiving card related information.
- Referee repeats steps 2-5 when necessary until the end of the match to keep information up to date.*
8. Referee enters overtime during match.²
 9. System stores overtime.
 10. System sends notification to fans subscribed to receiving overtime related information.

Special Requirements:

- Access system from a mobile application.²
- Language internationalization on text displayed.²
- Response time of application usage should approximate 1 second, 90% of the time.
- Storage should occur within 5 seconds, 90% of the time.^{1,2}
- Servers should be able to handle increased traffic during matches. 50000 people should be able to access and use the system at any time.¹
- Updates of match events must be stored separately as they may occur at different times during a match and must be kept up-to-date.^{1,2}
- Robust recovery highly prioritized in cases where access to remote services such as database systems is failing.²
- Brightness needs to be able to be easily adjusted *within* the application to avoid bright stadiums making it hard to read the screen.⁴

* Note: in matches where no goals were scored, or no cards were given, or no overtime was necessary, the main success scenario would omit certain steps. It was considered redundant to create separate use cases for these scenarios and alternate flows were to be avoided.

USE CASE UC5: UPDATE STATISTICS AND EVENTS

Other than real-time match related events that referees are involved with (UC4), IFA Administrators are responsible for statistics and events related to the organization of matches.

Primary Actor: IFA Administrator

Stakeholders and Interests:

- Fan: Wants to acquire insight into statistics of players, teams, leagues, and coaches.^{1,2}
- IFA: Wants to have a centralized system that integrates information related to players, teams, leagues, and coaches.^{1,2}
- Team manager: Wants to be able to easily access statistics of importance to them, which may indicate the performance of one of their players, or of a player of a different team they may wish to acquire.^{1,2}

Precondition:

- IFA Administrator is identified and authenticated.²

Main Success Scenario:

1. IFA Administrator starts a new **update of statistics**.
2. System presents a list of categories for which statistics can be provided. These consist of: **teams, players, leagues, coaches**.^{1,2}
3. IFA Administrator selects a category to update.
4. IFA Administrator selects the relevant sub-category to be updated and updates the information. Sub-categories depend on the main category and are as follows:^{2,3}
 1. Teams: matches won, matches lost, draws, current ranking, recent transfers.
 2. Players: goals scored in season, assists, red/yellow cards received, number of shots on goal in season, matches played, minutes played.
 3. Leagues: participating teams, schedule, **ranking**.
 4. Coaches: current team, previous teams, notable achievements.
1. System presents overview of updates information.
2. IFA Administrator confirms update.
3. System stores updated statistics in database system.^{1,2}

Special Requirements:

- Access system from a web-based application.²
 - Language internationalization on text displayed.²
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USE CASE UC6: SETUP NOTIFICATION SUBSCRIPTION

Primary Actor: Stakeholder. This is a generalized actor consisting of fans, teams (including players and coaches), and referees (including linesmen and fourth official), as they should all be able to receive notifications on events of their interest.²

Stakeholders and Interests:

- Fan: Wants to be notified in real-time of match related events to keep track of what is happening during a match. Wants to be able to setup the type of information that they receive notifications on.
- Teams: Want to ensure correct results are provided of their matches. Want to be kept updated on match related events of competitors. Wants to be able to setup the type of information that they receive notifications on.
- Referees: Want reliable, fast, and accurate way to keep track of score and provide score to those interested. Linesmen and the fourth official want to be kept up-to-date on match data that the referee inserts during a match. Wants to be able to setup the type of information that they receive notifications on.

Precondition:

- Stakeholder is identified and authenticated.²

Main Success Scenario:

1. **Stakeholder** starts a **setup** of subscription to **notifications**.
2. System presents a list of categories that include the following: goals, cards, penalties, time (consists of start of match, full-time, half-time, and overtime), scheduling (consists of rescheduled or cancelled events), transfers, lineup, headlines (i.e. important news).^{1,2,3}
3. Stakeholder selects zero or more categories of information that he or she wishes to receive notifications on.^{1,2}
4. Stakeholder confirms selection.
5. System logs selection and stores it in database system.^{1,2}

Special Requirements:

- Access system from a web-based application or a mobile device.²
 - Language internationalization on text displayed.²
 - The roles involved with this generalized primary actor must be notified in the same manner through push notifications.^{1,2}
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USE CASE UC7: CHECK STATISTICS

Primary Actor: Stakeholder. This is a generalized actor (similar to UC6) consisting of fans, teams (including players and coaches), and referees (including linesmen and fourth official), as they all have an interest in certain statistics.²

Stakeholders and Interests:

- Fan: Wants to acquire insight into statistics of players, teams, leagues, and coaches.^{1,2}
- IFA: Wants to have a centralized system that integrates information related to players, teams, leagues, and coaches.^{1,2}
- Team manager: Wants to be able to easily access statistics of importance to them. For example, their team's statistics indicating performance, the performance of one of their players, or of a player of a different team.^{1,2}

Precondition:

- Stakeholder is identified and authenticated.²

Main Success Scenario:

1. Stakeholder enters the name of an entity of interest, such as a player, team, league, or coach.
2. System presents a list of results
3. Stakeholder selects a particular option to see the static(s) of interest.

Special Requirements:

- 50000 people should be able to access the system at any time.¹
 - Response time of application usage should approximate 1 second, 90% of the time.^{1,2}
 - Users from all around the world should be able to access the system (i.e. no limitations due to location).¹
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USE CASE UC8: AUDIT TEAM FINANCES

Primary Actor: IFA budget auditor

Stakeholders and Interests:

- IFA: Wants transparency and insight into the financial situation of teams, including their transactions and resource management. Wants easily accessible way to audit financial records of teams.^{1,2}
- Team: Wants system to accurately and reliably display their financial and resource management. Wants automatic and fast updating of accounting data.^{1,2}
- Government Tax Agency: Wants to be able to audit the financial reports of teams. May consist of multiple agencies depending on the category of the league, such as national or provincial. May also depend on the country in which a team or league is active.⁵

Precondition:

- Certified IFA budget auditor is identified and authenticated.²
- Team has been registered.

Main Success Scenario:

1. IFA budget auditor initiates a team audit.
2. System presents list of teams registered with the association.
3. IFA budget auditor selects team to be audited.
4. System presents team's finances (consist of transactions and budget) and team's resource management (consists of stadiums, players, and coaches).^{1,2}
5. IFA budget auditor selects information of interest and requests report.²
6. System generates and presents report.²
7. IFA budget auditor saves report.

Special Requirements:

- Access system from a web-based application.²
- Language internationalization on text displayed.²

Open issues:

- What rules exist for historical financial information?
 - What are the tax law variations in the various countries involved?
 - What customization is needed for different leagues?
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USE CASE UC9: MANAGE RESOURCES

Primary Actor: Team manager**Stakeholders and Interests:**

- IFA: Wants teams to manage resources within the system to be able to continuously and reliably monitor the resources of teams.^{1,2}
- Team: Wants system to accurately and reliably record and display resources within the system, as financial audits may have significant consequences for them.^{1,2}

Precondition:

- Team manager is identified and authenticated.²
- Team has been registered.

Main Success Scenario:

1. Team manager accesses resource management.^{1,2}
2. System presents categories of resources. These consist of: stadiums, players, coaches, budget (income, expenses), transactions.^{1,2}
3. Team manager selects the relevant category.
4. System presents the information related to the selected category.
5. Team manager updates information pertaining to that category.^{1,2}
Team manager repeats steps 3-5 until indicates done.
6. System presents overview of updated information.
7. Team manager confirms updated information.
8. System logs updates and stores updated information in database system.^{1,2}

Special Requirements:

- Access system from a web-based application.²
- Language internationalization on text displayed.²
- Robust recovery is needed in case access to resource management systems has failed.⁵

Open issues:

- Should team manager be able to delegate activities to other staff members such as accounting? If so, what roles and system privileges are required?
 - Should transactions be made using the system or are they just recorded in the system?
 - Explore more details of the information that should be available for each of the resource categories.
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