**CSSE 333**

**Circle The Wagons [1]**

**Security and Data Integrity Analysis**

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# Executive Summary

This document is the security and data integrity analysis of the project that we designed to help players keep track of their basketball. This document contains a privacy analysis, security analysis, entity integrity analysis, referential integrity analysis, and business rule integrity analysis.

# Privacy Analysis

In our database we need to keep the users’ sensitive information private and only give access to those users that need to see it. A player’s date of birth can only be seen by their own account and by their coaches because a coach needs to know date of birth for games and events. A coach’s date of birth can only be seen by their own account because a player does not need to know a coach’s date of birth. A password is only known by the account holder, but it is not viewable to them in the program. All other data, including height and weight, associated with a user can be seen by everyone in their team.

# Security Analysis

One possible breach of the security of the system would be if someone gained access to the location where passwords are stored. If this happened, and passwords were stored in their original form, data integrity would be violated because an unauthorized person would have access to the account of a user and be able to make changes as if they were the user. This type of breach would also violate privacy because someone could see stats outside of their associated teams. This type of breach would affect the stakeholders. For the players and coaches, their account is no longer private, and they would lose confidence in the security of the system. The developers and professors would be affected because fewer people would want to use the system. To solve this problem, we can encrypt the password by salting and hashing before storing them.

A breach of the database connection login information would also violate data integrity and privacy by enabling someone to manipulate data and view all the data of the users. As stakeholders, the players and coaches would be affected because their data would be compromised. The developers and the professor would be affected by this because they would be responsible for fixing any changes made. This type of breach could be prevented by encrypting the login information before storing it.

Another possible breach of the security system would be a SQL injection attack. This would violate data integrity by possibly manipulating or deleting data. Privacy would also be violated by this type of breach because it would enable someone to edit the data of a user. The players and coaches would be impacted by this type of breach because they would not be able to trust that their own data could only be manipulated by those with explicit access. The developers and the professor would also be affected because code would be run that they did not intend to run. They would also be responsible for fixing the manipulations. We can prevent these types of breaches by avoiding using string concatenation.

# Entity Integrity Analysis

Person – The primary key for the person table is the ID. We are requiring that the following fields are not null: first name, last name, username, password. We are also requiring that the DOB is before the current date. We also want to ensure that the username is unique.

Player – The primary key for the Player table is the ID. This ID is also a foreign key to the Person table. We also requiring that the height and weight of the player is greater than 0.

Coach – The primary key for the Coach table is the ID. This ID is also a foreign key to the Person table .

Position – The primary key for the Position table is the name of the position.

Team – The primary key of the Team table is the ID. We also require that the team’s name is not null.

Stat – The primary key of the Stat table is the name of the stat.

Drill – the primary key of the Drill table is the ID. We also require that the team’s name is not null.

Plays On – The primary key of the Plays On table is the combination of player ID, team ID, and position name. The player ID is a foreign key to the Player table. The team ID is a foreign key to the Team table. The position name is a foreign key to the Position table. We also require that the start date is not null and is before or equal to the current date. The end date is also greater than or equal to the current date.

Coaches – The primary key of the Coaches table is the combination of coach ID and team ID. The coach ID is a foreign key to the Coach table. The team ID is a foreign key to the Team table. We also require that the start date is not null and is before or equal to the current date. The end date is also greater than or equal to the current date.

Has Stat – The primary key of the Has Stat table is the combination of player ID and stat name. The player ID is a foreign key to the Player table. The stat name is a foreign key to the Stat table. We also require that the quantity of the stat is greater than or equal to 0. The date of the stat cannot be null and must be less than or equal to the current date.

Targets – The primary key of the Targets table is the combination of Drill ID and stat name. The drill ID is a foreign key to the Drill table. The stat name is a foreign key to the Stat table.

# Referential Integrity Analysis

In our database we chose that all updates on primary keys will cascade, and all deletes will be rejected. We chose to cascade all updates so that all data across multiple tables is guaranteed to be updated at the same time. With this rule in place, we will not lose or have any data that does not match other tables. We chose to reject all deletes so that we can track the history of all players and coaches. Rejecting the deletes also prevents us from accidentally deleting data in other tables. In addition, we also ensure that each foreign key references a value in the primary key table.

# Business Rule Integrity Analysis

In our database we do not have any business rule constraints. Our data primarily focuses on data for different users and does not involve any transactions. Also, it is important to note that data entered for one user has no impact on another user’s data.

# References

[1]Circle the Wagons: <http://www.fastmodelsports.com/library/basketball/fastdraw/290/play-Drill-of-the-Day-07-18-2011-Circle-the-Wagons>

[3]Basketball Drills: <https://www.masterclass.com/articles/basketball-drill-guide>

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# Glossary

Drills: exercises used by teams and individual players to improve their fundamental skills [2]

# Appendix

## ER Diagram

Diagram

Description automatically generated

## Relational Schema

Diagram

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