

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS
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Systems Analysis and Design
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NCAA Basketball Tournament - Systems Analysis

1 Competition Overview

The "March Machine Learning Mania 2025" competition is a prominent prediction challenge on Kaggle that invites participants to forecast the outcomes of the 2025 NCAA men's and women's basketball tournaments. It is a skills-based competition designed to promote and advance the field of data science. The NCAA Basketball Tournament is one of the most prestigious college basketball competitions in the United States. The tournament is structured into different phases, starting with the **Regular Season**, followed by the **Playoffs**, and concluding with the **Tournament**. It involves multiple conferences, teams, and stakeholders, also including coaches, referees, and spectators. The goal of this analysis is to understand the system dynamics and interactions within this tournament.

2 Systems Analysis Report

2.1 Systemic Analysis

2.1.1 Identification of Key Elements

The NCAA Basketball Tournament system comprises the following essential components:

- **Season:** The entire period during which the NCAA tournament takes place.
- **Regular Season:** The initial phase of the season.
- **Playoff:** The knockout stages.
- **Final 4:** The final phase of the tournament.
- **Conferences:** Groups of teams based on region or category.
- **Teams:** Participating teams.
- **Coach:** The head coach of each team.

- **Match:** Individual games within the tournament.
- **Cities:** Locations where the games are played.
- **Referee:** Officials in charge of the matches.
- **Fans:** Supporters and spectators.
- **Field:** Courts where the matches are played.

2.1.2 Mapping Relationships

The tournament's elements interact in various ways:

The **Season** is the entire period in which the NCAA tournament takes place.

The **Season** is divided into the **Regular Season**, **Playoff**, and **Final 4**.

The **Regular Season** is the beginning of the **Season**.

The **Conferences** are divisions within the **Regular Season**.

The **Conferences** are made up of **Teams**.

The **Coach** trains the **Teams** for the **Matches**.

The **Matches** are played on **Fields** in different **Cities**.

Each **Match** includes **Fans** and **Referees**.

After the **Regular Season** come the **Playoffs**.

Based on the results of the **Playoffs**, teams advance to the **Final 4**.

The winner of the **Final 4** becomes the champion of the **Season**.

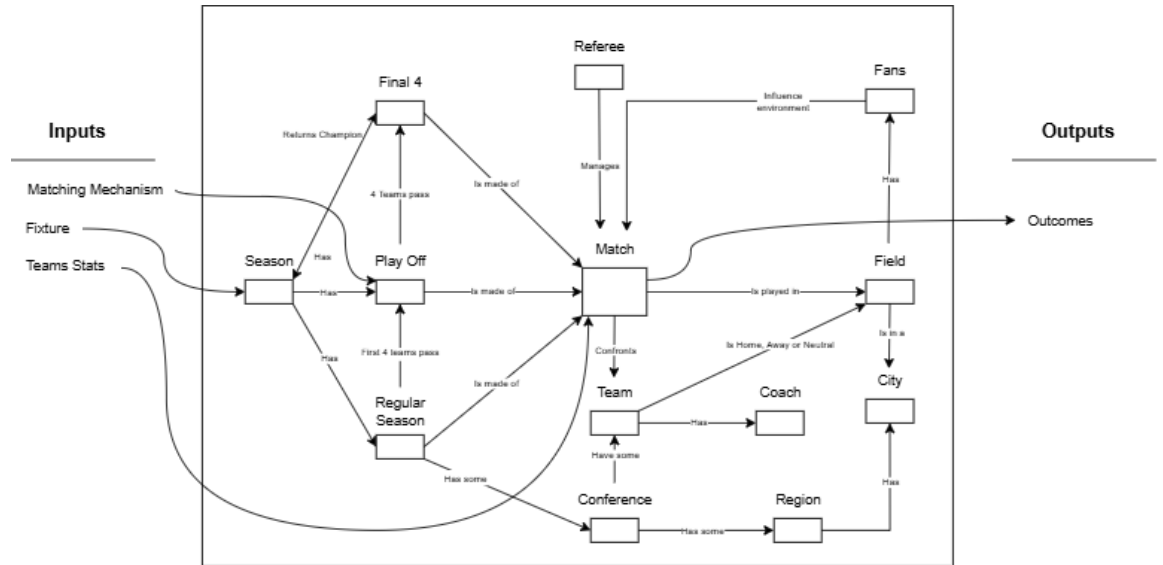


Figure 1: Diagram (svg file in repository)

2.2 Complexity and Sensitivity

Depending on the **Coach**, the **Team** plays with a specific strategy.
According to the **fixture**, the stages may vary, and the .
Depending on the **City**, **Teams** may perform differently.
The **Matching Mechanism** also influences the **play-off** stage of the tournament because if it changes, the matches will be different.
Also the state of the Team plays an important role, whether it is home, away, or neutral.

2.3 Chaos and Randomness

Favoritism or poor decisions from the **Referee**.
Conditions of the **Field**.
The **Fans** on the Field, although unpredictable in their behavior, some fall into repetitive patterns such as chants, reactions, etc.
Technical failures in the **Field**.
Teams' logistical failures.

2.4 Conclusion

This analysis shows that the NCAA Basketball Tournament is a complicated system made up of many different parts. Things like fans and coaching decisions can have a big effect on the results. Also, the results of the games are often difficult to predict because of something called 'chaos theory'.