Group Project: Proposal

Problem Statement:

Optimize scheduling for the group stages of the Fifa 2026 world cup.

- Schedule games around regions and cities, where each team gets an optimal amount of rest and minimal travel time, while adhering to the given constraints.
- Utilize combinatorial optimization or constraint satisfaction programming to figure out scheduling, matching teams to cities, minimizing travel time for each team and the various other tournament constraints.
- We will initially start off by defining a structure to represent a possible match-up, and represent all match-ups on a tree, where a node at depth 'i' would be a match on day 'i'. Then we could use constraint satisfaction to backtrack and search for a path where all nodes satisfy the given constraints.

Data + Computations:

Data:

- Previous world cup (Fifa 2022) data.
- Use current ranking of top 48 teams to determine which teams are potentially within this years world cup
- Use pre-existing FIFA world cup draws to design our random draw of groups

Constraints:

- 48 Teams total
- 12 Groups (4 teams each group)
- 3 Regions (16 teams per region, teams only stay within their own region)
- 3 Games per team (play each other team within the group once)
- 3 Days of rest between every game for each team (affects travel time and scheduling)
- Ensure that most popular teams play within the bigger stadiums (define using previous world cup data + existing stadium capacity data + viewership/pay-per-view data)

References + Examples:

- Travelling salesman problem (for scheduling)
- Linear programming (for discrete optimization within constraints)
- World tour scheduling problem (for inspiration)
- Previous world cup data + viewership data + stadium capacity data