MSIS 5303

NCAA Class Madness Scheduling – 2022 Version (V.1)

Each year, there are many complaints about how the NCAA Men’s Basketball Committee seeds and schedules teams in the 68-team single elimination tournament to determine the National Champion. It is inevitable that somebody is unhappy. We will approach a portion of the task by using our modeling skills to generate an alternative schedule that will likely differ from the actual assignments. Your task is twofold – 1) generate a model that “solves” the situation using OUR parameters (which is basic scheduling common sense IMO) and then 2) do a thorough comparison of the actual tournament assignments and the results of your model.

The task: Create an LP model that will assign teams to regions. You will be using only the top 24 teams (the #1 thru #6 seeds) and all 4 regions. The objective of your model for assigning teams will be to minimize the sum of distance from the location of each team to their assigned region. Distance data is provided on a separate spreadsheet.

The restrictions for team assignment to regions follow below. These are in the spirit of common sense and the NCAA tournament committee ‘rules’, but more much holistic then their “micro” approaches.

1) Each of the four regions (West - San Francisco, South – San Antonio, East – Philadelphia, Midwest – Chicago) will have exactly one #1 seed assigned, exactly one #2 seed assigned, exactly one #3 assigned, exactly one #4 assigned, exactly one #5 assigned and exactly one #6 assigned.

2) Teams from the same conference cannot be assigned to the same region (unless there are more than 4 teams from the same conference – the SEC in our case). Conferences are shown on the data file (it is a team attribute). Also, don’t worry about conferences that do not have multiple teams (i.e., IGNORE THEM!!!).

For the SEC – make sure each region has at least 1 SEC team, but no more than 2 SEC teams assigned.

3) The “too-close” rule – a loose adaptation of a true NCAA rule. Do not allow St. Mary’s to be assigned to the West region. But it is okay to allow (not force) Villanova to be assigned to the East region. I can explain further if this bothers you in any way.

4) “Marquee” Value – “Q” –There are 9 teams that have a “Q” factor – they are either marquee teams or teams that have captured the interest of the basketball fanbase because of some unique aspect of the team. This is scaled on a value of 1-10.

There are two different requirements that must be met BY REGION regarding the Q factor.

1. Each Region must have at least 2 teams that have a Q factor.
2. For the teams assigned to the region that have a Q factor, their average value must be >= 4.2. Note, the 15 teams that do not have a Q factor do NOT factor into this constraint.

Part A - THE MODEL - Implement an appropriate linear programming model that assigns the 24 teams to Regions, minimizing the sum of overall distances subject to the items listed above. Suggestion: Attack modularly AND model efficiently. What do we mean ‘efficiently’? If you are a little sloppy with your constraints, or include unnecessary or duplicative constraints, you may exceed the 100-constraint limit imposed by the Solver. Model carefully.

Part B - THE COMPARISON: Compare your solution to the NCAA’s assignments. Keep in mind neither model is necessarily ‘better’ and each approach is using different criteria. NOTE: Don’t just forget this part. At least 20% of your grade will be based on a thorough comparison of your model solution to the NCAA actual bracket.

Specifically, measure the following for both your solution and the actual assignments (obviously, only the 24 teams of interest).

* Miles overall and individually for the #1 seeds, #2 seeds, #3 seeds, #4 seeds, #5 seeds, and #6 seeds.
* The number of regions where multiple teams from the same conference are assigned (do not consider the SEC). (Your solution should have a measure of “0”).
* The number of regions where the SEC assignments (at least 1 but no more than 2) are violated (Your solution should have a measure of ‘0’).
* The number of regions that do NOT satisfy the Weighted Q requirements (Your solution should have a measure of ‘0’).
* The number of regions that do NOT satisfy the minimum number of marquee teams’ requirement (Your solution should have a measure of ‘0’).

A simple summary of the team assignments in a nice understandable format would also be helpful.

NOTE: The data file shows the actual NCAA assignments – in yellow.

NOTE2: If I have errors in the data file, I reserve the right to correct them all the way up into the checkpoint deadline. I have triple teamed my typing, but that doesn’t mean I haven’t had a turnover!