

Scheduling the German Basketball League

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Abstract The German Basketball League (Beko BBL) consists of 18 teams which play against each other in 34 rounds. Every team plays one game per round, and over the whole season it meets each other team once at its own home venue (*home game*) and once at the other team's venue (*away game*). This is organized in a way such that these two games are not played in the same half of the season. Furthermore, each team has at least 8 and at most 9 home games in each season half.

Apart from these fundamental requirements, there is a wide variety of additional aspects to be taken care of. As most of the games take place in multi-purpose arenas which are also used for other events as well, these venues are not always available. In fact, in the season 2011/2012 several teams cannot play in their home-town for several weeks in a row. As these *availability restrictions* cannot be relaxed, several classical approaches to league scheduling cannot be applied here. Despite these conditions, the plans for the single teams shall be designed such that each home game is followed by an away game and each away game is followed by a home game. A violation of this rule is called a *break* and shall be avoided whenever it is possible.

Another very important aspect is the *utilization by the media*. The games which are considered to promise the highest TV viewing figures shall be scheduled such that all of the given broadcasting slots are exploited in the best possible way.

In this paper, we give a polynomial time algorithm which can be applied to any instance to find a schedule fulfilling at least half of the availability restrictions. Moreover, we present several algorithmic approaches which we utilized to find the schedule which will be applied by the German Basketball League (Beko BBL) for the season 2011/2012. Finally, we show how good the different models fit the needs of the BBL with respect to availability restrictions, total number of breaks, and utilization by the media.

As all of the requirements mentioned above are very typical for sports leagues in general, the presented approaches are not limited to the considered example of the Beko BBL but can be applied to a whole variety of other sports leagues as well.

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