

2nd Year Group Project

Sports Scheduling

This project involves creating a set of fixtures for an English football season. The problem can be defined as follows.

- The four main divisions in England comprise the Barclays Premiership League, Coca-Cola Football League Championship, Coca-Cola Football League One and Coca-Cola Football League Two. These divisions comprise 20, 24, 24, 24 teams respectively.
- Each division plays a double round robin tournament. That is each team plays every other team, both home and away. This means that there are 380 matches played in the Premier League and 552 matches played in the other three leagues; making a total of 2036 fixtures that have to be scheduled.
- Each season, a complete fixture list has to be produced which defines when every team will play, and whether they will be at home or away.

At first sight, it might appear that we can simply schedule each division in isolation. However, something called the *pairing system* means that we cannot do this. The pairing system dictates that certain teams cannot play at their home venue at the same time, and this might affect teams which are in different divisions. The pairs will be given to you.

There are also other factors which have to be taken into account. For example (and this is not a complete list):

- There must be a certain amount of time before teams can play each other again.
- If a team plays at home on the first day of the season, they must play away on the last day (and vice versa).
- Teams cannot play more than three consecutive home or away games.

These constraints (and others) can be confirmed (or not) by analysing the fixtures that are actually published (and used). For example, you need to decide how many *timeslots* you have for each division.

Your main tasks should be as follows:

- Carry out a literature review to find out what has been done before in this area.
- Collect the data (i.e. the fixtures that were presented at the start of the football season).
- Carry out an analysis of the data to draw out the key aspects of the problem.
- Clarify the problem ensuring that you specify how you measure the quality of the solution and the constraints that you have to respect.
- Decide which algorithms/data structures you will use to produce your fixture schedule.
- Compare your solutions with those that were actually used and say why yours were better (or not).