Heuristic Optimization Methods, academic year 2020/2021
Fantasy football draft problem

Task for the final exam (15 points)

1. Design and implement a **Tabu Search (TS)** algorithm for solving the given problem. Three problem instances are assigned. Instances 1 and 2 were assigned previously in the scope of the midterm task, while Instance 3 is new. To obtain an initial solution for these instances, you may use your previously implemented greedy algorithm (those students that did not complete the midterm task may use any method of their choice to obtain an initial solution).

2. Execute your TS algorithm for the given instances of the problem. Investigate and report on the impact of the tabu tenure (length, or size, of the tabu list) on the obtained search results. Investigate at least three different tabu tenures.

3. For each TS algorithm run, save the value of the objective function (overall score for the ''best eleven''), and the list of drafted players, as well as the list of players in the first team lineup, corresponding to the best found solution.

4. Design and implement a **Simulated Annealing (SA)** algorithm to find a solution to the given problem. Once again, to obtain an initial solution for these instances, you may use your previously implemented greedy algorithm (those students that did not complete the midterm task may use any method of their choice to obtain an initial solution).

5. Execute your SA algorithm for the given instances of the problem. Investigate and report on the impact of the initial temperature (using a single cooling schedule), and at least two different cooling schedules (using the same initial temperature) on the obtained search results.

6. For each SA algorithm run, save the value of the objective function (overall score for the ''best eleven''), and the list of drafted players, as well as the list of players in the first team lineup, corresponding to the best found solution.

7. Submit a report that describes your implemented algorithms. The report template is provided and should include the following:

    - Programming language used for the algorithm implementation.
    - Results.
    - Algorithm components of the implemented TS algorithm and SA algorithm.
    - The pseudocode of the implemented algorithms.
    - A description of the implemented algorithms.
    - An analysis of the impact of different parameters (as stated previously) on the obtained solutions.

- A discussion of the comparison of results obtained by the implemented algorithms and solutions obtained by Local Search implemented in the scope of the midterm exam (for Instances 1 and 2).

8. The project is due on **December 15, 2020 at noon**. Additional information regarding the report template and code submission will be provided on the course website.