CSE 7004 - Combinatorial Optimization
Term Project

Due: May 22, 2017

In this project, you are requested to modify Multi-Unit Non-discriminatory Combinatorial Auction Problem described in [1] such that each item r_i has an associated cost c_i if it is allocated. For this modified problem (which will be called CABS), you are given 48 test cases with the following configurations:

- The number of items: 25, 50, 75, and 100

- The number of units of items: uniform(1,100), uniform(1,500) and uniform(1,1000)

- The number of bids: 500, 1000, 2000 and 10000

In this project you should implement:

- A front-end for Gurobi MIP Solver: Your program should read the test cases, prepare the integer programs associated with the given test cases and run Gurobi solver.

- A heuristic solver: You should propose and implement at least one heuristic method (with possible different parameters) for CABS.

You should solve given 48 test cases both with Gurobi MIP Sslver and your own heuristic solver(s) and compare the results. In Gurobi set maximum time for solving an instance to 60 minutes. You should report and discuss performances of Gurobi solver and your proposed heuristic. Details of the project will be explained in class.

You need to install academic version of the Gurobi solver from `http://www.gurobi.com`. Academic version requires one time activation which could be done in our university's network.

References

[1] "Ali Haydar Özer and Can Özturan". A model and heuristic algorithms for multi-unit nondiscriminatory combinatorial auction. *Computers Operations Research*, 36(1):196 – 208, 2009. Part Special Issue: Operations Research Approaches for Disaster Recovery Planning.