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42137 Optimization Using Metaheuristics

Set-Covering problem is selected for the final project. The Set Covering is an NP-complete problem and it is a very popular problem in operations search. It requires covering all items with subsets by achieving minimal cost. Since it is a NP-complete problem for the large sets, usage of the metaheuristics is needed.

The **TABU search** algorithm is selected to solve the problem. It is a local search algorithm that searches through the neighborhood by remembering the previous all/some solutions that are visited. This memory attribute of the TABU search allows the algorithm to escape from the local optima. In the pure algorithm, a random initial solution is selected and the neighborhood that constructed with move m is searched. Non tabu results of the search is evaluated and the best solution among them is selected for the next point for the following iteration. If the objective value of the selected point is better, the best solution so far is updated as the new point. Besides the pure algorithm, in order to explore the different solutions diversification and intensification will be considered in the solution process in addition to the pure one.