

Artificial Intelligence (CSL333)

Assignment 1

To solve the given problem I implemented a basic hill climbing algorithm with random restarts. The algorithm works as follows:

First, a bid is selected randomly.

Then a list of possible neighbours is generated where the definition of possible neighbours being the bids that do not contradict (contradict means that the selected bid does not have the same company id as that of the bids already selected and does not contain a region that has already been allotted) with the bid selected in the previous step.

Then among the list of possible neighbours, a neighbour that has the maximum price to number of regions ratio is selected and added to the list of selected bids.

Then again a list of possible neighbours is generated with respect to the bids already selected and the procedure is repeated.

When the algorithm gets stuck (if it can't find any more neighbours) then again a random bid is selected and algorithm starts again. This is the step where random restart occurs.

Also, before a random restart the collection of bids is saved if their total price is better than the previous collection of bids.

The heuristic chosen to select the next neighbour is that ratio of the price of the bids to the number of region that the bid has. This is chosen because there is a need to increase the profit at each bid and also to keep the number of regions as less as possible so that more bids can be accommodated without contradicting with the previous bids. We can do this because we do not care if some regions go undeveloped.

To run the code: `chmod 777 compile.sh`
 `./compile.sh`
 `chmod 777 run.sh`
 `./run.sh inputfile outputfile`