Exercise 5: An Auctioning Agent for the Pickup and Delivery Problem

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1 Bidding strategy

Our bidding strategy only takes into account the best bidding of our opponents at each round. At each round we compute the ratio between our bid and the best bid, and we use it to compute its mean over all past rounds.

Using this mean ratio, we multiply our marginal cost (the total cost of the optimal plans we computed with the tasks we already won and the one put to auction) by this ratio, with a minimum ratio of minRatio, and a minimal marginal cost of minBid * defaultBidRatio.

2 Results

2.1 Experiment 1: Comparisons with dummy agents

2.1.1 Setting

Our first experiment is to compare our agent with the dummy random agent provided with the stub of this assignment.

The settings of this experiment where as follow :

```
tasks number = 10
minRatio = 1.05
defaultBidRatio = 0.75
minBid = 2000
```

The other variables are not important, or didn't change from the settings given.

2.1.2 Observations

The results were :

```
<statistics>
        <stat rank="1" agent="auction-main-03">
                <total-tasks value="8"/>
                <total-distance value="1104.4"/>
                <total-cost value="5522"/>
                <total-reward value="19328"/>
                <total-profit value="13806"/>
        </stat>
        <stat rank="2" agent="auction-random">
                <total-tasks value="2"/>
```

```
                <total-distance value="725.6"/>
                <total-cost value="3628"/>
                <total-reward value="4242"/>
                <total-profit value="614"/>
        </stat>
</statistics>
```

We can see that we did quite nice against this dummy agent. However, the last tasks had a ratio higher than before, explaining why we lost it. However, we would have most likely won the next one.

2.2 Experiment 2

2.2.1 Setting

Our next experiment is to compare our agent with our own agent.

The settings of this experiment where as follow :

```
tasks number = 10
minRatio = 1.05
defaultBidRatio = 0.75
minBid = 2000
```

The other variables are not important, or didn't change from the settings given.

2.2.2 Observations

The results were :

```
<statistics>
        <stat rank="1" agent="auction-main-03">
                <total-tasks value="7"/>
                <total-distance value="1274.4"/>
                <total-cost value="6372"/>
                <total-reward value="13939"/>
                <total-profit value="7567"/>
        </stat>
        <stat rank="2" agent="auction-main-03">
                <total-tasks value="3"/>
                <total-distance value="572.7"/>
                <total-cost value="2864"/>
                <total-reward value="3835"/>
                <total-profit value="971"/>
        </stat>
</statistics>
```

In this experiment, we saw that one of the 2 agents had a bad start, and tried desperately to get back to the level of the other one. He started to manage that near the end, but was still short a few tasks.