Agent TwoOneFive

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Introduction:

The Supply Chain Management (SCM) world simulates a supply chain consisting of multiple factories that buy and sell products from one another. Autonomous agents that serve as factory managers represent the factories [3]. Agents negotiate with other agents to get the necessary supply or sales after receiving a target quantity to either buy or sell. The goal is to turn a profit, and the agent with the highest profit (averaged over multiple simulations) wins.[3] The Supply Chain Management League (SCML) is a part of the International Automated Negotiating Agents Competition (ANAC) since 2019. SCML runs in the SCM world.[3]

There are changes from SCML 2022 In the OneShot track. As a result of reducing the price issue into only two consecutive values, the trading price will not change much from the catalog price during the simulation. Therefore, it is more important in SCML 2023 to focus in matching supply and demand to avoid penalties (i.e. buy and sell similar quantities) [1] instead of focusing on buying low or selling high.
Apart from that, since the number of L0 and L1 agents are not fixed anymore in SCML2023OneShotWorld, our strategy is a derivative of agent *UcOneshotAgent3_4*, where we will be focusing on seller's and buyers's market condition. In case the number of competitors is lower than the number of partners, then we will be more aggressive, if the number of competitors is higher than the number of partners, we will be more conservative. In order to achieve that we:

Determine price

- As a seller, we initially start by offering the maximum price and at some time *t* we change the price to the lower one. On the other hand, as a buyer we initially start by offering the minimum price and at some time *t* we change the price to the highest one. The time *t* is calculated depending on the number of partners, whether we have more partners, we will be more aggressive and the value of *t* will be lower. Alternatively, if we have lower number of partners, we will be more conservative and the value of *t* will be higher. We definie a pc_ratio which tells us about the rate between partners and competitors.

Determine quantity

- The concern is that whenever we offer the maximum quantity to each partner, the risk of selling too much is getting higher. Conversely, if we offer equal quantity to each partner, the risk of selling little quantity will increase. Therefore, we decided to take a value between the equal quantity and the maximum quantity. To accomplish this, we take into account the number of partners. Whenever a negotiation succeeded or failed, the partner will not longer take part in the next negotiation until it terminates that step.

Determine the acceptance condition

● Focus on receiving or selling the right amount of quantity. We will be accepting unit prices that are higher or equal than what we offered and reject for those offers that exceeds the amount of quantity.

Performance Evaluation:

We run the tournament according to the SCML2023OneShot documentation in the "Developing an agent for SCML2023 (OneShot)" section. [1] The tournament is run between agents developed by default in SCML2023OneShotAgents. The agents are GreedyOneShotAgent, BetterAgent and AdaptiveAgent. The tournament is run for 20 times step and a SCML2023OneShotWorld simulation of 100 times. The average score is shown in the *Figure1*. In general, the performance is a better than the defaults agents.
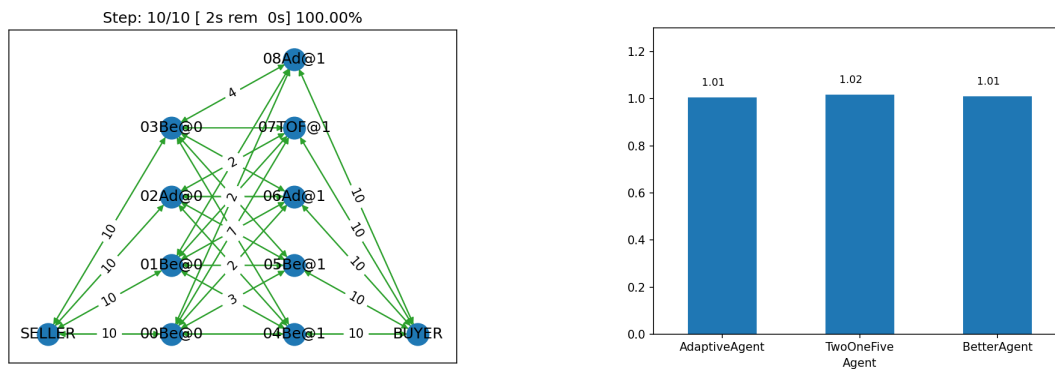

Figure 1: Result tournament run 2023OneShotWorld

Reference:

[1] Supply Chain Management League (SCML) 2023. *SCML 2023 CFP Challenge documentation.*
[2] Developing an agent for SCML2023 (OneShot) *from Webpage SCML 0.5.6 documentation.*
[3] What is SCM and SCML? *scml 0.5.6.*