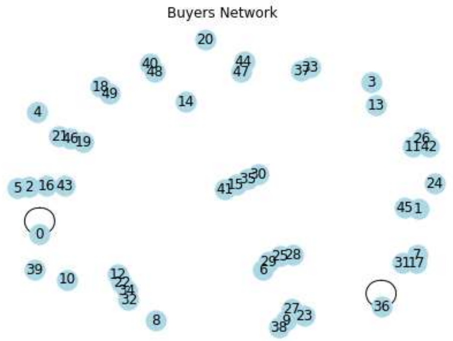
**Lydia Teinfalt, 3/25/2025, HW7**: Network analysis of ZI Traders
specs: Python 3x on Google Collab and Spyder

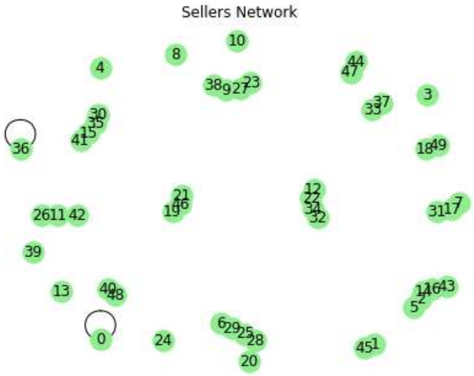
## Homework 7 Results

Using the latest implementation of ZI (Zero Intelligence) Traders with random activation and trades executed in parallel, I created three network graphs: buyers, sellers, and trades. A significant flaw with the network representing trades is that the indices of buyers and sellers overlap. Given more time, implement a change to have unique indices between buyers and sellers so that trader network could be captured correctly.

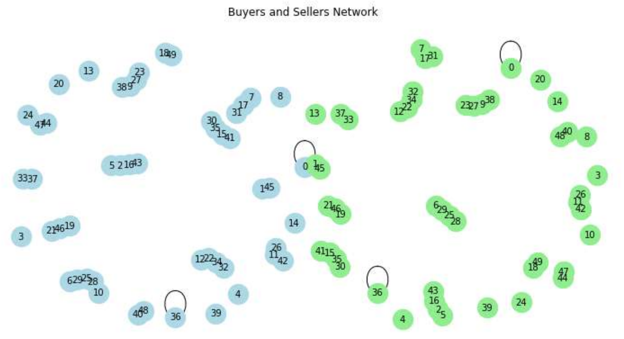
First Buyers Network graph from a first run with buyers designated by blue nodes. There are clusters with four being the highest transaction chains with examples in the following diagram 5-2-16-43 and 41-15-35-30. There are two nodes, 0 and 36, that have a circle to itself. In this case, is it showing repeated transactions with these buyers perhaps?



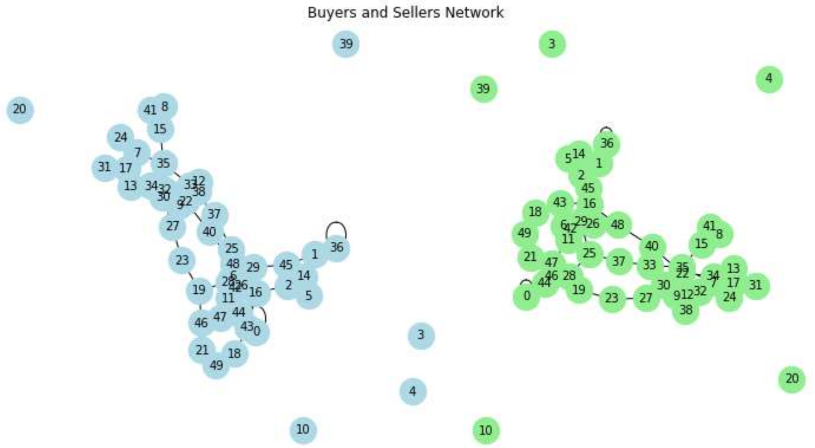
The sellers network graph also shows chains and the 5-2-11-46-43 having 5 vertices? With more time, I would need to improve the rendering so that it is clearer the nodes in a cluster.



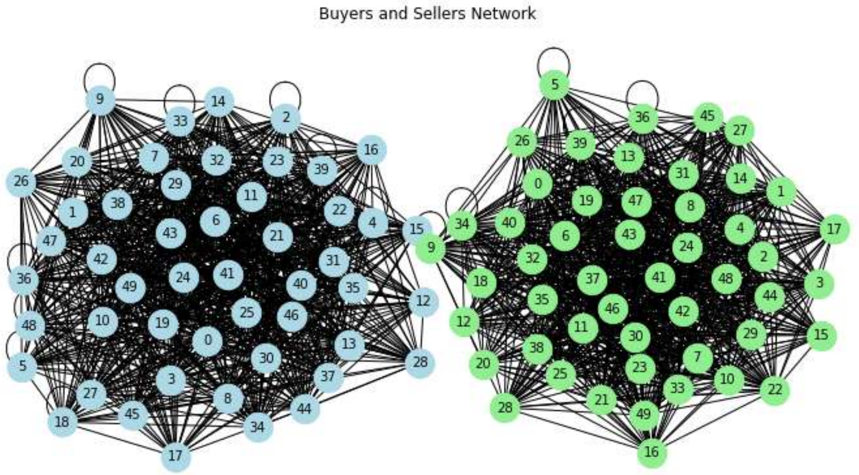
The buyers and sellers' network are rendered together on a single graph. The overlap shown between buyers and sellers is a result of offset and does not represent the interaction between the buyers and sellers. As mentioned previously, the indices of buyers and sellers are not unique, so trades are not captured in the third network.



In the second run of ZI Traders, where same agents are reused, there is a significant increase in the cluster with more edges rendered.



When the ZI Traders model is executed 35 times, the network grows more complex and densely clustered



The difference between first, second network is attributed to reuse of agents in second run. The third graph, with 35 runs, speaks more to the increased volume of trades.

## Code repository

https://github.com/lydiateinfalt/CSS610-AgentBasedModelingSimulation-Spring2025/blob/main/Python/ZITraders.py

https://github.com/lydiateinfalt/CSS610-AgentBasedModelingSimulation-Spring2025/blob/main/Python/ZI_RandomActivation.py