Network Analysis Assignment 2

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1 Answers

1.
Vizualization:
For the vizualization, please check the *problem_1.py* file in the folder.
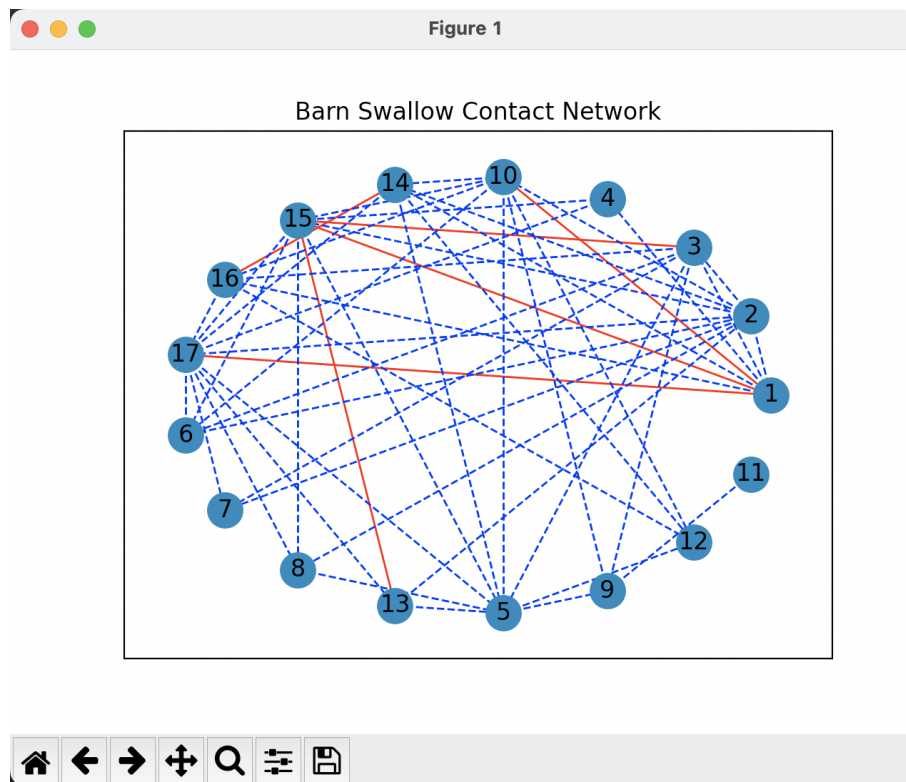I have done the implementation there itself.
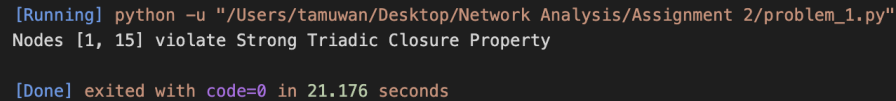

Figure 1: Vizualization

STCP Violation :
For the vizualization, please check the $problem\_1.py$ file in the folder.
I have done the implementation there itself.

There are total of 17 nodes in the barn-swallow network. Since node 1 and 15 violated the STCP, the rest of 15 (2,3,4,5,6,7,8,9,10,11,12,13,14,16 and 17) nodes in the barn-swallow network satisfy the STCP.

This means that the nodes 1 and 15 have at least 2 strong tied edges but the edges between the neighbouring nodes (from 1 and 15) did not exist (neither strong nor weak tied edges exist).

While on the other hand, the rest of the nodes (2,3,4,5,6,7,8,9,10,11,12,13,14,16 and 17), satisfy the STCP because these nodes do not violate the STCP. Which means that they have either at least 2 strong tied edges between neighbouring nodes and there is an edge between the neighbouring nodes (of the given node) or they simply do not violate STCP.

```
[Running] python -u "/Users/tamuwan/Desktop/Network Analysis/Assignment 2/problem_1.py"
Nodes [1, 15] violate Strong Triadic Closure Property

[Done] exited with code=0 in 21.176 seconds
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Figure 2: Result of Problem 1

2.
Balance in Signed:
When the code runs the bfs check in the check balance, the algorithm determines that the network does not satisfy the criteria for balance because there are odd number of - edges and there is also an edge between two supernodes in the same layer.

The two disjoint set of nodes implied by balance after modifying simple network are:
i) Group X :$[1, 2, 3, 4, 5, 11, 15]$
ii) Group Y : $[7, 9, 10, 12, 13, 8, 6, 14]$

Assymetric Edges:
The number of asymmetric node pairs is 3975.

The distribution of absolute differences implies that there are many asymmetrical edges whose differences are lesser like 1,2 etc. and there are fewer asymmetrical edges whose difference is big. So, we can say from the graph that many people trust other people each other when it comes to

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bitcoin. And there are less people who distrust other people each other when it comes to bitcoin over the counter trust.

After modifying the bitcoin network into undirected graph, bitcoin network is not balanced as at least one of the supernodes has internal negative edges.
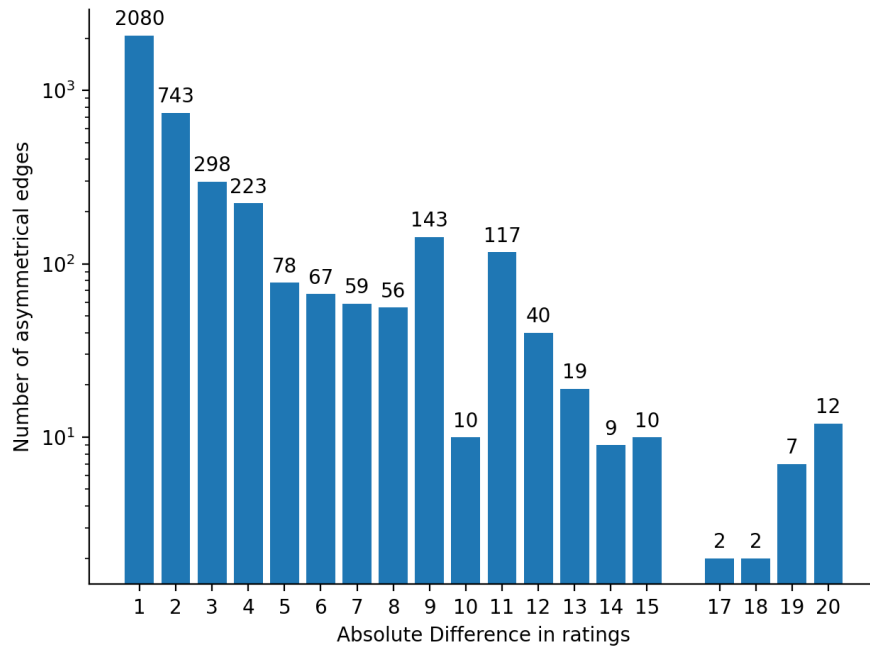
Pictures:

Figure 3: Absolute Difference in Ratings VS No. of asymmetrical edges

Note: All the refactoring parts are done in python file.

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PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

[Running] python -u "/Users/tamuwan/Desktop/Network Analysis/Assignment 2/problem_2.py"
There are 7 supernodes and all are valid.
Odd cycle found in reduced graph
Simple Graph is Unbalanced

There are 6 supernodes and all are valid.
Bipartite mapping of modified simple graph nodes
Group X :  [1, 2, 3, 4, 5, 11, 15]
Group Y:  [7, 9, 10, 12, 13, 8, 6, 14]

There are 3975 pairs of nodes that have asymmetric edges
Supernode has internal negative edges
Bitcoin Network is not balanced

[Done] exited with code=0 in 124.601 seconds
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Figure 4: Result of Problem 2