

Application of Quotient Graphs in Total Domination

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Total Domination



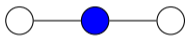


Figure 1: Not a Total Dominating Set

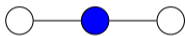


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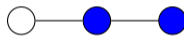
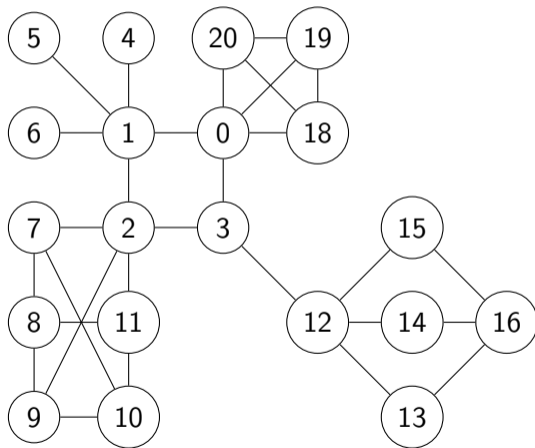


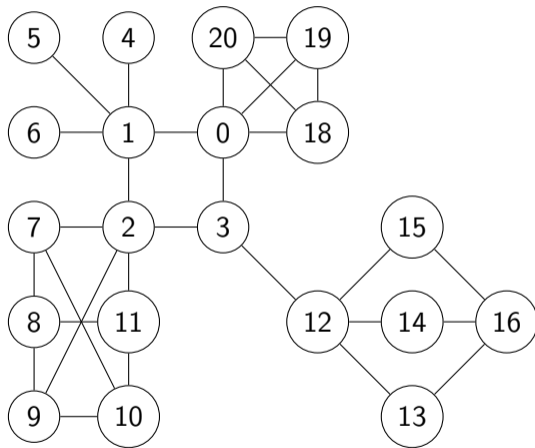
Figure 2: A Total Dominating Set

Running Example



Neighborhood Similarity

Redundant Information



Redundant Information

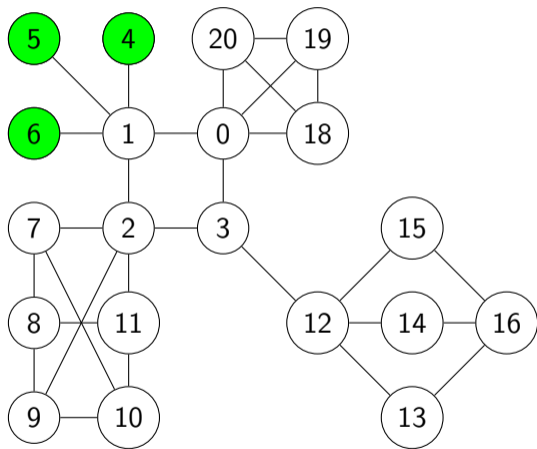


Figure 3: Vertices with identical neighborhoods

Redundant Information

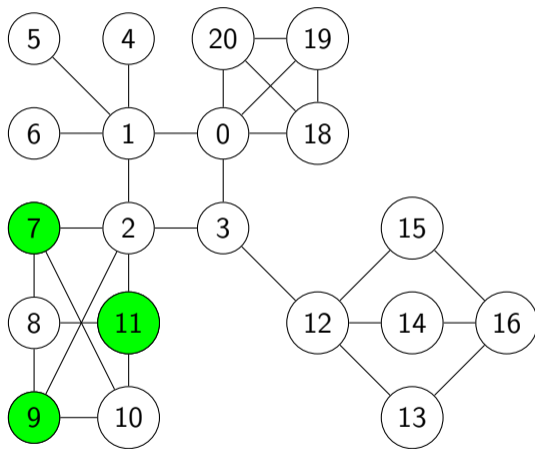


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Redundant Information

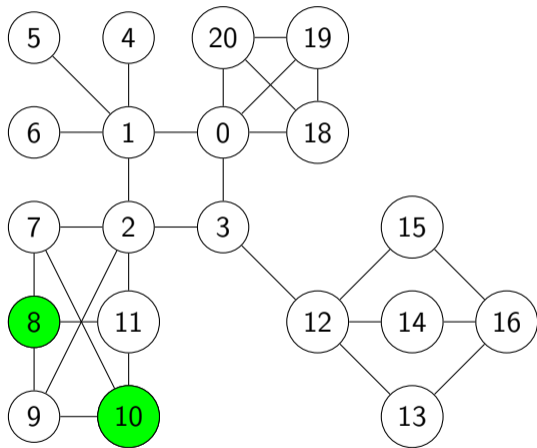


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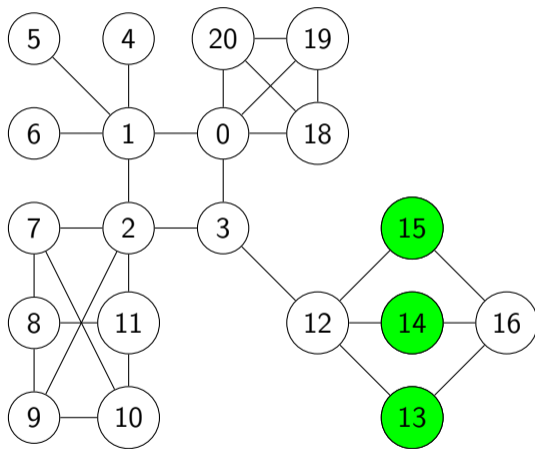
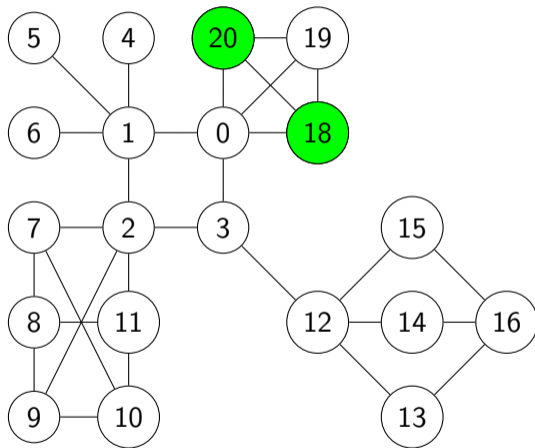


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Quantifying Redundancy

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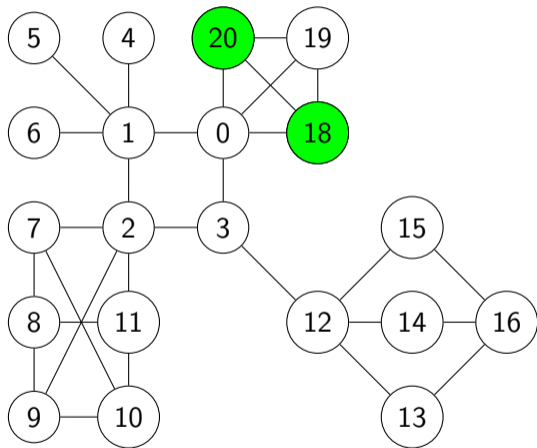
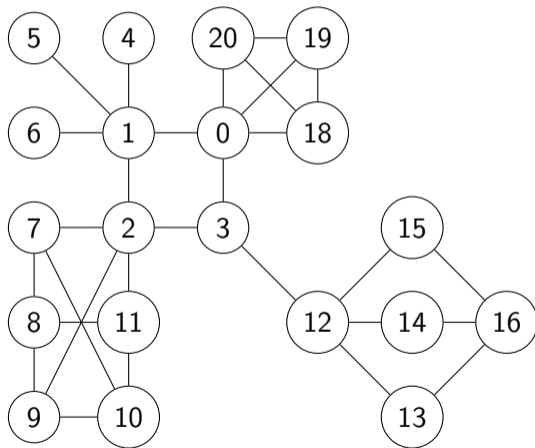


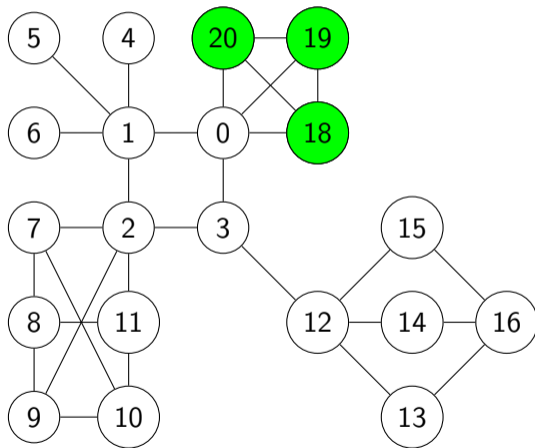
Figure 4: $\sigma(18, 20) = 2$ $\hat{\sigma}(18, 20) = 1 - \frac{2}{6} = \frac{2}{3}$

Quotient Graphs

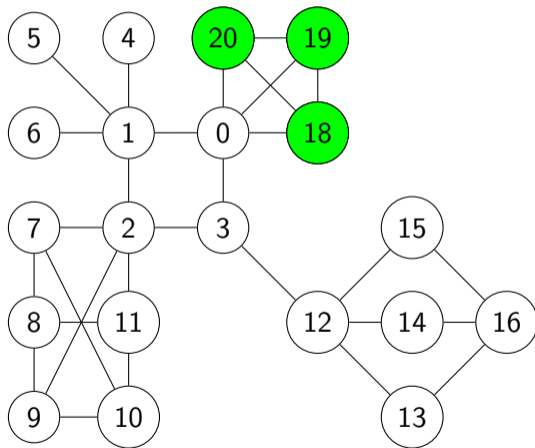
Removing Vertices



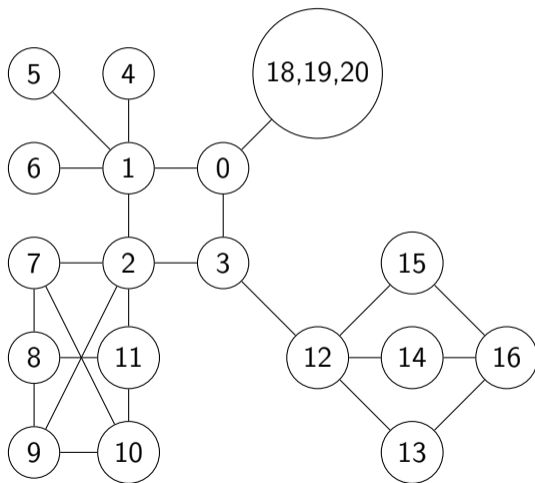
Removing Vertices



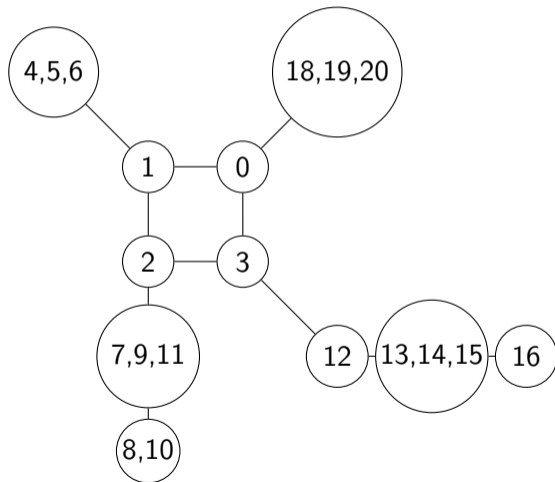
Removing Vertices



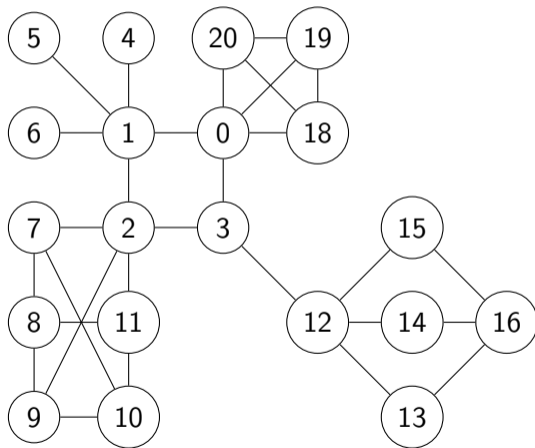
Removing Vertices



Condensed Graph



Original Graph



Results and Future Work

Results

- Measure of Neighborhood Similarity

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- Condensation Algorithm

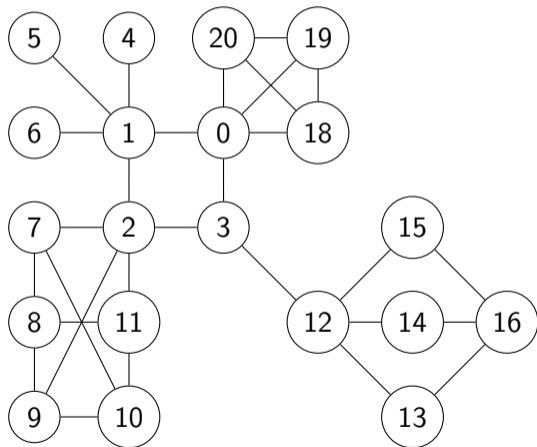
Future Work

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- Selectively apply Condensation Algorithm to subgraphs

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Future Work

- Selectively apply Condensation Algorithm to subgraphs
- Apply Condensation Algorithm on less regular graphs

