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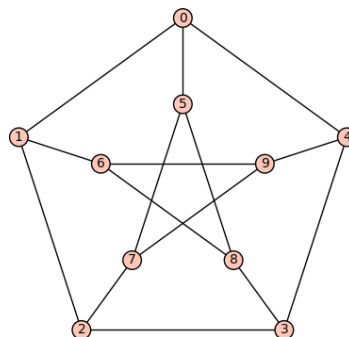
LARSON—MATH 756—CLASSROOM WORKSHEET 02
Independent Sets & Independence Number

Review

1. What is an *independent set* in a graph?
2. What is the *independence number* α of a graph?
3. What is an algorithm for finding a maximum independent set in an arbitrary graph?
4. How many iterations will the naive independence number algorithm for a graph with order n require?

New

1. Find a formula for α for a star with n vertices.
2. Find a formula for α for a path with n vertices.
3. What is a *vertex cover* of a graph (and the vertex covering number β)?
4. Find the vertex covering number β of the Petersen graph.



5. (Gallai Identity) Prove, for any graph, that $\alpha + \beta = n$, where n is the order of the graph.
6. What is a *clique* in a graph (and the clique number ω)?
7. Find the clique number ω for the Petersen graph.
8. What is the complement $\bar{G}$ of a graph?
9. Prove: for any graph G , that $\alpha(G) = \omega(\bar{G})$.
10. Describe a polynomial-time algorithm for finding a maximum independent set of vertices in a tree.
11. What is a *proper coloring* of a graph? (and what is the chromatic number χ ?)