Last name _____

**First name** _____

LARSON—MATH 356—CLASSROOM WORKSHEET 18
Tarjan-Trojanowski Algorithm & Chromatic Polynomials

Review

- What are the *neighbors* of a vertex v in a graph G? What is $Nbhd(v)$?

- What is the **main idea** of the Tarjan-Trojanowski algorithm for finding a maximum independent set in a graph?

- What is the Tarjan-Trojanowski algorithm for finding a maximum independent set in a graph?
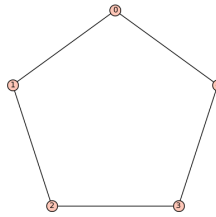
1. Use the Tarjan-Trojanowski algorithm to find $maxset(C_5)$.

2. What is the **complexity** of the Tarjan-Trojanowski algorithm for finding a maximum independent set in a graph?

Our goal now is to *count* the number of K-colorings of a graph G.

3. (**Notation**). If $e = (v, w)$ is an edge in graph G, what is $G - \{e\}$?

4. (**Notation**). If $e = (v, w)$ is an edge in graph G, what is $G/\{e\}$?

5. (**Claim**) If $e = (v, w)$ is an edge in graph G, then the number of proper K-colorings of $G - \{e\}$ where v and w have the same color is the same as the number of proper K-colorings of $G/\{e\}$.

6. What is $P(K; G)$?

7. Why does $P(K; G - \{e\}) = P(K; G/\{e\}) + P(K; G)$?