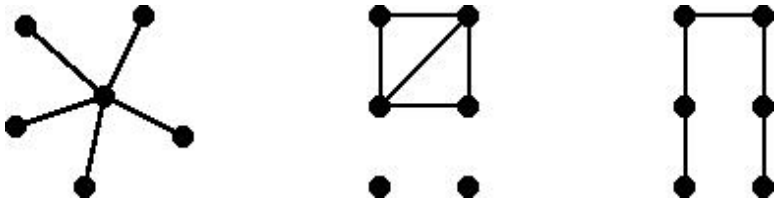
Probability Models, HW3, due February 24

1. Below are the 3 networks from HW2, Problem 2. Let $K = 3, p = 0.1$ and let X be the number of edges, as usual. For each network:

(a) Find N_S and N_D.
(b) In the formula for $\mathrm{Var}[X]$ we derived in class, argue that $P_4 = 0$.
(c) Compute $\mathrm{Var}[X]$ using the formula we derived in class.
(d) Describe another way to compute $\mathrm{Var}[X]$ (but no computations).
(e) Recall that the speciation probability S is a random variable that depends on X as $S = 1 - (1-p)^X$. On HW2 you computed the unconditional speciation probability $P(\text{speciation})$ by finding $E[S]$, approximately and exactly. Now also compute $\mathrm{Var}[S]$.



2. For the network below, find N, N_E, N_S, and N_D.