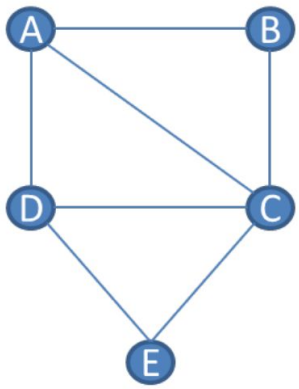
Tuesday Quiz

1. [0.5 point] Modularity Q is positive if the expected number of edges within the group exceeds the number of edges within the group.
   Answer - False
2. [0.5 point] Is the adjacency matrix of an undirected graph always symmetric? (True/False)
   Answer - True
3. [2.5 points] For node D, use the Girvan-Newman algorithm to calculate the betweenness of each edge (do this for node D ONLY). Write down the edges and their betweenness values in the format below:
   (Edge1, Edge2) = Betweenness Value



   Answer- [0.5 points each]
   (A,B) - 0.5
   (C,B) - 0.5
   (A,D) - 1.5
   (C,D) - 1.5
   (E,D) -1
4. [0.5+1 points] Describe the community membership matrix for AGM and directed AGM.
   Answer-
   AGM
   Only 1 community membership matrix [0.5 points]
   Directed AGM
   There are two community membership matrices
   F... out-going community memberships [0.5 points]
   H... in-coming community memberships [0.5 points]

   -0.25 if you have not mentioned 2 community membership matrices
5. [1+1 points] What is the problem in AGM and what is the relaxation in BigClam in terms of membership?
   Answer -
   Problem - Finding B means finding the bipartite affiliation network.. [1 point]

There is no nice way to do this. Fitting B(V,C,M {pc}) is too hard.

Relaxation - Memberships have strengths (avoid discrete membership changes) [1 point]

6. [1 Point] AGM can express the following community structure:
   a) Non-Overlapping
   b) Overlapping
   c) Nested
   d) All of the above
7. [2 point] We are given a set of coin flips : X=[0, 0, 1, 0, 1, 0, 0, 1]. Figure out the bias of a coin when the Model is f(θ) and it returns 1 with probability θ , else returns 0. We assume the coin flips are independent. What is Pf(X|θ)?

   Pf(X|θ) = (1-θ)(1-θ)*θ*(1-θ)*θ*(1-θ)*(1-θ)*θ

   = θ^3 * (1-θ)^5