341 Introduction to Bioinformatics:

Biological Networks

Tutorial 2 – February 4, 2010

1. Draw a simple undirected graph *G* that has 15 vertices, 30 edges, and 3 connected components. Why would it be impossible to draw *G* with 3 connected components if *G* had 105 edges?

2. Let G be a simple connected graph with n vertices and m edges. Explain why O(log m) is O(log n).

3. Would you use the adjacency list structure or the adjacency matrix structure in each of the following cases? Justify your choice.

   (a) The graph has 10,000 vertices and 20,000 edges, and it is important to use as little space as possible.

   (b) The graph has 10,000 vertices and 20,000,000 edges, and it is important to use as little space as possible.

   (c) You need to answer whether two vertices of the graph are adjacent as fast as possible, no matter how much space you use.

4. Name three high-throughput methods for protein-protein interaction detection.

5. Describe the sources of biases introduced in the protein-protein interaction network data that were obtained by "pull-down" experiments.

6. What are the sources of noise in yeast-2-hybrid screens?

7. Describe genetic interaction networks.