CS3323 Fall 2006 Assignment 6
Due Monday, Dec. 5, by midnight.

- Assignments should be handed in by placing them in the CS3323 bin on E level of Gillin Hall.

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1. For each of the following, either draw a graph satisfying the given criteria or explain why it can't be done. Your graphs should not have any multi-edges (more than one edge between the same pair of vertices) or self-loops (edges with both ends at the same vertex).

   (a) Draw a graph with 3 connected components, 12 vertices, and 18 edges.

   (b) Draw a graph with 3 connected components, 12 vertices, and 8 edges.

   (c) Draw a graph with 3 connected components, 12 vertices, and 50 edges.

   (d) Draw a graph with three vertices of degree 3, and four vertices of degree 2.

2. Would you use the adjacency list or the adjacency matrix representation 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 as fast as possible the query **areAdjacent**, no matter how much space you use.

3. Would you prefer DFS or BFS (or both equally) for the following tasks? (Assume the graph is undirected and connected.) Justify your answer.

   (a) Determining if the graph is acyclic

   (b) Finding a path to a vertex known to be near the starting vertex

   (c) Finding the connected components of the graph

4. Describe the pseudo-code of a non-recursive DFS algorithm.