1. Consider the graph below. This graph has 6 vertices and 9 edges, it is directed or undirected (circle one), and it is weighted or unweighted (circle one). It has 1 connected component.

2. Let $G = (V, E)$ be an undirected graph, and let $n = |V|$ and $m = |E|$. An adjacency-list representation of $G$ requires $O(n + m)$ storage, while an adjacency-matrix representation of $G$ requires $O(n^2)$ storage.

3. True or False: Let $G = (V, E)$ be an undirected graph, and let $n = |V|$ and $m = |E|$. Then, $m = O(n^2)$.

4. Consider the graph below. This graph has 7 vertices and 10 edges, it is directed or undirected (circle one), and it is weighted or unweighted (circle one). The maximum indegree and outdegree of the graph are 2 and 3, respectively, and are realized by vertices d, b, g, e and c, respectively. The minimum indegree and outdegree of the graph are 0 and 1, respectively, and are realized by vertices c and a, b, d, e, g, respectively.
5. Consider the graph above. Perform a depth-first-search of the graph, starting from the vertex labeled a. Assume the edges adjacent to each vertex are considered in alphabetical order. Number the vertices in the order they are discovered by the search, and label each edge as a discovery or back edge.

6. Consider the graph above. Perform a breadth-first-search of the graph, starting from the vertex labeled a. Assume the edges adjacent to each vertex are considered in alphabetical order. Number the vertices in the order they are discovered by the search, and label each edge as a discovery or cross edge.

7. Let $G = (V, E)$ be an undirected graph. A breadth-first-search of $G$ can be performed in $O(|V| + |E|)$ time, which is asymptotically $<$, $=,$ or $>$ (circle one) the time required to perform a depth-first-search of $G$. 