Due: Monday, November 13, 2017

1. Page 705, exercise 24; use DFS
2. Page 796, exercise 22
3. Page 803, exercise 18
4. Prove that if a connected undirected graph has no vertex of degree 1, then it contains a cycle.
5. (a) An Eulerian cycle in an undirected graph $G = (V, E)$ is a cycle that goes over each edge of $E$ exactly once, although it may go through vertices multiple times. Show that $G$ has an Eulerian cycle if and only if it is connected and all vertices have even degree.
   
   (b) Describe, analyze, and implement (in whatever programming language you like) a depth-first search algorithm that finds an Eulerian cycle in a graph, if one exists, or reports that there is none (together with the evidence of non-existence—that is, disconnected vertices or a vertex with odd degree). Your algorithm must work in $O(|V| + |E|)$ time.