**Nonrecursive depth-first search.** Implement depth-first search in an undirected graph without using recursion.

**Diameter and center of a tree.** Given a connected graph with no cycles

* Diameter: design a linear-time algorithm to find the longest simple path in the graph.
* Center: design a linear-time algorithm to find a vertex such that its maximum distance from any other vertex is minimized.

**Euler cycle.** An Euler cycle in a graph is a cycle (not necessarily simple) that uses every edge in the graph exactly one.

* Show that a connected graph has an Euler cycle if and only if every vertex has even degree.
* Design a linear-time algorithm to determine whether a graph has an Euler cycle, and if so, find one.