Interview Questions: Undirected Graphs

Warning: The hard deadline has passed. You can attempt it, but **you will not get credit for it**. You are welcome to try it as a learning exercise.

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Question 1

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

Question 2

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.

Question 3

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

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

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