Graph Search and Traversal by Labeling/Backtrack Algorithms.

CSI 310: Lecture 23
Graphs.

Search and traversal of a maze of squares. Abstracts to problems on
2. Traverse: Find all squares that are reachable from the START square.

1. Search: Find one path from START to GOAL.
This way, to test if a vertex has been found takes \textit{constant time}, instead of \(O(\text{length of list})\) time to look in a list.

The main idea is to put and retain a "mark" on each vertex as soon as we determine that it can be reached from the start vertex.
Depth-First Labelling Traversal
Depth-first Labelling Traversal
Depth-first Labelling Traversal
Start

Depth-first Labelling Traversal
Depth-first Labelling Traversal

Start
Depth-first Labelling Traversal
Depth-first Labelling Traversal
Breadth-first Labelling Search

0, 0, 1, 1, 0, 0, 3, 1, 0, 3, 0, 3, 2, 5, 0

Here are the squares in the order they are inserted in the queue.

5, 4, 0, 4, 3, 5, 5, 5, 5, 5

2, 2, 4, 2, 1, 2, 4, 3, 5, 2, 1, 3, 4, 4, 5, 3, 0, 3, 4, 5

Start

Goal

These are the squares in the order they are inserted in the queue.