This algorithm finds a path from a specific vertex s to all other vertices which are reachable from s.

It works for both directed and undirected graphs.
In the undirected case it constructs a maximal tree containing s.
In the directed case it constructs a maximal rooted arborescence rooted at s.

GRAPH SCANNING ALGORITHM

Input: A graph G (directed or undirected) and some vertex s.

Output: The set R of vertices reachable from s, and a set $T \subseteq E(G)$ such that (R, T) is an arborescence rooted at s, or a tree.

① Set $R := \{s\}$, $Q := \{s\}$ and $T := \emptyset$.

② **If** $Q = \emptyset$ **then stop**,
else choose a $v \in Q$.

③ Choose a $w \in V(G) \setminus R$ with $e = (v, w) \in E(G)$ or $e = \{v, w\} \in E(G)$.
If there is no such w **then** set $Q := Q \setminus \{v\}$ and **go to** ②.

④ Set $R := R \cup \{w\}$, $Q := Q \cup \{w\}$ and $T := T \cup \{e\}$. **Go to** ②.

Depending on the order in which the vertices are chosen in ③ and on the choice of v in ②

If the vertex v chosen in ② was the last to enter Q we obtain a depth first search (DFS) algorithm.

If the vertex v chosen in ② was the first to enter Q we obtain a breadth first search (BFS) algorithm

The resulting trees are the depth first search tree (DFS-tree) and the breadth first search tree (BFS-tree), respectively.