BFS algorithm

```
function BREADTH-FIRST-SEARCH(problem) returns a solution node or failure
  node ← NODE(problem.INITIAL)
  if problem.IS-GOAL(node.STATE) then return node
  frontier ← a FIFO queue, with node as an element
  reached ← {problem.INITIAL}
  while not IS-EMPTY(frontier) do
    node ← POP(frontier)
    for each child in EXPAND(problem, node) do
      s ← child.STATE
      if problem.IS-GOAL(s) then return child
      if s is not in reached then
        add s to reached
        add child to frontier
  return failure
```

BFS algorithm

Important aspect

- The order of the nodes in fringe **FIFO**
- Should the same state be generated?
  - Same as the EXPANDED states **NO (reached)**
  - Same as the states IN fringe **NO (reached)**
- When to report the goal?
  - When generated? **Yes**
  - When expanded?