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```
In [4]: class DepthFirstSearch:
    def __init__(self, graph):
        self.graph = graph
        self.frontier = []
        self.visited = set()

    def empty(self):
        return len(self.frontier) == 0

    def remove(self):
        if self.empty():
            raise Exception("empty frontier")
        else:
            node = self.frontier[-1]
            self.frontier = self.frontier[:-1]
            return node

    def dfs(self, start, goal):
        self.frontier.append(start)

        while not self.empty():
            node = self.remove()
            print(node)

            if node == goal:
                print(f"Goal {goal} found!")
                return True

            self.visited.add(node)

            for neighbor in self.graph[node]:
                if neighbor not in self.visited and neighbor not in self.frontier:
                    self.frontier.append(neighbor)

        print("No solution found.")
        return False

graph = {
    'A': ['B', 'D'],
    'B': ['C', 'E'],
    'D': ['O'],
    'C': ['J', 'K'],
    'E': ['O'],
    'O': ['N', 'W', 'Q'],
    'W': [],
    'N': [],
    'Q': []
}

dfs_search = DepthFirstSearch(graph)
```

```
print('the path is\n')  
dfs_search.dfs('A', 'W')
```

the path is

A

D

O

Q

W

Goal W found!

Out[4]: True

In []: