

```
1 use std::collections::HashSet;
2 use std::fmt::{Debug, Formatter, Result as FmtResult};
3 use std::hash::Hash;
4 use std::rc::Rc;
5
6 type NodeRef<T> = Rc<Node<T>>;
7
8 #[derive(Clone)]
9 struct Node<T: Eq + PartialEq + Hash> {
10     value: T,
11     adjacents: Vec<NodeRef<T>>,
12 }
13
14 impl<T: Eq + PartialEq + Hash + Debug> Node<T> {
15     // Create a new Node
16     fn new(value: T, adjacents: Vec<NodeRef<T>>) -> Self {
17         Self { value, adjacents }
18     }
19
20     // Get a reference to the node's value
21     fn get_value(&self) -> &T {
22         &self.value
23     }
24 }
25
26 impl<T: Eq + PartialEq + Hash + Debug> Debug for Node<T> {
27     fn fmt(&self, f: &mut Formatter<'_>) -> FmtResult {
28         let adj_values: Vec<String> = self
29             .adjacents
30             .iter()
31             .map(|n| format!("{:?}", n.get_value()))
32             .collect();
33         write!(
34             f,
35             "[value: {:?}, adjacents: \"[{}]\"]",
36             self.value,
37             adj_values.join(", ")
38         )
39     }
40 }
```

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39     }
40 }
41
42 struct Graph<T: Eq + PartialEq + Hash> {
43     nodes: Vec<NodeRef<T>>,
44 }
45
46 impl<T: Eq + PartialEq + Hash + Debug + Clone> Graph<T> {
47     fn new(nodes: Vec<NodeRef<T>>) -> Self {
48         Self { nodes }
49     }
50     fn dfs(&self, start: NodeRef<T>) -> Vec<NodeRef<T>> {
51         let mut visited = HashSet::new();
52         let mut result = Vec::new();
53         self.dfs_recursive(&start, &mut visited, &mut result);
54         result
55     }
56     fn dfs_recursive(
57         &self,
58         node: &NodeRef<T>,
59         visited: &mut HashSet<T>,
60         result: &mut Vec<NodeRef<T>>,
61     ) where
62         T: Clone,
63     {
64         if visited.contains(node.get_value()) {
65             return;
66         }
67
68         visited.insert(node.get_value().clone());
69         result.push(node.clone());
70
71         for adj in &node.adjacents {
72             self.dfs_recursive(adj, visited, result);
73         }
74     }
75 }

```