Algorithm Lab

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1 Graph Algorithm

Implement the following graph algorithms using C++.

1. BFS
2. DFS Recursive
3. DFS Iterative

Algorithm 1 BFS

```
1:  procedure BFS(G, v)
2:      queue < int > Q
3:      Q.push(v)
4:      visited[v] = TRUE
5:      distance[v] = 0
6:      while !Q.empty() do
7:          p = Q.front()
8:          Q.pop()
9:          for i ← 0, G[v].size() do
10:             next = graph[v][i]
11:             if visited[next] == 0 then
12:                 Q.push(next)
13:                 visited[next] = 1
14:                 distance[next] = distance[v] + 1
15:             end if
16:         end for
17:     end while
18: end procedure
```

Algorithm 2 DFS Recursive

```
1: procedure DFS(G, v)
2:     visited[v] = TRUE
3:     for i ← 0, G[v].size() do
4:         next = graph[v][i]
5:         if visited[next] == 0 then
6:             DFS(next)
7:         end if
8:     end for
9: end procedure
```

Algorithm 3 DFS Iterative

```
1: procedure DFS(G, v)
2:     Stack < int > S
3:     S.push(v)
4:     visited[v] = TRUE
5:     while !S.empty() do
6:         p = S.top()
7:         S.pop()
8:         for i ← 0, G[v].size() do
9:             next = graph[v][i]
10:            if visited[next] == 0 then
11:                S.push(next)
12:                visited[next] = 1
13:            end if
14:        end for
15:    end while
16: end procedure
```