

10 November 2022

1. **Warm up:** Answer the following questions.
 - (a) What does a connected, undirected graph for which BFS and DFS reaches a given node `node` in the same number of steps look like?
 - (b) What is the maximum / minimum number of nodes that a tree can have, if its maximum level is ℓ ?
 - (c) What is the longest path (with no repeated edges) in a tree with maximum level ℓ ?

2. This question modifies the definition of a *node* in a *tree* from the previous worksheet, to a *vertex* in a *graph*. In this question we consider *undirected graphs*.

```
1  struct vertexType {
2      int label;
3      nodeType* neighbourList;
4  };
5
6  struct nodeType {
7      int info;
8      nodeType* link;
9  };
```

You are given an array of 10 vertices in a graph, initialized as `vertexType vertices[10]`.

- (a) Write a function that return the number of edges in the graph.
- (b) Write a function that returns `true` if the graph is connected, and `false` if the graph is disconnected.
- (c) Write a function that prints out the `label` of each `vertexType` in a depth-first manner, starting from the first item in the given list.