Compulsory 3

Tree and Graph

This compulsory will focus on Non-linear data structures, specifically Trees and Graphs.

The goal is to implement your own class library in C++ to work with the standard operations of Trees and Graphs. Specifically, one library for General Trees, and one library for Graphs. They should have the following:

For General Trees:

* Members: Node information, list of children
* Functions: Constructor, Access functions (return root, parent of a node, children of a node), Query functions (size, depth, isEmpty, isRoot, isLeaf), insertion (both at random and as the child of a specific node) and deletion of a node, and one type of traversal (Depth in preorder or Breadth)

For Graphs:

* Members: Node information, adjacency list
* Functions: Constructor, Access functions (return node information, adjacent nodes, vertices in graph, edges in graph), Query functions (size, isEmpty), insertion (both at random and as the child of a specific node) and deletion of a node, insertion and deletion of an edge, and one type of traversal (Depth or Breadth). You can choose to implement adjacent nodes with an adjacency list or an adjacency matrix

The code should be well modularized and structured to minimize clutter as much as possible. Clear naming for variables and functions should also be prioritized. Use of XML comments within the code for functions is strongly encouraged.

The submission should be in the format Surname\_Name\_Compulsory3 on Canvas. The file should be a PDF file including the following:

Link to the GitHub repository (public!) with the code and project files.

* Description of the two traversal algorithms (Breadth and Depth), and why you chose to implement either one of them for graphs and trees
* Reason for choosing to implement an adjacency list or an adjacency matrix for graphs.