NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

SC1007 Data Structures and Algorithms **2021/22 Semester 2**

Tutorial 3: Tree and Binary Search

School of Computer Science and Engineering *Nanyang Technological University*

Q1 A sequence, x_1, x_2, ..., x_n, is said to be cyclically sorted if the smallest number in the sequence is x_i for some i, and the sequence, x_i, x_{i+1}, ..., x_n, x_1, x_2, ..., x_{i-1} is sorted in increasing order. Design an algorithm to find the minimal element in the sequence in $\mathcal{O}(\log n)$ time. What is the worst-case scenario?

Q2 You are given a pre-order traversal and an inorder traversal of a binary tree. Draw the binary tree from the two traversal results.

pre-order: A, B, C, D, E, F, G

inorder: C, B, E, D, A, F, G

Q3 What is the upper bound of the height of an AVL Tree? Write it in an asymptotic notation. The AVL tree is a binary tree in which the left and right subtrees of any node have heights that differ by at most 1.