

CSC 2720 Data Structures

Homework assignment 3

Instructions: Please complete the following questions on a separate sheet of paper. After you have finished, scan your work and upload it to **Homework Assignment 3** in our **Gradescope** for the **CSC 2720 DATA STRUCTURES XLS Group ACS11 Spring Semester 2025** course.

1. Suppose that x and y are references to nodes of circularly linked lists, although not necessarily the same list. Describe a fast algorithm for telling if x and y belong to the same list.
2. Describe in detail how to swap two nodes x and y (and not just their contents) in a singly linked list L given references only to x and y . Repeat this exercise for the case when L is a doubly linked list. Which algorithm takes more time?
3. Describe, in pseudo-code, an algorithm for computing the number of descendants of each node of a binary tree. The algorithm should be based on the Euler tour traversal.

Due Date: March 23, 2025