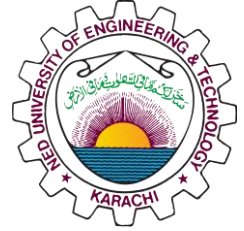




**NED University of Engineering & Technology**  
**Department of Computer Science & Information Technology**  
**CS-159: Data Structures & Algorithms**  
**Fall 2025**



**ASSIGNMENT # 1**

**Submission Deadline: Sept 29<sup>th</sup>, 2025.**

**Submission Guidelines**

Please carefully read the following instructions for submission of the assignment.

- Please submit the assignment before the deadline. It should be clear that submission after due date would not be considered.
- In case plagiarism strict actions will be taken You are advised to avoid submission of copied solution from any other student.
- **Submission:** Submission will only be accepted through GOOGLE CLASSROOM. You need to submit your work in **two** parts. Submission will be incomplete without both the parts.
  1. A single pdf file that contains solutions to all questions. Each answer is supposed to have properly intended and commented code.  
Before submission, rename your pdf file with your roll number.
  2. C/C++ program files for all questions. The file should be renamed as Q1\_CT01 for the for the 1<sup>st</sup> program if roll no. 01 and so on...

**Question 1:**

Given an array of integers and a target sum, find two numbers in the array that add up to the target sum. Return their indices. You can assume there will be exactly one so

**Question 2:**

Create a function that takes a list of integers and returns `True` if the list contains duplicate elements, otherwise return `False`.

**Question 3:**

Write a program to find the middle node of a singly linked list.

**Question 4:**

Implement a function to reverse a singly linked list. Your solution should update the pointers of the nodes and not just print the elements in reverse.

**Question 5:**

Given the heads of two sorted singly linked lists, merge the two lists into a single sorted list. The new list should be made by splicing together the nodes of the first two lists.



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**Question 6:**

Given the head of a linked list, remove the  $n$  nodes from the list and return its head.

**Question 7:**

Write a function to insert a new node at a specific position (e.g., at the beginning, at the end, or after a given node) in a circular singly linked list.

**Question 8:**

Implement a function to delete a node from a doubly linked list, given a pointer to the node to be deleted.

**Question 9:**

Write a function to reverse a doubly linked list. Your solution should correctly update the next and prev pointers for each node.

**Question 10:**

Given a circular singly linked list, rotate it by  $k$  positions. For example, with  $n=7$  and  $k=3$ , the list 1, 2, 3, 4, 5, 6, 7 becomes 5, 6, 7, 1, 2, 3, 4.