भारतीय सूचना प्रौद्योगिकी संस्थान गुवाहाटी
Indian Institute of Information Technology Guwahati

DATA STRUCTURES LAB (CS111)
ASSIGNMENTS–05

Assignments to be completed during lab sessions

1. Write functions to perform the following operations on circular doubly-linked lists.

   i. Write a function to add an element at the beginning of the list.

   ii. Write a function to print the elements in the list both with forward and backward traversals.

   iii. Write a function to count the number of elements in the list.

   iv. Write a function to remove the first element of the list.

   v. Write a function to add an element at the end of the list.

   vi. Write a function to remove the last element of the list.

   vii. Write a function to add an element at a given list position.

   viii. Write a function to remove the element at a given list position.

   ix. Write a function to add data after the first occurrence of a given key value in the linked list.

   x. Write a function to remove the first occurrence of a given data present in the list.

   xi. Write a function to reverse the elements in the list.

   xii. Write a function to reverse the elements in the list without creating a new list.

   xiii. Write a function to insert an element in a sorted list so the final list remains sorted.

   xiv. Write a function to sort the elements in a list.

   xv. Write a function to merge two lists.

   xvi. Write a function to get/access the data at the ith node of the list.

xvii. Write a function to merge two sorted linked lists so the resultant list remains sorted.

xviii. Use recursion to print the list.

xix. Use recursion to print the list in the reverse order.

xx. Use recursion to reverse the list.

Additional assignments

1. Suppose in a (faulty) doubly linked list some nodes point to some random nodes with their previous pointers. Write a function to rectify the list if it is defective.

2. Given a doubly-linked list and a positive integer n, write a function to rotate the linked list clockwise by n modulo l nodes, where l is the length of the list.