भारतीय सूचना प्रौद्योगिकी संस्थान गुवाहाटी

Indian Institute of Information Technology Guwahati

DATA STRUCTURES LAB (CS111)

ASSIGNMENTS–04

Assignments to be completed during lab sessions

1. Write functions to perform the following operations on singly-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.
   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 get an element from a given list position.
   viii. Write a function to set an element at a given list position.
   ix. Write a function to add an element at a given list position.
   x. Write a function to remove the element at a given list position.
   xi. Write a function to add data after the first occurrence of a given key value in the linked list.
   xii. Write a function to remove the first occurrence of a given data present in the list.
   xiii. Write a function to reverse the elements in the list.
   xiv. Write a function to insert an element in a sorted list so the final list remains sorted.
   xv. Write a function to sort the elements in a list. You may create new lists for this.
   xvi. Use recursion to print the list.
   xvii. Use recursion to print the list in the reverse order.
   xviii. Use recursion to reverse the list.

Additional assignments

1. Write a function to detect if there is a loop in a given singly-linked list. Then, write another function to rectify a detected loop in a given faulty singly-linked list.
2. Write a function to merge two sorted singly-linked lists so the resultant singly-linked list remains sorted.