Indian Institute of Technology Kharagpur

AUTUMN Semester, 2015
COMPUTER SCIENCE AND ENGINEERING

CS19001: Programming and Data Structure Laboratory

Assignment – 11

Full Marks: 10

Time allowed: One week

INSTRUCTIONS: Please see the questions and write C programs step by step. Ensure proper indentations to improve the readability of your code. **IF YOU USE DYNAMIC MEMORY ALLOCATION, ENSURE THAT YOU FREE ALL DYNAMICALLY ALLOCATED MEMORY BEFORE THE PROGRAM EXITS**. All these features are necessary and absence will lead to deduction of marks.
Please do not forget to upload files to *Moodle* before 12:30 PM, 11/11/2015.

Linked Lists in C

1. Write a complete C program to remove duplicate values in a linked list with 8 nodes, where the value at each node is an integer, and the integers are stored in non-decreasing order. Collect the values at the nodes of the linked list from the user. The linked list should be processed by a function `void removeDups (node *header)`, where `node` is a structure that describes a single node of the linked list, and `header` is a pointer to the first node of the linked list. The list should be traversed only in the forward direction. Print the original linked and the linked list after removing the duplicates, from inside the `main()` function. (4 marks)

2. Write a complete C program with a function `void reverse (node *header)` to reverse a linked list with 5 nodes, where the value at each node is an integer; `node` is a structure that describes a single node of the linked list, and `header` is a pointer to the first node of the linked list. Don't just print the contents of the linked list in reverse order – you have to actually reverse the original linked list, whereby the last node will become the head node. The values at the linked list nodes are entered by the user. Print the values at the nodes of the linked list, before and after processing, using a function `void print_linked_list(node *header)`. (4 marks)

3. Write a complete C program to print the middle element of a linked list with 10 or less nodes, using a function `void print_middle (node *header)`, where `node` is a structure that describes a single node of the linked list, and `header` is a pointer to the first node of the linked list. Each node of the linked list contains an integer. The list should be traversed only in the forward direction. Collect the number of nodes in the linked list and the values to be stored in the node from the user. For an even number of nodes in the linked list, print the content of any one of the two middle nodes. (2 marks)
