National Institute of Technology Calicut
Department of Computer Science and Engineering
B. Tech. (CSE) – Third Semester

CS2092D: Programming Laboratory
Assignment – 2_Part-B

General Instructions

- Programs should be written in C language and compiled using C compiler in Linux platform.
- Invalid input should be detected and suitable error messages should be generated.
- Sample inputs are just indicative.
- Please do the programs in your free time either from System Software Lab (SSL) / Network Systems Lab (NSL), when the lab is not used for regular lab hours or do the programs using your own computer. Even if the programs work in your own computer, there is a chance that they may not work properly in the computers in SSL / NSL, due to some compatibility issues of the C compiler or the machine. Hence, before the evaluation day, check that your programs are ready for execution in the computers in NSL/SSL.
- Evaluation of few random questions from the following questions will be conducted on **30, August 2018 (Thursday).**

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1. Given a sorted singly linked list of ‘n’ integers, write a program to remove the duplicate elements from the list. Each node in the linked list has a data part that stores the integer value and a pointer that points to the next node of the list. Assume that Head is a pointer that points to the start node of the list. Perform the above operation by traversing the list exactly once.

Input	Enter the value of n	7
	Enter the elements	1, 2, 2, 3, 5, 5, 5
Output	The elements of the list	1, 2, 3, 5

2. Given a singly linked list of ‘n’ integers, write a program to find the k^{th} node from the end of the linked list. Each node in the linked list has a data part that stores the integer and a pointer that points to the next node of the list. Assume that Head is a pointer that points to the start node of the list.

Input	Enter the value of n	5
	Enter the elements	1, 2, 3, 4, 5
	Enter the value of k	4
Output	The 4th element from the end of the linked list is	2

3. Create an array of structures that stores the following details for each customer.
NAME
ACCOUNT NUMBER (Account number should be of 5 digit)
BALANCE AMOUNT (Balance should be more than 10).

Add 100 to the balance of all the customers having more than Rs.1,000/- in their account. Write a menu driven program that uses the structure mentioned above and allows the user to perform the following operations:

(a) Add a customer record.
(b) Display the name of customers having balance less than 200.
(c) Display the details of the customers whose balance amount got incremented.
(d) Display the details of all the customers.

Sample Input Output

(1) Add a customer record
(2) Display the name of customers having balance less than 200.
(3) Display the details of the customers whose balance amount got incremented.
(4) Display the details of all the customers.
(5) Exit

Input	Enter your choice	1
	Name	Raju
	Account number	23678
	Balance	1230
Input	Enter your choice	1
	Name	Ramu
	Account number	56743
	Balance	129
Input	Enter your choice	1
	Name	Ravi
	Account number	78324
	Balance	840
Input	Enter your choice	1
	Name	Renu
	Account number	36785
	Balance	59
Input	Enter your choice	2
Output		Ramu
		Renu

Input	Enter your choice	3
Output		**Name Account number Balance**
		Raju 23678 1330

Input	Enter your choice	4
Output		**Name Account number Balance**
		Raju 23678 1330
		Ramu 56743 129
		Ravi 78324 840
		Renu 36785 59

Input	Enter your choice	5

4. Given a singly linked list L of 'n' integers, write a program to count the number of occurrences of each element in the list L.

Input	Enter the value of n:	10
	Enter the elements of the linked list:	4, 3, 8, 1, 4, 8, 3, 8, 2, 3
Output	Number of occurrences of 4	2
	Number of occurrences of 3	3
	Number of occurrences of 8	3
	Number of occurrences of 1	1
	Number of occurrences of 2	1

5. Given a singly linked list of 'n' integers, write a program to swap the elements in the linked list pair wise.

Example:

If the Linked List 'L' contains odd number of elements {1, 2, 3, 4, 5} then pairs in this list are (1,2), (3,4) and leaving the last element unaltered.

After swapping, the modified list will be 2, 1, 4, 3, 5

If the Linked List 'L' contains even number of elements { 1, 2, 3, 4, 5, 6} then pairs in this list are (1,2), (3,4) and (5,6).

After swapping, the modified list will be 2, 1, 4, 3, 6, 5

Input	Enter the value of n	5
	Enter the elements of the linked list	1, 2, 3, 4, 5
Output	Elements of the linked list	
	After pair wise swapping:	2, 1, 4, 3, 5

Input	Enter the value of n	6
	Enter the elements of the linked list	1, 2, 3, 4, 5, 6
Output	Elements of the linked list after Pair wise swapping	2, 1, 4, 3, 6, 5

6. Write a program to reverse a singly link list **A** of **n** integers. Your program should contain a function reverse() which takes **A** and **n** as parameters.

Input	Enter list size	6
	Enter elements of list	2, 4, -6, 5, 8, -1
Output	Reversed list	-1, 8, 5, -6, 4, 2

7. Create an array of structures that stores the following details for each employee:
NAME
SALARY
WORK PER DAY (in hours)
Assume that the number of employee is 10.

Increase the salary depending on the number of hours of work per day as follows :

Work per day (in hours)	**8**	**10**	**≥ 12**
Increase in salary	**Rs.50**	**Rs.100**	**Rs.150**

Write a menu driven program that uses the structure mentioned above and allows the user to perform the following operations:
(a) Add an employee record.
(b) Display the details of all the employees who did not get any increment in salary.
(c) Display the details of all the employees with their final salaries.
(d) Display the details of all the employees, given work per day(in hours).

Sample Input Output
(1) Add an employee record
(2) Display the details of all the employees who did not get any increment in salary.
(3) Display the details of all the employees with their final salaries.
(4) Display the details of all the employees, given work per day(in hours).
(5) Exit

Input	Enter your choice	1
	Enter Name	Alice
	Salary	Rs.63,000
	Work per day (in hours)	8

Input	Enter your choice	1
	Name	Bob
	Salary	Rs.63,000
	Work per day (in hours)	10
Input	Enter your choice	1
	Name	Jack
	Salary	Rs.63,000
	Work per day (in hours)	6
Input	Enter your choice	2
Output	**Name**	**Final Salary**
	Jack	Rs.63,000
Input	Enter your choice	3
Output	**Name**	**Final Salary**
	Alice	Rs.63,050
	Bob	Rs.63,100
1	Jack	Rs.63,000
Input	Enter your choice	4
	Enter the work per day(in hours)	8
Output	**Name**	**Final Salary**
	Alice	Rs.63,050
Input	Enter your choice	5

8. Given two sorted singly linked lists A and B of size ‘m’ and ‘n’ respectively, write a program to merge the elements of A and B. Assume that the elements of A and B are in ascending order. The elements of the merged list should also be in ascending order. Each node in A and B has a data part (which is an integer) and a pointer to the next node. HEAD1 and HEAD2 are pointers that point to the start nodes of A and B respectively.
Note: Do not use sort function

Input	Enter the value of m	3
	Enter the value of n	3
	Enter the elements of linked list A	1 2 3
	Enter the elements of linked list B	2 3 4
Output	The merged list is	1 2 2 3 3 4

9. Given a singly linked list L of ‘n’ integers, write a program to search an element ‘k’ in the list L. Each node in the linked list has a data part that stores the integer value and a pointer that points to the next node of the list L. Assume that Head is a pointer that points

to the start node of the list L. If ‘k’ is present in the list L, print the position of ‘k’ from the start node of the list, otherwise print ‘Integer not found’. Assume that the position of first node in the list is 1.

Input	Enter the value of n	3
	Enter the elements of the linked list	2, 5, 8
	Enter the element to be searched	5
Output	Element found at node	2

Input	Enter the value of n	5
	Enter the elements of the linked list	2, 5, 8, 6, 7
	Enter the element to be searched	9
Output	Integer not found	

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