ECE 3104 CIE LAB 1 | LAB WORKSHEET 2
Thursday, 05 May 2016

The lecturer will sign off after check for completion and keeps this page for records.

For Student to complete	
ECE3104 Lab Sheet No: 1 Must be completed by 4:50pm 6 Oct 2015 Student Sign _____ Date Handed in: _____	 Student Name:_____ Student ID: _____

For Tutor to Sign

I have seen the tasks specified in this lab sheet running.

Signed by:_____ Date: _____
(Lectuter/Tutor)

Note: To achieve terms and be eligible to sit the final examination at least 6 of the 8 lab sheets must be signed off as completed within the time specified.

Objectives:

At the end of this lab session you should be able to:

	Check
1. Work around Visual/Dev C++ IDE	□
2. Write a project in C++.	□
a. Setup a project	□
b. Write code	□
c. Run, save, open, edit project and print code	□
3. Finding and fixing errors	□
4. Object oriented programming: objects, classes, events and methods	□

Introduction to Data Structure and Algorithm in C++

Description:
This course concentrates on the practical part of the course of Algorithm and Programming with OOP under C++ Environment. This course allows students to understand practically the Logical and physical representation of data, algorithms, complexity and efficiency, data Structure operations, array, lists, and matrix representations, linked lists and their Different variations, string storage representation and manipulation, queues and stacks and their applications, tree structures and their different variations, graphs and Networks , sorting techniques, searching techniques

Objectives:

1. Extend programming ability using an object oriented language.
2. Analyze algorithms to determine time and space complexity.
3. Build and manipulate linear and non-linear data structures, including stacks, queues, linked lists, trees, and graphs.
4. Sort, search, and merge data.
5. Choose the appropriate data structure to use in solving typical computer science problems.

Course Plan

Weeks	Topics
1	Revision OOP concept, classes, inheritance, information hiding, encapsulation… Revision for C++ statements (reading, writing, control structure and functions)
2	***Data Structures:*** Including Lists, stack, queue, priority queues, trees, Binary trees, BST, Hash tables ***Array (Static and Dynamic data structure)*** ***− array creation and implementation*** ***− Creation*** ***− Passing to function*** ***− Insertion Implementation*** ***− Delete Implementation***

3	**linked list and Double Linkedlist** Creation Passing to function Insertion Implementation Delete Implementation Search Implementation Sort Implementation Separation implementation Merge Implementation
4	***Stack ADT (array implementation)*** ***Implementing basic operation of stack (push, pop) using array Implementation*** ***Stack ADT (linked list implementation)*** ***Implementing basic operation of stack (push, pop) using Linkedlist Implementation***
5	queue ADT (array implementation) Implementing basic operation of Queue (Enqueue, Dequeue) using array Implementation queue ADT (Linked list implementation) Implementing basic operation of Queue (Enqueue, Dequeue) using Linked List Implementation
6 , 7	***Sorting Algorithms:*** Including heap-sort, quick-sort, merge-sort, selection sort. Parallel list ranking and parallel sorting.
8, 9	***Algorithm design patterns:*** Greedy Algorithms. Divide and conquer: running time of divide and conquer algorithms, closest-point algorithms and Dynamic Programming
10, 13	***Graph Algorithms:*** Including traversal (DFS and BFS), topological sorting shortest paths (all pairs and single-source), minimum spanning tree, maximum flow, minimum-cost flow and matching and Backtracking Algorithms Binary tree Implement Binary tree traversal methods : Preorder, In-order, Postordered traversal. Recursive Algorithms for above mentioned Traversal methods. ***Binary Search tree*** ***Implementing Binary search tree operation (search ,addition, deletion).***

14	***Project Presentation and Revision***

Activities for this lab:

- Explain the concepts of OOP.
- Examples of OOP languages
- C++ as a language to be use (understand the concept)
- Codes to demonstrate OOP concept explained