HELWAN University

Department of Computer Science
CS 214: Data Structures
Course Syllabus

Faculty of
Computers and Information

Instructor	Dr. Waleed A. Yousef, Wyousef@Helwan.edu.eg
Text	Kruse, Robert L.; Tondo, Clovis L.; and Leung, Bruce P. "*Data structures and program design in C*", Second Edition, Prentice Hall.
Prerequisite	CS 112 (C Programming); a very good familiarity with C Language is necessary for the course. The student is assumed to have a good understanding of important topics, e.g., pointers, memory allocation, passing parameters, files…etc.
Objectives	This course is a fundamental course for any computer science student. The basic objective is to implement and teach the student the details of the basic data structures that are necessary for any serious programming. By the end of the course, and with the help of assignments, the student will have acquired the talent of designing new structures that are necessary for special kind of applications.
Syllabus	The following table is an approximate schedule.

Lec.	Topics
1	General discussion on programming principles and software engineering (Ch. 1 and 2). The importance of Data Structures will be motivated. HW: big program involving files (reviewing C)
2	Growth of functions, and complexity: Sec. 3.2, 3.3 from Rosen.
3	The concept of ADT and Stacks: contiguous implementation. (Ch. 3)
4	Stacks: linked implementation. (Ch.3)
5	Recursion, Recursion vs. iteration, tail recursion, unnecessarily recursion. (Ch. 3)
6	More on ADT and queues (contiguous implementation). Ch. 4
7	Queues: linked implementation + General lists: contiguous implementation. Ch. 4, Ch. 5
8	General lists: linked implementation, Sequential search Ch.5, Ch.6
9	Binary search Ch. 6
10	Some tree terminology and rigorous analysis of Binary search, and proving important theorems.
11	Trees and BST Ch. 9
12	BST (cont.) including deleting nodes
13	Graph representation and Breadth first and depth first traversal.

Homework	There will be a new assignment, almost, every other week. Assignments will include both problems and computer exercises. Every student has to solve the computer exercises at home, to leave the time of the weekly labs for technical questions, debugging, and discussions with the TAs. **Late assignments lose marks while copied ones get no marks, are considered cheating and violation to the ethical code, and influence the whole grade.**
Grading	Homeworks and Midterms: 40%, Final Exam: 50%, and project 10%.