

Course Syllabus Fall 2016

CSC 212 Data Structures

King Saud University



- Name: Dr. Achraf El Allali
- Office: 2119
- Office hours are displayed on the office door.
- Information and announcements will be communicated to you by email (**university email**).
 - Make sure you have access to your university email account.
 - You have to check your email periodically.
- All course materials and assignments will be uploaded on **LMS**.
 - Make sure you have access to LMS.
 - If you have not used LMS before, login to the system and get familiar with it.

Fundamental concepts of data structures. Performance measurement of algorithms. Implementation and use of lists, stacks, queues, priority queues, trees, heap, hash tables and graphs. Students will do programming assignments and a project.

- This course is delivered in three lectures and one tutorial every week.
- Attendance to lectures and **tutorial** is **mandatory**.

To be able to:

- 1 Describe and use fundamental data structures such as lists, stacks, queues and trees and graphs.
- 2 Implement a specified data structure i.e. be able to choose a storage structure for the data elements and algorithms for the operations.
- 3 Determine time and space complexity of data structures and associated algorithms.
- 4 Compare alternative data structures for a problem (e.g. based on their time and space complexity) and be able to choose the most appropriate one for the given problem.
- 5 Design appropriate data structures for a problem i.e. be able to analyze a given problem, identify and specify data elements, structure and operations appropriate to it.
- 6 Understand recursion and be able to write recursive algorithms for problems.

Week	Date	Lecture 1	Lecture 2	Lecture 3
1	18/09/2016	Orientation & Introduction		National Day Break
2	25/09/2016	Introduction to Data Structures	Performance Analysis	Performance Analysis
3	2/10/2016	Performance Analysis	Performance Analysis	List (Specification)
4	9/10/2016	List (Linked List)	List (Array List)	Double Linked List
5	16/10/2016	Queue	Queue	Priority Queue
6	23/10/2016	Stack	Stack	Stack
7	30/10/2016	Recursion	Recursion	Recursion
8	6/11/2016	Trees & Binary Tree	Binary Tree	Binary Tree
	13/11/2016			
9	20/11/2016	BST	BST	BST
10	27/11/2016	AVL	AVL	AVL
11	4/12/2016	B+ Trees	B+ Trees	B+ Trees
12	11/12/2016	Hash	Hash	Hash
13	18/12/2016	Heap	Heap	Heap
14	25/12/2016	Graphs	Graphs	Graphs
15	1/1/2016	Revision	Revision	Revision

Data Structures and Algorithms in Java, 6th edition, by M.T. Goodrich and R. Tamassia.
John Wiley and Sons, Inc., ISBN: 0-471-73884-0

- Online tutorials: 2%
- Homework: 6%
- Programming assignments: 4%
- Quizzes (3): 9%
- Midterm I 12%.
- Midterm II 12%.
- Project 15%.
- Final 40%.

Notice the emphasis on **continuous evaluation**, so work continuously and avoid last minute revision.

Every tutorial consists of two parts:

- 1 Online tutorial:
 - **What is it?** It is a small online multiple choice test that you have to answer on LMS.
 - **When?** The test is posted before the week of the corresponding tutorial session.
 - **Why?** The goal of this test is to help you assess your understanding of the lecture content before you attend the tutorial.
 - **How should I answer?** If you are not sure about your answer, take a look again at your lecture content or other resources and try to understand the parts related to the question. After that go back and answer the question.
 - **Is it graded?** Yes (see evaluation slide).

2 Regular tutorial:

- **What is it?** It is a set of problems that you have to prepare for the tutorial session.
- **When?** The tutorial is posted before the week of the corresponding tutorial session.
- **Why?** The goal of the tutorials is to make you familiar with the types of questions that you will get in the homework, quizzes and exams.
- **Is it graded?** No. However, if you do not prepare the tutorials before coming to class, you will get little benefit from the tutorial sessions.

- **What is it?** It is a set of problems that you have to solve at home then submit to LMS (**hard copy submissions is not accepted**).
- **When?** There will be 5 to 7 problem sets, and you will have typically one week to return the homework. Solving the homework usually takes time, so do not leave it until the deadline.
- **Why?** The goal of the homework is to assess your understanding of material and give you a clear idea about the type of questions that you will get in the exams.
- **How should I answer?** Try to start working on the homework as soon as it is posted. If you are unable to answer a problem, you may discuss it with your classmates. However, the solution you submit **must be your own**. Copying the solution of other students (even if you understand it) is considered **cheating**.
- **Is it graded?** Yes (see evaluation slide).

- **What is it?** A programming assignment is a small programming exercise that you have to solve and submit to **Web-CAT** (no other form of submission is accepted).
- **When?** There will be 2 to 4 programming assignments, and you will have typically one week to submit your solution. Solving a programming assignment usually takes time, so do not leave it until the deadline.
- **Why?** The goal of the programming assignments is to practice the notions seen in class.
- **How should I answer?** Try to start working on the programming assignment as soon as it is posted. If you are unable to answer a problem, you may discuss it with your classmates. However, the solution you submit **must be your own**. Copying the solution of other students (even if you understand it) is considered **cheating**.
- **Is it graded?** Yes (see evaluation slide). The mark given by Web-CAT is your final mark and will not be modified for any reason.

- **What is it?** Quizzes are short exams conducted during the tutorial session.
- **When?** There will be 3 quizzes. Every quiz will cover the topics of the homework sets that came before it and not covered by the previous quiz/exam.
- **Why?** The goal of the quiz is to assess how much effort you did in solving the homework.
- **How should I prepare?** The best way to prepare for a quiz is to solve the related homework.
- **Is it graded?** Yes (see evaluation slide).



- **What is it?** It is a semester-long programming task where you write code to solve a specific computational problem.
- **When?** The project is assigned during the first weeks of the semester. The project is divided into several **cumulative** phases. At each phase, you have to submit a code (to **Web-CAT**) and a report.
- **Why?** The project has as goal to allow you to put into practice the knowledge acquired in class, and as such it constitutes an important part of the course.
- **How should I work on the project ?** The project is a group assignment, so you have to choose your group and coordinate with your fellow members to work on the project as soon as it is posted. Writing the code and correcting the bugs takes time so do not wait until the deadline.
- **Is it graded?** Yes (see evaluation slide). The mark given by Web-CAT is your final mark and will not be modified for any reason.
- **Plagiarism** in the project is **prohibited** and will be dealt with very harshly.

- Online parts of the homework and the project code will be automatically evaluated using the online system Web-CAT.
- You will be assigned a Web-CAT account to submit your assignments.
- You will receive documentation on how to use Web-CAT. Read Them carefully.
- Follow closely the submission instructions indicated in your assignments.

Tentative schedule (subject to change):

- MT I: date fixed by the college.
- MT II: date fixed by the college.
- Makeup for midterms and quizzes: Wednesday, January 4th.
 - The makeups are for students who miss a midterm or a quiz with a valid excuse.
 - To attend the makeup, you must submit your excuse **within one week** after the exam, otherwise you may be refused to enter the makeup.
- Final (comprehensive): date fixed by the college.
- No calculators or any other electronic devices are allowed in the exams.

- More than **25% absence** automatically results in **denial** of final exam.
- Plagiarism will not be tolerated and is grounds for **failing the course**. Any student (or group of students) submitting work which is not his/their own, or if the submitted work was found to be copied, he/they will all face failing the course. No excuses will be accepted whatsoever.