

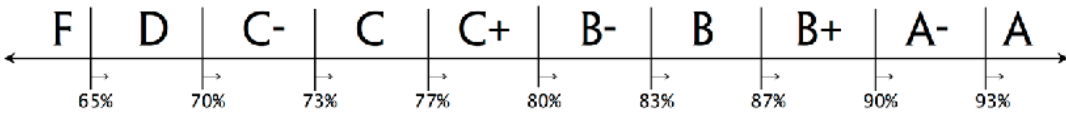
ALGORITHMS

CMPT 435 and MSCS 502 • Fall 2021

Background

When and where	Wednesdays 8AM—9:15AM and Fridays 11AM—12:15PM in HC 1021	
Suggested Text	<i>Introduction to Algorithms</i> , 3 rd edition by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. Published by MIT Press. ISBN: 9780262033848	
Web	https://www.labouseur.com/courses/algorithms	
Instructor	Alan G. Labouseur Hancock 3007 (Office hours are posted.)	Alan.Labouseur@Marist.edu 845-575-3832 Marist phone 845-440-1102 home office phone

Grading

Letter Grades				
You can earn up to 1000 points over the course of the semester, broken down as follows:	Assignment 0	0.0%	0 points, but $-\infty$ if you skip it	[1, 2]
	Assignments 1, 2, 3, 4, 5	50.0%	500 points (5 at 100 points each)	[1, 2]
	Semester Project	10.0%	100 points	[1, 2]
	Mid-term Exam	15.0%	150 points	[1, 2]
	Final Exam	20.0%	200 points	[1, 2]
	Attendance and Participation	2.5%	25 points for quality and quantity	[1]
	Laziness and Whining	2.5%	25 points for not (lazy or whining)	[1]

Objectives and Assessment

Assessment methods include assignments, quizzes, exams, discussions, presentations, peer review, and projects.	In this course, I hope that you will learn to think like a computer scientist , and...
[References] refer to Department of Computing Technology Goals available at https://www.labouseur.com/courses/goals.pdf	<ul style="list-style-type: none">• gain and demonstrate an understanding of many fundamental concepts in the study of algorithms (including but not limited to sorting, searching, traversing trees and graphs, recursion, and dynamic programming) and their accompanying data structures [1, 2, 5];• gain and demonstrate an understanding of asymptotics and their utility [2];• gain and demonstrate an understanding of the techniques developing, analyzing, and proving correct different kinds of algorithms [1, 2];• learn that developing the algorithms (and the software that is their implementation) is only half the battle, debugging and testing are critical skills for a talented professional, and skills that will be valuable. [1, 2]• gain and demonstrate an understanding that the chasm between programs that work once and programs that work every time is ridiculously huge, and that their asymptotic runtime can be similarly (and also ridiculously) huge. [1, 2];• enhance your continuing education skills. Capable problem solvers never stop learning. You will get practice in finding answers for yourself.
	Finally, many internship and job interview questions are based on this material. I want you to be so awesome that the company hires you on the spot and sends you home with a Brinks truck full of cash and video games, including Portal 3.

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-Proposed Schedule

#	Week		Due Friday	CLRS	Topics and Activities	
	Wed	Fri				
0	1-Sep	3-Sep	—	1, 2	Studying, characterizing, and analyzing algorithms and data structures	
1	8-Sep	10-Sep	0: LaTeX Limericks	10	Elementary data structures: Linked lists, Stacks, Queues, and (rooted) Trees	
2	15-Sep	17-Sep	—	3	Growth of functions and asymptotic notation Analyzing elementary data structures with asymptotic notation	Asymptotic Analysis
3	22-Sep	24-Sep	1: Data Structures	2.3	Sorting Lists - {permutation/monkey, selection, insertion} Detailed running time for Selection Sort	
4	29-Sep	1-Oct	—	2.3, 7	The <i>divide and conquer</i> philosophy, Merge sort, and Quick sort Recursion trees, Running time for Merge Sort and Quicksort	
5	6-Oct	8-Oct	2: Sorting	—	Mid-term Exam in Hancock 2023 at 8am on October 6 th One-page study sheet permitted. Some restrictions apply.	
6	13-Oct	15-Oct	—	—	Thoughts on the Mid-term Exam and semester-long project <i>No class meeting on Friday: Mid-semester break</i>	
7	20-Oct	22-Oct	—	10.2, 11 p.799	Linear and Binary search Hashing with chaining (but probably not probing)	Asymptotic Analysis
8	27-Oct	29-Oct	—	12, 18 13	Binary Search trees, Balanced trees, B-trees	
9	3-Nov	5-Nov	3: Searching and Hashing	22	Graphs in Theory and practice	
A	10-Nov	12-Nov	—	22-23	Graphs in Theory and practice Breadth-first and depth-first traversals	
B	17-Nov	19-Nov	4: Graphs and Trees	16 15, 24.1	Greedy Algorithms - Fractional Knapsack Dynamic Programming with Bellman-Ford SSSP	
C	24-Nov	26-Nov	—	—	<i>No class meetings: Thanksgiving</i>	
D	1-Dec	3-Dec	—	4.3 - 4.6	The master method and its proof.	
E	8-Dec	10-Dec	5: Dynamic & Greedy	—	Semester review Help with the Semester Project	
F	15-Dec @ 8am		Semester Project	—	Final Exam , in Hancock 2023 at 8am One-page study sheet permitted. Some restrictions apply.	