

Syllabus

AP/ITEC 2620 3.0

Introduction to Data Structures

Section M, Winter 2020

Instructor:	Prof. S. Chen
Office Hours:	Thursdays 1:00 – 3:00pm, DB (TEL) 3046
TA:	TBA
Classroom:	DB 1004
Time:	Tuesdays 7:00 – 10:00pm
Lab:	ITEC labs
Midterm:	Tuesday 7:30 – 9:00pm, February 25
Final:	TBA
Textbook:	A Practical Introduction to Data Structures and Algorithm Analysis – Java Edition, Clifford A. Shaffer
Homepage:	http://www.yorku.ca/sychen

Course Description

This is an introductory course in algorithms and data structures. This is not a course in JAVA programming – it is assumed that you already know how to program. Thus, JAVA can now be used as a language to communicate more advanced and abstract ideas. These ideas are part of what separate good programmers from mere coders.

Textbook

The required text is “A Practical Introduction to Data Structures and Algorithm Analysis – Java Edition” by Clifford A. Shaffer. I should warn you that you may find the book hard reading, but I hope you will find it insightful and worthwhile.

Important Dates

The Homework Assignment is due in class at the beginning of class on Tuesday, February 11th.

The Midterm will be 7:30-9:00pm on Tuesday, February 25th.

Evaluation

Homework Assignment (due 2/11):	10%
Midterm (on 2/25):	30%
Final (TBA):	60%

Late Policy

Late assignments will NOT be accepted, and there will be NO makeup midterm. Instead, the following accommodation is provided to ALL students.

If your (calculated) average on the midterm is better than your assignment grade, your midterm average will replace it. If your average on the first half of the final exam is better than your midterm average, then your final exam average will replace it. Note: it is thus possible for your final exam score to count for 100% of the course.

Lecture Topics

<u>Lect</u>	<u>Day</u>	<u>Topic</u>
1a	1/7	Introduction
1b	1/7	Searching
2a	1/14	Sorting – non-recursive algorithms
2b	1/14	Estimation and Complexity analysis – non-recursive algorithms
3a	1/21	More complexity analysis, Complexity estimation – non-recursive algorithms
3b	1/21	Linked lists
4a	1/28	Doubly linked lists and Binary trees
4b	1/28	Recursion and Binary tree operations
5a	2/4	Sorting – recursive algorithms
5b	2/4	Binary search tree operations
6a	2/11	Complexity analysis – recursive algorithms
6b	2/11	Homework and Midterm review
	2/18	READING WEEK
	2/25	MIDTERM
7a	3/3	Stacks
7b	3/3	Queues, Priority Queues
8a	3/10	Heaps
8b	3/10	Search trees
9a	3/17	Graphs and Graph algorithms
9b	3/17	Grammars
10a	3/24	Grammars
10b	3/24	Game trees
11a	3/31	Hashing
11b	3/31	Review

Suggested Readings from Shaffer (third edition)

<u>Lect</u>	<u>Topics</u>	<u>Sections</u>
1a	Introduction	1.1, 1.3-1.5
1b	Searching – linear search, binary search	pages 77-79, 9.1
2a	Sorting – insertion sort, bubble sort, selection sort	7.1, 7.2
2b	Complexity analysis	2.4, 2.7, 3.1, 3.3-3.5
3a	More complexity analysis	3.2, 3.6-3.9
3b	Linked lists	4.1-4.1.4
4a	Doubly linked lists and Binary trees	4.1.5, 5.1, 5.3.1, 5.4
4b	Recursion and Binary tree operations	2.5, 5.2
5a	Sorting – quicksort, mergesort	7.4, 7.5
5b	Binary search trees	5.4
6a	Complexity analysis – recurrence relations	2.4, 14.2.2
6b		
7a	Stacks	1.2, 4.1, 4.2
7b	Queues, Priority Queues	4.3, 5.5
8a	Heaps, Heapsort	5.3.3, 7.6
8b	Breadth-first search, Depth-first search	11.3.1, 11.3.2
9a	Graphs and Graph algorithms	11.1, 11.4, 11.5.1
9b	Grammars	see website
10a	Grammars	see website
10b	Game trees	see website
11a	Hashing	9.4
11b		

Suggested Readings from Shaffer (old/java edition)

<u>Lect</u>	<u>Topics</u>	<u>Sections</u>
1a	Introduction	1.1, 1.3-1.5
1b	Searching – linear search, binary search	pages 60-62, 10.1
2a	Sorting – insertion sort, bubble sort, selection sort	8.1, 8.2
2b	Complexity analysis	2.5, 2.7, 3.1, 3.3-3.5
3a	More complexity analysis	3.2, 3.6-3.9
3b	Linked lists	4.1-4.1.4
4a	Doubly linked lists and Binary trees	4.1.5, 5.1, 5.3.1, 5.5
4b	Recursion and Binary tree operations	2.4, 5.2,
5a	Sorting – quicksort, mergesort	8.4, 8.5
5b	Binary search trees	5.5
6a	Complexity analysis – recurrence relations	2.5, 14.2.2
6b		
7a	Stacks	1.2, 4.1, 4.2
7b	Queues, Priority Queues	4.3, 5.6
8a	Heaps, Heapsort	5.3.3, 8.6
8b	Breadth-first search, Depth-first search	7.3.1, 7.3.2
9a	Graphs and Graph algorithms	7.1, 7.4, 7.5
9b	Grammars	see website
10a	Grammars	see website
10b	Game trees	see website
11a	Hashing	10.4
11b		