CS331 DATA STRUCTURES AND ALGORITHMS FALL 2019
Lecture 8:35-9:50am Wed/Fri - PS111 Lab 8:35-9:25am Mon SB112J or SB112E or SB112F
Instructor: Matthew Bauer bauerm@iit.edu Office Hours Mon 8:30-11am, Tues 8:30-11am 206D Stuart
Online Google Meet Sun 7-7:30pm https://meet.google.com/scy-vwoq-dqs

TAs (office hours in 108SB): You can see any TA for assistance during their office hours in 108 Stuart, but your work will be graded by your assigned Grading TA.
Jay Huang jhuang71@hawk.iit.edu Mon 9:30-11:30am Carlos Rodriguez crodriguez1@hawk.iit.edu Mon 9:30-11:30am
Avery Peck apeck2@hawk.iit.edu Thurs 4:30-6:30pm Kaitlyn Krupa kkrupa@hawk.iit.edu Mon 5-7pm

Textbooks (online only): Problem Solving With Algorithms and Data Structures Using Python
https://runestone.academy/runestone/books/published/pythonds/index.html
Python Tutorial https://docs.python.org/3/tutorial/index.html Python Doc https://docs.python.org/3/library/index.html

Computing Resources: All assignments will be distributed and submitted via Mimir (course code:d89466ca59). You can also install your own local Jupyter Notebook http://jupyter.org/install.html

Catalog Description: Implementation and application of the essential data structures used in computer science. Analysis of basic sorting and searching algorithms and their relationship to these data structures. Particular emphasis is given to the use of object-oriented design and data abstraction in the creation and application of data structures.

Course Objectives: Students should be able to:
- Explain, implement, and apply the following data-structures: lists (unordered and ordered), stacks, queues, expression trees, binary search trees, AVL-trees, hash tables, and heaps.
- Analyze the time and space complexity of algorithms using asymptotic upper bounds (big-O notation).
- Explain and use references and linked structures.
- Outline basic object-oriented design concepts: composition, inheritance, polymorphism.
- Outline basic concepts of immutable data structures and explain the trade-offs compared to mutable data.
- Write and test recursive procedures, and explain the run-time stack concept.
- Analyze searching and sorting algorithms, and explain their relationship to data-structures.
- Choose and implement appropriate data-structures to solve an application problem.
- Understand techniques of software development, such as unit testing and version control.

Lecture: Review reading before arriving to class. Download starter notebooks before class. Class will consist of lots of interactive demos. Completed notebooks are always posted

Assignments: Labs(11)-25% Lecture Participation-5% Exam1-20% Exam2-20% Exam3-30%
Late labs 10% score reduction per day up to 5 days late A=90-100 B=80-89 C=70-79 D=60-69 E=0-59 NO EXTRA CREDIT! Failure to attend class and participate in class discussions may result in a lowering your final grade by one letter grade. Also, the instructor reserves the right to fail any student that receives a failing score on any exam regardless of the scores on the other assignments. All grades will be posted in Blackboard

Ethics: Any behavior on any homework, lab, project or exam that could be considered copying or cheating will result in an immediate zero on the assignment for all parties involved and will be reported to academichonesty@iit.edu See the IIT Code of Academic Honesty, https://web.iit.edu/student-affairs/handbook/fine-print/code-academic-honesty

Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodation from the Center for Disability Resources (CDR) located at 3424 S. State Street - 1C3-2, 312 567.5744 or disabilities@iit.edu

Communication is critical to the success and satisfaction of the learning experience. Please take advantage of myself, my posted office hours, and e-mail to communicate any class issues with me.

Calendar

Week	Monday	Wednesday	Friday
1-8/19	Lab 0 Preliminaries Due Sun 8/25	Read PythonDS Introduction, Python tutorial, ch 1-5, 9 Syllabus, Language Intro	Language Intro
2-8/26	Lab 1 Basic Python Due Sun 9/8	Language Intro	Language Intro
3-9/2	NO LAB use TA office hours Lab 1 Basic Python Due Sun 9/8	Language Intro	Language Intro
4-9/9	Lab 2 Iocane Due Sun 9/15	Reading: PythonDS Analysis Searching, Sorting, and Timing	Searching, Sorting, and Timing
5-9/16	Lab 3 Ngrams Due Sun 9/22	Array-backed lists	Iterators
6-9/23	Lab 4 Arraylist Due Sun 9/29	Reading: PythonDS 3.19-3.21 Linked structures	Linked lists
7-9/30	Lab 5 LinkedList Due Sun 10/13	EXAM 1 (covers labs 1-4) WH 113	Reading: PythonDS 5.5 Hashing and Hashtables
8-10/7	NO LAB meet with TAs during office hours Lab 5 LinkedList Due Sun 10/13	Hashing and Hashtables	Reading: PythonDS 3.3-3.12 Stacks and Queues
9-10/14	Lab 6 Hashtable Due Sun 10/20	Stacks and Queues	Reading: PythonDS 6.8-6.10 Priority Queues (and Heaps)
10-10/21	Lab 7 StackApps Due Sun 10/27 Lab 8 CircQueue Due Sun 10/27	Priority Queues (and Heaps)	Reading: PythonDS 4 On Recursion
11-10/28	Lab 9 Heaps Due Sun 11/3	On Recursion	On Recursion
12-11/4	Lab 10 Recursion Due Sun 11/17	EXAM 2 (covers labs 5-9) WH 113	Binary Search Trees
13-11/11	Lab 10 Recursion Due Sun 11/17	Reading: PythonDS 6.11- 6.14 BSTree data structure	BSTree data structure
14-11/18	Lab 11 BSTrees Due Sun 12/1	Reading: PythonDS 6.15-6.18 Balanced BSTree: AVL Tree	Balanced BSTree: AVL Tree
15-11/25	Lab 11 BSTrees Due Sun 12/1	PRE-RECORDED LECTURE Balanced BSTree: AVL Tree	NO LECTURE
Final's Week		TBA EXAM 3 (covers labs 1-11)	