Instructor. Kamesh Madduri, W312 Westgate. Office hours: TW 2:00–3:30 PM.

Teaching Assistants, office hours. Fengyang Jiang (TR 11:30 AM-1 PM, W328 Westgate), Yu-Hsuan Kuo (R 2:30-4:30 PM, F 12:40-1:40 PM, W308 Westgate), Amatur Rahman (WF 10-11:30 AM, W374 Westgate).


Class Goals and Objectives. This class introduces undergraduate students to the principles of efficient algorithm design, and teaches them how to analyze the asymptotic behavior of both recursive and non-recursive algorithms. The first objective is to teach a precise notion of efficiency: time and space complexity. The second is to provide mathematical tools to compare efficiency of various algorithms or programs. These tools contain the basic methods for finding the rates of growth of functions, which include solving recurrence relations. A part of this objective is to convey the dramatic importance of the selection of an appropriate algorithmic method for a given task. The third goal is to provide a variety of tools which are indispensible in the design of efficient algorithms. These tools consist of: (a) building blocks, which include the most important data structures and several classic algorithms, (b) design paradigms, including divide-and-conquer, greedy, and dynamic programming; several classic algorithms are presented as applications of these paradigms. It is assumed that students entering this class know how to analyze algorithms for correctness, but further mastery of this aspect of algorithm design is also an objective of this course.


Prerequisites. CMPSC 122; CMPSC 360 or MATH 311W.

Textbooks.
- Pat Morin, Open Data Structures, http://opendatastructures.org/ (recommended)

Class Material. Class announcements, lecture notes, slides, homework assignments, and discussions will be on Canvas.
**Evaluation and Grading.** The final grade will be based on five in-class exams (40%), in-class quizzes (25%), two take-home exams (20%), and a final exam (15%). The in-class exam dates are Sep 5, Sep 24, Oct 10, Oct 26, and Nov 14. The two take-home exams are tentatively due Oct 17 and Nov 30.

**Attendance Policy.** Students are strongly encouraged to attend all the lectures and recitations. There will be five in-class exams this semester, as well as a short quiz in nearly every lecture. Please let the instructor and the teaching assistants know if you will be missing a class or a recitation for an unavoidable reason.

**Class schedule.** Last updated October 7, 2018.
Aug 20-Aug 24: Introduction, Asymptotic notation
Aug 27-Sep 21: Divide-and-conquer algorithms
Sep 26-Oct 5: Data structures
Oct 8-Oct 24: Graph algorithms
Oct 29-Nov 5: Greedy algorithms
Nov 7-Nov 28: Dynamic programming
Nov 30-Dec 7: NP completeness

**Academic Integrity Statement.** Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University’s Code of Conduct states that all students should act with personal integrity, respect other students’ dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

The CSE Department has its own statement on [Academic Integrity](http://www.eecs.psu.edu/students/resources/EECS-CSE-Academic-Integrity.aspx). Academic sanctions for each violation includes a reduction in score for the submission and optionally a reduction of the final letter grade in the course.

**Disability Accommodation Statement.** Penn State welcomes students with disabilities into the University’s educational programs. Every Penn State campus has an office for students with disabilities. The Student Disability Resources Web site provides contact information for every Penn State campus ([http://equity.psu.edu/student-disability-resources/campus-contacts](http://equity.psu.edu/student-disability-resources/campus-contacts)). For further information, please visit the Student Disability Resources Web site ([http://equity.psu.edu/student-disability-resources](http://equity.psu.edu/student-disability-resources)).

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: [See documentation guidelines](http://equity.psu.edu/).
If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.

**Counseling & Psychological Services Statement.** Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.

Counseling and Psychological Services at University Park (CAPS) ([http://studentaffairs.psu.edu/counseling/](http://studentaffairs.psu.edu/counseling/)): 814-863-0395
Counseling and Psychological Services at Commonwealth Campuses ([http://senate.psu.edu/faculty/counseling-services-at-commonwealth-campuses/](http://senate.psu.edu/faculty/counseling-services-at-commonwealth-campuses/))

Penn State Crisis Line (24 hours/7 days/week): 877-229-6400
Crisis Text Line (24 hours/7 days/week): Text LIONS to 741741

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