Course Information

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Teaching Assistants

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Questions?

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Websites

Stellar	Announcements, calendar, grades, and PDF course content. https://tinyurl.com/6-006sp20
Piazza	All discussion related to course material. http://piazza.com/mit/spring2020/6006
Gradescope	LaTeX problem set submissions and regrades. https://www.gradescope.com/courses/84219
Code Checker	Auto-graded code problem set submissions. https://alg.mit.edu

Content

6.006 is an introductory course covering elementary data structures (dynamic arrays, heaps, balanced binary search trees, hash tables) and algorithmic approaches to solve classical problems (sorting, graph searching, dynamic programming). Written course material will be distributed via notes from lectures and recitations. An additional useful reference is **Introduction to Algorithms** by Cormen, Leiserson, Rivest, and Stein (Third Edition, MIT Press), commonly known as **CLRS**, though this text is not required for the course.

Lectures

Lectures will be available online, prerecorded for OCW[1]. They will be released at 11 A.M. on Tuesdays and Thursdays. A link to the unlisted video recordings can be accessed by going to the **Online Content** page on `alg.mit.edu` after login.

Recitations

One-hour **Recitations** will be held weekly on Wednesdays and Fridays. Recitations supplement the material presented in lecture in a more interactive setting. You are responsible for material presented during both lecture and recitation. Recitations will occur in **LIVE in Zoom classrooms**[2]. Please add yourself to any available recitation section on the LMOD website. While recitations are online, they will still be space limited. If you attend a section to which you are not assigned, the TA may ask you to leave if there are too many students connected. We will assign two additional sections after we gauge demand.

	Time (EDT)	TA	Zoom Room `mit.zoom.us/`
R01	10 A.M	RL	`j/232599005`
R02	11 A.M	LH	`j/655956749`
R03	12 P.M	JBr	`j/383921417`
R04	1 P.M	PP	`j/878130681`
R05	2 P.M	PP	`j/878130681`
R06	3 P.M	CS	`j/260092214`
R07	4 P.M	AR	`j/799332156`
R08	5 P.M	AC	`j/747242461`

	Time (EDT)	TA	Zoom Room `mit.zoom.us/`
R09	6 P.M	AC	`j/747242461`
R10	7 P.M	MC	`j/784346143`
R11	10 P.M	MS	`j/997867070`
R12	11 P.M	SK	`j/465070431`
R13	12 A.M	EQ	`j/634617844`
R14	5 P.M	SL	`j/110182901`
R15	6 P.M	SM	`j/924219799`

Your **recitation grade** will be assigned based on the average of two numbers: 5.0, and the grade (between 0.0 to 5.0) your original recitation instructor would have assigned you before the course moved online.

[1] `https://ocw.mit.edu/index.htm`

[2] The password for our Zoom rooms can be accessed at `alg.mit.edu` after login on the **Online Content** page.

Office Hours

Teaching Assistants will hold virtual office hours via Zoom[3] on designated **office hour days** that directly precede each problem set due date or quiz.

6.006 Office Hours Zoom Room: `https://mit.zoom.us/j/234349376`

On every office hour day, office hours will be held in the Zoom room listed above, at ALL of the following times (EDT). The room will also be open at other times for students to chat with each other, but we suggest moving to non-course Zoom rooms to work outside of office hour times.

- 10 A.M. – Noon (morning)
- 2 P.M. – 4 P.M. (afternoon)
- 8 P.M. – 10 P.M. (evening)

Office hours will be held in one of two formats:

- **One TA:** Most office hours will be staffed by only a single TA in the Zoom room. This TA will maintain a queue of help requests (either from individuals or from groups of students), and will help students based on this queue.
- **Many TAs:** During the three days preceding each problem set deadline and the two days preceding each quiz, the evening office hours session from 8 P.M. – 10 P.M. will be staffed by 6 or more TAs who will each help many students working on the same content at the same time.

If you need help with theory questions, you will probably be helped fastest during office hours staffed by multiple TAs. Below is a calendar marking the days office hours will be held after moving online:

- days without office hours are white, and
- office hour days are gray (Many TA evening days are **darker**),
- assignment deadlines are black (these are never office hour days).

Month	U	M	T	W	R	F	S
March	22	23	24	25	26	27	28
	29	30	31	1	2	3	4
April	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	1	2
May	3	4	5	6	7	8	9

As before, Instructors will hold individual office hours online by appointment.

[3]The password for our Zoom rooms can be accessed at `alg.mit.edu` after login on the **Online Content** page.

Prerequisites

6.0001	Basic experience programming in Python 3.
6.042	Basic knowledge of discrete mathematics: set theory, relations and logic, combinatorics, proofs, recursion, number theory, graph theory, and probability.

We **strongly** caution against taking 6.006 before having fulfilled the listed prerequisites. We will evaluate entering understanding of the prerequisite material via a short Problem Set 0 assignment (released S 2/01 and due on F 2/07). **All students must submit this evaluation, regardless of prerequisite status**. We will assign each submission a letter grade. If you receive a C or below on the assignment, you will need to meet with a staff member to review your performance before you will be allowed to take the class. **We will not grade any other assignments from you until a good faith attempt of Problem Set 0 has been submitted**. The grade for this assignment will NOT affect your final grade in the class, but turning it in is required for taking this class.

Grading Policy

UPDATE: In compliance with EECS guidelines, we have removed 12 hours of course work from this class: two lectures, two recitations, and one problem set. While problem sets normally cover only two lectures, Problem Sets 5 and 6 now cover six lectures of material together, and will each be worth 50% more than a normal problem set. Your grade will now be based on recitation, 8 problem sets, 3 quizzes, and a final exam.

	Weight	Date	Time
Quiz 1	20%	Tuesday, March 31, 2020	7:30–9:30 P.M.
Quiz 2	15%	Tuesday, April 21, 2020	7:30–9:00 P.M.
Quiz 3	10%	Thursday, May 7, 2020	7:30–8:30 P.M.
Final Exam	35%	Wednesday, May 20, 2020	1:30–4:30 P.M.
Problem Sets	18%	8 PSs, 3% PS5 & PS6, 2% rest	
Recitation	2%	Graded by your TA	

MIT provides definitions[4] for the letter grades A, B, C, D, and F. In order to normalize assignments that vary in length and difficulty, we will provide a separate piece-wise linear mapping for each assignment, from the assignment's grade space to the interval $[0, 5]$. Grades mapped to the half-open intervals $(4, 5]$, $(3, 4]$, $(2, 3]$, $(1, 2]$, and $[0, 1]$ correspond to letter grades A, B, C, D, and F respectively.

This term **Alternate Grades are in effect** (PE, NE, IE). To determine your final grade in the class, we will compute the weighted sum of your mapped assignment grades. A sum strictly above a 2 will receive a PE in this class. All other students will be assigned a grade individually based on institute recommendations.

[4] `http://catalog.mit.edu/mit/procedures/academic-performance-grades/#gradestex`

If you feel that any assignment has been graded incorrectly, you may submit a **regrade request** to the relevant assignment on Gradescope, within a regrade window after the assignment's grade has been released (typically about a week). For any regrade request, we reserve the right to regrade the **entire assignment**, and your grade may be adjusted **up or down** as a result of the regrade.

Problem Sets

Problem sets will be released roughly a week before they are due. Associated with each problem set, we will hold an optional worked problem session, covering a selection of problem-set problems from previous terms. As with lectures this term, these problem sessions will be prerecorded for OCW, and will be released by 4 p.m. on the day listed.

PS #	Problem Session	Release Date	Due Date	Topic
0		S 2/01	F 2/07	Prerequisite Evaluation
1	F 2/07	S 2/08	F 2/14	Asymptotics, Sequences
2	F 2/14	S 2/15	F 2/21	Sets, Sorting, Recurrences
3	F 2/21	S 2/22	F 2/28	Hashing, Linear Sorting
4	F 2/28	S 2/29	F 3/06	Binary Trees, Binary Heaps
5	F 3/20	S 3/28	U 4/05	Graph Traversal, Topological Sort
	F 4/03			
6	T 4/07	U 4/05	U 4/12	Weighted Shortest Paths
7	F 4/17	U 4/19	U 4/26	Dynamic Programming
8	T 4/28	U 4/26	F 5/01	More Dynamic Programming (shorter)

Each problem set will contain a theory portion and a coding portion. Each theory portion must be uploaded to Gradescope as a PDF file compiled from a provided LaTeX template. Each coding portion will be administered and automatically graded via our Code Checking website, and must be completed using Python 3. Problem set submissions are **due by 6 P.M.** on the posted due date.

Late submissions will be accepted up until 48 hours after the due date, also at 6 P.M.. Solutions will be posted shortly after the late submission window closes. We will not penalize your two highest scoring late submissions, but we will penalize any additional late submissions by 50%. In exceptional circumstances, problem set deadlines may be individually extended without penalty at the request of an Institute Dean. Please submit extension requests via the online extension form on `alg.mit.edu`. As every assignment contributes to learning, **no assignment may be dropped.**

Exams

There will be no official lecture on quiz days. A review will be given during the recitation preceding each quiz. Quizzes and the Final Exam will be given **online** via Gradescope. Each exam will be closed book, but you will be allowed to use some pre-prepared **double-sided notes**: one page for Quiz 1, two for Quiz 2, three for Quiz 3, and three for the Final Exam. **Attendance at the quizzes and the Final Exam is mandatory and may not be excused.** Because of various issues with administering an exam online, we will provide an online form where students can request:

- a makeup exam at a different time, and/or
- extended time in extenuating circumstances.

Please only make such requests via our online form.

Collaboration

The goal of the problem sets is for you to practice applying the course material. In this class, you are **encouraged** to collaborate on problem sets. Students who work together on problem sets generally do better on exams than students who work alone, but you will learn the material best if you **work on the problems FIRST on your own**. Some forms of collaboration are **not allowed**; some examples are listed below. Violating the collaboration policy to increase your score on a problem set is likely to lower your score on an exam, which carries significantly more weight. A violation may also lead to academic action and/or a significant penalty on your grade.

- Identify any **collaborators** or **outside sources** at the top of each LaTeX submission.
- Write code and theory problem solutions **by yourself** in your own words.
- Do **NOT** directly copy the work of others.
- Do **NOT** look at written solutions or code by other students before submitting your own solution. You may look at another student's code on their screen, only to help them debug, and only after you have submitted your own solution.
- Do **NOT** let other students see your written solutions.
- Do **NOT** send other students your code.
- You may ask TAs to help you debug your code during office hours or in a private Piazza post.

Syllabus

	Date	Lec	Topic		Date	Rec	PS Due
T	2/04	L01	Algorithms and Computation	W	2/05	R01	PS0
R	2/06	L02	Data Structures / Dynamic Arrays	F	2/07	R02	F 2/07
T	2/11	L03	Sets / Sorting	W	2/12	R03	PS1
R	2/13	L04	Direct Access & Hashing	F	2/14	R04	F 2/14
T	2/18		President's Day (Monday classes)	W	2/19		PS2
R	2/20	L05	Linear Sorting	F	2/21	R05	F 2/21
T	2/25	L06	Balanced Binary Trees	W	2/26	R06	PS3
R	2/27	L07	BSTs and Sequence Trees	F	2/28	R07	F 2/28
T	3/03	L08	Heaps / Priority Queues	W	3/04	R08	PS4
R	3/05	L09	Breadth-First Search	F	3/06	R09	F 3/06
T	3/10	L10	Depth-First Search	W	3/11	R10	
R	3/12	L11	Weighted Shortest Paths in DAG	F	3/13	R11	
T	3/17		Cancelled	W	3/18		
R	3/19			F	3/20		
T	3/23		Spring Break	W	3/24		
R	3/25			F	3/26		
T	3/31		**Quiz 1: L01 – L08**	W	4/01		PS5
R	4/02	L12	Bellman-Ford	F	4/03	R12	U 4/05
T	4/07	L13	Dijkstra	W	4/08	R13	PS6
R	4/09	L14	All-Pairs Shortest Paths	F	4/10	R14	U 4/12
T	4/14	L15	Dynamic Programming Intro	W	4/15	R15	
R	4/16	L16	Guessing Subproblems	F	4/17	R16	
T	4/21		**Quiz 2: L01 – L14**	W	4/22		PS7
R	4/23	L17	Subproblem Expansion	F	4/24	R17	U 4/26
T	4/28	L18	Subset Sum & Pseudo-polynomial	W	4/29	R18	PS8
R	4/30	L19	P, NP, Hardness, Completeness	F	5/01	R19	F 5/01
T	5/05	L20	Course Review	W	5/06	R20	
R	5/07		**Quiz 3: L01 – L18**	F	5/08		
T	5/12	L21	Algorithms: Next Steps	W	5/13		
W	5/20		**Final: L01 – L20**				